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Hardware and Software Selection for Library Automation

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Abstract: ***Information Technology have changed the role of the libraries in acquire, maintain and distribute the information to the users. Library Automation itself is an application of computers in libraries to maintain in-house operations such as acquisition, cataloguing serials control and circulation. Effective library automation depends on the selection of hardware, software & proper training to the library staff. It impacts the five laws of library science in providing right information to the right reader at right time. Selection of hardware & software is depends on the financial support from the management. The Open Source Initiative (OSI) is a good opportunity to select and implement open source library automation software without any financial commitment; it reduces the cost of the library automation.***

Keyword: OPAC, Automation, Modern Libraries, Computer Applications in Libraries.

1. Introduction

The Five laws of library science is a theory proposed by S. R. Ranganathan in 1931, detailing the principles of operating a library system. Many librarians worldwide accept them as the foundations of their philosophy. These laws are:

- Books are for use
- Every reader his or her book
- Every book its reader
- Save the time of the reader
- The library is a growing organism

By using the computer in libraries we can implement the Five laws effectively.

2. Definitions of Library Automation

The word “automation” has been derived from Greek word “automose”. It means which as power of spontaneous motion or self-movement. The term “automation” was first introduced by D.S. Harder in 1936. Various definitions of automation:

- According to Wikipedia, *Automation* or automatic control is the use of various control systems for operating equipment such as machinery, processes in factories, boilers and heat treating ovens, switching in telephone networks, steering and stabilization of ships, aircraft and other applications with minimal or reduced human intervention.
- According to Merriam-Webster online dictionary, automatically controlled operation of an apparatus, process, or system by mechanical or electronic devices that take the place of human labor.
- According to Encyclopedia of Library and Information Science, “automation is the technology concerned with the design and development of process and system that minimize the necessity of human intervention in operation”.

Knowledge is growing rapidly; libraries are procuring the large amount of various collections like books, periodicals, e-resources & non-book materials to fulfill the needs of the library users.

3. Objectives

Implementing library automation to prepare a database for library collections to proper organizing, retrieving the information & providing the information to the users within the time.

- To maintain bibliographic records of all the materials in a computerized form.
- To provide online catalogue to the users to access from their desk.
- To reduce the duplication of housekeeping operations.
- To prepare various types of reports / statistic within a short time.
- To maintain the circulation section effectively.
- To provide the speed, quality services to the users.
- To maintain various types of materials (books, non-book materials, serials etc.) available in library.
- To save the time of the users
- To reduce the duplication of work.
- To provide online catalogue
- To reduce the manpower
- To share the resources through library networking.
- To Increase the operational efficiencies of library staff
- To improve the quality, speed accuracy and effectiveness of services.
- To access other networks on the web.
- To facilitate wider access to information for users.

4. Essential Requirements for Library Automation

4.1 Hardware

Hardware is the primary requirement for library automation; different types of hardware are available in the market. A hardware specification depends on;

- Available budget.
- Size of the data to store.
- Usage load.
- Required speed.
- Features to upgrade when it required.
- Availability of servicing (maintenance).
- Compatible with operating system, what we are going to use.
- Warranty period.

4.2 Computer: Standalone, Server or On Cloud

Standalone system Specifications	IBM System x3100 M4 (Basic server form IBM) Specifications	On Cloud (Cloud server providers)
• i5 / i7 Processor INTEL • 8GB RAM • DVD Writer • 500 GB Hard Disk	• PN: 2582IKA • One Socket Tower • Intel Xeon E3- 1220v2 CPU (Quad Core) • 3.1. Ghz 8 MB Cache • 1600 MHz, 1x4GB Memory • 1x500 GB SATA 7200 RPM, 3.5" Simple Swap • MULTI BURNER, Integrated RAID 01 (SR C100)	• http://www.cloudoye.com • Http://azure.microsoft.com • http://iweb.com

Figure 1: Basic requirements of hardware

Cloud server price may be varying from provider to provider and mainly based on the following:

- Storage capacity
- RAM
- Operating system (Linux, Ubuntu, Windows)
- Supporting software's of library automation software.

4.3 Peripherals

a) **Keyboard & Mouse**
These are the common as minimum needs

b) **Printer**
Any laser printer to print circulation slips& other library use

c) Scanner
Basic model scanner is required to scan book cover images & library user photographs to upload into the library automation software.

d) **Barcode Printer**
Barcodes are required as per **Code 39**standard for books & user library cards.

- Required barcode printer to generate & to print.
- Numbers of open source barcode generators are available to generate required barcodes. Some are single barcode generators, some are multiple barcode generators. We can print the barcodes with normal laser printer to reduce the cost of the project.

Open source URL to generate multiple barcodes as **Code 39**standard:
http://openscience.in/koha/index1.html (Enter the required barcodes in each box)
http://openscience.in/koha/ (For printing continuous numbers)
We can generate the barcodes from Koha library automation software

4.4 Barcode Scanner

- Barcode scanner required for circulation & stock verification.
- Using barcode scanner we can come out from the wrong check outs and check ins.
- It saves the time, manpower & get the exact figures in stock verification by using barcode scanners.

4.5 Software

4.5.1 Operating System

Selection of operating system depends on

- Hardware compatibility
- Further supporting from operating system developers
- To be user friendly
- Upgrade facility (service packs)
- Library automation software
- Supporting software's for library automation software.

Operating System	Price Rs. (Approximate)
Linux	Free
Ubuntu	Free
Microsoft Windows 7	5,232.00
Microsoft Windows 8	7,124.00
Microsoft Windows Server 2012 Std	45,117.00
Windows Server 2012 Unleashed	3,500.00
Windows Server 2008 R2 Unleashed	3,389.00

Figure 2: Operating systems

5. Library Automation System

Various commercial and open source library automation software is available. Criteria for Library automation software selection.

- Vision or objectives of library automation.
- Who has developed the software? Whether company, institute or an individual?
- Availability of revisions time period
- Available modules
- Capacity to facilitate no of bibliographic records.

- Compatible Z39.50 to retrieve & import data from other databases.
- Compatible with MARC 21 to import or export MARC records.
- Whether the software has the facility to import bibliographic data available in ISO 2709 format and at the same time export data in this format.
- User friendly for customization.
- Facility to customize biblio frame work.
- Menu driven to easy access.
- Whether it can be interfaced with email system.
- No of users using the software.
- Easy upgrade facility with new versions.
- Support from developers
- Availability of customizable OPAC
- Cost of the software.

There are different types of library automation software available commercially & open source.

Sl. No.	Core services	Alice	Libsys	New Genlib	Soul	VTLS	Libsuite	Koha
1	Acquisition	1	1	1	1	1	1	1
2	Cataloguing	1	1	1	1	1	1	1
3	Circulation	1	1	1	1	1	1	1
4	Web/OPAC	1	1	1	1	1	1	1
5	Serials	1	1	1	1	1	1	1
6	Biblio format	1	1	1	1	1	1	1
7	Data exchange	1	1	1	1	1	1	1
10	Standards	1	1	1	1	1	1	1
11	Community information	0	0	1	0	1	0	1
11	Cost (Approx.)	3.5 Lakh	4.5 Lakh	Open Source	50000	8 Lakh	4.5 Lakh	Open Source

Figure 3: Features of few library automation software

6. Networking

Networking is required to interconnect the computers, computer peripherals, switches to share the information. The intension of the network is to distribute information among the interconnected users. The network mainly consist of three components i.e. transmission media, mechanism of control and interface unit to the network. Type of network is depends on requirement of the users or objective of the organization to provide the database access to the users. Local Area Network (LAN) is useful to access the library database within the organization.

Figure 4: Local Area Network

Wide Area Network (WAN) is required to provide the access facility to outside of the organization.

Figure 5: Wide Area Network

Cloud Network when we use the database on cloud:

Figure 6: Cloud Network

7. Budget

Budget approval to be taken from the management by submitting the library automation project proposal. Allocation of budget will play a key role in library automation project in procuring the hardware, software, library automation software & other computer peripherals. Based on budget availability we will choose the system configuration. i.e. Standalone / IBM server / Cloud server.

7.1 Training

Onsite hands-on training is required to library staff members in using each and every module of the library automation software. Training sessions to be conducted in regular intervals & whenever library automation software is updated.

7.2 Areas of Automation

- Acquisition system
- Cataloguing system
- Serials management system
- Circulation
- Members management
- Reports

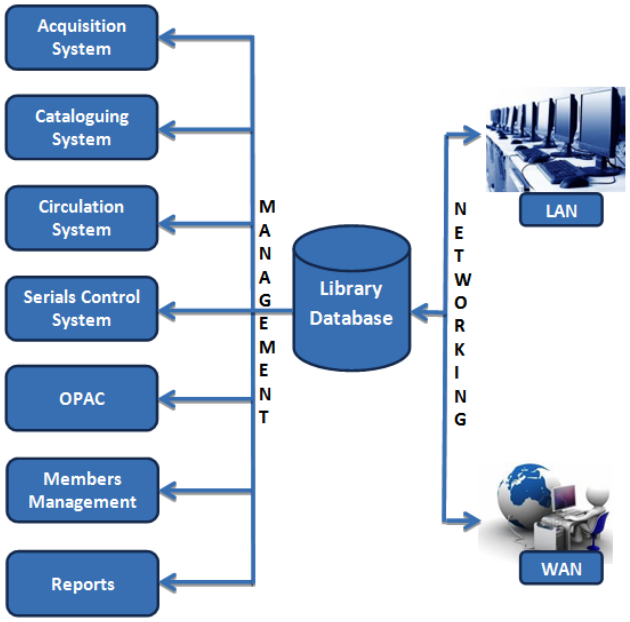

Figure 7: Structure of library automation system

7.3 Acquisition System

Acquisition is one of the important functions of any library. The goal of the library is to satisfy the users. The users of the library will be satisfied only if the library acquires reading materials based on the user's demands.

Acquisition module will be used in two ways i.e.

a) Normal: it is budget based acquisition by allocating the budget & register suppliers to procure the reading materials.
b) Simple: Simple bibliographic-data acquisitions

7.4 Objectives of an Automated Acquisition System

- To reduce the manual work in acquiring the books.
- Updating ordered list with received books list without any manual mistakes.
- More effective and efficient handling of claims and cancellations.
- More accurate and timely financial data recording, accounting and reporting.
- Improved ability to track orders, receipts, invoice and claims.
- Integration of acquisition with cataloguing and serial control for more effective bibliographic holdings.
- To provide necessary management information reports.
- Improved services to the users through faster, timelier processing of order sand receipts

7.5 Cataloguing System

Cataloguing of library materials may do in three ways:

a) Simple data entry
b) By converting available items data in to MARC format to import directly to the database.
MARC Edit: Library of Congress developed and providing it freely to download to create marc records or edit marc records.
c) By using Z39.50 to retrieving the required records data from other library databases.

We can download the MARC records from the Library of Congress, WorldCat etc. by using Z39.50. The library catalogue is considered as a mirror of the library because it reflects the collection of the library. The library catalogue is considered as a mirror of the library because it reflects the collection of the library. Automation of cataloguing will reduce the duplication work. Catalogue is made available in a network environment through LAN, WAN. Many users can access the database at same time through OPAC.

OPAC is a catalogue, which is available for searching online. Such OPAC may be searched from a terminal within the library or at a terminal elsewhere in the organization remotely.

Telecommunication networks: Today majority of the software's which are used for automation in libraries provide a separate module of OPAC. With the latest developments in integrated systems the OPAC is connected to the circulation system so that the used can come to know whether the document he/she is looking for is currently available in the library or on loan. OPAC also promotes resource sharing program and bibliographic search can be done by author, title, accession number, ISBN, Keywords etc. Search in OPAC is by using Boolean logic or by truncation.

7.6 Serials Management System

Serials are published in different intervals with regular or irregularly. Subscriptions maintenance is easy with library automation software.

- To maintain up to date database of received periodicals.
- Easy to know & send reminders to the suppliers for non-receipt of periodicals.
- Renewing the subscribed periodicals before its subscription expiry.
- Routing of periodicals.
- Users can search the OPAC to know the status of current periodicals availability in library.
- Maintaining binding journals details.

8. Circulation System

The main component of a circulation control system is the transaction of documents i.e. issue and return of documents. This database contains bibliographic details of the documents which provide information on titles, authors and publishing details, which are used in notifying the users about the overdue. Circulation involves the charging and discharging of library materials, reservations, statistics, sending of reminders for the over-due material, etc.

8.1 Features of Automated Circulation System

- To know the status of the items.
- Identification of items on loan to a particular borrower.
- Maintaining the reservations& to send available information to users when it returned by the other users.
- Sending circulation alerts i.e. check out & check in.
- Sending system generated reminders to overdue items.
- Printing recall notices for items on long term loan.
- Renewal of loans.
- Notification to library staff of overdue items and printing of overdue notices.
- Calculation of fines.
- Issuing no due certificates.

8.2 Members Management

- Easy to maintain users registration with their date of joining and period of membership expiry.
- Providing restrict the borrowing limit to the user groups.
- Predefine the expiry date to a particular user or user groups.
- Provision to provide the login access with user ID & password to know their account from OPAC page.

8.3 Reports

We can generate the reports for:

- Accession list.
- Item wise stock list.
- Day wise check out items list
- Day wise check in items list
- Overdue list day wise, or for particular period.
- Not borrowed users list.
- Total borrowers list.
- Most issued items.
- Most borrowed user.
- Not circulated items list.
- Reserved items list.
- Without subject items list.
- Subject wise list.

8.4 OPAC

Users can access the OPAC by using local host / system IP within the LAN. If provided public IP, it can be accessible outside the organization. User manual to be provided to the users as soft copy or hard copy. With the OPAC home page, users can do the following things:

- Search the catalogue for new arrivals.
- Search within the selected item type.
- Suggest a book for procurement.
- Reserve an item.
- Know the status of an item.
- Reading history of their account at library.
- Prepare a selected reading list.

Proper training is required to the users to use OPAC effectively.

9. Conclusion

Selection of hardware and software will play a vital role in library automation; it depends on financial assistance from the management. After initiation of open source movement cost of the library automation become nearer. User forums are available to discuss and share their experiences to resolve the problems. There no need an annual maintenance to maintain open source library automation software. Library automation is the only solution to acquire, maintain and discriminate the resources effectively. Proper training, brainstorming secessions are required for library staff members and conducting user education is necessary to use the library automation database effectively.

References

[1] Kent, Allen, (1997).Encyclopedia of Library and Information Science. New York: Marcel Dekkar.
[2] Riaz, Muhammad, (1992). Library Automation. Atlantic Publisher and Distributors Ltd.
[3] Rao, Ravichandra I.K., (1986). Design and Development of Library Automation: function, file, requirement and procedure. In s. Parthasarathy (Ed), Computer Application to library Information Retrieval and networking, 20-28.
[4] Mukhopadhyay, Parthasarathi. (2008). Library Automation through Koha.Prova Prakshani.
[5] Breeding, Marshall. (2009). The Viability of Open Source ILS, Bulletin of the American Society for Information Science and Technology – December / January 2009 – Volume 35, Number 2.
[6] Yogendra Singh. (2004). Library Automation in Academic Libraries in India: Problems and Prospects, Caliber 2003.