

Impact of RFID Technology in Libraries

Gopal Prasad Dixit
Research Scholar,
Bharathiar University, Coimbatore.

Abstract

Librarians are always known as early adopters of technology, as seen in case of Computer and later in case of Bar-codes. Later have seen standards like MARC and OCLC becoming popular among libraries for sharing bibliographic information with other libraries. In last decade have seen various library automation software's being emerging as next wave of automation in libraries. To automate the counter activities, they gave us bar-codes. Bar-codes have served the librarians and libraries for a long time, and now it is slowly getting replaced by RFID technology. This paper discusses the impact of RFID technology, implementation methodologies, advantages and disadvantages in Libraries.

Keywords: RFID, automation, technology, barcode, computer, software, MARC

1. Introduction

Computers are being used increasingly to automate various activities in libraries with a suitable off-the-shelf general or specific-purpose software package that are now available in a wide range. RFID technology is currently widely accepted by various LIS software using number of protocols. The concept of RFID can be simplified to that of an electronic barcode and can be used to identify, track, sort or detect library holdings at the circulation desk and in the daily stock maintenance. This system, consist of smart RFID labels, hardware and software which enables libraries with more smart and secure way of managing their library collections to provide effective customer service to their users. A RFID system for library environment consists of:

- ✓ Tags
- ✓ Readers
- ✓ Middleware
- ✓ Host Computer
- ✓ Application Software (ILS)

Libraries are using cutting edge item level RFID technology in a closed loop system. Today, more and more libraries are adopting RFID as it streamlines workflow in the area of self service, book returns, shelf management and inventory. The potential benefits of using RFID in libraries from the perspective of its main stake holders- the organization; library staff and its patrons shall be highlighted. The paper discusses underline NCIP standards development, practical issues related to RFID working in a library environment and touch upon basic RFID issues concerning equipment maintenance & support; software compatibility; privacy and standardization. Real potential of RFID as a cross-institution platform for identification will be limited by use of proprietary RFID systems and hence recommends system integrators, vendors and libraries to adopt standards & follow best practices guidelines issued by NISO for use of RFID in Libraries.

2. RFID in Libraries

Today patrons can visit library's catalogue any time they wish to with use of library's website. Library communities have always shown eagerness in experimenting new technology and have improved patron services today as a result of those efforts. RFID Technology is going to be next wave to automation in Library industry.

RFID plays vital role in redefining the library process to make everyone's job easier right from patron to library staff. RFID gives a platform to automate most of the process performed by the library

staff like check in – check out, sorting, stock management and inventory. Library staff whose job is meant to be helping patron, use library resources at the fullest, is always busy handling the books. RFID helps to automate this process and provides them an opportunity to better utilize their time in serving patrons.

3. BENEFITS OF RFID TECHNOLOGY IN LIBRARY

1. RFID tags replace both the EM security strips and Barcode.
2. Simplify patron self check-out / check-in.
3. Ability to handle material without exception for video and audio tapes.
4. Radio Frequency anti -theft detection is innovative and safe.
5. High-speed inventory and gives information of items which are out of proper order.
6. Long-term development guarantee when using Open Standard.

4. Overview

- Efficient Book circulation management.
- Automatic Check-in and Check-out.
- Library inventory tracking in minutes instead of hours.
- Multiple books can be read simultaneously.
- Unique ID of the RFID tag prevents counterfeiting.
- Automated material handling using conveyor & sorting systems.
- Facilitate inter library & intra-library borrowing

Let us know have look at the benefits in more details by categorizing the benefits for each identity which is connected to Library industry.

5. Advantages of RFID in Libraries:

The use of RFID technology in library reduce the time required to perform the various task at circulation counter. The RFID tags provide

- RFID technology is more secure and better than bar codes.
therefore, it increases the security of the product.
- High reliability
- Rapid charging/discharging:
- Simplified patron self-charging/discharging Improved Production planning
- Ability to manage the expenses over a number of years
- Self charging discharging
- Reliability
- Longitivity of Tag life
- Faster Circulation
- Automated materials handling
- Easy stock verification
- Theft reduction

- High level of security
- Mis-shelve easy identification
- External Book Return
- Improved tracking of high value items
- Reduce Shrinkage errors
- Automated issue/return
- Automated sorting of books on return

6. Disadvantages of RFID in Libraries:

High Cost

Removal of exposed tags

Frequency Block

Chances of removal of exposed tags exit gate sensor problems

RFID tags are usually larger than barcode labels

Interoperability

Limited OS Support

7. Benefits with Staff

Less time needed for circulation operations

Implementing RFID will considerably reduce the amount of time required to issue, receive, transport, sort & shelve library materials

Efficient Inventory management

Inventory management can be done using a handheld reader without closing the library and is at least 20 times faster compared to existing barcode based system

Reducing Repetitive Stress Injuries (RSI)

RFID based system reduces repetitive scanning of individual items at the circulation desk during check in, check out and hence avoids RSI such as carpal tunnel syndrome

Taking inventory in a RFID based system doesn't require physical de-shelving & shelving of library materials

8. Benefits with Patrons

- i. Patrons will spend less time waiting in check-out lines by using Self Check in - Check out systems
- ii. Patrons find what they are looking for quickly & easily
- iii. Reminders for due dates allows patrons to submit borrowed materials in time
- iv. Use of book drops & return chutes for returning library material, allows for flexible timings

- v. RFID enabled patron cards allows for easy patron identification & reduces errors
- vi. Self service enhances patron privacy
- vii. Improved patron services even when libraries are facing staff shortage

9. RFID Standards in Library

This is an exciting time in the evolution of RFID (radio frequency identification) technology for libraries. National and international committees will soon finalize a number of important standards that have been under development for several years. These new standards will improve the interoperability and flexibility of library RFID systems and make the technology even more valuable.

ISO 180003- Mode 1 is a ISO standard for parameters for air interface communications at 13.56 MHz (High Frequency), based on which RFID hardware is being developed for usage in Library. The standard defines communication parameters on which the tag and reader communicates with each other.

ISO 28560-1/2/3 is a set of Information and documentation — Data model for use of radio frequency identifier (RFID) in libraries. The standard is under development stage at ISO and is planned to release in 2010. The standard is based on NISO committee's recommendation document "RFID in US Libraries". It will be defining various aspects of usage of RFID in libraries right from RFID hardware selection to placement of RFID tags and information to be written inside the tag

SIP2 Protocol is a communication protocol that provides a standard interface between a library's integrated library system (ILS) and library automation devices (e.g., check-out devices, check in devices, etc.). The protocol can be used by any application that has a need to retrieve information from an ILS or process circulation transactions via the ILS. There are two versions of SIP, version 1.0 and 2.0. SIP2 is based on a proprietary protocol, but has been opened for use by all parties providing systems for library circulation

10. NISO RECOMMENDATIONS

- In Libraries, 13.56MHz High Frequency tags should be used
- RFID tags for library use should be passive
- The typical read range of tags for library applications should not be increased substantially beyond the present range of 8-20 inches for smaller tags in future
- Only tags including standardized AFI feature should be used in libraries
- The system will cause no interference with other applications
- The system will utilize ISO/IEC 18000-3 Mode 1 tags programmed so that they should
- work for identification of items in other libraries
- The system will use tags that will not interfere with the operation of security systems in other libraries
- Security implementations for RFID in libraries should not lock a compliant system into any one security possibility (EAS, AFI, Virtual deactivation), but rather leave security as a place for differentiation between vendors

RFID tags should be reprogrammable for migration purposes. Data on RFID tags should be encoded according to the recommended data model, using encoding described in ISO/IEC 15962 & using relative object IDs specified in anticipated standard ISO/NP 28560 for RFID in Libraries

11. RFID Implementation in Libraries

Phase wise Planning for deployment of complete solution Estimated timeline for tagging 4 Lakhs (four lac) terms

Procurement of Hardware: Sourcing of RFID hardware i.e. Readers, Tags & Antenna needs to be done before

starting anything else. Once the hardware specification and respective products are finalized specific read regions can be decided and implantation can be done.

Tagging books: Each and every book needs to be tagged. The process needs 2-3 people continuously sticking tags to specific area of the book as decided earlier from the findings during the pilot test.

Integrating Middleware: Integrating middleware with the present library software systems and testing the results for improvements and errors.

Performing Test Cases: Predefined set of test cases will be performed in scenario based format to check out unit level and system level performance for accuracy and greater throughput.

Training Staff: This part of the implementation will include training staff on various aspects of RFID Technology and the new system in place. There will a demo which will include all the process in the system.

Process Improvement: The errors and improvements found out from the test cases will be revisited to make system perform in better way.

12. RFID in Libraries

- a. Indian libraries are geared up for Automation today with support from Govt, NKC & organizations like INFLIBNET, DELNET etc
- b. Hardly 20% of the libraries are using automation technology. So huge opportunity available for implementing
- c. Library veterans feel library automation is a must for a knowledge driven economy like India.
- d. ILS automation software's & technologies such as RFID will allow uniform resource sharing amongst University libraries
- e. Real potential of RFID as a cross-institution platform for identification will be limited by use of proprietary standards & RFID tags should be installed at the earliest point in the life cycle of the book
- f. Large University libraries should go for automation with RFID as this will allow efficient circulation of library items to large number of patrons visiting this libraries should be promoted as an environment for serious learning (Information centres, facilities, ambience etc.)
- g. A mechanism to rank the libraries on basis of collection, services, use of technology
- h. Library Automation will also help in building a National Union Catalog similar to LOC

Conclusion

RFID technology is not only emerging but also more effective, convenient and cost efficient technology in library security. This technology has slowly begun to replace the traditional bar-code on library items. RFID (Radio Frequency Identification) is the latest technology to be used in library theft detection systems. RFID Library Security systems provide in terms of circulation, security, inventory, and other areas of library workflow. The RFID tag found on library materials. "RFID is increasing in popularity among libraries, as the early adopters of this technology have shown that, it makes good economic sense, both for large and small libraries."

References

1. Dave Brich at Consultant Hyperion.URL:www.chyp.com as visited on 1-2-2005. As quoted in "News Comment – Contact less crazy" in Journal: Card Technology; pub by Elsevier. p2, February 2005.

2. Ayre, L.B. The Galecia Group Position paper: RFID and libraries. Retrieved March 17, 2010(<http://www.galecia.com/weblog/mt/arcieves/cat.rfidandwireless.php>)
3. Lindquist, M.G. RFID in libraries-Introduction to the issues. In world library and information congress paper presented at 69th IFLA general conference and council. Berlin. 1-9 August 2003 available <http://ifla.queenslibrary.org/IV/ifla69/papers>
4. Syed, S., 2005 Use of RFID Technology in libraries : a new approach to circulation, tracking, inventorying and security of library materials. *Library Philosophy and Practice*. 8(1), 15-21
5. "RFID for Libraries" as viewed on 01-03-2005 at URL: <http://www.biblio-tech.com/html/rfid.htm>
6. Makori, Elisha Ondieki, (2013) "Adoption of radio frequency identification technology in university libraries: A Kenyan perspective", *The Electronic Library*, Vol. 31 Iss: 2, pp.208 - 216
7. Hsu, Chien-Chang and Yuan Pang-Chi (2011) The design and implementation of an intelligent deployment system for RFID readers, *Expert Systems with Applications*, Volume 38, Issue 8, August 2011, Pages 10506-10517
8. Yu Shien-Chiang, (2007) "RFID implementation and benefits in libraries", *The Electronic Library*, Vol. 25 Iss: 1, pp.54 - 64
9. Kapoor Kawal et al (2014) "RFID integrated systems in libraries: extending TAM model for empirically examining the use", *Journal of Enterprise Information Management*, Vol.27 Iss: 6, pp.731 - 758
10. Yu, Shien-Chiang (2008) "Implementation of an innovative RFID application in libraries", *Library Hi Tech*, Vol. 26 Iss: 3, pp.398 - 410