Multiple Reader Interoperability with SIP2 based LMS

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**ABSTRACT: LMSs have been traditionally used for Automated Library Management. In recent years there has been ample progress in the way LMS have been used to increase the efficiency of the Libraries bringing in high factor of operational efficiency by saving Inventory time and helping in theft detection and pilferage.
There have been several debates on utilisation of modern ILS /LMS software of which KOHA[1] is a more widely used &internationally acclaimed open source tool. However there are serious limitation to users when they integrate different multiple Readers to LMS which specify SIP2[2] standard of data exchange with terminal equipment like RFID readers, Barcode readers etc. However not all LMS follow this standard and instead send data in a specific format as dictated by their native protocols or other industry standard protocols.
To overcome the limitation, this paper discusses a methodology where, multiple Readers can be integrated to SIP2 based LMS/ILS irrespective of their native data exchange. This is achieved by writing a Modulator to adapt Reader independent data exchange with SIP2 based LMS. RFID /Barcode/NFC vendors don't have to write proprietary extensions with every LMS /ILS to differentiate themselves. A sample case is discussed here with integration to KOHA as an example.**

Keywords: SIP2, RFID, LMS, ILS,BLCF

INTRODUCTION

While implementation of new standards, interoperability and the migration to new standards from existing ones will continue, there is always an emergent need to support existing implementation in libraries. There are many open source LMS in use in libraries besides adaptations of open source and proprietary implementations as well. Most of them allow Reader integration (NFC, RFID etc). Since most of the LMS follow SIP2 there was a need to modulate data exchange from different readers to match SIP2 for seamless data communication between the reader and the LMS.

Many Vendors have implemented methods to adapt their Readers to SIP2 LMS however they have not toyed with the idea of opening up the LMS to adapt multiple readers which gives the flexibility to the libraries to choose the Reader Hardware thus eliminating the inherent hardware locks that the vendors create.

The current paper discusses a successful method of opening up the SIP2 LMS integration to multiple readers thus making any SIP2 based LMS, reader agnostic.

**Proprietary implementation:**
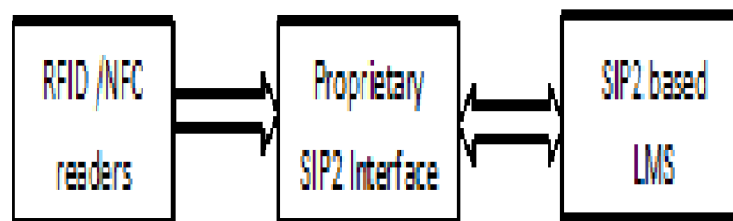
RFID readers have the capability of bulk read but due to the limitation of SIP2 the data exchange happens just like it was meant for a barcode scan, one at a time. There are standards recommended by BIC called the BLCF which overcomes this limitation by prescribing a new set of data standards where it has provided the data definition but has left the data exchange format to the providers of RFID readers (primarily for multi-processing of data)

As already stated there are several implementations of open source and proprietary LMS which follow SIP2. However their need to become reader agnostic has not been met for a long time now. The implementation below successfully demonstrates this with an open source LMS (KOHA).
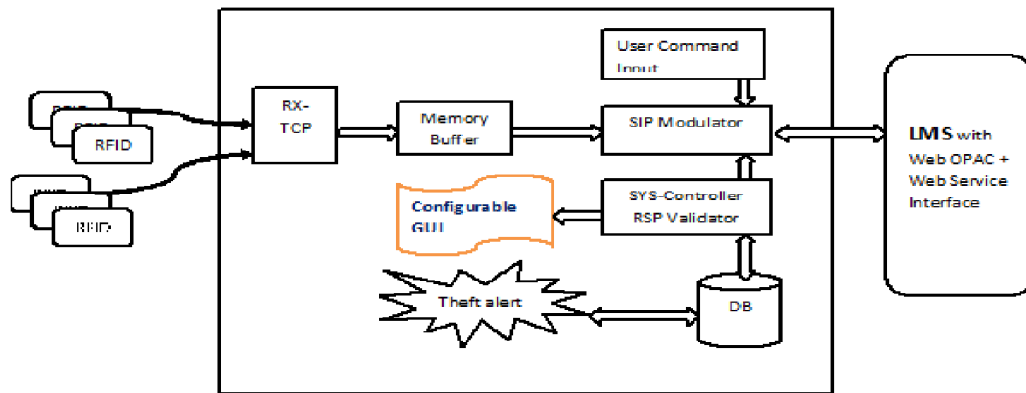
New Vendor independent adaptation of Readers to LMS:
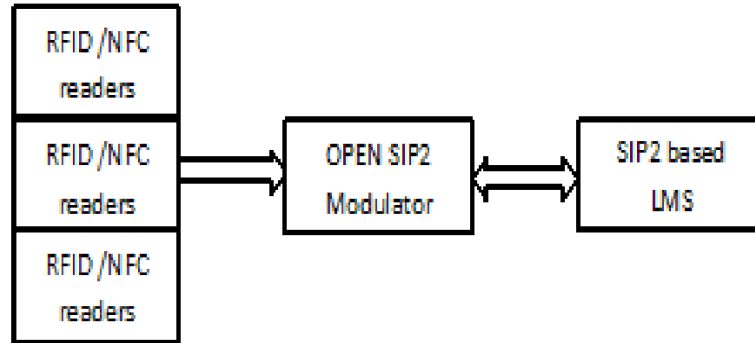
The SIP2 modulator is the central engine which enables the interoperability of the LMS with multiple readers giving the librarians a choice of readers at their disposal and become vendor agnostic thereby driving the costs downwards and extending themselves to better technologies.

Modulator overview:

OVERVIEW OF THE BLOCK DIAGRAM

1) **RFID READER**

The system gives vendor agnostic choice of RFID reader, where one can connect any RFID reader to the system.

The readers are used to detect the RFID tags and send the required information to the LMS.

2) **COMMUNICATION MEDIUM**

Socket (TCP/UDP) communication method is used to establish the communication between RFID readers and SIP2 management systems.

3) **TCP RX**

Receives the tag information data from the reader systems and stores for processing. In this stage memory buffers are used for queuing the incoming frames from several RFID Readers

4) **USER COMMAND INPUT**

This input will be received from User of self-check in /checkout systems to do specific activity like login, checkout/checkin/renew books etc

5) **SIP2 Modulator**

The SIP2 Protocol is widely accepted international standard for RFID based Library management system.

This block code converts incoming RFID reader data to the SIP2 protocol format data for the LMS systems to carryout user defined activity.

6) **SYS CONTROLLER & RSP VALIDATOR**

The system controller and response validator system receives &validates the response from the SIP2 demodulator & controlling unit for each & every single activity done from the user end.

According to the response validation results it controls the RFID systems & security alert systems.

7) **DB**

The database is used for storing the transaction status of the each Library Inventory, user authorisation information, reader information, security alerts information, and many other critical information related to the system.

8) **Theft /Security alert System**

Used to detect books which doesn't have authorised access to take outside the premises. These books are the ones which have not been checked out and hence the tags will be read at the theft gate and reported as theft /pilferage.

9) **WEB SERVER/WEB SERVICE/LMS WITH OPAC**

This block gives access to the koha LMS system, online public Access for the library, web services for the inventory management.

The overall system provides a significant freedom for librarians to select the RFID readers of their choice keeping in view the technology plus points and costing. This also opens up competition among LMS vendors to open up their proprietary implementations and be ready to adapt to any RFID readers to extend the benefit of technology & cost to customers (both librarians and the library patrons).

IMPROVEMENTS

The modulator can also be extended to have multiple standards thereby making the LMS switch to different standards depending on the different standards that the LMS might follow in an ecosystem where multiple different LMS are interconnected such as in inter library transfers etc.

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