

RFID

Considerations for Implementation

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Overview

- RFID
- RFID Components
- Considerations
 - Cost
 - Time
 - Technical
 - Security
 - Consortium
 - Education
- Questions

RFID

- RFID = Radio Frequency Identification
- Radio frequency communication is used to track physical items through a uniquely identifiable tag containing an internal computer chip and antenna to store and transmit data.
- Unlike barcodes, multiple tags can be distinguished and read simultaneously, data can be stored directly within the tag, line of sight is not required, and data can be read from varying distances, allowing locations to be tracked with fair precision.

RFID

- First recorded mention occurred in 1948, in a paper by Harry Stockman called *Communications by means of reflected power*.
- Used during World War II in the founding of the “Identification—Friend or Foe?” (IFF) systems to differentiate enemy and friendly aircraft.
- Used today for a variety of applications, such as tracking livestock, triggering equipment, tracking inventory, providing security access and payment systems.

RFID

- First proposed use in libraries occurred in 1998—the next year, the library of Rockefeller University in New York became the first library to implement an RFID system.
- The Farmington Community Library in Michigan became the first public library to do so that same year.
- Current figures estimate that <10% of American libraries use RFID
- Rate of adoption is increasing, however: the number of libraries across the globe using RFID jumped from 600 to 900 between 2007 and 2009, reaching a total number of ~3000 libraries by 2012.

RFID Components

RFID Tags

- All include an on-board, engraved antenna and a microchip (with at least 64 bits of capacity) and UID (unique identifier).
- 3 Main Categories:
 - Passive (category most libraries use)
 - Active
 - Semi-passive
- Main Formats:
 - WORM (“write once, read many times”)
 - Read
 - Read/Write
- Other potential features include:
 - Varying degrees of sturdiness
 - Specialized tags for media items
 - Security features
 - Anti-collision functionality (for simultaneous reading of multiple items)

RFID Components (contd)

- **Antennae**
 - Transmits the radio waves that activate the RFID tags and receive the returning information.
 - Built into circulation machines, writing machines, portable readers, built-in shelf readers, security gates, any other equipment which reads tag data.
 - Libraries tend to use both medium and long-range antennae depending upon needs and security.
- **Tag Writer**
 - Also called a tag programming station, it writes coded data to tags.
 - Links existent records with the tag UID
- **Server**
 - Performs as a conduit for all other components to communicate with the ILS and link all tags with item records.

RFID Components (contd)

- **Tag Readers**
 - Also called a transceiver, it typically contains a transmitter, antenna, decoder and is used to recognize and retrieve data from RFID tags.
 - Average time required to read a single passive tag is <100ms and generally capable of reading multiple simultaneously
 - Comes in a variety of forms throughout the overall RFID system:
 - Circulation machines (both staff-assisted and self-serve)
 - Hand-held reading devices
 - Built-in shelf readers
 - Security gates
 - Automated check-in machine (and sorter, depending on vendor)

Considerations

- Cost
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Cost Considerations

- Though more affordable than ever, cost remains the main deterrent for libraries considering RFID.
- Minimal costs:
 - RFID tags
 - Writing stations
 - Circulation stations
 - Associated software
 - Potential server upgrade
 - Vendor services
 - Cost of staff hours to complete project

Cost Considerations (contd.)

- This excludes the functionality that draws many to RFID, much of which is particularly expensive.
- Potential Costs (will vary):

▫ Portable Reader	= \$5-10k
▫ Single-width Security Gate	= >\$10k
▫ Automated Check-in/Sorter	=>\$100k
- Ensure that you receive pricing on all pieces of RFID technology that you are considering from all potential vendors as prices may vary significantly. Don't forget to check for costs associated with services as well, such as installation, technical support, etc.

Cost Considerations (contd.)

- Tag costs must include:
 - Enough tags for current holdings (plus room for error)
 - Tags/tagging for future materials in perpetuity
 - Consider library purchasing trends and material types in calculating all tag costs since specialized tags for media, such as discs, will be more expensive.
 - The tagging project in general will constitute costs in terms of vendor services or cost of staff hours, which should be calculated.

Cost Considerations (contd.)

- Libraries will likely need to provide an argument for ROI (return-on-investment) in the face of these not insignificant costs.
- Be aware that, for most, payoff will require many years, but this will vary widely for each library based on factors such as loss prevention, workflow streamlining, injury reduction, and many other factors.

Time Considerations

- Tagging current materials is a significant project both in terms of staff hours and disruption of library workflow regardless of whether tagging is performed in-house or by a vendor.
- Two main options:
 - Shut down library for duration of tagging project
 - Keep library open and risk disruption

Time Considerations (contd.)

- **OPTION 1: Closing the Library**
 - May not be feasible for some (especially if holdings are extensive)
 - Risk not finishing within set time period if complications arise
 - If in-house, staff can devote their time to project, speeding the process
 - If hiring a vendor, they may require the closure
 - Minimal workflow disruption, but does disrupt patron access

Time Considerations (contd.)

- **OPTION 2: Keeping the Library Open**
 - Collection can be pulled in stages to minimize disruption to patrons
 - Significant disruption to workflow is likely, particularly if staff must spend time tagging
 - Temporary staff may need to be hired as a supplement depending on deadline

Time Considerations (contd.)

- Careful planning will be required to account for library workflow, patron needs, time required to complete tagging.
- Any items not present at time of project will still require tagging.
- **Additional time commitments:**
 - Checking for and dealing with mistakes in tagging
 - Installation of actual technology
 - Testing system
 - Training staff before final implementation

Technical Considerations

- As regards vendor choice, be sure to research:
 - Vendor involvement in installation
 - Vendor requirements from IT department
 - Level of technical support provided by vendor (for how long, how timely and how costly?)
- Evaluate current technology
 - Is current server adequate?
 - Can the current ILS interface with particular RFID system?
 - Will any supplemental hardware or software be required?

Security Considerations

- Before choosing an RFID vendor, ensure that their systems are compliant with ISO standards.
- Potential security concerns related to patron privacy:
 - **Tracking** – Uses location tracking features to, by extension, track an individual patron
 - **Hotlisting** – Entails tracking lists of item tag numbers with the potential to track an individual's reading habits
- Protective measures (such as short-range tags or encryption), along with a full security policy, should be put together before implementation.

Consortium Considerations

- How many branches will be undergoing transition?
- Order of implementation:
 - All at once?
 - Staged?
 - Only one branch?
 - Each branch as ready?
 - Tag at different times, but begin use all together?
- What level of functionality will each branch receive?
- What level of funding?
(both initially and moving forward)

Consortium Considerations (contd.)

- Risks if not all branches transition together:
 - Items sent from a non-RFID branch to an RFID branch will require either a tag or different circulation process, negating streamlining due to RFID
 - Untagged holdings won't set off security gates
 - Extra complications to circulation and lack of security greatly increase risk of inventory loss due to theft and negligence
 - If choosing to tag ILL items, whose responsibility for time and cost: home library or destination library?

Education Considerations

Staff Training:

- Initial priority should be on IT and technical services (also, anyone involved in the tagging project).
- All staff must understand and be able to perform necessary functions for their work (including basic troubleshooting).
- Vendors will typically provide some level of training, but staff should practice using new system until comfortable.
- Check whether vendor provides a safe sandbox or training mode. If not, consider creating dummy records and accounts to play with.

Education Considerations (contd.)

Patron Training

- Plan out training in advance (brochures, videos, signage)
- Teach at the circulation desk
- Monitor initial patron system usage (self-checkout) during initial transition period
 - NOTE: Consider assigning a staff member to watch stations or check receipts as patrons leave to ensure items have been properly checked out during first weeks of transition to minimize loss

Questions?

