

RADIO FREQUENCY IDENTIFICATION (RFID) FOR LIBRARY TRACKING

RFID-enabled systems have moved beyond security to become tracking and management systems that combine security with more efficient tracking of materials throughout the library, including easier and faster charge and discharge, inventorying, and materials handling.

The tags affixed to library materials are read using RFID technology regardless of item orientation or alignment (i.e., the technology does not require line-of-sight or a fixed plane to read tags as do traditional theft detection systems) and distance from the item is not a critical factor except in the case of extra-wide exit gates. The corridors at the building exit(s) can be as wide as four to 6 feet with two parallel exit sensors, which will sense any unauthorised book being taken out of the library without register it with the librarian or the personnel in charge.

WHY RFID FOR LIBRARIES

- RFID tags replace both the EM security strips and Barcode on the books
- Simplifies patron self check-out/check-in.
- Ability to handle all library assets including documents, video and audio tapes.
- RFID anti-theft detection is innovative and safe.
- High-speed inventory and identify items which are out of proper order.
- Long-term development and support assurance when using Open Standards such as EPC Gen 2 UHF tags.

Implementation of an RFID system is not a simple process. It is a complex web of technology, equipment and software that has to be fitted to each library's needs.

BENEFITS OF RFID FOR LIBRARIES

Rapid Locate

Fast and flexible locating increases productivity of staff and enhances the customer experience. UHF RFID tags to track the location of each book on the shelf, and items can be classified by genre, author,subject, or other characteristics much like you see to today's bookstores. The middleware that runs system can integrate with a library's ILS (Integrated Library System), allowing customers to search for books and identify which shelf in the library they are on, even if they are misplaced in a different section.

Rapid Check-In/Check-Out

The use of RFID reduces the amount of time required to perform circulation operations. The most significant time savings are attributable to the anti-collision RF algorithm that allows many tags to be read simultaneously with excellent accuracy.

The other time savings realized by circulation staff are enhanced if the RFID tags replace both the EM security strips or RF tags of older theft detection systems and the barcodes of the automated library system .There can be as much as a 50 percent increase in throughput.

For library patrons using self-check-out, there is a marked improvement because they do not have to carefully place materials within a designated template and they can check-out multiple items simultaneously. Staff is relieved further when readers are installed in book-drops.

High reliability

The readers are highly reliable. RFID library systems claim an almost 100 percent detection rate using RFID tags.

High-speed inventory

A unique advantage of RFID systems is their ability to scan books on the shelves without tipping them out or removing them. A hand-held inventory reader can be moved rapidly across a shelf of books to read all of the unique identification information. Using wireless technology, it is possible not only to update the inventory, but also to identify items which are out of proper order.

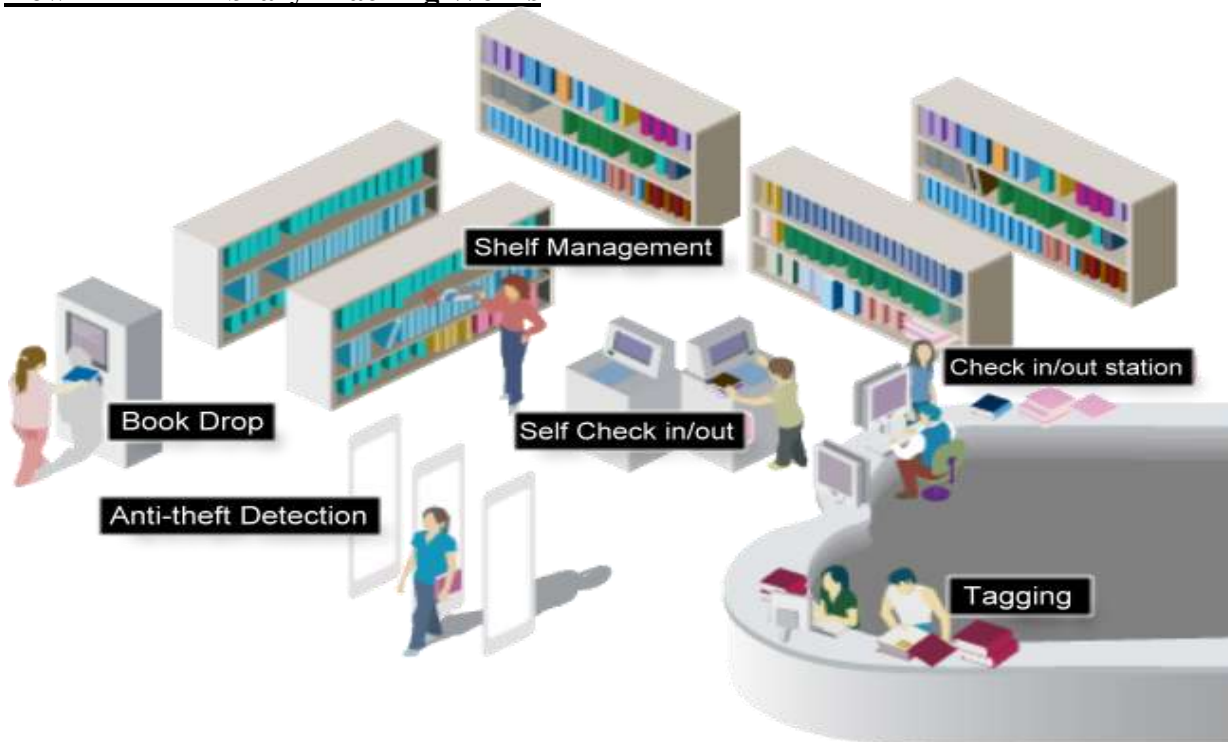
Automated materials handling

Another application of RFID technology is automated materials handling. This includes conveyer and sorting systems that can move library materials and sort them by category into separate bins or onto separate carts. This significantly reduces the amount of staff time required to ready materials for re-shelving.

Long tag life

Finally, RFID tags last longer than barcodes because nothing comes into contact with them. Most RFID vendors claim a minimum of 100,000 transactions before a tag may need to be replaced

How RFID in Library Tracking Works



This is a brief list of the most important pieces of the RFID puzzle.

- **Tags** - Every item must be tagged and the tag programmed with the required unique information.
- **Readers** - Each service unit needs to have sufficient portable readers to carry out operations.
- **Check in, check out and sorting** – The circulation area systems need to be designed and built. The system allows for the implementation of self-sorting machines and other time and worker health savers.
- **Self-Serve check out stations** - One of the prime cost reducers of the system. Implementation of this system requires several decisions around security protocols, fine and bill payment procedures, library card types and other policy decisions that will increase or limit the usefulness of these systems.
- **Software** – Newer systems come with software that converts the radio frequency data to digital and communicates it to the ILS system. Older versions require third party software to communicate between the two systems.

CASE STUDY:

What do Guelph, New Orleans, Seattle and Shenzhen, China have in common? They all have libraries that use RFID technology to track their book inventory. The New Orleans Public Library had all of its branches damaged by Hurricane Katrina in late 2005. The Alvar branch was completely rebuilt including all of its books and CDs/ DVDs with RFID tags, which will be used to check books in and out. Now, students and faculty can check books with a single swipe of their RFID-enabled Library cards.

The new system will allow customers to self check-out items at new checkout stations. This is a necessity, as the library will be short-staffed due to insufficient funds. Shenzhen's new public library in China, enormous in comparison - over 500,000 sq ft - will have around 2 million books tagged.

Seattle's New Library



Seattle's RFID library project is the largest in the world, with Shenzhen's second. Approximately 24% of libraries in the US use RFID and 18% worldwide and growing quickly.

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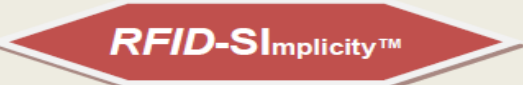


RFID APPLICATION SOFTWARE – RFID-SImplicity™

Despite all progress made during recent year in RFID technology and cost reduction, RFID implementation projects remain complex, tedious and involve a significant risk level. The main reason for RFID projects failures and complexity does not lay on the hardware side, but rather on the software side; Actually, 80% of a typical RFID project overall cost is being spent over development and deployment of specific software. These custom-made solutions are also hard to maintain over the years from the economic point of view as the entire maintenance cost are borne by each single customer; consequently they tend to become rapidly obsolete. Hardware Vendor software packages are always limited to their own hardware, while the success of any RFID projects starts by the freedom to select for each project the most suited hardware.

Our Software, **RFID-SImplicity™** closes this major gap. Being an end-to-end software package and at the same time open to any RFID hardware, **RFID-SImplicity™** reduces significantly the total cost of RFID project implementations, without compromising on RFID hardware selection.

RFID-SImplicity™ offers a wide range of dedicated Application Packages for various vertical markets In order to customize the application to the specific project requirements, each **RFID-SImplicity™** Application Package, includes a powerful parameterization tool, enabling the implementation of RFID projects in a very short time (days to weeks), while completely eliminating the risk inherent with specific development and System Integration projects.

The **RFID-SImplicity™** Core provides services such as *communicating with the RFID hardware, database management, 3rd party integration, user permission* and more. It is shared by all Vizbee Applications, and warrants for a robust performing infrastructure. The core is highly scalable. It allows gradual implementation from a small partial project and up to large multi-site installations,, thereby avoiding the risk implicitly involved in big- bang operations. The **RFID-SImplicity™** Core is an open system with exhaustive APIs to facilitate its integration within other systems in the organization like *ERPs, Access control, RFID-enabled Personnel ID Badges, Video surveillance*, etc. Sharing the robust Core, dedicated Application Packages were developed, to serve the needs of different vertical markets.

HEALTHCARE-ASSET & PATIENT TRACKING	MUSEUMS & GALLERIES	ASSET TRACKING	LOGISTICS-YARD & FLEET MGMT.
DOCUMENT TRACKING	POLICE PROPERTY & EVIDENCE TRACKING	CONSTRUCTION LAY-DOWN YARDS	LIBRARIES
GUARD TOUR	PRISONS	CONTAINER TERMINALS	RAILWAY LOCOMOTIVE & WAGON TRACKING
COLD CHAIN-SECURITY, LOCATION and TEMPERATURE TRACKING	MANUFACTURING WORK-IN-PROCESS (WIP)	VEHICLE TRACKING	PERIMETER PROTECTION
WIRELESS SENSOR NETWORKS	PARKING	IT and MOBILE ASSET TRACKING	LINEN & UNIFORM LAUNDRY
WASTE MANAGEMENT	RETURNABLE CONTAINERS & PALLETS	STUDENT & SCHOOL BUS TRACKING	PRECAST CONCRETE
<div style="display: flex; justify-content: space-between; align-items: center;"> <div>CORE AND WIZARD-ENABLED BUSINESS RULES ENGINE</div> <div style="text-align: center;">  </div> <div style="text-align: right;">   </div> </div>			
HARDWARE	API	RELAYS	DATABASE

Priority to the Graphical User Interface Domains

RFID-Simplicity™ recognizes the primordial importance of Functional and Graphical User Interface simplicity and user friendliness for the success of projects. Benchmarks and test groups are run on each interface design to validate that it is intuitive enough, so that a non-educated operator can use the system after less than 30 minutes of training.

Select the best suited RFID hardware for each project

The selection of the best suited RFID technology is critical to the project ultimate success of any RFID project. Issues like the technology, radio frequency, radio system infrastructure, the lifetime, the physical size of the tags, maintenance requirements etc., must be carefully taken into consideration in selecting the hardware that will be used for each project.

With the **RFID-Simplicity™** platform, the system integrator can freely select for each project the RFID hardware or even combine different hardware in the same project in order to optimize, both technically and economically, the performance of the system.

Business Rules Engine

All **RFID-Simplicity™** Applications include an advanced and intuitive Wizard-assisted Business Rules Engine enabling the seamless programming of business/security rules for every tracked item, whether it is an asset or a person. Complex rules can be programmed easily assisted by the **RFID-Simplicity™** Rules Wizard. Each rule includes the definition of the system reaction to its violation, including: *Display of the alert on the map, Audio alarm, SMS, emails, opening or closing contacts, focusing a PTZ Camera on the Alert location and commencing recording, or sending commands to third party systems.* Multiple condition actions and alerts can easily be added and modified as required.

The system works on standard PCs. Each processor can handle up to 200 RFID events / sec).The numbers of processors and servers are not limited. Web Operator Clients are available. For each dedicated application, specific functions are supported on PDAs.





RFID-Simplicity™ can be used either as the front end and even display information received from other systems. Alternatively, **RFID-Simplicity™** can be used as a service to other systems for real-time location, rule engine, settings etc, while using the other system's user interface.



The RFID-Simplicity™ parameter-driven platform enables quick and easy implementation of RFID projects –for any sized application.

The FSN generic platform is a comprehensive, fully integrated solution to drive cost out of RFID system acquisition while offering flexibility and ease-of-use. It enables a total solution include all RFID software and hardware, such as Tags, Sensors, Fixed and Handheld readers, Antennas, GPS and GPRS communications as well as world class Enterprise 802.11n WLAN as required. It can monitor in real-time thousands of tags (people or assets) their presence, location, as well as other parameters, such as movement, tampering, verticality n(tilt), temperature, humidity and more.

- Single, unified interface for multiple applications
- Supports all RFID technologies in a unified, single system
- Parameter-driven customization, no coding required
- Evolves with system needs , Powered by Vizbee™
- Open, flexible architecture and APIs for multi-system integration
- Easy to use SDK allows System Integrator or client modifications and is .NET compatible. Full mobility integration with GPS/GPRS/GSM and 802.11n WIFI. Seamless integration with video, alert and access control systems

Single, unified platform for maximum visibility and low cost of ownership

The **RFID-Simplicity™** generic RFID platform was designed with the user in mind. The intuitive multi-lingual human Interface is map-driven and the software and user interface delivers an intuitive, comprehensive visual overview of system status. Most actions are performed from the main screen with one button click. The system includes Administrator, Operator and Service Web access for customer provided workstations.

Single site small **RFID-Simplicity™** projects can grow gradually into multi-site and multi applications projects with hundreds of receivers and tens of thousands of tags, just by adding tags, receivers, and software licenses at each stage.. New releases of **RFID-Simplicity™** Core and Application Packages are released every year. These upgrades include new functionalities, new hardware options and warrant that the system remains state of the art over the years. Upgrades are provided automatically to all customers on the current Maintenance and Support subscription.