

Office of Technology Strategies (TS), Architecture, Strategy & Design (ASD)

A VA Executive's Guide to Radio-Frequency Identification's (RFID) Use in Healthcare Operations

INTRODUCTION

This CTS Note explores the emerging technologies of radio-frequency identification (RFID) and wireless sensors in healthcare. There are some parallels between RFID and a previous note (CTS Note 6) about patient-generated data (PGD). While mobile applications and devices focus on a user's input, RFID technology focuses on asset- or machine-generated data. The benefits of using RFID in healthcare range from simple administrative improvements to more complex data supporting diagnoses or drug safety. RFID use also supports mobile strategies in healthcare, as mobile devices can use or track the data generated by RFID sensors. Ultimately, RFID technology is necessary for managing the growing amount of medical data and is an important component of realizing the Department of Veterans Affairs (VA) IT Vision.

BACKGROUND

As the largest healthcare system in the United States, VA must devise ways to leverage the influx of data entering the world of healthcare and benefits provisioning. Specifically, machine-generated data will quadruple the amount of data in VA's IT environment. The healthcare industry has turned to RFID to help manage and use this data.

While RFID technology has been around for over a decade, recent publicity combined with further research and development have introduced a number of commercially viable RFID solutions. These new breeds of RFID technology promise to deliver the next wave of solutions for dealing with asset management, patient identification, and drug safety. RFID offers more advanced resource and patient tracking capabilities than manual or bar-

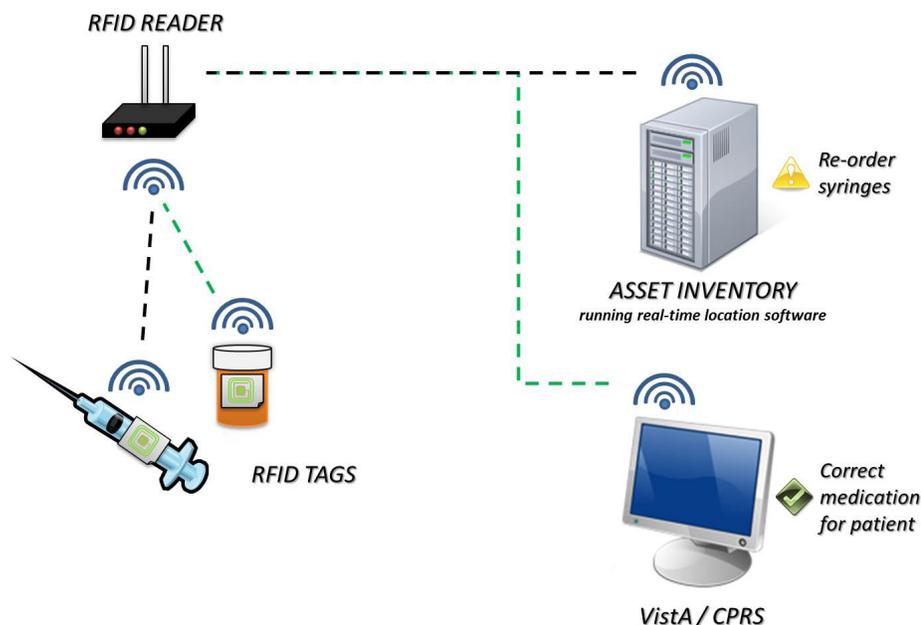


Figure: RFID System at Work

Technology Strategies

Defining OI&T's
"To Be"
Technology
Vision



This newly established office within OI&T's Architecture, Strategy & Design (ASD) interacts not only with the ASD pillar offices, but also with multiple stakeholders within OI&T and with strategic offices across the enterprise. TS works closely with IT and business owners to capture business rules and provide technical guidance as it relates to Data Sharing across the enterprise, specifically for inter-agency operability.

code efforts. Examples of this include wristbands for patient identification, processes for implantable medical devices, and RFID-enabled sterilization trays.

RFID TECHNOLOGY AT A GLANCE

RFID systems, also known as real-time location systems (RTLs), comprise a tag, which holds data about an item; a reader, which will read the data stored on a tag; and software/databases that act on the information. A reader can be stationary or mobile, simple or smart. It will typically need to be connected to a network, especially within an infrastructure that captures data from different sites. In this scenario, the network of readers will be served by a host server, which will manage all data transfer between the readers and a central database (see Figure).

Active and Passive RFID

Traditionally, most RFID usage has relied on passive tags, meaning that the tag data is only transmitted when a reader scans or recognizes the tag. E-ZPass transponders are a good example of passive RFID tags. In healthcare, passive tags are commonly used in as-

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set management for lower-value assets or items associated with specific locations in a medical facility. The advent of wireless technology gave rise to active RFID tags. These tags have an internal power source generating an outgoing signal which is transmitted to a reader or RTLS without the tag needing to be scanned. Active tags are beneficial when intelligent features are required, such as data logging using integrated sensors for temperature or pressure.

RFID in Healthcare

The healthcare industry has adopted RFID technology to address a variety of challenges in healthcare delivery, including the following:

Patient Tracking: Low and high frequency RFID are used for applications such as bedside care and mother and baby matching. Ultrahigh frequency is being used to monitor patient movement and establish geo-fencing as required.

Wait Time Monitoring: RFID technology is being deployed to monitor patient wait times in real time. Reusable active technology lets an emergency room see exactly the number of patients in the queue and length of wait time by patient.

Medication Authentication & Control: Bedside care has embraced RFID to ensure that the right medication is given to the right patient. RFID technology can be easier to work with than bar codes, and provides greater privacy throughout the process. Additionally, tags for one medication can also be integrated with other medication tags, guarding against adverse reactions between drugs.

Inventory & Asset Management: The use of RFID technology is reducing the chance of overlooking things like sponges or other surgical kit components after an operation room procedure. By using RFID to tag high demand items like pumps, medical facilities have reported fewer shortages of these critical items. Other equipment can be tagged and tracked throughout a facility making them easy to locate when required. Ultimately, RFID can help a facility manage its entire supply inventory.

BENEFITS

RFID provides key benefits to VA as it evolves its health IT infrastructure to meet the new patient-centric and data-heavy healthcare environment.

Increased Information Security: RFID helps address health data privacy concerns, allowing medical centers to use tags for more agile access control. For example, if a nurse moves

away from the computer on wheels (COW) while administering care or medication, the COW can be programmed to log off based on the distance of the nurse's RFID tag (e.g., an ID badge), thus protecting patient data displayed on the screen.

Increased Information Agility: Medical devices that use RFID technology to report patient data (about a patient's visit or beyond a medical facility) help automate information collection and information sharing across electronic health record (EHR) systems. Information standards can be built into RFID readers so that the information collected is usable for private or VA EHR systems.

Lower Total Cost of Ownership: While RFID is not directly linked to software development lifecycles, the technology can be used to reduce costs and increase efficiencies in existing healthcare processes and applications. For instance, tracking medical assets via RFID can inform real-time decisions for investing in (or restocking) those assets. Tracking machine data about patients can also determine when a patient needs to visit, allowing medical centers to anticipate and streamline patient visits.

RFID AT VA

The OneVA Enterprise Technology Strategic Plan (ETSP) specifically calls out RFID technologies for addressing short- and long-term system management goals. The goal is to expand asset management functionality by "leveraging technologies (barcode, RFID, mobile computing, etc.) to enhance, locate, track and manage VA assets." To this end, VA recently invested in a real-time location system (RTLS) for all of its VA Medical Centers (VAMC) and seven outpatient pharmacies. The benefit of implementing RFID is not isolated to this kind of operational intelligence at the administrative level. RFID is now used for generating data that support diagnoses, healthcare delivery, patient safety, and many other outcomes directly related to patient health. RFID technology offers solutions that align to VA's IT Vision, documented in the ETSP, and integrate with strategic objectives (such as mobile device strategies) to help create a holistic response to the evolving nature of the healthcare industry.

If you have any questions about RFID technology, don't hesitate to ask CTS (askCTS@va.gov) for assistance or more information.

Check out earlier CTS Note editions [here](#) (vawww.blog.va.gov/oit360).