

Web Server Based Patient Tracking System in hospitals- An application of passive RFID using cloud computing

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Abstract : This paper focuses on the method with the help of which the information about the patient in the hospital can be accessed electronically using radio frequency identification (RFID) technology. The proposed RFID system uses tags which are embedded in wristband through which info embedded on the tags are read by RFID readers. Data information is easily exchanged between patient and doctor. In the proposed system the cloud computing is attached to the RFID architecture to handle scalable RFID system.

Keywords:RFID,Cloud Computing

I. INTRODUCTION

Radio Frequency Identification (RFID) is a technology that uses radio waves to transfer data from an electronic tag which is also called as RFID tag or label attached to an object through a reader for the purpose of identifying and tracking the object .Some RFID tags can be read from several meters away and beyond the line of sight of the reader. RFID can be used in many applications. A tag can be affixed to any object and used to track and manage inventory, assets, people, etc. For example, it can be affixed to cars, computer equipment, books, mobile phones, etc. The Healthcare industry has used RFID to reduce counting, looking for things and auditing items. Many financial institutions use RFID to track key assets and automate compliance.

RFID tags

RFID tags can be either passive, active or battery assisted passive. Passive RFID does not use a battery, while an active has an on-board battery that always broadcasts its signal. A battery assisted passive (BAP) has a small battery on board that is activated when in the presence of a RFID reader.RFID technology is grouped under the term Automatic Identification(Auto ID).AutoID technologies are a way of controlling information and material flow .The RFID technology is a means of gathering data about a certain item without the need of touching or seeing the data carrier through the use of electromagnetic waves.

RFID and Barcode

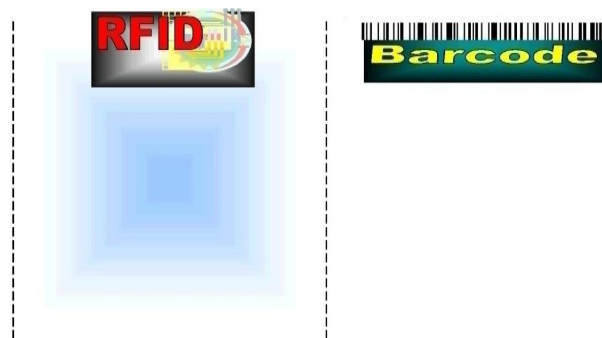
A high level comparison :

RFID technology is similar to the bar code identification system that we see in the retail stores every day; however one big difference between RFID and barcode is that RFID does not rely on the line-of-sight reading that bar code scanning requires. RFID eliminates the need for line-of-sight reading that bar coding depends on. Also, RFID scanning can be done at greater distances than bar code scanning. High frequency RFID systems (850 MHz to 950 MHz and 2.4 GHz to 2.5 GHz) offer transmission ranges of more than 90 feet, although wavelengths in the 2.4 GHz range are absorbed by water (the human body) and therefore has limitations. RFID is used in the retail industry for product tags, and will soon join, and perhaps replace, bar coding as a way to track, control, and manage the flow of goods across their life cycle.

The primary benefits of RFID technology over standard bar-coding are:

- Information stored on the tag can be updated on demand
- Huge data storage capacity
- Instantaneous data identification
- Data collection from multiple items (hundreds of tags per second)
- Small surface area requirement
- Longer read range; line-of-sight not required
- Greater resistance to scratches and physical abuse
- Greater accuracy in data retrieval and reduced error rate

Figure 1 : The difference between RFID and Barcode



Why RFID is important?

It is believed that RFID technology will play two major roles. It will provide a means of unique object identification at low cost, which will enable it to transform supply chains and reduce their costs dramatically. Secondly, it will be used in combination with other sensing and network technologies to track objects and physical environments for purposes beyond supply-chain management, resulting in an electronic infrastructure that is intelligent and aware of its physical environment. Such an infrastructure can help increase visibility and control over physical world events that plague business decision making today. It is superior to barcode scanning in terms of speed, parallel processing and simplicity and not human intervention is required.

Applications of RFID :

1) Asset tracking

RFID is useful in static or in-motion asset tracking. User can instantly determine the general location of tagged assets.

2) People Tracking:

People tracking system are used just as asset tracking system. Hospitals and jails are most general tracking required places. Hospital uses RFID tags for tracking their special patients. In emergency patient and other essential equipment can easily track. It will be mainly very useful in mental care hospitals where doctors can track each and every activity of the patient. Hospitals also use these RFID tags for locating and tracking all the activities of the newly born babies.

3) Document tracking:

This is most common problem. Availability of large amount of data and documents brings lots of problem in document management system. An RFID document-tracking system saves time and money by substantially reducing:

- Time spent searching for lost document
- The financial and legal impact associated with losing documents.

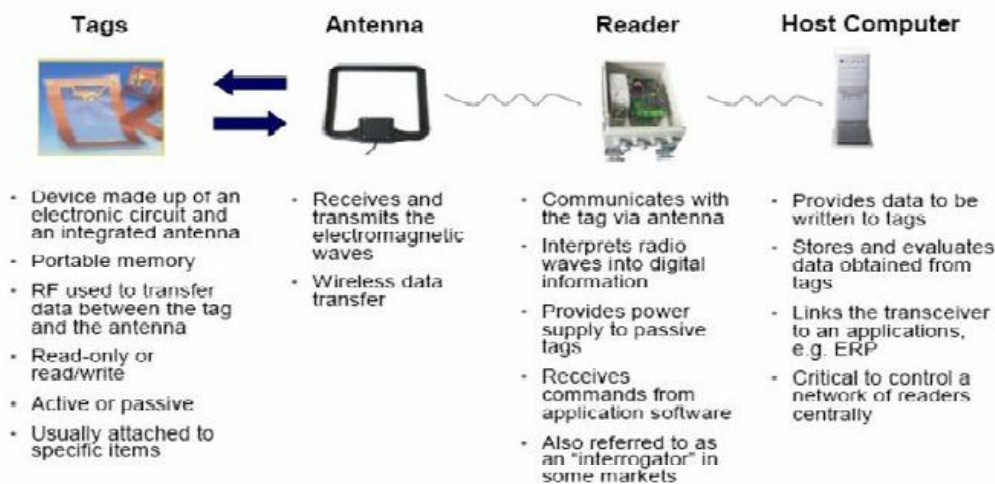
4) Government Library:

Many government libraries use barcode and electromagnetic strips to track various assets. RFID technology uses for reading these barcodes unlike the self-barcode reader RFID powered barcode reader can read multiple items simultaneously. This reduces queues and increases the number of customers using self-check, which in turn will reduce the staff necessary at the circulation desks.

5) Manufacturing & Aerospace:

RFID technology provides an easy way to manage a huge and laborious manufacturing process. It offers all the benefits of small production parts to batch, processes and manufacturing. This type of process helps in better analysis, reduce and eliminate bottlenecks, reduced time in locating parts and products and production process based sensors can be installed to alert any anomalies. Aerospace industry and Department of Defense have a lot to gain from RFID integration into their production and process lines. Boeing and airbus, according to the direction of US Federal Aviation Administration, make Mandatory to put an appropriate tracking mechanism to track the aircraft parts.

II. PROPOSED SYSTEM



In the existing system, when patient enters in the hospital initially he has to register himself. It means he has to fill registration form on which he has to write his health history and pay registration charges along with consultation fees. Once he visits the doctor for consultation doctor has to read his health history and check the patient and suggests medication according to health condition. So during every visit doctor has to read patient's file to understand the health history or medication in the previous consultation. The whole procedure is time consuming. In the proposed system we are going to make use of radio frequency identifier. There is no need to fill registration form. Patient can fill his health history online then he will be provided with unique identifier. In this when the patient visits the hospital first time he has to pay registration charges and consultation fees and has to tell his ID then the patient will be provided with the wristband where the passive tag is attached. Passive tag consists of unique identifier which is similar to that of patient's identifier. Here the RFID reader is mounted on the door of doctor's cabin. It is connected to the computer system which is present near to the doctor. When

patient enters inside the cabin he has to wear a wristband. RFID reader on the door reads the data from the tag present in the wristband and extracts patient's information from the backend and displays it on the system which is present near to the doctor. Then doctors can suggest medicines according to patient's health condition and his health history. One of the drawbacks of RFID technology is tag collisions in RFID system. Collisions can be reduced with the help of anti-collision protocols. Reduction in collisions will result in scalable RFID systems which can be managed by attaching cloud computing to the existing RFID system.

III. CONCLUSION

In this paper with the help of proposed system we can achieve electronic patient tracking using RFID. When the huge amount of data is collected by RFID reader it results into scalable RFID system. To manage the scalable RFID system cloud computing can be attached to the existing RFID architecture.

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