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Enhancing Supply Chain Management Using RFID

Dr. Shilpa Abhang
[1] *Assistant Professor, Dept. of MCA, Jyoti Nivas College, Bangalore, India*

ABSTRACT

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

Keywords: RFID, Cloud Computing

1. 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.

1.1 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.

1.2 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

**Address for correspondence:*
Mail Id: shilpaabhang@yahoo.in

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*

1.3 Why is RFID 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.

1.4 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.

2. THE PROPOSED SYSTEM

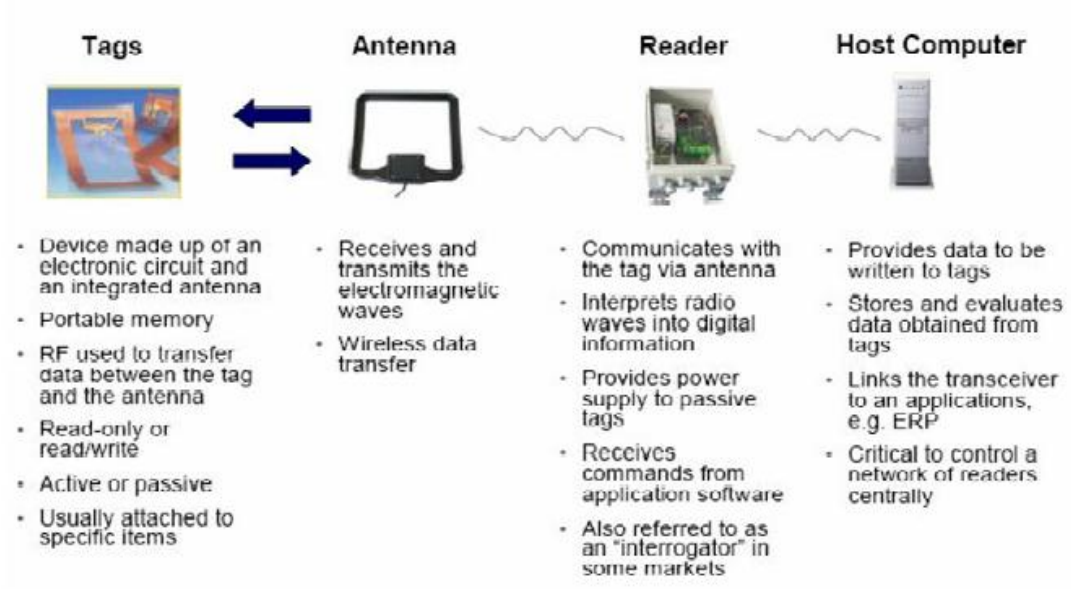

Figure 2: *Architecture of RFID*

Radio Frequency Identification Applications can be used to monitor as well as to manage the movement of the finished product in a supply chain. In this the tags can be attached to the product or materials or the tag can be directly attached to the container which consists of the products itself. Pallets, trailers, totes, carts, cargo containers, and reusable transport items can all be tagged. Readers placed throughout a facility can monitor movement and location of inventory, thus providing real time data. This can be within a warehouse, a freight yard or within a retail location. RFID applications in the supply chain enable more frequent and accurate inventory counts RFID applications in the supply chain can also decrease costs associated with inventory counting. 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.

CONCLUSION

In this paper with the help of proposed system we can achieve electronic product 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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AUTHOR'S BIOGRAPHY

Dr. Shilpa Abhang is working as assistant professor in MCA department of Jyoti Nivas College. She is having 9 years of teaching experience. She has published 8 research papers in international journals, presented 2 papers in international conference and 2 papers in national conference. Her hobbies are travelling and bicycling.