

# Chapter 8.8

## RFID: New Technology on the Horizon for IT Majors

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### ABSTRACT

Educators have an ongoing challenge as they strive to stay up-to-date with new technology. One emerging technology, RFID (radio frequency identification) tags, has the potential to impact information systems in businesses as well as in our lives. Educators responsible for planning curriculum need to consider how to incorporate topics pertaining to RFID technology into a wide variety of technology courses. Therefore, one purpose of this manuscript is to give curriculum planners and teachers a summary of RFID by: presenting an overview of RFID technology; exploring RFID limitations and possible solutions; and examining the future outlook of RFID. An additional purpose further assists educators in

considering how to incorporate this new course topic into the curriculum by providing some teaching resources, objectives and suggestions pertaining to RFID.

### INTRODUCTION

Today's educators need to have a fundamental knowledge of a wide variety of evolving technology. It has been stated that teachers need to "cross-fertilize ideas across technology and research domains" (Kalles & Papagelis, 2006). To accomplish this, educators need to continually scan the horizon for developing technology.

One such emerging technology is RFID (radio frequency identification) tags. RFID tags are

small, wireless devices that help identify objects, animals, and people.

RFID is just one part of the fast evolving telecommunications industry. Some educators have indicated that it is important for information technology students to learn more about the field of telecommunications (Choi, Teer, & Teer, 2005). As new course material is considered, either for introductory IT (information technology) courses or more specific upper level IT courses, it is important for educators to learn about RFID and determine if some course coverage should be devoted to RFID.

One purpose of this manuscript is to give curriculum planners and teachers a summary of RFID by: presenting an overview of RFID technology; exploring RFID limitations and possible solutions; and examining the future outlook of RFID. An additional purpose is to provide teaching resources, objectives, and suggestions pertaining to RFID. Hopefully, this will further assist educators as they consider how to incorporate this new course topic into the curriculum.

## **OVERVIEW OF RFID TECHNOLOGY**

RFID is a type of automatic identification similar to bar codes. The difference between the two is that in RFID systems, an electronic device uses radio frequencies to communicate, whereas bar codes require line-of-sight scanning. For example, these tags can be used to track objects in supply chains and can even be found in the pockets, belongings, and bodies of consumers.

There are two types of RFID tags currently being used, UHF (ultra high frequency) and HF (high frequency). Tags can further be classified as active, semi-passive, and passive. Active tags are the most expensive and contain an internal power source; passive tags are powered by external radio signals; semi-passive can function either way. RFID tags are given a unique EPC

(electronic product code) and are installed with a transponder and digital memory chip. In addition to the EPC, the data contained within each tag may provide identification, location information, or product specifications.

The RFID system includes an electronic reader which enables data transmitted from tags to be read, stored, and eventually processed. The reader communicates with a host computer that runs software called middleware, which connects the data to specific applications. Readers are essentially a type of interrogator that use an antenna packaged with a transceiver and decoder. The reader sends out a signal that activates or “wakes up” a corresponding RFID tag which transmits its unique EPC code. Data can then be read from or written to the tag.

RFID tags are available in a variety of shapes and sizes, most of which are extremely small. RFID has made considerable progress recently with advancements in the technology, lower costs, and smaller tags. RFID systems have emerged as a practical auto-ID platform in industries as varied as automobile manufacturing, microchip fabrication, and even cattle herding (Weis, 2003). In some medical facilities, RFID tags are being used to double and triple check that the patient in the operating room is having the correct operation (Martin, 2005). RFID tags have also been used in disaster victim identification after the tsunami catastrophe in December 2004 (Meyer, Chansue, & Monticelli, 2006). Additional applications include the use of RFID to detect human activity. For example, an iGlove can track the objects grasped by the wearer. The iBracelet also tracks human activity and was found to be more aesthetically and ergonomically preferred to the glove (Smith et al., 2005). Current news articles indicate that RFID is being implemented in the areas of manufacturing and supply chain management (Loebbecke & Palmer, 2006). However, there are still several issues that are preventing RFID tags from becoming more prominent in today’s businesses and eventually replacing bar codes.

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