

Chapter III

RFID for Identification of Stolen / Lost Items

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ABSTRACT

Standards organisations such as EPC Global work to provide global compatibility between RFID readers and tags (EPCGlobal, 2007). This is essential to ensure that product identification numbers can be accessed along a supply chain by a range of producers, manufacturers and retailers. If all that is stored on the RFID tag is a universal product code, then public access is appropriate. However, where the tag might store more information than just the product identification details, and this data might be private, there is a need to protect such information. The objective of this chapter is to test a security framework designed to authenticate RFID readers before allowing them to access private data stored on RFID tags.

INTRODUCTION

RFID is an area of automatic identification that is gaining momentum and is considered by some to emerge as one of the most pervasive computing technologies in history (Robert, 2006). Today RFID is a generic term for technologies that use radio waves to automatically identify people or objects (RFID Journal). There are several methods

of identification, the most common of which is to associate the RFID tag unique identifier with an object or person. A typical RFID system will consist of a tag, a reader, an antenna and a host system (Berthon, 2004). In most commonly touted applications of RFID, the microchip contains Electronic Product Code (EPC) with sufficient capacity to provide unique identifiers for all items produced worldwide. When an RFID reader

emits a radio signal, tags in the vicinity respond by transmitting their stored data to the reader (Position, 2003).

The principal advantages of RFID system are the non-contact, non-line-of-sight characteristics of the technology. Tags can be read through a variety of visually and environmentally challenging conditions such as snow, ice, fog, paint, grime, inside containers and vehicles and while in storage (Robert, 2006).

AUTHENTICATION

Authentication is one of the best methods to deter the growing concerns of unauthorized readers from accessing the RFID tag information which could result into the violations of information stored in the tag (Ayoade, 2005). Ayoade et al developed (Ayoade, 2005) a framework that makes it compulsory for the readers to authenticate themselves with the APF (Authentication Processing Framework) database prior to having access to registered tags information.

In this chapter our objective is to develop a system that will demonstrate the RFID Authentication framework in action. The system will be used to identify stolen high cost items recovered by the police. This is an interesting application on which to test the RFID Authentication Framework because, in the hands of the wrong people, the private information stored on the RFID tags could work against the authorities. Our system will read RFID tags attached to expensive items like laptops, PDAs, mobile computer systems, cars, and other expensive equipments and to identify such items by a specific (authentic) reader. For security purposes, the system will make sure that only authentic readers authorized to access specific tags embedded in the items can have access to those tags.

The business benefits expected from this system are:

- i. It will be a means of protecting items in various departments in the universities, or industries.
- ii. It will enhance police effort in locating and recovering stolen items.
- iii. It will help police to determine the rightful owner of the recovered item.

Most times it is very difficult for the police to identify recovered stolen items. However, with the help of this system, once the stolen item is within the range of the RFID reader in the hand of the police officers, it will be possible for the police to identify the item embedded with the RFID tag quickly and accurately. This technology would be a great benefit to police officers as the process of identifying and returning recovered equipment to its owners is a very difficult and painstaking process that uses up precious time and resources. In a nutshell, this research work will be of great benefit to the community which deploys it.

RELATED WORK/LITERATURE REVIEW

Automatic identification technologies like RFID have valuable uses, especially in connection with tracking things for purposes such as inventory management (Wikipedia, n.d.). RFID is particularly useful where it can be embedded within an object, such as a shipping container. RFID tags communicate information by radio wave through antennae on small computer chips attached to objects so that such objects may be identified, located, and tracked. The fundamental architecture of RFID technology involves a tag, a reader, and a database. A reader scans the tag (or multiple tags simultaneously) and transmits

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