The Ethical Debate Surrounding RFID

Stephanie Etter
Mount Aloysius College, USA

Patricia G. Phillips
Duquesne University, USA

Ashli M. Molinero
Robert Morris University, USA

Susan J. Nestor
Robert Morris University, USA

Keith LeDonne
Robert Morris University, USA

RFID TECHNOLOGY

Radio frequency identification (RFID) is a generic term that is used to describe a system that transmits the identity of an object or person wirelessly using radio waves (RFID Journal, 2005). It falls under the broad category of automatic identification technologies. RFID tags, in the simplest of terms, are "intelligent chips that can be embedded in or attached to a product to transmit descriptive data" (Gelinas, Sutton, & Fedorowicz, 2004, p. 6). According to the online *RFID Journal* (2005), there are several methods of identifying objects using RFID, including the most common of storing a serial number that identifies a product on a microchip that is attached to an RFID tag. RFID is not a new technology, but it has only recently been in the spotlight as more businesses are receiving press for putting the technology to work in their supply chains.

RFID tag technology is sometimes associated with the term electronic product code (EPC). An EPC uniquely identifies objects in a supply chain. According to EPCGlobal, "EPC is divided into numbers that identify the manufacturer and product type. The EPC uses an extra set of digits, a serial number, to identify unique items." The EPC number is placed on a tag composed of a silicon chip and an antenna, which is then attached to an item. Using RFID, a tag communicates its number to a reader (EPCGlobal, 2005). In broad terms, RFID tags are placed into one of two categories: active or passive. According to the Association for Automatic Identification and Mobility (AIM, 2005), active RFID tags are powered by an internal battery and are typically designated as read-write tags. When a tag has read-write capabilities, the tag data can be modified. Passive tags, according to AIM, operate without a power source and obtain operating power from the tag reader. Passive tags are typically read-only tags, having only read-only memory. Active tags generally have a longer read range than passive tags.

RFID development dates back, according to some accounts, to the 1940s work of Harry Stockman who discussed the possibility of communication by means of reflected power. Stockman at that point was early in the exploration and "admitted that more needed to be done in solving the basic problems of reflected-power communication before the application could be useful" (Landt & Catlin, 2001). According to the *RFID Journal,* RFID's early applications can be found during World War II when it was used by the military in airplanes, through the assistance of radar, to identify friend or foe (IFF).

Two decades later the first commercial use of RFID-related technology was electronic article surveillance (EAS), which was designed to help in theft prevention. These systems often used 1-bit tags that could be produced cheaply. Only the presence or absence of the tag could be detected, which provided effective anti-theft measures (Landt & Catlin, 2001).

Commercial applications expanded in the 1980s across the world, although not everyone had the same RFID applications in mind. The United States found the greatest applications for RFID to be in the areas of

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transportation, personnel access, and to a lesser extent, animal tracking. "In Europe, the greatest interests were for short-range systems for animals, industrial and business applications, though toll roads in Italy, France, Spain, Portugal, and Norway were equipped with RFID" (Landt & Catlin, 2001).

Today we see RFID in use in toll collection, tracing livestock movements, and tracking freight (Jones, Clarke-Hill, Comfort, Hillier, & Shears, 2005). While not a new technology, the use of RFID is slowly gaining momentum for widespread application, with RFID technology being used in industries such as retail, banking, transportation, manufacturing, and healthcare.

PRIVACY DEBATE

The two main controversies regarding the use of RFID are privacy and security. While advances in technology can address the security issues related to RFID, the ethical debate surrounding privacy is not as easily solved. As RFID technology becomes mainstream, its privacy protection challenges are becoming the topic of debate between technologists, consumer activists, academics, and government agencies. Yoshida (2005) reports that there is a "polarizing force tugging at the technology: the government and industry groups advocating RFID's adoptions, and the civil libertarians concerned about its potential abuse." The main question is, will this technology lead to situations where confidential information can be improperly disclosed? A representative from the UK's Department of Trade and Industry warned, "RFID tags could be used to monitor people as well as merchandise. As the use of RFID spreads, privacy issues must be weighed in the context of societal consent" (Yoshida, 2005).

RFID is not the first technology to spur a privacy debate. While technologies like RFID are not necessary for the invasion of privacy, they have made new privacy threats possible and old privacy threats more powerful. Based on IT ethics literature, there are three key aspects to privacy that computer technology tends to threaten (Baase, 2003):

1. freedom from intrusion,
2. control of personal information, and
3. freedom from surveillance.

RFID has the potential to impact all three, especially in terms of invisible information gathering. Gunther and Speikermann (2005) argue that RFID has added a "new dimension to the traditional e-privacy debate because much more information can potentially be collected about individuals" (p. 74).

While many understand the origin of RFID as being related to inventory tracking, privacy advocates argue that RFID can be used to track items after the item is out of the supply chain and in the hands of the consumer. RFID has the potential to allow anyone with an RFID scanner, either business or individual, to see the contents of shopping bags, purses, or other personal items, a process known as skimming. The RFID privacy concerns then are three-fold: pre-sales activities, sales transaction activities, and post-sales uses (Peslak, 2005).

While some believe that privacy advocates who argue against the use of RFID are being overly cautious and unreasonable, it is important to note that several businesses may already have plans to use RFID for the purposes of marketing, advertising, and tracking. For example, IBM filed a patent application in 2001 which offers the potential to use RFID "to track people as they roam through shopping malls, airports, train stations, bus stations, elevators, trains, airplanes, rest rooms, sports arenas, libraries, theaters, museums, etc." (Bray, 2005). Unique item identification made possible through RFID has the potential to lead to a degree of personal attribution and surveillance never before possible (Gunther & Speikermann, 2005).

Global RFID standards are non-existent. Active RFID tags can often be read outside of the supply chain, are difficult for consumers to remove, can be read without consumer knowledge, and in the future may be able to uniquely identify items so that each item is traceable back to a credit account. According to Gunther and Speikermann (2005), "Consumers feel helpless toward the RFID environment" (p. 74) and "even though the potential advantages of RFID are well understood by a solid majority of consumers, fear seems to override most of these positive sentiments" (p. 76). There is some development in the area of privacy-enhancing technologies (PETs), technology designed to enable privacy while still using RFID, but as Gunther and Speikerman-n (2005) report, consumers still feel helpless (p. 74).

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