

Radio Frequency Identification (RFID) Infrared Financial Messaging (IrFM)

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Protocols

Radio Frequency Identification (RFID) and Infrared Financial Messaging (IrFM) are examples of specifications of standards for communications. They are also both being used in the commercial context of payment for goods or services. However, they differ significantly in their structure, technologies and scope as well as in their ranges of capability. This does not mean that one is intrinsically better than the other. It does mean that in a given set of use cases one is more likely than the other to satisfy a particular set of requirements. This discussion will not explore the deep technical characteristics of each specification but rather look at each in the framework of a specific usage – a payment application.

For articles that concentrate on the technical aspects of the IrFM protocol log on to IrDA's website and select IrDA Insider Newsletter. The pertinent article is: "A Summary of Short-Range Wireless in 2003" by Glade Diviney, Extended Systems, Inc.

Players

To further narrow the discussion, this comparison will be made inside the boundaries of a use case that prescribes value transfers between two parties. We'll describe these parties as the "consumer" and the "merchant" and we'll describe the value transfer as an exchange of money for portable, tangible consumer product(s).

Definitions

For this discussion, the consumer is any person wishing to exchange money for goods or services and who will be doing so in the merchant's presence. Likewise, the merchant is any entity that offers goods or services for sale in return for a stated sum of money. As examples, a motorist approaching a toll station, a student about to use a vending machine and a homemaker standing at the grocery store check out counter all fit within the definition of a consumer. In the same vein, a toll booth, a soft drink machine and the clerk at a quick service restaurant all qualify as a merchant. We'll further define these kinds of transactions as "proximity" payment events because the entities giving payment, and the entities receiving payment, are physically close to each other.

A Payment Use Case

Description

As a backdrop for the comparison, let's assume that a proximity payment is about to take place in a grocery supermarket using the following assumptions about the environment:

- It is a large store with multiple checkout lanes within four or five feet of each other
- Checkout traffic is consistently heavy. That is to say – always a line of three or four people in each lane
- All of the lanes are equipped with Point of Sale (POS) devices adapted for RFID and Infrared
- All of the store customers have devices enabled for both RFID and Infrared

- All store customers have multiple types and instances of payment options

Market Requirements

This analysis incorporates a “consumer advocacy” bias, which is to say that it endeavors to measure a protocol’s performance principally on how it satisfies consumer usage requirements. As such, the advantages, or disadvantages, of a particular protocol for stakeholders in the banking, transaction processing, software development, hardware manufacturing and, to some extent, the retail merchandizing industries are not fully explored.

Additionally, certain assumptions are made about consumer usage requirements as follows:

- A consumer is unlikely to purchase a new device which has the sole purpose of implementing a new payment methodology.
- A consumer may be willing to accept a new payment methodology when added to an existing device (i.e., accept a plastic card with an RFID chip embedded within it or a mobile phone with a payment application added).
- A consumer cannot be relied upon to accept a single merchant as their sole provider of services in a given category (i.e. shopping for food exclusively at Safeway, or for merchandise at only one department store).
- More often than not, consumers hold a kaleidoscope of credit, debit and loyalty cards indicating their preference for choice.
- A consumer will not use a payment method that is more complex than their existing options unless there are substantial short and long-term rewards for doing so.
- A consumer will adopt a new method if it is demonstrably simpler, quicker, safer and, with more capability than was previously available.
- Security, integrity, recourse, auditability, privacy, confidentiality and control are core values that consumers continue to apply in their decision to use one payment methodology over another.

Comparison Matrix

What follows is a line item comparison of each protocol’s ability to perform, or satisfy, a particular proximity payment task as it implements consumer and merchant business system requirements. The list is not exhaustive of a particular protocol’s ability because it is focused on a single use case – one, among what is assumed to be substantial number of other use cases.

The table below is simultaneously binary and analog.

- “0” represents a “No”
- “1” represents a “Yes”
- The numerals “1” through “3” also represent an attempt to qualify a “Yes” by stating “Yes” in degrees.
 - “1” means the task was satisfied
 - “2” means the task is done well relative to the competing protocol’s method
 - “3” means the task was done exceptionally well relative to the competing protocol’s method.

The qualitative approach is a form of weighting a given function in light of the bias for consumer advocacy.

| | <i>RFID</i> | <i>IrFM</i> | TASK | NOTE |
|---|-------------|-------------|--|-------------|
| A | 2 | 1 | Ease of payment application activation | 1 |
| B | 3 | 2 | Time elapsed in Handheld/POS in session creation | |
| C | 3 | 1 | Minimizes elapsed time in discovery | |
| D | 1 | 1 | Enforces two-party only session | |
| E | 0 | 2 | Recovers from session interruption | |
| F | 1 | 1 | Consumer able to select at least one payment instrument | |
| G | 0 | 3 | Consumer able to select from among more than one payment instrument | 2 |
| H | 0 | 3 | Consumer able to replay payment using alternative instrument in handheld | 2 |
| I | 1 | 0 | Payment executable without keystrokes | |
| J | 1 | 1 | Payment amount request visible to consumer | |
| K | 0 | 1 | Payment amount request visible on handheld | |
| L | 0 | 1 | Digital receipt available to handheld | |
| M | 1 | 1 | Paper receipt available to consumer | |
| N | 0 | 3 | Lightens the consumer's physical wallet | |
| O | 0 | 2 | Relative minimization of new equipment impact on merchant | |
| P | 1 | 1 | Privacy and confidentiality | |
| | 14 | 24 | Index of Utility | |

Notes to the Matrix

- 1 Comparing the act of opening a software application with the idea that the "payment application" is more or less permanently open (activated) in an RFID payment card or device.
- 2 Software virtual card storage in handhelds allows for a large number of instances where RFID allows for only on instance of a virtual card.

Summary: RFID is a better, more secure way for consumers to store Customer Information in a credit card or a key fob. The concept is easy for consumers and merchants to understand and use. It still has the major limitations of one-way communication between payer and payee, and a one to one relationship to payment or loyalty instruments (if you use 30 credit cards you will need 30 RFID enabled credit cards, loyalty cards and/or key fobs).

IrFM takes advantage of the millions of IrDA inexpensively enabled cell phones and PDA's currently in use throughout the world. This global standard allows the consumer to store an infinite number of credit cards/loyalty cards in a single handheld (cell phone or PDA) device. The transaction is further secured by 2 way communication between the consumer and the merchant, allowing for an electronic confirmation of the sale accompanied by an instant digital receipt.