17th Bled eCommerce Conference
eGlobal
Bled, Slovenia, June 21 - 23, 2004

An Architecture for Mobile Payments and Couponing in the Retail Industry

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Abstract
The growing prevalence of electronic commerce and the widespread use of mobile devices has made mobile payments an interesting alternative method of payment for customers and merchants. One major issue to be resolved is the integration of a real-time wireless means of payment within their current payment system. In this paper, we propose a new architecture of mobile payment system to improve business processes and increase customer loyalty. An all-in-one device that enables mobile payments and also integrates a membership scheme would simplify and significantly accelerate the payment process at the point of sale (POS). Moreover, the deployment of an effective customer relationship management (CRM) system and an adapted data mining tool would allow retailers to propose a dynamic-generated website to their customers. This would follow a one-to-one e-marketing strategy and would improve companies' ability to suggest customized offers and coupons.

1 Introduction

The continued release of new technology constantly pushes retailers to update their POS - the place and moment in a store where a customer pays for merchandise (Jensen 2001). A recent survey shows that 41 percent of the retailers interviewed have replaced their POS package within the last two years (Retail Systems Alert Research Services 2002). This indicates that there is a real incentive for the retail industry to invest in information technology. In addition, the new functionalities of the POS are growing since they are embedded with operating systems such as Unix, Linux and MS-Windows.

Moreover, the increasing general enthusiasm on mobile technologies such as Bluetooth and radio frequency identification (RFID) has a positive effect on the acceptance of new mobile applications and services. This would explain why wireless POS solutions are already on their way to arrive at your local retailer. Contactless payments and ticketing are becoming a new trend for quick-service

oriented industries (Moore 2003) such as public transports (e.g. Public Transport Pass), toll booths (e.g. FasTrak), gas stations (e.g. ExxonMobil's Speedpass) fast-food restaurants (e.g. McDonald's) and ski resorts (e.g. Swatch Access).

Therefore, an architecture in the retail industry combining mobile technology and traditional commerce techniques has the potential to generate some significant benefits for the merchants and their customers. For example, the payment process would be faster, easier and more secure. As a result, waiting time at the POS will be shorter, so customers would not have the impression that they waste precious time waiting in lines.

Another problem encountered at the POS is the probability that the credit card reader malfunctions or slows down the payment process. Consumers become very impatient when technology fails. Retailers should be able to guarantee a high level of quality of service. To do so, they need to have a very reliable system of payment. Otherwise, they will lose consumers as cash-based transactions become increasingly rare.

In addition, CRM systems are very popular in the retail industry: every successful company in the sector uses this type of system to analyze customer behavior and predict sales. Consequently, with the collected data, retailers can offer personalized offers and coupons to consumers who are members of their loyalty programs.

The objective of the proposed architecture is to adapt legacy systems used in the retail industry with mobile technologies. The improvement of the payment experience and the customer relationship management stands to increase sales and customers' loyalty. Once customers have an ID and an account, they will have a good reason and a tangible reminder to go back to a specific merchant. Hence, this fully integrated system using wireless payment capabilities and a one-to-one marketing through the company's website could be a factor of differentiation and an improvement of the value proposition offered to the customers. Furthermore, using a mobile device to pay should be seen as a incentive for participating in the membership scheme.

2 Mobile Technologies for Proximity Payment Devices

As exposed before, retailers and customers want to avoid connectivity problems during financial transactions. Therefore, they would prefer to rely on a simple peer-to-peer network. This is possible since proximity payments usually involve two parties using an ad-hoc network based on a wireless technology such as Bluetooth, infrared and radio frequency identification (RFID) which enable short range wireless device-to-device payments (Mobile Payment Forum 2002). Each of these networking technologies have their benefits and shortcomings. They are described in Table 1, which was previously exposed in (Ailisto et al 2003).

	IrDA	RFID	Bluetooth
Operating range	Medium	Short	Long
Cost	Medium	Low	Medium-high
Power consumption	Medium	None	Medium-high
Data storage capacity	Unlimited	Limited	Unlimited
Interference hazard	Medium	Low	Medium-high

Table 1: Comparison of IrDa, RFID and Bluetooth

These technologies are well adapted to be used in small mobile payment devices. However, depending on the type of constraints, one technology can be better than the others. PDAs (Personal Digital Assistants) and many mobile phones already support Bluetooth and IrDa for wireless communication. Furthermore, these devices are coming with greater memory capacity, which enables them to store larger amount of data. Therefore, this type of device would be more appropriate for complicated wireless transactions than a simple RFID tag embedded in a small key chain, for example.

Needless to say, the great advantage that RFID tags have on other current wireless communication or data transmission schemes is a low power consumption. The tag is composed of few computer chips and a tiny antenna. The power that activates the transponder comes straight from the reader. Still, there is a distinction to be made between active and passive tags. Active tags have their own source of energy provided by an embedded battery. The passive tag is only activated when the reader finds the frequency on which the passive tag responds. As a result, passive tags are much more adapted to small and cheap payment devices since they are power autonomous. The failure rate using passive instead of active tags for wireless payment is diminished because of the absence of power breakdown on the client side.

IrDA and Bluetooth could be an alternative for mobile peer-to-peer payment. However, they suppose that the consumer owns a device that is already equipped with such technology. The price of these mobile devices is much higher than a simple key chain with RFID capabilities. However, the data storage capacity of devices such as mobile phones and PDAs is much larger than a single small RFID chip. The storage capacity has to be chosen in function of the data transmitted wirelessly. RFID is typically used to transmit an identification number, in contrast with PDAs or mobile phones, which can exchange much more information due to the better processing power and almost unlimited storage capacity.

IrDA devices have to be pointed in the right direction to be able to reach the other terminal. This phenomenon can be easily observed with the use of a television and a classic remote controller. This problem is not present with radio-based devices. Figure 1 shows how different technologies transmit signals.

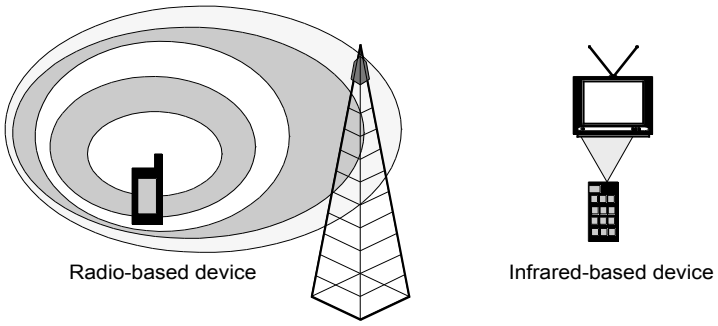

Figure 1: An Illustration of Radio-based and IrDA-based Devices

Radio-based devices such as mobile phones use higher frequencies than infrared. One result is the available bandwidth is larger. Moreover, IrDA devices usually transmit in a unidirectional mode, as opposed to Bluetooth and RFID-based devices, which emit signals in an omnidirectional mode.

Since proximity payments have to stay simple and easy to use, the technology chosen for the financial data transmission at the POS should be adapted. The mass adoption of a new mobile payments means will not be possible if this new payment system requires the consumer to be an expert in computer science. Moreover, retailers attach an importance for easy and fast cashier training. They do not want to hire an extra IT staff to support the payment process at the POS. Therefore, the payment process has to remain simple for the customer and the cashier.

3 Issues on Mobile Payments

Mobile payments are generally defined as payments carried out wirelessly via a mobile device. According to Gartner Research, the transaction value of mobile payments will expand to $15 billion in Western Europe by year-end 2005 (Adrian 2002). Despite the predictions, mobile payments are confronted with technological and business issues that delay its development. One major challenge is to convince consumers and merchants that they need new payment systems (Jones 2001). Moreover, device and network limitations, maturity of payment solutions, and customers' lack of interest, all represent problems preventing the mass adoption of new mobile payment schemes.

A logical evolution occurred in the monetary value transaction environment due to the progress of technology. In the beginning, payments were mostly conducted on a face-to-face basis (cash-, paper-, card-based). As technology progressed, remote transactions gained in popularity with the development of data wired networks (credit cards, e-payments). The current trend is to implement wireless systems that can handle remote as well as face-to-face mechanisms with a single device.

Payment transactions have identified multiple dimensions. A distinction between the different types of payments should be also described. Therefore, we propose a classification of the payment market's dimensions in this following table adapted from (Telecom Media Networks 2002):

By means	**Cash**, **Paper** (Cheques, Bankers draft), **Card** (Credit, Debit, Smart), **Electronic** (e/m-commerce, virtual money, e-wallet, stored value account), **Tokens/money surrogates**
By size	**Micro-payments** (generally below $10), **Macro-payments**
By Place of Purchase	**Real-world** or **F2F**, **Remote** (Internet, Mail and telephone orders)
By Seller/Buyer Origin	**B2B** (rare for m-payment), **B2C**, **P2P**
By Type of Purchase	**Physical goods**, **Digital/electronic goods**, **Rights** (rich media)
By Clearing and Settlement Method	**Bilateral**, **Multilateral** (joint clearing house), **Using intermediaries**
By Type of Transaction	**Pay Per View** (PPV), **Pay Per Unit** (PPU)
By Type of Payment	**Pay now** (debit), **Pay later** (credit), **Pre-pay** (against stored value)
By Geography	**Domestic**, **Cross-border**, **Single currency**, **Multiple currency**
By Location of Payer's Account Details	**Network-/server-based**, **Device (client-based)**, **Chip (client-based)**

Table 2: The Different Payment Dimensions

An important strategic issue for mobile payment system suppliers is choosing the type of payment dimension they want to focus on. For example, micropayments generally represent a payment, which is below 10 Euros and is usually supported by cash or debit cards. Merchants are reluctant to accept credit card transactions for small amounts because of transaction fees. However, most companies promoting micropayments failed because the margins on small value payments are notoriously low, and sufficient economies of scale are extremely difficult to attain (Costello 2002). On the other hand, macropayments, which are thus logically every payment above 10 Euros, represent a real challenge for mobile payments. They need stronger security mechanisms because of the large amount of money involved and the greater possibility of fraud.

A survey from SpeedFacts shows a very surprising statistic: the mobile phone is the preferred payment method between 12.5 and 50 Euros (Speedfacts Online Research GmbH 2001).

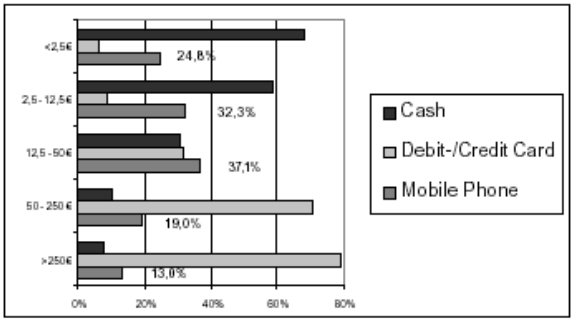

Figure 4: Preferred Payment Method of Internet Users if Away

The location of purchase is another dimension that electronic payment has already changed. Mobile payments will deliver even more new features to improve the current systems. F2F (face-to-face or proximity payment) transactions are the most common way to purchase goods. However, considering the explosion of e-commerce, remote payments are about to become increasingly popular. Mobile payments should revolutionize these two types of transaction. In fact, a mobile phone can replace a wallet for small expenses. For example, if people were to go

to their local retail store they would be able to pay with their mobile handset directly at the POS (Point-of-Sale). For remote payments, the major benefit for the consumer is that there is no need to be present at the time of the purchase. Another possibility is the payment of goods on the Internet via a mobile device.

To have a better understanding of the different characteristics and of remote payment means, Thomann presents the following table (Table 2). He includes the different risks, the payment time and the transaction costs (Thomman).

	credit risk (merchant)	fulfillment risk	payment time (cardholder)	transaction cost
Check	high	high	later	medium
Pre-paid	low	high	before	medium
Post-paid	high	low	later	medium
Debit card	issuer's	low[b]	now	medium
Credit card	issuer's	low[b]	later	high[c]
E-Purse	very low	high	before	low

a. Mail Order (MO), Telephone Order (TO).
b. Fulfillment risk for debit/credit is low due to chargeback rights.
c. Credit card transaction cost is high due to commissions.

Table 3: Characteristics in Remote Payments (Internet, MO/TOa)

Moreover, Forrester's research predicts some values of mobile payment transaction types considering two distinctive dimensions: size of payment and location. Table 4 illustrates this forecast done in 2001 for Europe (De Lussanet 2001).

	2000	2001	2002	2003	2004	2005
Micro Remote	< 1	< 1	1	4	12	27
Macro remote	5	24	162	619	1'890	3'014
Micro P2P	26	87	423	3'370	4'440	5'005
Macro P2P	19	67	314	1'387	5'241	12'674

Table 4: Past, Actual and Projected Value of M-Commerce Transaction (in million), Europe

The potential of proximity or peer-to-peer (P2P) payments seem to be the best opportunity for the long term. Furthermore, in the short term, micro peer-to-peer payments offer the best revenue.

The benefits of using a wireless device to pay are narrowly linked to the convenience of using an easy, real-time, cashless and frictionless payment system. Consumers expect mobile payments to be easy-to-use, fast, personalized, secure

and universal. The challenge for a wireless device is that it should be able to conduct any transaction, anytime and anywhere.

However, mobile payments also bring many problems to solve. One of the most crucial issues is the price that a mobile payment will be charged. More than ever, consumers are reluctant to pay more without having an added value service; arguments like convenience and security will probably not be attractive enough. Moreover, Dahlberg argues that, from the businesses' perspective, SMS and value added services are considered expensive, and operator's and banks' transaction fees irritate some consumers (Dahlberg 2002). Hence, service providers have to find the right revenue model if they want the mobile users and merchants to adopt their new mobile application. Otherwise, there is no chance that the mobile payment solution will succeed. Technology suppliers also have the mission to design mobile devices that are easy-to-use, fast and reliable in a payment context. Without a convenient device, the consumer will not make any effort. A very popular m-commerce example is the book ordered in 40 minutes using a mobile phone!

In order to determine the success of a payment system, de Clercq proposes some commercial, juridical and technological requirements (de Clercq 2002).

Commercial	Juridical	Technical
Universality	Digital signature	Network technologies
Instant connectivity	Current legislation on payment systems	Service technologies
Personalization		M-commerce terminals
Convenience		M-commerce security mechanisms
Expenses		
Protection of the privacy		
Security		

Table 5: Some Requirements for the Success of a M-Payment System

To have a better understanding of the technologies in mobile payment, we propose three dimensions. This mobile payment framework is inspired from a m-business application framework designed by (Camponovo and Pigneur 2003).

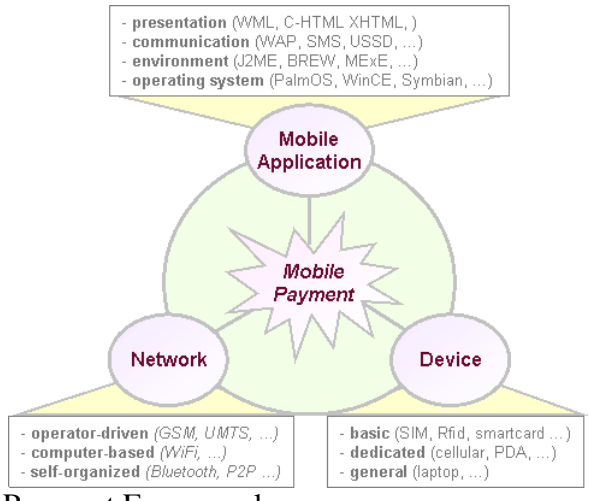

Figure 5: Mobile Payment Framework

First, «Network» gathers the technologies used in a wireless network infrastructure. Then, «Device» represents the user wireless infrastructure. Finally, «mobile application» describes the technologies used mostly by mobile application developers, mobile application service providers and content providers.

Further details and descriptions on technologies that enable mobile payments can be found in (Seah et al. 2001).

Most mobile payment initiatives have thus far been launched by credit cards issuers, telcos or mobile services providers. Mobile payment infrastructures were based on four-parties models which gather the consumer, the merchant, the trusted third party and the payment service provider. The main phases of a mobile payment are described below in Figure 6 (Buhan et al. 2002).

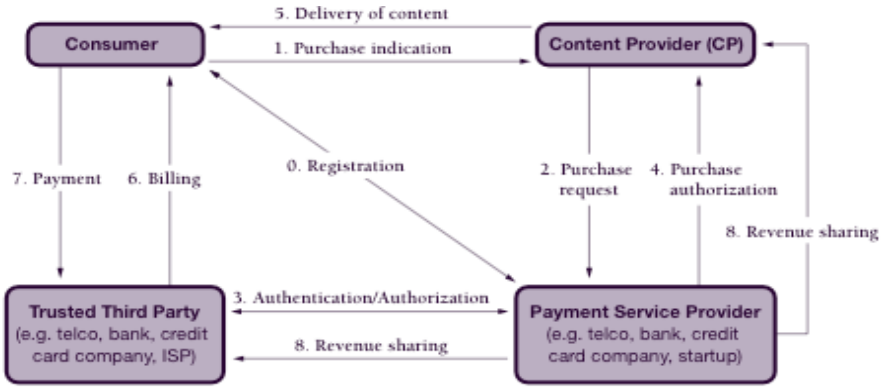

Figure 6: Mobile Payment Main Phases

Security is a critical factor for mass adoption. Consumers need to use a payment means that they can trust. Since data are sent wirelessly, there are no guarantees of total security. For micropayments, the problem is not as important as for macropayments. Since simplicity and speed are crucial, then security features need to be aligned with the financial risk that customers and merchants take during the transaction.

The benefits for customers to use a mobile device to make their purchase in a retail store are related to speed and convenience. Both would improve payment experience at the POS. For example, consumers will not lose time looking for their credit card or cash in their wallet. They will not have to slide or insert their card into the reader. They will not wait for the credit card to be processed and authorized. Then they would not have to sign a receipt. Moreover, they will not forget their credit card in the reader or on the counter at the end of the transaction. During that scanning and payment time they will be able to pack their purchases into bags.

Many retailers are already working on self-checkout. This will definitely accelerate the checking out process. Each items purchased will be embedded with a RFID tag. The consumer will just pass through a reader, which will make an inventory of every item in the caddy. Moreover, consumers could pay directly with a RFID payment device.

3.1 Case study: Paybox

As an illustration, Paybox is a company that offered mobile payment services in Austria, Spain, Sweden and UK. Paybox is an open and neutral -- i.e. not tied to a particular network or bank account -- payment intermediary aiming at banks independent from telecom operators (Carat 2000). For the moment, Paybox only processes direct debits, which is cheaper than to process than credit card payments. Therefore, funds in Paybox transactions are drawn not from credit cards, but from the customer's bank account (Card Technology Today 2002). Moreover, the system does not depend on PKI structures and transmits the PIN now via DTMF-procedures (Dual Tone Modulation Frequency), but could migrate to a PKI-structure if widely available (ePSO 2001).

Paybox is a server-based solution because the system links a mobile device or subscription to a separate bank account or credit card that has been pre-registered with the payment service (Jones 2003a). However, we must underline the fact that Paybox represents a perfect example of how a bank is trying to control the entire value chain of mobile payment. In fact, mobile network operators provide their communication infrastructure but do not take any active task in the payment transaction.

To subscribe to the Paybox service, consumers have to fill out a form. Once the application is approved, the consumer can use Paybox for a range of transactions, including (Card Technology Today 2002):

- Payment for e-commerce
- Person-to-Person (P2P) transaction (i.e. the user can send money to another individual in any country where Paybox operates)
- Payments to bank accounts (i.e. for bill payments and P2P transactions with non-Paybox users)
- Payments in the mobile world (e.g. in taxis and for delivery services).

The customer's requirements for using Paybox are the possession of a mobile phone, a bank account and a Paybox registration.

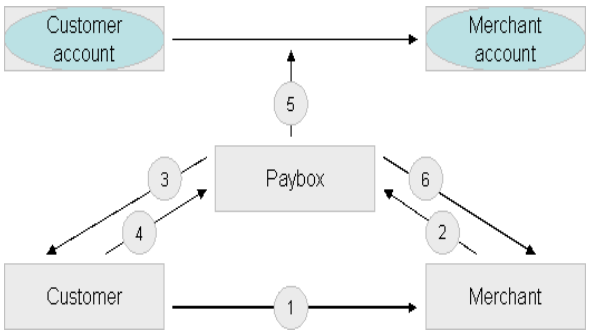

Figure 7: The Paybox Scheme

The typical payment transaction using Paybox would go like this:

1. The customer gives his or her mobile phone number to the merchant
2. The merchant transmits to Paybox the phone number and the price
3. Paybox calls the customer and a voice message asks for authorization of payment
4. The customer authorizes the payment by entering his or her PIN
5. Paybox informs Deutsche Bank to settle the payment via the traditional payment system (direct debit)
6. The transaction is confirmed by an automated voice or SMS.

The advantage of such a system is that only the mobile phone number, not the bank account number or credit card details, are transmitted. Moreover, consumers can even request a Paybox alias phone number if they do not feel comfortable giving their mobile phone number to merchants. Therefore, Paybox tries to improve the customer's trust and payment security.

The current business model is to charge a small consumer subscription fee (5 euros per annum) and charge merchants for each transaction with an average commission of around 3 percent, which is comparable to credit cards (Jones 2001).

At the end of the year 2002, Paybox attempted to find new partners to secure its future. In fact, Paybox looked for 10 million euros in external funding to provide operating cash and potentially to replace Deutsche Bank's dominant holding (Jones 2002).

On 23 January 2003, Paybox announced that it had failed to find new partners and funding. Consequently, it will wind down its mobile payment processing activities in all countries except Austria, where Mobikom Austria will take on the business (Jones 2003b). Paybox will actually become a new company (Paybox Solutions), which will supply technology and services for mobile payment systems.

Gartner's diagnosis for Paybox's failure is the lack of demand due to the slow growth of m-commerce in Europe, the European economic climate and the fact the mobile payments do not yet offer a sufficient advantage over conventional systems such as credit cards (Jones 2003b). Moreover, Paybox cited the slow development of the market and the industry's lack of co-operation -- particularly among banks and telecoms operators -- as the major factors behind the decision to exit the UK market (Thomas 2003).

4 The Proposed Architecture

We propose an architecture where customers can use a mobile device to pay. This device replaces also a membership card that is used in most common loyalty programs in the retail industry. Consequently, consumers have an all-in-one device to pay their purchase at the POS. The POS will be equipped with a wireless terminal that can communicate with the small client device. Since POS are connected to mainframes to store sales data, they can retrieve and send information about the customer who pays. The cashier will use the data stored on each client to verify the identity of the customer. The data sent to the retailer mainframe will be collected and analyze with a data mining tool. This way, the

retailer will be able to use a CRM system to improve its customer service. A website dynamically built on the preferences of each consumer will enable a one-to-one marketing. Therefore, customers have personalized offers and coupons for their next purchase. The whole system is illustrated in Figure 8.

The mobile device that retailers can offer to their customers has to be cheap. Using a mobile phone or a PDA with Bluetooth or IrDA is possible, but many complications can arise during the payment process. For example, the battery level of the mobile phone could be too low to conclude the transaction. Then, with the heterogeneity of mobile devices on the market, retailers will not be able to support the compatibility of every existing device. Therefore, it seems more adapted for the retailers to offer a device they can support. Another advantage of using a small proprietary device is that fraud will be even more difficult. The idea to propose a key ring is that consumers can always carry it with their keys. Hopefully, the key chain will be light and small enough to be convenient. Another benefit would be that the consumer would not have to look for the device during the checkout process. It would work even if it stays in a pocket or a bag. A significant advantage that RFID has on its competitor is that passive tags do not need any source of energy onboard. There will be fewer problems due to power issues.

The POS will be equipped with a cash register that can communicate wirelessly with the customer's device. As explained before, retailers already use POS with powerful and flexible operating systems such as Unix, Linux and MS-Windows. Therefore, only a simple hardware and software update should be necessary for the cash register to be compatible with the proposed architecture. The integration of this architecture should not be a colossal investment but, on the contrary, should represent the normal budget for POS upgrade.

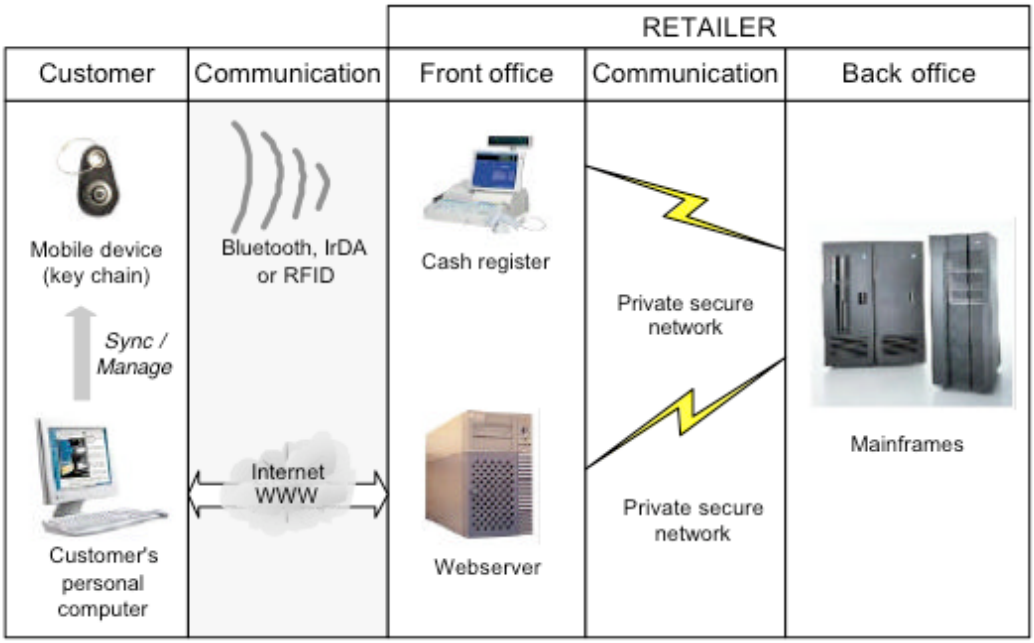

Figure 8: The Proposed Architecture Illustration

In fact, collection of data is already done in datawarehouse for most retailers. However, those who use a CRM system do not necessarily exploit the data to build a dynamic website for their consumers. Moreover, few retailers show the data collected to their consumers. If retailers let their consumers observe and manipulate their data, there will be a new kind of relationship between them. Retailers will help consumers to visualize the history of their purchase and also optimize their expenses by giving them personalized offers and coupons. To highlight the benefits that consumers have using the loyalty program, the amount of savings will also be shown.

Moreover, the website can be used to manage the member's account. A very simple interface will allow any member of the family to manage the account. Consumers will be able to add money on their account using their credit cards. They will also allow the authorized people to pay with the same key chain. Indeed, the account can be used by a group of individual. Computers located in the customer service area would be connected to the Internet to allow anyone to add money or manage their account directly from the store. Since the credit card number is already stored in the database, consumers will not need to have their wallet or their credit card with them. This will give the chance to customers who forgot their wallet or do not have enough money on their account to shop conveniently, given that they have their key chain on them.

To enhance security, the POS will display all the information attached to the account defined by an ID. This number will be encoded in the mobile device. It will be transmit to the cashier terminal when a payment is made. The cash register will retrieve all the needed information for the datawarehouse where all the data are stored. A picture of the owner will be display to enable verification the identity of the consumer. There will be also a list of other authorized people attached to that key chain in case the buyer is not the principal owner. Further biometric solutions can be possible to enhance the security of the payment at the POS (Walner 2002). This would limit a risk of financial fraud, which retailers do not like to take. The risk will be also limited because the key chain will function like an e-purse. The money is loaded on the account through the website. The great benefit about centralized data is that even if the customer loses the device, the money is still on the account. Moreover, with the picture identification, fraud becomes very difficult for thieves of mobile devices.

This solution is based on a proximity payment scheme, which is independent of a third billing party. Therefore, we avoid all the annoyance due to a mobile network operator infrastructure. For example, if the payment is made through a mobile network operator (e.g. GSM, GPRS, UMTS, CDMA), there can be reception problems for the client device. Another benefit when bypassing a third-party is the absence of connection and transaction fees.

Since POS will be connected to a private secure network, the data transmitted will not be a vulnerable as a wireless communication. The only data sent out in the air is the identification number of the account. Paybox also uses a similar approach, but only the phone number is sent. All credit card information is stored in a secure database at the mobile payment service provider or at the bank.

One of the most essential components of the solution is the website, which is powered with a customer relationship management system. The main importance of the website lies in the strong opportunity of using a one-to-one marketing strategy which would increase sales and loyalty. Customers will find personalized coupons based on their previous purchases. This functionality brings the user a feeling that the company knows the customer personally. This will probably improve the perceived quality of customer service. In addition, retailers will have higher profit and lower cost of keeping profitable customers, which is much higher than the acquisition cost. The ultimate objective of couponing will be to keep the customers out of the competitor facilities and therefore creating a "addictive" loyalty which has not been reached with current membership schemes.

To summarize the benefits of this architecture, we propose Table 6.

Simple	The payment process is very simple. First, the user arrives at the cash registers. The account number of the consumer will be transmitted to the wireless-enabled point-of-sale terminal. Once the retail employee authenticates the person (photo-based recognition), the cashier gives a receipt to the consumer.
Fast	This architecture simplifies the process by decreasing the number of operations the consumer and employee has go through.
Secure	During transmission, only the encrypted account number will be transmitted. This diminishes the risk of credit card fraud. In fact, the credit card number is only transmitted during the update of the account on the retailers website.
Convenient	Do not have to have the wallet and credit card ready while packing the goods into bags.
Personalized	Subscribing to the membership program enables the consumer to get personalized offers and rebates. The retailers will therefore increase the loyalty of their consumers.
Multifunctional	The device combines a means of payment and a membership card.

Table 6: Benefits of the Proposed Architecture

As we can see, this architecture fills many conditions that can push consumers to adopt a new payment system combined with a membership scheme.

However, a few things can limit the adoption of such a system. For example, privacy could be one problem. Therefore, we think that the fact that consumers can have access to their purchases' history and can also take advantage of this system by finding better offers and coupons, will limit the impact. Another problem comes from the fact that not all consumers are familiar with new technologies such as the Internet. Furthermore, the key chain will not be a universal means of payment, which makes it less likely to succeed in the payment market. However, since retail stores already offer other non-classical payment schemes and there is not a universal mobile payment device, our architecture could take advantage of the absence of a real alternative.

5 Conclusion

This paper introduced the need to offer a mobile payment solution combined with a loyalty program in the retail industry. Therefore, we made a brief description of the different technology alternatives that exist for proximity payment. Then, we defined what mobile payments are and what the issues are today. We used Paybox to illustrate a mobile payment system that was successfully offered in Europe. Finally, we tried to propose an architecture that would resolve some of the current issues learned from failures in mobile payment systems.

The objective is to combine all the good things about mobile technology while trying to avoid the shortcomings that come with it. Retailers constantly innovate their payment and membership schemes. In conclusion, mobile payment is probably the next step in the electronic payment market and retailers are already working on it.

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