Mobile Payments:

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DELL Services

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Mobile Payments?

As per the Wikipedia, **Mobile payment** or known also as Mobile wallet is an alternative payment method. Instead of paying with cash, cheque or credit cards, a consumer can use a mobile phone to pay for goods and services. The primary models of mobile payments are SMS based, Direct Mobile Billing, Mobile Web and NFC. Disadvantage of SMS based approach is security and non reliable interface. In Direct mobile billing, consumer uses the mobile billing option during checkout at an e-commerce site. In direct mobile billing merchant needs to wait and get the money processed through the operator network which is time consuming. Mobile Web is same as desktop web and customer experience is not so good. NFC is standard is fast catching up but requires NFC ecosystem i.e. NFC chip in mobile, bank's reader and related payment infrastructure to be built & deployed.

Problem Statement

Merchants are facing difficulties to accept credit card and cash payments at the door steps. The Wireless credit cards machines are expensive and non scalable for volume. Cash settlement at the end of the day with each and every delivery person is another nightmare for the merchants. The exiting mobile technologies do not cater to card present transactions which customer is most comfortable with paying for goods & services.

Market Potential

Estimated 90 million credit card holders are across India. Estimated credit card turnover in India is around 40000 million INR and market is expected to grow by 30%. Estimated mobile payment's in 2009 is 68 B$. Mobile payments are expected to grow 6 folds by 2014.

As per Reserve Bank of India, there are 0.5 million registered merchants across India alone and these merchants are unable to take payments at the door steps or facing the issue of cash on delivery.

Solutions

1. **Mobile POS**

   The traditional PSTN based POS terminal can be replaced with mobile based POS terminal as shown from the following figure's where organized, un-organized and semi-organized sectors can use mobile phones to accept card present transactions and settle cash on delivery.

Large & Small Enterprises:

One busy afternoon at the store.
Long queue at the check out …

- Scans the bar code
- Creates a mobile cart
- Checks out with credit card

Enter the store employee with a mobile POS

Excellent Customer Service

Large enterprises connect with the backend servers to get product details based on bar code scanning and small stores can store the product information on the mobile storage and no backend connection required.

Door Step Delivery

Order a Pizza

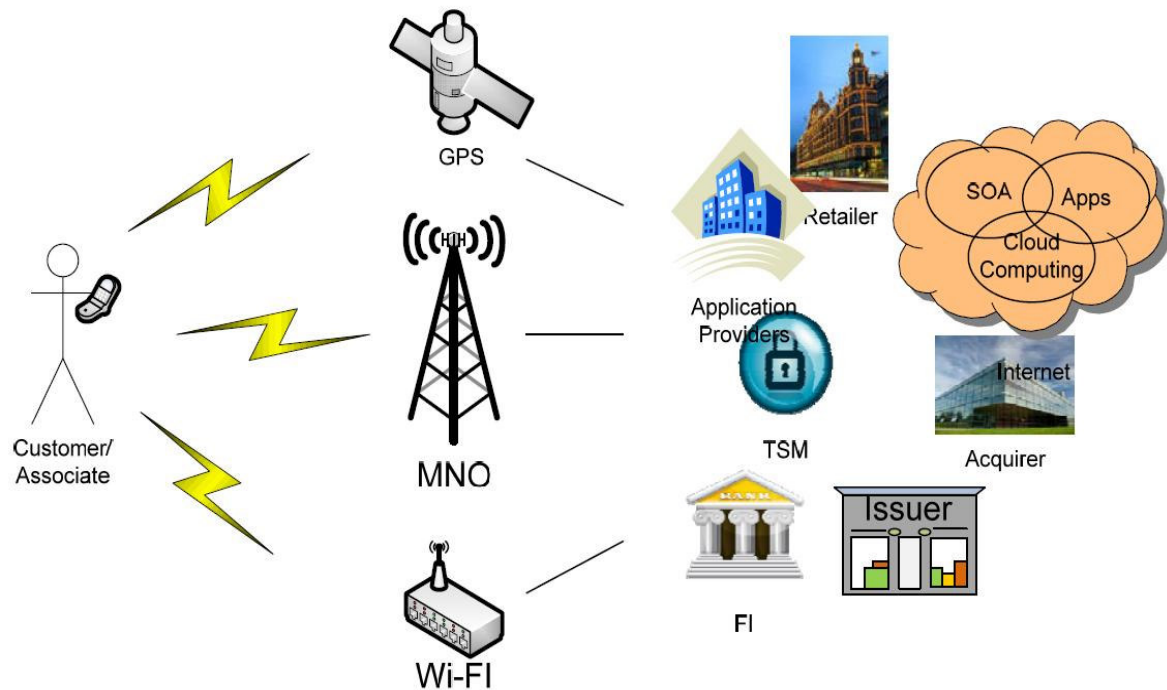- Swipe card or Accept cash
- Print receipt

Pizza Boy back at store

Cash or transaction settlement

Mobile enterprises (Large & Small) can take credit card payment at door step and can settle cash transactions with the delivery person.

Mobile POS Framework

Mobile application and the Bluetooth based printing device is just one part of the overall framework. The POS agent on the mobile connects with the Retailer's backend servers over wireless networks and fetches the product information. The POS agent connects with credit card holder's issuing bank for completing the transaction. The POS agent as well updates the retailer's servers once the transaction is completed.

The POS agent updates the merchant's bank for settling the transactions at the end of the day so that merchant's bank can make a payment on next business day.

Design Goals in Mobile POS

To identify the key design attributes of a Mobile POS system, we investigated requirements from the various banks, Master/Visa and other companies. Also, investigated regulatory requirements from Reserve Bank of India (RBI). We drive following important observations.

First, banks are most concerned about the security and fraud as POS is now mobile and delivery agents can try to hack the system with the help of technical staff or friends. Banks are concerned about the mobile terminal provisioning securely and provisioning information is stored securely in the mobile terminal. Biggest concern is technology is

changing fast and various government's regulatory requirements may swing the market potential up or down.

Dell Mobile POS achieves these goals with following features

Data privacy and security.

Customer transaction data over the bank servers are stored securely using PCI-DSS compliance security standards. PCI-DSS mandates every bank, payment gateways to follow strict security guidelines with strict certifications process. PCI-DSS mandates that no card data to be stored on the cloud and data centers to be secured with strict access & policies. PCI-DSS also mandates PIN transaction security requirements and PA-DSS requirements.

Our approach to certify for the PCI-DSS compliance is to tie up directly with the leading banks for the purpose of payment transactions. All the leading banks servers are already PCI-DSS certified.

The PA-DSS certifications are temporarily stopped by the PCI-DSS for mobile applications and once PCI-DSS committee recommendations are available for mobile application, we would apply for the PA-DSS certification.

We have adopted approach of end to end encryption. The credit card swiper encrypts the data and it's only decrypted at the bank's servers which are PCI-DSS compliance.

No credit card data is stored on the device as well on the mobile terminal.

Terminal Provisioning and reconfigurability

Provisioning the mobile terminal with bank specific parameters like security keys etc is important design consideration. Each and every bank has different key to be used for protecting transaction details data on the device. This data is not credit card data rather transaction data performed on the device and to be synced at the end of the day with the bank servers. This data need to be encrypted using the bank specific key.

New developments in the regulatory committee of various governments might require every terminal to have an unquiet security key.

This makes mobile POS system to be reconfigurable based on the changing needs of the developing and developed countries. This can be achieved using remote device updates after the original provisioning. Some of the benefits using secure reliable updates include:

1. No manual intervention – New keys can be updated without manual intervention

2. Customization – New swiper/scanner devices can be supported

3. Configuration – Configuration provides necessary control to a bank to configure and control the different devices.

4. Updates – Updates enable application to be dynamically updated to enable new features.

Link Availability

The nature of transaction related data to be uploaded to banks at end of day requires reliable, secure and time bound delivery to the bank servers. However, data delivery over wireless cellular networks can be challenging. Links occasionally experience 'stalls' due to loss of coverage and during handovers. Mobile POS overcomes these challenges through design of service protocols that helps quickly adapt to the changing conditions of the underlying network.

User experience and performance

The traditional POS experience is very fast and same is expected from the mobile POS. The wireless link speed varies from country to country which makes it challenging to provide same user experience. Mobile POS overcomes these challenges through design of underlying layer that quickly adapt to fastest link available.

Technology adaptation

Technology is evolving fast and new technologies like NFC and chip cards are becoming popular. It's challenging to keep up speed with technology. Mobile POS overcomes these challenges by adopting approach of modular architecture. In our approach, mobile application and payment infrastructure can be reused with the NFC and card chip technologies. Payment Framework is independent of the swiper device and can complement the NFC and evolving technologies.

Description of Services

Mobile POS defines mechanism for POS services and functions. We discuss some of these specific services

Protocol Definition

Mobile POS leverages HTTPS to build its set of services. The main benefits are that it 1) Allow reuse of the service infrastructure 2) enables easy access to the existing services and 3) provide flexibility to compose new ones.

Terminal Activation service

Terminal activation service enables banks and partners to activate the device and download the secure keys

Remote Wipe

The mobile payment application keeps track of the number of unsuccessful attempts and hacking attempts. Banks and partners VAS servers run the analytics on the transactions data and attempt to fraud can be detected. Bank Servers and partner servers can initiate remote wipe and provisioned data can be erased.

Dynamic code update

This is particularly useful in scenarios 1) Extend the exiting functionality to support new class of swiper devices or a chip based swiper 2) Improves the quality or reliability

Coupon delivery

Mobile coupons are becoming popular. The most challenging difficulty retailer's encounter is reading the mobile coupons from customer's mobile and calculating the discount. The coupons can be delivered through SMS/MMS or Bluetooth to the customer. This coupon can be forwarded to the mobile POS and mobile POS connects with retailer's database to check discount.

2. **Mobile POS, NFC & Beyond**

    NFC is catching up fast with mobile phone users, OEM's and enterprise companies such as Transportation and logistics, Supply Chain, Healthcare and Agriculture . Main advantages of NFC are 1) Mobile Payments 2) Presence Applications 3) RFID.

    The POS payment framework for accepting card present transactions is reusable for the NFC based and chip based cards. Framework comprises of the Dell's android based phones, android 2.3 is released with NFC framework which can be used in mobile payment applications. NFC totally not dependent on the OEM for NFC chip to be integrated in the phone, without NFC chip in the phone NFC can be used with the micro SD and USIM.

    Our approach of terminal provision, dynamic code update, reconfigurablity and security enables the mobile POS to be ready for integration for new technologies.

Key Concerns

1. **Security & Fraud Prevention**

    Banks, governments, Visa/Master and other partners are all concerned about the security and fraud as discussed earlier. We have taken an approach where security is addressed by certifications and a solution in place like remote wipe, reconfiguration and analytics. Our approach is first and foremost is to resolve security concerns.

2. **End user experience**

End user experience is extremely critical. We have taken approach to integrate bar code scanner, printer and swiper in a small customizable device which can be easily fit in pocket or belt of the service provider. We have taken approach to integrate the payment and various other services like coupon collections right at the mobile phone so as to improve the end user experience significantly and in return get excellent customer satisfaction report.

3. **Cost**

Cost of the solution is important consideration. Our approach is providing different options to the customers based on requirements, volume, end user experience expected etc. Solution is customizable as per the requirements of various large and small enterprises and made cost efficient.

Implementation and Status

We have currently built a proof of concept prototype for mobile POS application and integrated Bluetooth card swiper device along with printer. We plan to integrate with various banks for the payment transactions and related certifications. We plan to show how we can provide security and fraud detection and do remote wipe along with terminal provisioning.

Conclusions

The vast opportunity in the financial payments and growth of mobile phones will continue to drive finance industry towards increased mobility. The financial institutions are moving towards more secure systems like chip cards and NFC. But the consumers are not shifting towards these new technologies very fast and new infrastructure needs to be build and deployed which is expensive and time consuming. Moreover, consumers are used to magnetic card based payment system and are ease with these systems.

Mobile POS project is an attempt to bridge this gap. Besides a proof of concept prototype, we are also in the process of investigating other long term, challenging problems in mobile POS including security, technology adoption, dynamic code update and terminal provisioning. We will address above challenges to enable a secure mobile POS system which can bridge the gap between existing technologies and the future payment technologies.

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