

“E-Wallet and its Applications”

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Abstract— In the past few thousand years, the way we pay has changed just four times – from barter system to coins, to paper money, to plastic cards. Now we are on the brink of the next big shift. We now want to introduce the digital wallet, which contains the virtual versions of our existing plastic cards. A digital wallet is a software component that allows a user to make an electronic payment with a financial instrument such as credit card or digital cash and hides the low-level details of executing the payment protocol that is used to make the payment. Moreover it also authenticates the consumer through the use of digital certificates or other encryption methods, stores and transfers value and secure the payment process from the consumer to the merchant. It can hold other than payments like Bank account details, credit cards, gift coupons and reward certificates, loyalty cards offers, etc. In this paper we have discussed various types of E-wallets, technology behind them and their applications in real life.

Keywords— e-wallet, NFC, plastic card, mobile payments

I. INTRODUCTION

With the advancement in technology, things around us have changed drastically. Technology caters to man’s comfort and convenience. With the help of our Smartphone, we can do everything. Be it ordering food or groceries, booking a cab or movie tickets, etc. A digital wallet refers to an electronic device that allows an individual to make electronic transactions. This can include purchasing items on-line with a computer or using a Smartphone to purchase something at a store. An individual’s bank account can also be linked to the digital wallet. They might also have their driver’s license, health card, loyalty card(s) and other ID documents stored on the phone. The credentials can be passed to a merchant’s terminal wirelessly via near field communication (NFC). Increasingly, digital wallets are being made not just for basic financial transactions but to also authenticate the holder’s credentials. For example, a digital-wallet could potentially verify the age of the buyer to the store while purchasing alcohol. The system has already gained popularity in Japan, where digital wallets are known as “wallet mobiles” [1].

II. CHARACTERISTICS AND NEED FOR ELECTRONIC PAYMENTS

A. Characteristics

- 1) More than 40 years of data retention.
- 2) Firewall encrypted security logic.
- 3) Compatible with many supportive hardware.
- 4) No separate card reader is required to access our card.
- 5) Polarity reversal indicator is pre-built in our card.
- 6) Reusability of our card is unlimited.
- 7) Multiple card features are incorporated in the same card.
- 8) External complexities are less.
- 9) User authentication is provided.
- 10) Maximum possible cash.
- 11) All ID information in one location.
- 12) Current balance can be stored and read.
- 13) Universal access.
- 14) Cannot be duplicated.
- 15) Works with all scan types (Barcode, RFID, Strip).

16) Supporting Platform

- Windows Pc running Windows 8, Windows 7, Windows XP
- Apple iphone, ipod & ipod touch with OS version 3.0 & higher.
- Blackberry OS version 4.2
- Windows phone
- Android phone

B. Why we need E-wallet

- 1) For frequent online shoppers, it becomes a hassle to fill out order forms with the same information for every item they purchase. Unnecessary they have to retype credit card numbers and addresses each time. It would be nice if this information could be handled automatically.

- 2) The main objective of e-wallet is to make paperless Money transactions easier.
- 3) Thick, bulky, unmanageable physical wallet.
- 4) Finding particular item is time consuming.
- 5) Evocating a lost wallet is extremely hard.
- 6) Managing multiple monetary and identification implements is not easy. Monetary implements include cash, debit and credit cards and stored value cards while identification includes national or state identification cards and driver's licenses.
- 7) Reducing the chance of theft by having only one item to manage.
- 8) More than 25% of online shoppers abandon their order due to frustration in filling in form. The digital wallet combats this problem by giving users the option to transfer their information securely and accurately. This simplified approach to completing transactions results in better usability and ultimately more utility for the customer [6].

III. TECHNOLOGY

A digital wallet has both a software and information component. The software provides security and encryption for the personal information and for the actual transaction. Typically, digital wallets are stored on the client side and are easily self-maintained and fully compatible with most e-commerce Web sites. A server-side digital wallet, also known as a thin wallet, is one that an organization creates for and about you and maintains on its servers. Server-side digital wallets are gaining popularity among major retailers due to the security, efficiency, and added utility it provides to the end-user, which increases their satisfaction of their overall purchase. The information component is basically a database of user-input information. This information consists of your shipping address, billing address, payment methods (including credit card numbers, expiry dates, and security numbers), and other information.

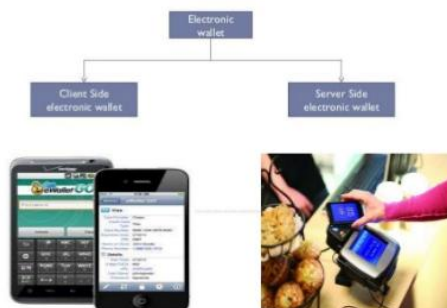


Fig. 1 Types of e-wallet

A. Secure communication medium

- The main technology used for the digital wallet is Near Field Communication (NFC). It allows with a simple “tap” of the device

onto a reader, to exchange data between the two device.

- NFC acts as the communication medium for exchanging monetary and identification information, such as credit card numbers and receipts, with other devices [9].

B. Fast secure authentication and secure tamper proof storage

- Secure programmable chips in cell phones will allow the cell phone to securely store both “digital cash” and the phone owner’s monetary and identification implements.
- This assumes that the cell phone owner secures his digital wallet with a good password. This chip will ensure that thieves are unable to access the digital wallet embedded in the stolen phone. Biometric scanners could also be integrated into cell phones and used for quick and easy authentication.

C. Operations on NFC

- It is based on inductive-coupling.
- It works using magnetic induction between two loop antennas located within each other’s ‘near field’.
- Operating frequency 13.56 MHz at data rate 106 Kbits/s to 424 Kbits/s.
- NFC use an initiator and a target; the initiator actively generates an RF field that can power a passive target.

IV. ARCHITECTURE OF E-WALLET

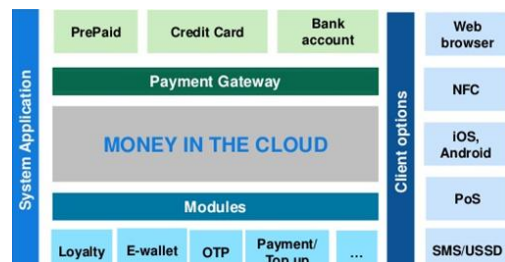


Fig. 2 Architecture of e wallet

V. TYPES OF E-WALLET

1) *Closed Wallet*: It is a software or application which is issued by a company exclusively for its customers. Myntra a venture managed by Flipkart has it’s own wallet where the money only related to it’s transactions are managed. You can either use those money to myntra itself or you can transfer to your bank account.

2) *Semi Closed Wallet*: They are same as closed wallets but they can be use to buy products and even perform financial transactions at predefined vendors.

These vendors are in contact with your wallet service providers. They donot allow you to withdraw cash. Paytm is semi closed wallet which can be used at multiple locations. For eg: to pay utility bills, shop at various websites and can even be used to pay bills at some vendor shop.

3) *Open Wallet:* They can be used to purchase goods and even perform financial transactions including withdrawing cash, transfer funds. For eg: credit and debit cards.

VI. DIFFERENT COMPANIES OFFERING E-WALLETS

A. Google e-wallet

Google e-wallet currently available for purchases in the US, lets you save all your loyalty cards in one place. You can also make payments online at any merchant that has a card with credit attached to it. It offers tap to pay for NFC enabled devices.

B. SQUARE wallet

Square Wallet lets you think a debit or credit card to your Square account and pay with it anywhere Square payments are accepted. If someone sends you a Square gift card you can also store that inside the Square wallet app for use whenever you are at that merchant.

C. PayPal

Paypal is one of the most accepted payment services on the planet. Lots of physical merchants can also let you pay with Paypal, no actual credit card needed. The Paypal app can use your location to determine what merchants around you let you pay with Paypal.

D. ISIS

Isis is available to both AT&T and Verizon customers and offers the same tap to pay functionality Android users currently enjoy with NFC. You will need to buy an accessory case to make Isis work. After that you can add all your payment cards and start tapping to pay at literally thousands of merchants with tap to pay terminals [8].

VII. MAJOR E-WALLETS IN INDIA

- PayU Money
- Pockets by ICICI Bank
- PayTM
- Oxigen Wallet
- Mobikwik Wallet



Fig. 3 E-Wallets in India

VIII. MERITS AND DEMERITS OF E-WALLET

A. Merits

- Digital wallet is a free app for Android phones.
- Free coupons are available from several sites.
- Prepaid offers are also available from Google Offers Hub
- Both savings and checkout are easier and faster.
- Designed to work with all retailers, networks and banks.
- Lower costs
- Competitive advantage
- Modern
- Convenience
- Easy mobility
- Ease of use
 - Withdraw or deposit value by telephone
 - Pay the exact amount, no fidding for change.
 - No signature required.

- Immediate payment.
- Flexibility
 - Transfers value by telephone
 - Pay person to person.
 - For low or high values.
 - Multi-currency capability.
 - No age limit, so suitable for all the family.
- Safety and control
 - Spend only what you have.
 - Read your balance.
 - Load value at home.
 - Lock your card or wallet.
 - Keep track of what you have spent and where.
 - Customer is traceable if a lost card is found.
- Accessibility and convenience
 - Cash machines and telephones give more access points to funds in bank account.
 - Available 24 hrs/ 365 days.
 - Cash machines and telephones cannot run out of electronic cash.

B. Demerits

1) *System Outages*: Information for digital wallets is stored on the cloud of business servers; therefore the risk of a system malfunction or shut down is always present. As a result, business will not be able to process payments or they will become increasingly slow due to high traffic in the servers.

2) *Security*: Companies must ensure that their customer's information is encrypted and well protected. One of the biggest concerns of adopting a digital wallet application is "will my information be safe"? This is the hurdle that companies must face and as a result, must develop security systems that are as safe and full proof as possible to avoid potential security issues.

3) *Stake holder dynamics*: Satisfying the business and strategic goals of multiple stake holders such as banks, retailers, regulatory bodies, is difficult.

4) *Compelling user experience*: A user friendly wallet interface, easy to use and intuitive is difficult to produce [11].

IX. APPLICATIONS

1) Consumers are not required to fill out order forms on each site when they purchase an item because the information has already been stored and is automatically updated and entered into the order fields across merchant sites when using a digital wallet. Consumers also benefit when using digital wallets because their information is encrypted or protected by

a private software code; merchants benefit by receiving protection against fraud [2].

2) *Osaifu – Keitaiis* one of the most known e-wallet in the world. In Japan, mobile phones are used to pay for fares or for other electronic cash transactions and as an identity card.

3) Google launched the Google Wallet application with its Nexus S 4G.

4) In France, the Cityzi service is used in electronic cash transactions.

5) One of the most "complete" e-wallet services applied nationwide is Malaysia's "MyKad", where the system is compulsory for everyone, being used as the national ID format.

X. CONCLUSION

We can use e-wallet for shopping of goods or services, payment of utility bills and we can even perform financial transactions. E-wallets come really handy while performing online transactions. Some famous e-wallets are Paytm, Oxigen wallet, M-Pesa, Chillr, Freecharge, etc. They are going to be future. India is heading towards cashless economy and we are in real need of such options for payments and to perform our financial operations.

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