

An Efficient E-Wallet Mechanism Protecting Privacy, Security and Unobservability

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Abstract- Contactless payment systems are one which uses credit and debit cards, key fob, smartcards and other mobile devices that use radio frequency identification or other types to make the payments a secured one. It is not the one which involves close physical proximity. It involves wifi networks or broad area cellular network to perform the transaction. In this paper we present a exploration on the selected terminology of contactless payments, its genealogy, the securities involved on contactless payments. The present study relates generally to transaction processing techniques and associates systems. The paper contributes to study of the various digital payment mechanisms and their transparency in doing the financial transactions. The study relates to methods and systems for monitoring immediacy contactless payment transactions and assisting consumers with use of their payment gateways in carrying out the proximity contactless payment transactions.

Keywords- Contactless Payments, Smartcards, Mobile Devices, Near-Field Communication (NFC), Point-of-Scale (POS), Radio Frequency Identification (RFID)

I. INTRODUCTION

Our country has witnessed a surge in the digital payments after the demonetization action carried out by our government. But still our country is mainly dependent on the cash dependent economy and there is a long way to go ahead to be full digital. The debit cards, credit cards and internet banking are the technologies which drive the economy in a cashless mode. Still, to bridge the gap in making digital payments contactless payments using Plastic cards enabled with NFC play a vital role [1]. Everyone holds a smart phone today; hence many online payment apps play a new role in the digital economy of the country contributing to the contactless payment technology. This paper gives the history, the pro's and con's of the digital payments in the first section, the architecture behind the digital payments are explained followed with the categories of the digital payments. The paper also discusses the avenues where the digital payments can be used in transparently defining the financial services. The various measures to efficiently to promote the digital payments scenerio is also mentioned in the paper.

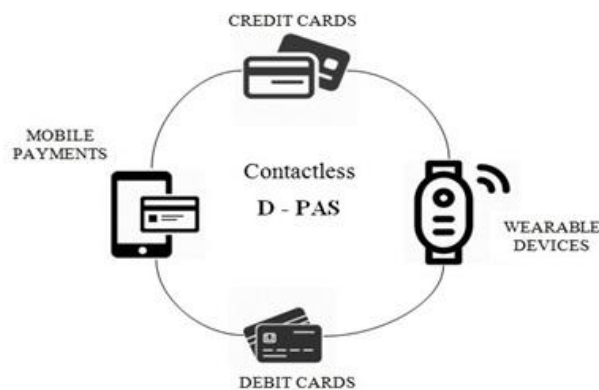


Fig. 1: Devices involved in Contactless Payments

II. HISTORY OF DIGITAL PAYMENTS

Mobile was one of the notable early adapters of similar technologies which offered speed pass contactless systems. This helped in participating mobile gas stations as early as 1997. In the recent days telecom providers has started to take part effectively with the use of near field in contactless payments. It was revealed in recent surveys that contactless payments have reached 90% of saturation point but another survey says that it has reached 94.6% which is termed as great success. Now contactless payments are widely done on partnership method.

III. PRO'S AND CON'S OF CONTACTLESS PAYMENTS

Pros:

- It is one of the fastest methods of payments.
- Convenient as you can make payments easily.
- Retailers cannot access your information.
- Time can be saved as you can make your transactions fast.
- You can redeem the points that come to your card as a reward for the purchases you do through the card.
- We can maintain our payments, balance etc.

Cons:

- Only a few have adopted this because they think it is not safe.
- Risk of spyware or malware attacks.
- The transaction limit cannot be adjusted.
- Taxes are being deducted in some transactions.

IV. ARCHITECTURE OF CONTACTLESS PAYMENTS

The Payment server contacts the bank server and it gets the necessary information from that server. Payments can also be done by the mobiles that have NFC and also that does not have NFC. Contactless reader sends a message to point of sale which would be received by payment server and it transfers to the bank server and if it is done through the mobile it is done directly to the payment server and it transfers to the bank server [2]. Thus in short the server receives the message and transmits the message which makes the user to feel easy and comfortable to use contactless payments.

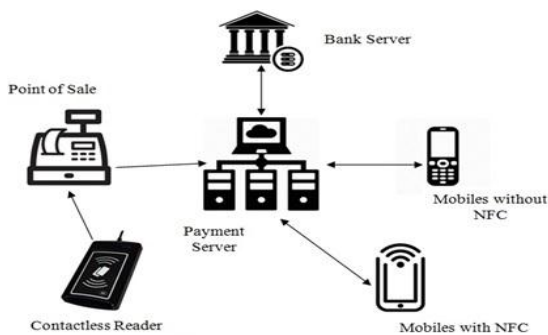


Fig. 2: A structural design, the use of contactless smart card or payment device

V. CATEGORIES OF CONTACTLESS PAYMENTS

Mobile-oriented: Recent users of mobile devices, gain the facility to shell out for transit fee, groceries, purchase of other products and services thus by tapping or wave around a mobile device near a merchant's contactless payment gateway that is POS terminal, reader like a device. Such nearness mobile payment gateways are typically based on NFC or any short range radio wave technology and in general supports the existing infrastructure of contactless

point-of-scale terminals that was originally conventional to support contactless credit and debit card payments [3]. Mobile payment transactions done at a contactless POS terminal using NFC devices will be monitored at a backend server machine. The server receives data monitored during transactions, with reference to proximity payment transactions; determine the observational data with one or more characteristics common to mobile payment transactions. The backend system verifies the proximity whether the contactless POS functions within the predetermined parameters and automatically concern request for servicing the POS terminal.

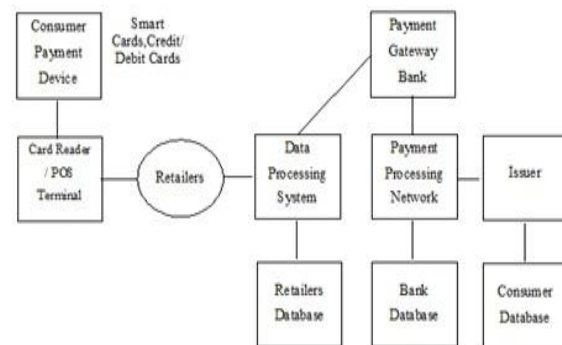


Fig. 3: Pictorial representation of an embodiment of the use of contactless smart card or payment device

Card-oriented Payments: A method for processing transactions via a mobile payment device includes a near field communication contactless element, such as an integrated circuit chip. Though customer's payment methodology may be a credit or debit card, it may also be a 'smart card' or a chip. Smart card is generally defined as a portable payment card embedded along with a processor and one or more memory chips with programmable or non-programmable logic. A contactless smart card is a device that incorporates means of communication with a RFID kind of card reader or a terminal with point of sale without the need for direct physical contact. It may be effectively swiped by approaching them close to a card reader device or a terminal. This technology usually communicates with a card reader or a terminal using RFID, where proximity to card reader or system terminal enables data transfer between reader or chip and the reader or terminal. Nowadays contactless cards have been introduced in banking and other applications, where they have implemented, not necessarily to remove the card from the user's wallet or pocket in order to swipe in a transaction. System automatically detects its presence, since the contactless card emits radio signals which in turn get captured by card reader or terminal. This contactless card or chip may also be embedded or incorporated into a mobile device or PDA. Because of such rapid growth in contactless payments, standards have been implemented that regulates the entire operation and interface

for contactless smart cards. The card oriented payments are safe in some point of view as we can get anything from any part of the world. A contactless card payment will always have a RFID module, allows reading without the help of the

VI. AVENUES FOR CONTACTLESS PAYMENTS

Online Shopping:

The e-wallet mechanism has witnessed a rapid growth over the last two years. E-wallet usage is considered to be dependent; about 4/5th of the monthly users, now use it weekly. This usage is driven by ease of use, discounts, and their absolute ubiquity of the e-wallets. Bill payments and online shopping are the highest spend categories of e-wallets. The payment applications have adopted ISO 14443 standard for contactless smart cards. Because of the use of a common standard, they have developed a desire to utilize a bank-issued contactless smart card as a commerce payment mechanism at a point of sale.

In standard mechanism, an authorization request message is generated while a consumer purchase goods or service at a POS using a contactless smart card. This case, the consumer device may be a dual function smart card, authorization message can be sent from POS terminal to the merchant's acquirer, to a payment processing system, then to an issuer. This authorization message may be secured using a standard encryption method like 128-bit SSL or other equivalent algorithm to prevent data from unauthorized access.

Transportation: Tollgates are the avenues where the contactless payments can be used. It was firstly announced in NHAI [National Highway Authority of India] Manesar toll plaza in New Delhi. The company claims that contactless payments are "open loop" which can be worked on near field communication technology. It allows the payments to be made with a tap at the terminal. Transport or a transit system includes metro, cars, ferry and tolls that are utilized by millions of people regularly [4]. The more efficient, reliable, cost effective transit is a basic necessity in modern metropolitan cities. Contactless smart cards can beneficially replace notes and coins from transit systems. Not only the smart cards payment systems are fast and efficient but they help us reduce the cost of maintenance. Foremost transit systems around the world are replacing existing payment system to contactless payment mechanism based on smart card technology.

The Transportation platform further configured so that consumers may register or set up a preponed fund transit accounts which get linked to their contactless smart cards [5]. The preponed funded accounts can have currency balances, ride based entitled balances or time schedule based balances, or pay-per ride tickets, maximum number of ride per tickets and unlimited ride fare tickets. For fare based transactions with such contactless payment smart cards, the

magnetic stripe reader. Contactless payments were once widely used such as in highway toll system. But again now they are trying to bring back in retail stores for buying more conveniently for an average consumer.

transit payment server settles the transactions against the preponed funded accounts associate with the transacting consumers' contactless smart cards.

VII. SECURITIES IN CONTACTLESS PAYMENTS

Depending on the economic space, there may be payment limit on some transaction because of some security problems in contactless payments but sometimes it is not safe because of some fraudsters who have some machines for scanning the barcodes in the credit/debit cards. Methods and machine readable devices are disclosed for securely authenticating a financial transaction utilizing an e-payment credential. With respect to one materialization, a mechanism of authorizing a financial transaction which utilize an e-payment credential may compromise maintaining legal information, identifies an account associated with the e-payment credential [6]. The information can also recognize one or more e-devices authorized to use the e-payment credential. A request to approve the transaction can be received. The transaction can be authoritative based on at least a part of the information identifying the account. Authorizing can encompass determining the e-device presenting the payment credential is the one authorized to use the e-payment credential.

VIII. MEASURES TO PROMOTE CONTACTLESS DIGITAL PAYMENTS

Compared to many other markets, the average Indian consumers is still traditional. Approximately 55% to 60% of all payments at the point of sale are still cash transactions but a gradual change is happening at the moment, and there seem to be a more positive aspect towards new type of digital payments. With rapid growth of smart phones and smart devices, NFC technology introduces us a new way of payment for goods and services; a one step payment gateway makes transactions easier, faster and safer. Contactless payments roughly with NFC technology are taking a new phase in the development. Organizations and banks around the world are working together to introduce payment method, and early adopters are much satisfied. Using contactless payments we can reduce some amount of risks involved in cash transaction. When all the people are made to be aware of these kind of transactions, this can be made a grand success by promoting in a large scale.

IX. CONCLUSION

The contactless payments are made for faster transactions and sometimes it is more convenient for customers to do shopping in a fast manner without having to wait for a long time for payment [7,8]. The popularity is mainly because of

people who have changed to smart phones who make contactless payments more effective and widely popular. A survey says that by 2021, contactless payments will reach nearly 230 million with a two fold increase over 2016. Contactless payments are very efficient in many ways but there is a small amount of drawback in the security related issues. If the security issues are enriched, then contactless cards will be a boom[9]. If fraudsters are not able to access the details then we can say that contactless payments are very safe and effective for the transactions. Contactless payments can be made more effective and also to be used by everyone in future.

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