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RFID Based Payment System

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Abstract—*Payment systems are the mechanisms that enable smooth transfer of funds between buyer and seller and/or banks. In the modern society, it plays a vital role in circulating funds all over the economy. In this sense, it can be readily said that payment systems are one of the most significant social infrastructures. It has shown remarkable changes in the past two decades. In the early days, the payment among the banks used to be made by exchanging paper payment instructions. However, the evolving customer needs, strict regulatory requirements and continuous innovation are driving the global payments industry to change, resulting in a significant impact on existing technology investments. Due to abundance of cost saving and revenue generating benefits, industry is looking into cashless payment system, that do not require physical contact between the device used in consumer payment and POS terminals by the merchant. This work describes the payment system based on RFID technology which has strong reliance on contactless technology thus having a highest relevance.*

1. INTRODUCTION

India still relies on the independent, national payment systems, a situation which is not expected to change any time soon. With higher level of interoperability achieved, substantial expenses could be saved for the general public as well as for industry and services. The avoidance of currency associated risks improved operating efficiency and contributed to a higher level of transparency, resulted in increased competition and the establishment of a truly Indian market. In a payment system there are four aspects that matter: speed, security, expense and general acceptance/usage. Cash is performing very poorly compared to other possible solutions in all of the first three aspects, but it is unbeatable in the fourth, but most important aspect. General acceptance and usage is the most important characteristic of any payment method and none of the newly introduced and emerging solutions could even come close to cash in this aspect. There were recently a number of initiatives by banks to introduce alternative payment instruments like mobile payment and electronic purse, but none of them succeeded so far; none became a generally accepted payment method. In the last 20 years the payment card was the only really successful, innovative solution that achieved widespread acceptance and adoption, and even its penetration only really accelerated during the past decade.

2. VISION

To reduce the role of cash in small value payment transactions / full substitution is not realistic/ we partially need to rely on new technology, combined with adequate regulations, supported by favourable financial conditions, standardisation and active marketing. E-cash has to be introduced. E-cash is such an electronic payment method, where the actual monetary value is stored on a chip in a plastic card and can also be used in off-line transactions. The new payment instrument is an offline purse that stores electronic value and acts as a kind of stored value account issued by banks. The purse can be loaded remotely from existing bank accounts resulting in full integration into the present financial infrastructure. The remote communication feature will provide direct access to one's bank account allowing customers to always recharge their purses whenever necessary, wherever they are. The use of encryption and digital signature does not only provide a very high level of security much tighter than that of existing solutions but also enables offline P2P money transfer and definition of funds which are earmarked for special purposes. The security architecture will also be used to ensure protection of sensitive personal information and to prevent misuse of user or transaction data. Besides being cheaper and more economic than the traditional paper money, the new e-cash would have additional benefits, like increased security–would comply with anti money laundering regulations–like contribution to the whitening of the economy, and to health and environment protection.

3. RECOMMENDED ARCHITECTURE

The below are assumptions and dependencies that are taken into consideration for designing architecture.

- We assume communication between tags and readers to be error-free
- As wireless communication is typically prone to static noise, we assume appropriate mechanisms, like ARQ techniques, to be implemented on lower communication layers

- Information exchange between two devices is encrypted
- RFID cards and reader are provided by the same financial institution
- RFID reader is installed in the shop's point of sales counter

4. ABSTRACT CONCEPT

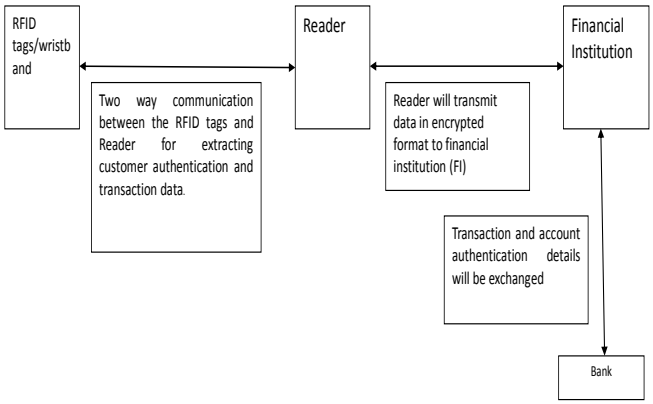

Fig. 1: Gives the abstract concept of the application. RFID reader reads the user details stored in the card. This user details are authenticated by financial institution for making the payment successful.

The user enters his name, the merchant's from whom the purchase is being made and merchant Id which would be assigned to them by the financial services institution. In the corresponding fields in the application interface both the user's and the customer's ID's are verified by the financial institution and they are allowed to proceed further. The user confirms the net total and select bill pay option on application interface. The financial services institution verifies that the required amount is present in the user's account via the corresponding bank. Once the validation has been performed, application performs the payment and the financial services Institution sends confirmation of the said payment via text message to both the user and the merchant.

5. PAYMENT PROCESS

The payment process can take place in two modes online mode and offline mode. Online mode can be used where transactions is ment to be in real time whereas offline mode can be used to complete payment process in batches

3.2.1 Online Mode

Step 1: Customer places RFID card in front of the RFID reader. Reader reads all the necessary information from the card to initiate the payment process

Step 2: Customer Items are scanned and User Interface displays list of items to be purchased along with total amount of the Bill

Step 3: Customer verifies details on user interface by clicking on "Transaction Approval". This will enable the

Financial institution to perform merchant and customer authentication

Step 4: A transaction with the customer's and merchant's authentication details shall be sent to the respective bank for account related matters

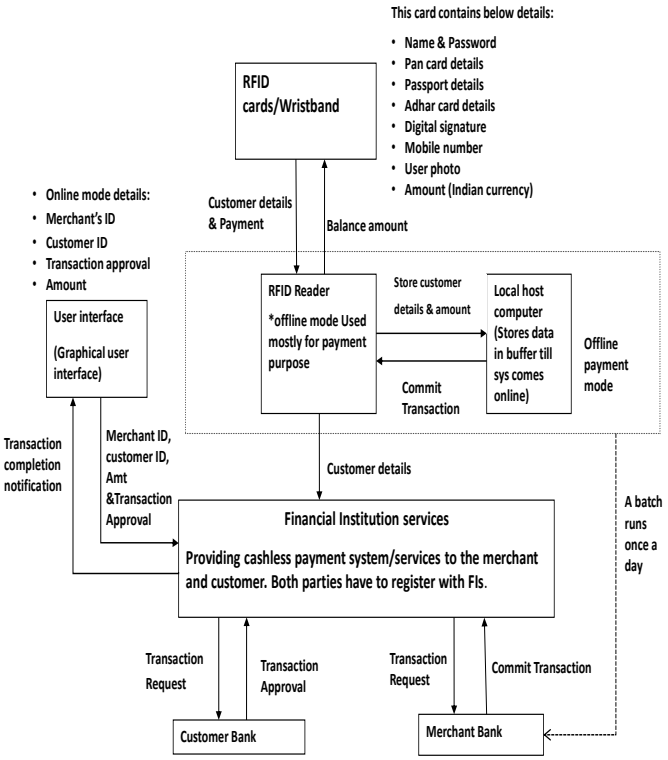

Fig. 2: Describes the two modes (Online and Offline) that can be used for payment process.

Step 5: Once it has been verified that the transaction can be made as per account details and bill requirements

Step 6: Once the transaction is committed and preserved, the relevant notifications are relayed to the customer and the merchant

3.2.2 Offline Mode

Step1: Customer places RFID card in front of the RFID reader. Reader reads information (Customer name, Pan-card details, mobile number and amount) from the card to initiate the payment process

Step2: Local host computer will verify the amount in the card. If amount in the card is greater than required amount it will store the details else it will show an error message

Step 3: A batch process will run every day so that stored amount is credited into merchant account

6. GAP ANALYSIS

From technology point of view and in theory, everyone knows that cash is outdated, expensive and modern technology could provide better, more convenient means for payment. However habits are hard to change unless there are great motivations for the change. If the role of cash is to be reduced, all involved parties need to act together and have to be committed to follow a common strategy, this will not be a simple and short task. First the political will is necessary that indeed the move from cash to e-money is desired, with all its benefits and initial difficulties. Financial service providers, merchants and even the regulators need to work together from design, through development and implementation to introduction and evaluation to be able to provide a technologically feasible, convenient, economically viable payment instrument that can be used universally across a number of countries, for a large variety of services and products at most merchants, for any values below a relatively high limit. The public needs to understand that the use of cash is not free of charge and there is no better way to make it obvious than the introduction of charges for cash payments. At the same time it also has to be ensured that using e-cash will be free of charge for both customers and merchants. Merchants need to accept the new payment forms which may necessitate investment from their side. They need assurance that this investment has a good return and as such guarantee cannot be provided they need incentives to carry out the necessary changes.

7. CONCLUSION

In this paper, we have considered the current state of RFID application in business-oriented application area. We described potential benefits of an intensified use of RFID tags in these areas, and are coming up with an analysis of the causes that prevent this intensification. Eventually, this analysis should help researchers and industry to direct their efforts to advance RFID technology itself and its application. In order to identify the most pressing problems that promise the most advancement, if overcome, at a reasonable investment, we tried to judge the issues encountered.

REFERENCES

[1] Mandeep Kaur, Manjeet Sandhu, Neeraj Mohan and Parvinder S. Sandhu," RFID Technology Principles, Advantages, Limitations & Its Applications", International Journal of Computer and Electrical Engineering, Vol.3, No.1, February, 2011 1793-8163.

[2] Shafiq ur Rehman and Jane Coughlan, "An Efficient Mobile Payment System Based On NFC Technology", World Academy of Science, Engineering and Technology Vol:7 2013-06-25.

[3] Ross Anderson, RFID and the Middleman, Cambridge University, paper at http://www.ross-anderson.com

[4] Kamran AHSAN, Hanifa SHAH and Paul KINGSTON, "RFID Applications: An Introductory and Exploratory Study ", IJCSI International Journal of Computer Science Issues, Vol. 7, Issue 1, No. 3, January 2010 ISSN (Online): 1694-0784 ISSN (Print): 1694-0814

[5] FirstData, Payments 101: Credit and Debit Card Payments, A First Data White Paper, October 2010.