Biometric payment is slated to be the next big innovation in the payments industry. Though, several solutions enabling cardholder authentication using biometrics already exist, a full-fledged biometric payment system, where user may pay at merchant point of sale (POS) terminal using impression of a finger—would soon be in place.

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INTRODUCTION

Biometric payments will be the norm for security, convenience, and efficiency in the years to come. Organizations will capitalize on the combined effect of biometrics and tokenization to strengthen security, cut payment fraud costs, while eliminating the inconvenience and anxiety of using and protecting payment cards and card data during biometric payments.

Leading players have foreseen the potential benefits of integrating biometrics with payment platform and are thus focusing on devising a solution that offers benefits such as cardholder convenience & payments security. However, the extent to which biometrics is used in available solutions is currently restricted to either doing cardholder authentication or facilitating Mobile App Login.

This whitepaper proposes a secured biometric payment model using tokenization, which will enable users to pay at Merchants point of sale (POS) with the impression of their finger. Apart from this, this paper will also provide a roadmap on how to address the challenges while implementing this model.
CURRENT STATE OF TECHNOLOGY IN THE MARKET

Much has been discussed about the usage of biometrics on Mobile platforms. Leading industry players such as Apple, Samsung and PayPal have already built payment solutions using biometrics for their respective mobile platforms where users can perform financial transactions using touch ID or fingerprint scans. Additionally, lot of work on biometric authentication has been done in the payment industry. For example, users can authenticate their identity on a bank ATM or a POS terminal using biometrics. As per a press release by Gartner, 30 Percent of organizations will use biometric authentication for mobile devices by 2016. Statistics reveal that the global biometrics technology market is emerging at a compounded annual growth rate of about 21.6 percent. Talking about biometric payments at Merchant point of sale, though, some work has already been done by many companies in a closed-loop environment, a full-fledged open-loop biometric payment platform is yet to be realized.

FUTURE TRENDS

With increasing complexity and availability of myriad technology, biometric system is poised to make our lives more convenient, in unexpected ways. Biometric payments through fingerprint technology will provide consumers with a convenient, safe, and seamless payment experience. It will enable each finger to uniquely identify a customer and represent a payment card. For example, the little finger may represent both ‘Bank of China CUP credit card’ and ‘Bank of America Visa Credit Card’. While making a payment through their little finger, users will need to select the corresponding payment scheme from the terminal.

Figure 1: Futuristic View of Payment Cards in a User Wallet
PROPOSED BIOMETRIC PAYMENTS MODEL USING TOKENIZATION

Biometric Payments Model using Tokenization comprises of the following 3 stages:

- **Stage 1 - Issuer BIN Enrollment**
  Issuer bank enrolls BIN number with corresponding payment scheme’s biometric server (Visa/MC etc.) for participating in biometric payments.

- **Stage 2 - Cardholder Enrollment**
  To enable biometric payment on a payment card, the user will have to first enroll it with the card issuer. The following diagram depicts the process flow of the cardholder enrollment stage:

  ![Cardholder Enrollment Process Flow Diagram](image)

  - Cardholder enrolls for biometric payment with the issuer bank. On the biometric terminal installed by the bank, the user has to first swipe the payment card and then scan his/her fingerprints. This sends an enrollment request containing fingerprints (Biometric Value) and the swiped card data.
  - When the Payment Scheme (PS) server receives the enrolment request, it searches its directory server to validate whether or not the BIN is enrolled for biometric payments. If yes, it sends the card data for tokenization.
• The enrolment data (Biometric Value, Card Token & BIN) gets stored in the enrollment database. This completes the user enrolment process and enables users to use their payment fingers to make biometric payment at merchant point of sale terminal.

• Stage 3 - Biometric Payment Authorization

The following diagram depicts the process flow of a Biometric Payment authorization, initiated by a user by scanning a payment finger on a biometric POS:

Merchants will require specially designed biometric POS to accept biometric payments. An enrolled user chooses the payment scheme (of his/her payment card) from the POS terminal. The user then scans his/her fingerprints and submits the transaction. Authorization message including fingerprint scan (Biometric Value) is sent to the acquirer switching system. Switch routes the message to user selected payment scheme’s biometric server. Payment scheme server looks up enrollment database and fetches card Token + BIN associated to the Biometric Value (BV) of the user. Server routes the authorization message to

Figure 3: Biometric Payment Authorization Process Flow Diagram
the corresponding card issuer authorization system (based upon BIN). Issuer authorization system receives authorization request and decrypts the card token to get the real card number. Authorization system performs required financial validations as well as PIN validations (If PIN was entered). Based upon the validation results, the authorization is approved or declined and sent back to the POS terminal.

**BENEFITS OF PROPOSED PAYMENT MODEL**

Following are the benefits of the proposed Biometric Payment model:

- With the use of tokenization, real card number is never exposed during transaction processing which makes it a highly secure process for implementing biometric payments.
- Consumers need not carry physical cards or buy expensive mobile phones for the sole purpose of participating in NFC-enabled payments.
- Because of enhanced security involved in biometric transactions, banks may charge lower interchange and thereby may allow Merchants to pay lower interchange fees.

**IMPLEMENTATION CHALLENGES**

- **Infrastructure**: Implementing Biometric Payments will create a need to change merchant infrastructure considerably. So, adoption and implementation of the aforesaid model might be an expensive proposition.
- **Accuracy**: Each finger scan is converted into a value termed as Biometric Value (BV). A sophisticated software that is capable of calculating Biometric Value uniquely and accurately is required to be developed.
- **Merchant/Cardholder Education**: Implementation of biometric payments will require complete re-structuring of the Merchant infrastructure. Both cardholders, as well as, merchants should be educated regarding the new system or new compliances, if any.
- **Security**: Storing biometric data securely is indeed a big challenge as finger print pattern of a person can be stolen by fraudsters to make fraudulent payments. Another layer of authentication might be required to minimize frauds and enhance security. This can be achieved by issuing a PIN, sending an OTP or by using additional biometric pattern matching of the user, such as palm impression or multiple finger prints, during transaction authorization.
- **Adoption**: To ensure global acceptance of this model, it is very important to ensure that implemented biometric payment system works as an open-loop system. Biometric Service providers, payment schemes in this case, should have a robust built in infrastructure in place.
- **Payment Cards management**: It might be difficult for users to remember which finger represents which card, and this might get a bit difficult to manage.
CONCLUSION

Biometric payments is the next big thing in the payment industry. Payment cards will be represented through user’s distinguishing features such as Finger Prints, Retina Scan, Face Scan, Palm/thumb impression etc. Since, security could be a concern, integrating tokenization with the biometric payments could eliminate the risk and make it a highly secure payment instrument. Though, adoption of biometric payments might pose several challenges, it is definitely a much needed step to achieve advancement in the consumer payments.

Deploying biometric payments will eliminate the need of carrying physical cards and buying expensive mobile phones, bought for the sole purpose of making convenient payments. This will also eliminate the risk of losing your card or a mobile phone as your biometric fingerprints (or Payment Fingers) will always be with you and that is all you need to make a payment. In a nutshell, though there are several challenges in implementing a biometric payment system, it certainly provides a future roadmap for a seamless, safe and convenient payments experience.
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