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Ritcha Ranjan

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TOKENIZATION OF A PHYSICAL DEBIT OR CREDIT CARD FOR PAYMENT

BACKGROUND

In conventional technology, consumers may provide actual credit card numbers, debit card numbers, or bank account numbers to a merchant point of sale terminal or to merchant websites when making in person or online purchases, respectively. In conventional technology, data breaches are a common security concern, and a risk exists that hackers may steal financial account information of the consumers. Current applications for in store and online purchasing may allow a consumer to safely conduct a transaction without having to provide actual financial account data to a merchant point of sale terminal or merchant website. However, applications for in store and online purchasing do not allow the consumer to use a plastic payment card comprising tokenized financial account information corresponding to a financial account of the consumer.

DETAILED DESCRIPTION

Overview

The examples described herein provide computer-implemented techniques for providing a payment card device comprising tokenized user financial account information corresponding to a financial account of the user for use in a transaction.

In an example embodiment, a user registers with a payment processing system and establishes a digital wallet account. The user accesses the payment processing system website using the user computing device web browser or as mobile application and downloads a digital wallet application. The user uploads financial account information associated with one or more financial accounts of the user to the digital wallet account via the digital wallet application or via a web browser of the user computing device. The payment processing system generates a payment card device for the user. An example payment card device comprises a smart card, a mobile device, or other device able to store financial account information. For example, the payment processing system generates tokenized financial account information for one or more financial accounts of the user. The user may configure the payment card device to include particular tokenized financial account information stored on the digital wallet account of the user. The payment processing system
generates a payment token comprising tokenized financial account information based on financial account information selected by the user via the user computing device. The payment processing system transmits the tokenized financial account information to the payment card device. The tokenized financial account information is written to the magnetic stripe of the payment card device. For example, the payment device comprises a magnetic stripe writer that writes the tokenized financial account information to the magnetic stripe. A merchant system point of sale terminal receives the tokenized payment information from the payment card device during a transaction initiated by the user. The payment processing system receives the payment token from the merchant point of sale terminal and accesses financial account information associated with the payment token from the user’s digital wallet account. The payment processing system identifies an issuer system associated with the financial account information associated with the payment token and transmits a payment authorization request to the issuer system. The issuer system receives the payment authorization request and approves or denies the payment authorization request. The payment processing system receives a notice of the approved or denied payment authorization request from the issuer system. The payment processing system transmits a notice of an approved or denied transaction to the merchant point of sale terminal and/or the user computing device based on the issuer system response.

Example aspects will be described in further detail with reference to Figure 1. Figure 1 is a block diagram depicting a system for providing a payment card device comprising tokenized user financial account information corresponding to a financial account of the user for use in a transaction.

**Example Processes and Architecture**

In an example, a user registers with a payment processing system. For example, the user may access a website of the payment processing system via a web browser of a user computing device over a network and establish a digital wallet account. The user may create a user name and/or password that the user may use to access the digital wallet account. In certain examples, the user may access the digital wallet account via a web browser of a user computing device or via a digital wallet application downloaded from the payment processing system website onto the user computing device. For example, the user accesses the payment
processing system website using the user computing device web browser and downloads a
digital wallet application. The digital wallet application operating on the user computing
device may communicate via a network with the payment processing system. In an example
embodiment, the digital wallet account allows the user to save financial account information
for use in online or in store transactions with merchant systems. In an example embodiment,
the user may enter financial account information into the digital wallet account via the digital
wallet application, which communicates with the payment processing system. Example
financial account information may comprise financial account information associated with
one or more credit card accounts, debit card accounts, bank accounts, rewards program
accounts, merchant system accounts, or other financial accounts of a user. Example financial
account information may comprise an account number or account identifier associated with
the account.

For example, the user may manually enter the financial account information via the
user interface of the user computing device or the user computing device may receive the
financial account information directly from a physical payment card via near field
communication (“NFC”), Bluetooth, Wi-Fi, radio frequency (“RF”) communication, or other
appropriate network communication method. For example, the user may access the digital
wallet application on the user computing device and select an option on the digital wallet
application to “tap” an NFC-capable payment card. In this example, the digital wallet
application instructs the user computing device to activate a mode to receive data via NFC,
then the user moves the NFC-capable payment card within a predefined proximity of the user
computing device such that financial account information stored on the payment card may be
transmitted to the user computing device. The digital wallet application resident on the user
computing device transmits received financial account information to the payment processing
system over the network, and the payment processing system stores the financial account
information and associates the financial account information with the digital wallet account
of the user.

In another example, the payment processing system generates a payment card device
for the user. For example, the payment processing system mails or otherwise sends the
payment card device to the user. An example payment card device comprises a re-writable
magnetic stripe, a magnetic stripe writer, a storage device capable of storing tokenized
financial account information, and a controller and antenna that enable the payment card
device to communicate with the user computing device via NFC, Bluetooth, Wi-Fi, or other
appropriate wireless communication protocol. In an example, the payment card device
comprises a device identifier stored therein that the payment processing system associates
with the digital wallet account of the user. The user receives the payment card device in the
mail from the payment processing system or otherwise receives the payment card device.

The payment processing system generates tokenized financial account information for
one or more financial accounts of the user. For example, the user may configure the payment
card device to carry particular tokenized financial account information stored on the digital
wallet account of the user. The user selects the digital wallet application on the user
computing device or otherwise accesses the user digital wallet account via the payment
processing system website using the web browser of the user computing device. In this
example, the user selects an option to configure the payment card device with particular
financial account information selected by the user. For example, the digital wallet
application displays one or more credit card accounts and/or bank accounts to the user and
the user selects a particular credit card account. The payment processing system generates a
payment token based on the selected financial account information. For example, the
payment token may comprise a virtual credit card number that is not the actual financial
account information. For example, the actual financial account information of a credit
account (the credit card number) is 2456-3400-0234-2219 but the payment token generated
by the payment processing system is 0000-1240-3456-9989. In an example embodiment, the
payment processing system stores the payment token and associates the payment token with
the selected financial account information and the user financial account.

The payment processing system transmits the tokenized financial account information
to the payment card device. For example, the payment processing system communicates the
generated payment token to the digital wallet application on the user computing device via
the network. The digital wallet application communicates the payment token to the payment
card device of the user via an appropriate method. For example, the digital wallet application
may display a request for the user to move the payment card device within a predefined
proximity of the user computing device or otherwise “tap” the payment card device with the
user computing device. In this example, the digital wallet application may communicate the
payment token to the payment card device via NFC, Bluetooth, Wi-Fi or other appropriate wireless communication protocol.

The tokenized financial account information is written to the magnetic stripe of the payment card device. In an example, a processor or magnetic stripe writer residing on the payment card device may write the received payment token to the magnetic stripe of the payment card device. In another example, the user computing device comprises a magnetic stripe writer or is communicatively coupled to a magnetic stripe writer. In this example, magnetic stripe writer writes the payment token to the magnetic stripe of the payment card device as the user slides the magnetic stripe of the payment card device along the magnetic stripe writer.

In certain examples, more than one payment token may be transmitted to the payment card device. For example, the payment processing system may generate a multiple payment tokens comprising tokenized financial account information corresponding to separate user financial accounts. In this example, the payment processing system transmits the payment tokens to the payment card device via the user computing device. The user may select a particular payment token to be written to the magnetic stripe of the payment card device either via a user interface of the payment card device or via the user computing device by selecting one or more options on the digital wallet application or digital wallet account. The payment card device may store payment tokens corresponding to the different financial accounts of the user, and the user may select a particular one of the financial accounts to write to the magnetic stripe of the payment card device via a user interface object on the payment card device. In this example, the user selects the desired payment token and the magnetic stripe writer resident on the payment card device writes or re-writes the selected payment token to the magnetic stripe of the payment card device.

In certain examples, the payment processing system may periodically generate an updated payment token associated with the financial account information. For example, the payment processing system, to ensure the security of the user’s financial account information, generates a subsequent payment token to associate with the financial account information and transmits the subsequent payment token to the user computing device. The payment processing system may update a payment token every 24 hours or at other appropriate, predefined time intervals, which may be user configurable. The payment processing system
may associate the updated or subsequent payment token with the financial account information in the user’s digital wallet account. In these examples, the magnetic stripe of the payment card device may be re-written with data comprising the updated or subsequent payment token. For example, the digital wallet application may notify the user that the payment card device needs to be updated, and the user taps the payment card device to the user computing device. The payment card device receives the updated payment token via wireless communication and re-writes the magnetic stripe of the card via a magnetic stripe writer resident on the payment card device or via a magnetic stripe writer on the user computing device or communicatively coupled to the user computing device. In another example, the digital wallet application automatically transmits an updated or subsequent payment token generated by the payment processing system to the payment card device if the digital wallet application is able to establish a network connection between the user computing device and the payment card device. In this example, the payment card device then automatically re-writes the magnetic stripe of the payment card device with data comprising the updated or subsequent payment token in response to receiving the updated or subsequent payment token from the user computing device.

In an example, a merchant system point of sale terminal receives the tokenized payment information from the payment card device. For example, the user uses the payment card device configured with the payment token in a transaction at a merchant location. In this example, the user may select one or more items for sale and present the items to a cashier for checkout at the point of sale terminal. The cashier may total the items and ask the user to select a payment option. The user selects an option to pay via the digital wallet payment card device. The user or merchant system cashier swipes the magnetic stripe of the payment card device to a card reader of the merchant system point of sale terminal at the merchant system store location. In this example embodiment, the merchant system point of sale terminal receives the payment token from the magnetic stripe of the payment card device.

In another example, the merchant point of sale terminal receives the payment token from the payment card device via NFC, Wi-Fi, Bluetooth, or other wireless communication. In this example, the user or cashier may tap the payment card device of the user to the card reader of the merchant system point of sale terminal to establish an appropriate wireless communication channel to enable the transmission of the payment token from the payment
card device to the merchant point of sale terminal. Alternatively, the point of sale terminal may communicate with the payment card device to establish a wireless communication channel, such as Wi-Fi or Bluetooth. The payment card device then transmits the payment token to the merchant point of sale terminal via the wireless communication channel. In an example embodiment, in addition to the payment token, the payment card device transmits other data to the merchant point of sale terminal. For example, the payment card device may transmit a payment card device identifier to the merchant point of sale terminal, the payment card device identifier identifying the digital wallet account of the user.

The payment processing system receives the payment token from the merchant point of sale terminal and accesses financial account information associated with the payment token. For example, the merchant point of sale terminal communicates the payment token to the payment processing system via the network. In another example, the merchant point of sale terminal communicates the payment token to a merchant system server, which communicates the payment token to the payment processing system. The merchant point of sale terminal also may transmit a transaction total, financial account information associated with an account of the merchant system, descriptions of one or more of the items in the transaction, or other useful, relevant, or appropriate transaction information to the payment processing system with the payment token. In an example, the payment processing system also receives the payment card device identifier from the merchant point of sale terminal and accesses the user digital wallet account identified by the payment card device identifier and/or by the payment token. The payment processing system retrieves the financial account information from the digital wallet account of the user associated with the payment token.

The payment processing system communicates with an issuer system to process the transaction. The payment processing system identifies an issuer system associated with the financial account information associated with the payment token received from the merchant point of sale terminal. For example, a credit issuer may be associated with a credit account. The payment processing system generates a payment authorization request to transmit to the identified issuer system. For example, the payment authorization request may comprise a total amount of the transaction, account information associated with the merchant system, and the actual user financial account information associated with the payment token used in the transaction.
The issuer system receives the transaction authorization request and approves or denies the transaction. For example, the issuer system may approve or deny the transaction authorization request based on a credit limit of the user, the current credit balance of the user’s account, the total amount of the current transaction, and/or other relevant information to which the issuer system has access. The issuer system may approve the transaction and generate an approval notice to transmit to the payment processing system. In this example, the issuer system may add a charge, withdraw funds, or otherwise debit the user’s account associated with the issuer system and add a credit, add funds, or otherwise credit an account of the merchant system. In another example, the issuer system may deny the payment authorization request received from the payment processing system. In this example, the issuer system may generate a notice of denial of the payment authorization request to transmit to the payment processing system.

The payment processing system receives a notice of an approved or denied payment authorization request from the issuer system. The payment processing system, when it receives a notice of an approved payment authorization request, transmits a notice to the merchant point of sale terminal and/or the user computing device indicating that the transaction was successfully processed. When the payment processing system receives a notice of a denied payment authorization request from the issuer system, the payment processing system transmits a notice to the merchant point of sale terminal and/or the user computing device indicating that the transaction was denied by the issuer system.

The merchant point of sale terminal may generate a receipt based on the notice of the approved or denied transaction received from the payment processing system. The payment processing system also may transmit one or more notifications to the digital wallet account of the user that summarize and/or describe the transaction. For example, the user may access the digital wallet account via the user computing device and view a transaction receipt associated with the transaction.

**ABSTRACT**

A user registers with a payment processing system and establishes a digital wallet account and uploads financial account information to the digital wallet account via the digital wallet application. The payment processing system generates a payment card device for the
user, who can configure the payment card device to include particular tokenized financial account information stored on the digital wallet account of the user. The payment processing system transmits the tokenized financial account information to the payment card device. The tokenized financial account information is written to the magnetic stripe of the payment card device. A merchant system point of sale terminal receives the tokenized payment information from the payment card device during a transaction, accesses financial account information associated with the payment token from the user’s digital wallet account, and transmits a payment authorization request to an issuer system, which approves or denies the payment authorization request.