~~Customer Initiated Land-Based Payment Using Secure Elements~~Method and apparatus for settling payments using mobile devices

Abstract
Techniques for mobile devices configured to support settlement of charges in electronic invoices or bills are described. A mobile device embedded with a secure element generates or is loaded with an electronic invoice. When the mobile device is brought to a consumer with an NFC mobile device, the data including the electronic invoice and other information regarding the mobile device or an owner thereof is read off wirelessly into the NFC mobile device. After the user verifies the amount being charged and authorizes the payment, the NFC mobile device communicates with a payment gateway or network for payment that is configured to proceed with the payment in accordance with a chosen payment methods.

Description
BACKGROUND OF THE INVENTION
1. Field of the Invention
The present invention is generally related to the area of electronic commerce. Particularly, the present invention is related to a mobile device configured to settle payments using a mobile device reading electronic bills or invoices off from another mobile device in a near field communication range.
2. The Background of Related Art
For many ~~land-based~~ credit or debit card transactions, the payment process is started by a customer asking for a bill when checking out a purchase. A cashier or service ~~staff will bring~~member brings a bill to the customer for verification. The customer then hands out a credit/debit card to the service staff member. The service ~~staff~~member brings the card to a Point of Sales (POS) counter to initiate a transaction payment. The service ~~staff~~member then brings back a receipt to the customer for signature to authorize the transaction. It is a lengthy process that typically takes a couple of minutes or much longer when the service member has to take care of multiple payment transactions at a time. In addition, in the case for the debit card transactions, ~~it is~~the process may be even more troublesome when ~~the~~a PIN is needed to authorize the transaction at the POS.

~~According to one aspect of our invention, we provide a Mobile POS solution. Instead of bringing a financial card to the POS, the service staff will bring a Mobile POS to the customer to start a transaction. However, the customer still needs to trust and relay on the POS by the merchant to start the payment process. As more and more customers are using personal portable devices such as smart phones, the~~

traditional payment paradigm assuming only merchant's dedicated POS able to start secure payment is challenged. In this invention, we propose a method that uses secure elements as an instrument to transport bills to customers so that they can initiate transactions with their personal Near Field Communication (NFC) devices. Secure elements can be in a form of dedicated contactless smart cards or secure element components of merchants' NFC devices. An electronic bill can be either
• created in a smart card at the store's POS and bring to a customer, or
• created in a secure element (SE) of the merchant mobile POS at a customer

Our Solution
Our solution uses a contactless smart card or a secure element in a NFC device to transport a bill from a merchant to a customer. The customer then uses his NFC portable device to read the signed bill from the smart card and starts the transaction using one of the methods that his mobile wallet has enrolled with. This underlying payment method can be the traditional payment method such as credit and debit card, or new internet payment method such as Paypal, Alipay, or new contactless epurse such as PBOC2, CEPS or transportation purse. In addition, while most of the mobile payment methods require the customer to give the cell phone number to the merchants, our method does not need any contact information to be disclosed. This method protects customer privacy.

The following figure shows an architecture according to one embodiment of out present invention.

Fig. 1. System components

The following figure shows a flowchart or process of performing a transaction according to one embodiment of out present invention.

As an exemplary operation, the above flowchart may be described below:

1. Smart Card Applet Issuing Flow
Merchants signed up for smart bill payment will be issued with a number of contactless smart cards installed with personalized smart bill applet. The applet can also be installed on an NFC device with SE.

The following information is personalized in each applet:
• Assigned merchant id
• Applet serial number for the merchant
• Merchant key (either symmetric or asymmetric key). In general, these are

diversified keys of a set of system master keys.

2. Payment Initiation Flow
As described in the flowchart, the following are typical Example of
• Electronic bill
• Transaction detail information
• Amount
• Bill Number
• Transaction Time
• Signed electronic bill
• Append personalized smart bill info: merchant id, serial number
• Generate a signature (either MAC or digital digest)
• Payment Information
• Total payment amount including tips
• payment method
• necessary information needed to conduct the payment

As part of the description of the instant application, the Appendix herewith describes one exemplary embodiment that may be used to support a payment transaction or facilitate a payment process. The transaction may be conducted online or offline, with or without a payment server.

The processes, sequences or steps and features discussed above and in the appendix (part of the application) are related to each other and each is believed independently novel in the art. The disclosed processes and sequences may be performed alone or in any combination to provide a novel and unobvious system or a portion of a system. It should be understood that the processes and sequences in combination yield an equally independently novel combination as well, even if combined in their broadest sense; i.e. with less than the specific manner in which each of the processes or sequences has been reduced to practice in the disclosure herein.

The foregoing and attached are illustrative of various aspects/embodiments of the present invention, the disclosure of specific sequence/steps and the inclusion of specifics with regard to broader methods and systems are not intended to limit the scope of the invention which finds itself in the various permutations of the features disclosed and described herein as conveyed to one of skill in the art.

Claim
A method for conducting a payment transaction, the method comprising:

initiating the payment transaction by transporting an electronic check to an NFC device associated with a customer;

requesting a verification on the check from the customer, wherein the check is being displayed on a display of the NFC device and requesting an action from the customer;

receiving a message from the NFC device after the customer authorizes the payment transaction;

clearing the check after receiving a payment from the consumer against the check, wherein the payment comes from an institution where the customer has held an account or the NFC device directly.

Appendix
Method and apparatus for performing payment transactions

BACKGROUND
Technical Field
[0001] The present invention is generally related to commerce over networks. Particularly, the present invention is related to techniques for personalizing a secure element and provisioning an application such as an electronic purse that can be advantageously used in portable devices configured for both electronic commerce (a.k.a., e-commerce) and mobile commerce (a.k.a., m-commerce).

Description of the Related Art
[0002] Single functional cards have been successfully used in enclosed environments such as transportation systems. One example of such single functional cards is MIFARE that has been selected as the most successful contactless smart card technology. MIFARE is the perfect solution for applications like loyalty and vending cards, road tolling, city cards, access control and gaming.

[0003] However, single functional card applications are deployed in enclosed systems, which are difficult to be expanded into other areas such as e-commerce and m-commerce because stored values and transaction information are stored in data storage of each tag that is protected by a set of keys. The nature of the tag is that the keys need to be delivered to the card for authentication before any data can be accessed during a transaction. This constraint makes systems using such technology difficult to be expanded to an open environment such as the Internet for e-commerce and/or wireless networks form-commerce as the delivery of keys over a public domain network causes security concerns.

[0004] In general, a smart card, chip card, or integrated circuit card (ICC), is any

pocket-sized card with embedded integrated circuits. A smart card or microprocessor cards contain volatile memory and microprocessor components. Smart cards may also provide strong security authentication for single sign-on (SSO) within large organizations. The benefits of smart cards are directly related to the volume of information and applications that are programmed for use on a card. A single contact/contactless smart card can be programmed with multiple banking credentials, medical entitlement, driver's license/public transport entitlement, loyalty programs and club memberships to name just a few. Multi-factor and proximity authentication can and has been embedded into smart cards to increase the security of all services on the card.

[0005] Contactless smart cards that do not require physical contact between card and reader are becoming increasingly popular for payment and ticketing applications such as mass transit and highway tolls. Such Near Field Communication (NFC) between a contactless smart card and a reader presents significant business opportunities when used in NFC-enabled mobile phones for applications such as payment, transport ticketing, loyalty, physical access control, and other exciting new services.

[0006] To support this fast evolving business environment, several entities including financial institutions, manufactures of various NFC-enabled mobile phones and software developers, in addition to mobile network operators (MNO), become involved in the NFC mobile ecosystem. By nature of their individual roles, these players need to communicate with each other and exchange messages in a reliable and interoperable way.

[0007] One of the concerns in the NFC mobile ecosystem is its security in an open network. Thus there is a need to provide techniques to personalize a secure element in a contactless smart card or an NFC-enabled mobile device so that such a device is so secured and personalized when it comes to financial applications or secure transactions. With a personalized secure element in an NFC-enabled mobile device, various applications or services, such as electronic purse or payments, can be realized. Accordingly, there is another need for techniques to provision or manage an application or service in connection with a personalized secure element. There is a need to simplify the payment process. With the advancement in mobile devices, it is anticipated that many consumers will carry one with them. Thus there is an opportunity of using a mobile device to quickly settle the payment at a point of sale (POS).

SUMMARY OF THE INVENTION

[0008] This section is for the purpose of summarizing some aspects of

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