Therefore, a need exists for a solution that allows for the security codes on cards to be changed during the lifetime of the cards that is cheaper, more robust, and more reliable than existing solutions.

[008] The benefits of such a solution would be two-fold: first, keeping a solution based on security codes would avoid the need to change or replace the existing card payment infrastructure; second, changing the value of these security codes significantly decreases the possibility of fraudulent activity.

SUMMARY

[008a] According to a first aspect of the present invention, there is provided a method for generating a security code for a card on a transaction event basis, the card having a display and no internal electrical battery power, comprising the steps of:

(a) during each transaction using the card, performing at least the following:

(1) interfacing the card with an external electrical power source associated with a delivery device;

(2) after and while providing electrical power to the card from the external electrical power source, performing at least the following:

(i) transmitting a request for transaction authorization approval from the card to the delivery device connected to a network;

(ii) transmitting the request for transaction authorization approval from the delivery device to the network;

(iii) validating the request for transaction authorization approval by the network;

(iv) generating a new security code at a generator server and inserting the new security code into a transaction script;

(v) transmitting the transaction script from the network to the delivery device;

(vi) transmitting the transaction script from the delivery device to the card; and

(vii) retrieving the new security code from the script in the card.

[008b] According to a second aspect of the present invention, there is provided a method for generating a plurality of security codes for a card on a transaction event basis, the card having a display and no internal electrical battery power source, comprising the

steps of:

(a) during each transaction using the card, performing at least the following:

(1) interfacing the card with an external electrical power source associated with a delivery device;

(2) after providing electrical power to the card from the external electrical power source, performing at least the following:

(i) transmitting a request for transaction authorization approval from the card to the vdelivery device connected to a network;

(ii) transmitting the request for transaction authorization approval from the delivery device to the network;

(iii) validating the request for transaction authorization approval by the network;

(iv) generating a plurality of security codes from a generator server and inserting the plurality of security codes into a transaction script;

(v) transmitting the transaction script from the network to the delivery device;

(vi) transmitting the transaction script from the delivery device to the card; and

(vii) retrieving the new security codes from the script in the card.

[008c] According to a third aspect of the present invention, there is provided a method for generating a security code for a card on a transaction event basis, the card having a display and no internal electrical battery power source, comprising the steps of:

(a) during each transaction using the card, performing at least the following:

(1) interfacing the card with an external electrical power source associated with a delivery device;

(2) while interfaced, performing at least the following:

(i) receiving electrical power from the external electrical power source;

(ii) after receiving the electrical power from the external electrical power source, transmitting a request for transaction authorization approval from the card to the delivery device, thereby causing the request for transaction authorization approval to be transmitted from the delivery device to a remote generator server;

(iii) receiving a transaction script from the remote generator server that has a new security code in the transaction script; and

(iv) retrieving the new security code from the transaction script.

[008d] There is provided a method for generating a security code for a card, comprising the steps of:

transmitting a request for transaction authorization approval from a card to a delivery device;

validating the request for transaction authorization approval by the delivery device;

transmitting an outcome response to the request for transaction authorization approval from the delivery device to the card; and

generating the new security code on the card.

[008e] There is provided a method for generating a plurality of security codes for a card, comprising the steps of:

transmitting a request for transaction authorization approval from a card to a delivery device;

validating the request for transaction authorization approval by the delivery device;

transmitting an outcome response to the request for transaction authorization approval from the delivery device to the card; and

generating a plurality of new security codes on the card.

[008e] There is provided a method of display a security code for a card, comprising the steps of:

transmitting a request for transaction authorization approval from a card to a delivery device;

validating the request for transaction authorization approval by the delivery device;

transmitting an outcome response to the request for transaction authorization approval from the delivery device to the card;

selecting one of the security codes from security codes stored in the memory area; and

displaying the one security code selected from the security codes on a display embedded in the card.

[009] There is disclosed a comprehensive "Dynamic Security Code" ("DSC") System ("DSC System") that can change the security code of a prepaid, debit, or credit card ("Payment Card"). In an effort to thwart Card-Not-Present ("CNP") fraud, the DSC System provides dynamic security code values ("DSC Values") that can have a limited use. When needed, another DSC Value will be generated by a DSC Generator Server on a network or generated by the microprocessor embedded in the DSC card. The DSC card can also be used with existing standard payment card infrastructures. In addition, the DSC System can be used with other form factors and in other environments not related to payments such as balance inquiries.

[010] When a DSC Value needs to be validated by the Issuer, it can be sent to the Issuer's DSC Validator Server ("DSC Validator Server") using the same channels as the ones used for traditional static security codes. For example, when a Cardholder uses a web browser to manually enter the DSC Value in lieu of the static security code into the electronic form provided by a merchant or into the registration form provided by an online or mobile wallet provider.

[011] In one embodiment of the invention, DSC Values are generated by a DSC Generator Server. When needed, the DSC Generator Server will calculate one or more new DSC Values for a specific DSC Card. Examples include, but are not limited to the Issuer's EMV authorization processing performed during a payment transaction, a purchase transaction, a purchase transaction with cash advance, an account status inquiry,

CLAIMS

What is claimed is:

1. A method for generating a security code for a card on a transaction event basis, the card having a display and no internal electrical battery power source, comprising the steps of:

(a) during each transaction using the card, performing at least the following:

(1) interfacing the card with an external electrical power source associated with a delivery device;

(2) after and while providing electrical power to the card from the external electrical power source, performing at least the following:

(i) transmitting a request for transaction authorization approval from the card to the delivery device connected to a network;

(ii) transmitting the request for transaction authorization approval from the delivery device to the network;

(iii) validating the request for transaction authorization approval by the network;

(iv) generating a new security code at a generator server and inserting the new security code into a transaction script;

(v) transmitting the transaction script from the network to the delivery device;

(vi) transmitting the transaction script from the delivery device to the card; and

(vii) retrieving the new security code from the script in the card.

2. The method for generating the security code for the card of claim 1, further comprising the step of (viii) storing the new security code in a memory area.

3. The method for generating the security code for the card of claim 1, further comprising the step of (viii) displaying the new security code on a display embedded in the card.

4. The method for generating the security code for the card of claim 3, further comprising the step of (iv) transmitting a confirmation message about the outcome of the display update step to the network.

5. The method for generating the security code for the card of claim 1, where the step of transmitting the script from the delivery device to the card is by a contact connection with the card.

6. The method for generating the security code for the card of claim 1, where the step of transmitting the script from the delivery device to the card is by a contactless connection between the online delivery device and the card.

7. The method for generating the security code for the card of claim 1, where the step of transmitting the request for transaction authorization to a network is by an offline delivery device that is forced to go online by the card.

8. A method for generating a plurality of security codes for a card on a transaction event basis, the card having a display and no internal electrical battery power source, comprising the steps of:

(a) during each transaction using the card, performing at least the following:

(1) interfacing the card with an external electrical power source associated with a delivery device;

(2) after providing electrical power to the card from the external electrical power source, performing at least the following:

(i) transmitting a request for transaction authorization approval from the card to the delivery device connected to a network;

(ii) transmitting the request for transaction authorization approval from the delivery device to the network;

(iii) validating the request for transaction authorization approval by the network;

(iv) generating a plurality of security codes from a generator server and inserting the plurality of security codes into a transaction script;

(v) transmitting the transaction script from the network to the delivery device;

(vi) transmitting the transaction script from the delivery device to the card; and

(vii) retrieving the new security codes from the script in the card.

9. The method for generating a plurality of security codes for the card of claim 8, further comprising the step of (viii) storing the plurality of security codes in a memory area.

10. The method for generating a plurality of security codes for the card of claim 9, further comprising the step of (ix) selecting one of the new security codes from the plurality of security codes stored in the memory area.

11. The method for generating a plurality of security codes for the card of claim 10, further comprising the step of (x) displaying one of the plurality of security codes on the display in the card.

12. The method for generating the security code for the card of claim 8, further comprising the step of (viii) transmitting a confirmation message about the outcome of the display update step to the network.

13. The method for generating the security code for the card of claim 8, where the step of transmitting the script from the delivery device to the card is by a contact connection with the card.

14. The method for generating the security code for the card of claim 8, where the step of transmitting the script from the delivery device to the card is by a contactless connection between the online delivery device and the card.

15. The method for generating the security code for the card of claim 8, where the step of transmitting the request for transaction authorization to a network is by an offline delivery device that is forced to go online by the card.

16. A method for generating a security code for a card on a transaction event basis, the card having a display and no internal electrical battery power source, comprising the steps of:

(a) during each transaction using the card, performing at least the following:

(1) interfacing the card with an external electrical power source associated with a delivery device;

(2) while interfaced, performing at least the following:

(i) receiving electrical power from the external electrical power source;

(ii) after receiving the electrical power from the external electrical power source, transmitting a request for transaction authorization approval from the card to the delivery device, thereby causing the request for transaction authorization approval to be transmitted from the delivery device to a remote generator server;

(iii) receiving a transaction script from the remote generator server that has a new security code in the transaction script; and

(iv) retrieving the new security code from the transaction script.

17. The method of claim 16, further comprising the step of (v) storing the security code in a memory area of the card while the card is receiving the electrical power.

18. The method of claim 16, further comprising the steps of:

(v) receiving one or more other new security codes from the transaction script;

(vi) selecting one of the security codes; and

(vii) wherein the new security code that is retrieved is the selected one.

19. The method of claim 16, further comprising the step of (v) transmitting a confirmation message about an outcome of the displaying to the remote generator server.

20. The method of claim 16, wherein the step of (i) receiving the electrical power and the step of (iii) receiving the transaction script are performed with a contact connection with the card.

21. The method of claim 16, wherein the step of (i) receiving the electrical power and the step of (iii) receiving the transaction script are performed with a contactless connection with the card.

22. The method of claim 16, wherein the step of (ii) transmitting the request for transaction authorization is by way of an offline delivery device that is forced to go online by the card.

23. The method of claim 16, further comprising the step of (v) displaying the new security code on the display associated with the card.