Computer system and computer-implemented method for electronic wallet transactions

Field of the invention

[0001] The present invention relates to a computer system and computer-implemented method for electronic wallet transactions, in particular, for carrying out payment transactions using a plurality of electronic wallets.

Background of the invention

[0002] The rise of mobile devices in the past few decades has more recently brought revolutions to the way commerce operates. For instance, a sizeable number of merchants have moved their physical shop fronts to the virtual world of internet and more customers are making online payment transactions. As such, cash as a physical payment vehicle is no longer the most popular form of payment. In its place, payment vehicles such as payment cards and electronic wallets (e-wallets) have established themselves in the world of electronic commerce (e-commerce).

[0003] Riding on the waves of e-commerce and the ubiquitous use of mobile devices is the use of e-wallets for payments via a mobile device. This brings convenience to customers as it reduces the need to obtain and secure cash, thereby speeding up transactions and enhancing customers' shopping experience.

[0004] Nonetheless, e-wallets are generally provided by different e-wallet service providers (e.g. financial technology companies, banks, financial institutions etc.) and they are incompatible with one another. In order to gain a larger share in the mobile payment market, e-wallet service providers generally offer perks (e.g. rewards) specific to their own e-wallets. This attracts customers to register for multiple e-wallets so as to enjoy promotions provided by different e-wallet service providers.

[0005] To secure a competitive advantage, merchants may register to use multiple e-wallets so as to bring multiple e-wallet payment options to customers. However, this results in administrative issues and introduces other inconveniences to the merchants as multiple e-wallet accounts make it extremely difficult for them to manage and consolidate their financial positions each day.

[0006] It is therefore an aim of the present invention to provide computer systems and methods to ameliorate some or all of the aforementioned problems.

Summary of the invention

[0007] The present invention aims to provide a new and useful computer system and computer-implemented method for carrying out payment transactions using a plurality of electronic wallets.

[0008] Definitions of the invention are given in the appended claims.

Brief description of the drawings

[0009] Non-limiting embodiments of the invention will now be described for the sake of example only, with reference to the following drawings in which:

Fig. 1 shows a computerised network in accordance with a first embodiment of the invention;

Fig. 2 shows steps of a method in accordance with an embodiment of the invention and which may be performed by a universal switch machine comprised in the computerised network of Fig. 1;

Fig. 3 shows steps of a method which may be performed by the universal switch machine of Fig. 1 in accordance with an embodiment of the invention;

Fig. 4 shows steps of a method in accordance with an embodiment of the invention and which may be performed by a payment network server comprised in the computerised network of Fig. 1;

Fig. 5 shows steps of a method which may be performed by the payment network server of Fig. 1 in accordance with an embodiment of the invention;

Fig. 6 shows steps of a method which may be performed by the payment network server in accordance with an embodiment of the invention;

Fig. 7 shows steps of a method which may be performed by the payment network server in accordance with an embodiment of the invention;

Fig. 8 shows steps of a method which may be performed by the payment network server of Fig. 1 in accordance with an embodiment of the invention;

Fig. 9 shows schematically the structure of a universal switch machine which may be used in the computerised network of Fig. 1 in accordance with an embodiment of the invention;

Fig. 10 shows schematically an exemplary input display associated with an input terminal of the universal switch machine in accordance with an embodiment of the invention; and

Fig. 11 shows schematically the structure of a server which may be used in the computerised network of Fig. 1 to implement a method in accordance with an embodiment of the invention.

Detailed description of the embodiment

[0010] As used in this document, the term "electronic wallet" refers to an electronic account that is maintained with an electronic wallet service provider. In an embodiment, an electronic wallet refers to any electronic cashless payment vehicle associated with a payment account, such as a credit card, a debit card, a prepaid card, a charge card, a membership card, a promotional card, a frequent flyer card, an identification card, a prepaid card, a gift card, and/or any other device that may hold payment account information, such as mobile phones, Smartphones, personal digital assistants (PDAs), key fobs, transponder devices, NFC-enabled devices, and/or computers. In addition, the "electronic wallet" may exist as application-based stored value accounts associated with an electronic wallet service provider tied in with an issuing institution.

[0011] As used in this application, the terms "component," "module," "system," "apparatus," "interface," or the like are generally intended to refer to a computer-related entity, either hardware, a combination of hardware and software, software, or software in execution. For example, a component may be, but is not limited to being, a process running on a processor, a processor, an object, an executable, a thread of execution, a program, and/or a computer. By way of illustration, both an application running on a controller and the controller can be a component. One or more components may reside within a process and/or thread of execution and a component may be localized on one computer and/or distributed between two or more computers.

[0012] Furthermore, the claimed subject matter may be implemented as a method, apparatus, or article of manufacture using standard programming and/or engineering techniques to produce software, firmware, hardware, or any combination thereof to control a computer to implement the disclosed subject matter. For instance, the claimed subject matter may be implemented as a computer-readable medium embedded with a computer executable program, which encompasses a computer program accessible from any computer-readable storage device or storage media. For example, computer readable media can include but are not limited to magnetic storage devices (e.g., hard disk, floppy disk, magnetic strips . . .), optical disks (e.g., compact disk (CD), digital versatile disk (DVD) . . .), smart cards, and flash memory devices (e.g., card, stick, key drive . . .).

[0013] In general terms, embodiments of the present invention propose a computerised network for processing payment transactions using a plurality of electronic wallets. The

computerised network comprises at least one universal switch machine and a payment network server. The universal switch machine is configured to accept payment transactions using the plurality of electronic wallets, to retrieve a list of electronic wallets associated with a plurality of electronic wallet service providers from an electronic wallet database, to receive transaction details for each of the payment transactions, and to transmit a payment transaction request for each of the payment transactions to the payment network server. The plurality of electronic wallet service providers are each registered for payment transactions using one or more of the plurality of electronic wallets. The transaction details comprise an electronic wallet identifier identifying at least one of the plurality of electronic wallets selected from the list of electronic wallets associated with the plurality of electronic wallet server providers, a payment amount and a customer electronic device identifier. Moreover, the payment network server is configured to receive the payment transaction request from the at least one universal switch machine, identify a service provider server associated with the electronic wallet identifier, and to initiate an authorisation for the payment transaction.

[0014] In embodiments, each universal switch machine or the payment network server is further configured to generate a universal code based on the payment transaction request, to transmit the universal code to a customer electronic device associated with the customer electronic device identifier, to receive a confirmation code associated with the payment transaction request from the customer via the customer electronic device, and to determine if the confirmation code matches the universal code.

[0015] In order to process payment transactions from the plurality of electronic wallets, the universal switch machine comprises an input terminal, a communication interface and a processor. The input terminal is configure to receive transaction details of a payment transaction. The transaction details comprising an electronic wallet identifier identifying at least one of the plurality of electronic wallets selected from a list of electronic wallets associated with a plurality of electronic wallet server providers, a payment amount and a customer electronic device identifier. The communication interface is configured to transmit the transaction details and a merchant identifier associated with a merchant, the merchant being a party to the payment transaction. The processor is configured to obtain the transaction details from the input terminal, to transmit a payment transaction request to the payment network server where the payment transaction request comprises the transaction details and the merchant account identifier, and to retrieve from an electronic wallet database the list of electronic wallets associated with the plurality of electronic wallet server providers where the plurality of electronic wallet service providers are each registered for payment transactions using one or more of the plurality of electronic wallets.

[0016] The payment network server comprises at least a computer processor and a data storage device, where the data storage device comprising non-transitory instructions is operative by the processor to receive a payment transaction request associated with a payment transaction from a universal switch machine, to identify a service provider server associated with an electronic wallet service provider, and to initiate an authorisation for the payment transaction. The payment transaction request received from the universal switch machine comprises transaction details and a merchant identifier, the transaction details comprising a payment amount, a customer electronic device identifier and an electronic wallet identifier associated with one of the plurality of electronic wallets, where the electronic wallet identifier is used in identifying the service provider server associated with the electronic wallet service provider.

[0017] Whereas previously, the acceptance of an individual electronic wallet as a payment method was highly dependent on whether a merchant has registered with the electronic wallet service provider of the individual electronic wallet previously, embodiments of the present invention provide a universal switch machine and a payment network server working in tandem to accept payment transactions using a plurality of electronic wallets. In particular, the universal switch machine is configured to retrieve from an electronic wallet database, a list of electronic wallets associated with a plurality of electronic wallet service providers. The list of electronic wallets stored at the electronic wallet database may be maintained by the payment network server. The plurality of electronic wallet service providers associated with the list of electronic wallets may be registered with the payment network server. In an embodiment, the universal switch machine displays the list of electronic wallets such that at least one of the plurality of electronic wallets in the list can be selected for carrying out a payment transaction at the universal switch machine.

[0018] In this way, the computerised network provides a solution to allow payment transactions using a plurality of electronic wallets to be processed by the universal switch machine without requiring the merchant to have registered with the different electronic wallet service providers, thereby reducing administrative costs for the merchants in processing payment transactions using the plurality of electronic wallets.

[0019] Moreover, the payment network server allows merchants to effectively register with a plurality of electronic wallet service providers centrally. Any universal switch machine with access to the payment network server would be able to accept payment transactions of an electronic wallet so long as the electronic wallet service provider associated with that electronic wallet has registered with the payment network server. The use of the payment network server thus reduces administrative costs for both the merchants and the electronic wallet service providers since payment transactions can be processed in a centralized way.

Consequently, customers are able to make payment using one of a multitude of different electronic wallets at the universal switch machine, thereby improving convenience for the customers as more payment options are made available.

[0020] Furthermore, as provided by the present invention, the payment network server communicates with a plurality of universal switch machines and a plurality of electronic wallet service providers directly. Therefore, the payment network server acts as a centralized platform which may be configured to sort and consolidate settled payment transactions for the merchants such that it reduces the administrative costs for the merchants and allow them to consolidate their cash positions within a predetermined period of time, more easily.

[0021] Other desirable features and characteristics will become apparent from the subsequent detailed description and the appended claims, taken in conjunction with the accompanying drawings of the disclosure.

[0022] Referring to Fig. 1, a computerised network 100 which is an embodiment of the invention is shown. The computerised network 100 comprises a payment network server 106 which facilitates a payment transaction between a customer (e.g. an electronic wallet owner) and a merchant which receives the funds. The payment network server 106 is a server associated with a payment network. As shown in Fig. 1 the payment network server 106 is in communication with a universal switch machine 104 and multiple service provider servers 108. The service provider servers 108 are associated with a plurality of electronic wallet service providers. An electronic wallet service provider is an institution which maintains electronic wallet accounts and provide electronic wallets to customers to perform transactions over the payment network. The payment network server 106 is also in communication with an acquirer server 110. The acquirer server 110 is operated by an acquiring institution at which the merchant maintains an account to receive funds. Note that the term "institution" is used here in a sense which is not necessarily limited to organizations which are legally constituted as banks, since in some jurisdictions other organizations may be permitted to maintain financial accounts such as an electronic wallet account. In an embodiment, the electronic wallet service provider can be one of the following: a bank, a financial technology company, a telecommunication company or a financial institution. The electronic wallet service providers also provide funding, via their corresponding service provider servers 108, to the payment network for payment transactions that are authorised. Although only one customer electronic device 102 and only one universal switch machine 104 is shown in Fig. 1, a plurality of customer electronic device 102 and a plurality of universal switch machines 104 associated with respective merchants may also form part of the computerised network 100. Similarly, a plurality of

acquirer servers 110 operated by respective acquiring institutions may also be in communication with the payment network server 106 and form part of the computerised network 100. Moreover, an electronic wallet database 112 is operationally connected to the universal switch machine 104 and the payment network server 106. The electronic wallet database 112 serves at least to store a list of electronic wallets associated with a plurality of electronic wallet service providers which are registered with the payment network server 106 for payment transactions using the electronic wallets. In an embodiment, the payment network server 106 maintains the list of electronic wallets while the universal switch machine 104 is configured to retrieve and provide the list of electronic wallets to customers for each payment transaction. In an embodiment, there is also provided a payment network database 114 in communication with the payment network server 106. The payment network database 114 serves at least to store data in regards to payment transactions processed using a plurality of electronic wallets by the payment network server 106. The payment network database 114 may also store information associated with electronic wallets used in these payment transactions, in particular, information relating to identifying service provider servers using electronic wallet identifiers provided for each payment transaction. Furthermore, a service provider database 116 is operationally connected to each of the plurality of service provider servers 108. The service provider database 116 serves at least to store data associated with electronic wallet accounts maintained by respective electronic wallet service providers. The service provider database 116 also store data which associates an electronic wallet account to a customer electronic device identifier (e.g. a mobile number, an internet protocol (IP) address, an email address etc.). Communication between the servers and databases may take place via any type of network, for example, a virtual private network (VPN), the Internet, a local area and/or wide area network (LAN and/or WAN), and so on.

[0023] Typically, when a customer is in a retail location associated with a given merchant (e.g. a shop operated by the merchant), the customer can go to the universal switch machine 104 operated by the merchant to make a purchase of a product. Note that the term "product" is used in this document to include any of physical objects, data products (such as music or software) or services, in addition to a dictionary meaning of the term "product". The universal switch machine 104 may be in the form of a point-of-sale (POS) terminal. The universal switch machine 104 may be configured to interact with a customer electronic device 102 connected to the computerised network as shown in Fig. 1. Details of the universal switch machine 104 are discussed further in conjunction with Figs. 9 and 10.

[0024] In order to conclude a purchase, the customer is prompted to make payment at the universal switch machine 104. In an embodiment, the customer chooses to pay for the purchase using one of a plurality of electronic wallets selected from a list of electronic

wallets displayed at the universal switch machine 104. In an embodiment, each electronic wallet displayed is associated with an electronic wallet identifier, the electronic wallet identifier being a unique identification associating the electronic wallet to its corresponding electronic wallet service provider. For example, an electronic wallet identifier is a unique portion of an electronic wallet account number associated with the electronic wallet. The electronic wallet identifier may also be any string or combination of alphanumeric characters which can uniquely identify the electronic wallet and its associated electronic wallet service provider. For example, an electronic wallet identifier "53c33d17-12345-abc12-948271dhfg" is assigned to a customer when he/she registers for an electronic wallet account with an electronic wallet service provider. This electronic wallet identifier is unique to the electronic wallet account that is associated with the customer. The electronic wallet identifier may be provided in the form of an encrypted token associated with the electronic wallet account. In an embodiment, the electronic wallet identifier is provided by the customer at the universal switch machine 104 manually or electronically when he/she makes payment. It will be understood that there is no limit as to the maximum or minimum number of electronic wallets associated with the list provided by the universal switch machine 104 in order for the proposed method and/or system to work. In addition to selecting an electronic wallet from the list, the customer provides a customer electronic device identifier at the universal switch machine 104. The customer electronic device identifier is a unique identification associated with a customer electronic device 102. For example, a customer electronic device identifier is a mobile number, a device identification (ID) or an international mobile equipment identity (IMEI) number associated with the customer electronic device. The customer electronic device 102 may be a mobile phone, a personal computer, a tablet, a laptop, a key-fob or a personal digital assistant (PDA).

[0025] The universal switch machine 104 is configured to process payment transactions of a plurality of electronic wallets and receives transaction details of each of the payment transactions from each respective customer. The transaction details for each payment transaction comprise an electronic wallet identifier identifying at least one of the plurality of electronic wallets selected from the list of electronic wallets, a payment amount and a customer electronic device identifier. In an embodiment, an input terminal of the universal switch machine 104 is configured to receive manual input relating to one or more of the transaction details. In some embodiments, electronic input may be provided (e.g. in a QR code/Bluetooth etc.). The electronic wallet identifier, the payment amount for a payment transaction and/or the customer electronic device identifier may be provided at the input terminal of the universal switch machine 104 by the customer and/or by the merchant and/or by a cashier associated with the merchant operating the universal switch machine 104. After the transaction details are received, the universal switch machine 104 is

configured to generate a payment transaction request comprising the transaction details and a merchant identifier associated with the merchant, and to transmit the payment transaction request to the payment network server 106.

[0026] In an embodiment, the universal switch machine 104 is configured to generate a universal code based on the payment transaction request. The universal code may comprise one or more of the following: a barcode, a Quick Response (QR) code, a one-time password (OTP) or a gesture. The universal code may be generated after receiving the transaction details but prior to transmitting the payment transaction request to the payment network server 106. After the universal code is generated, the universal switch machine 104 is configured to transmit the universal code to the customer electronic device 102 associated with the customer electronic device identifier. The universal code may be transmitted to the customer electronic device 102 from the universal switch machine 104 wirelessly or contactlessly, for example using Near Field Communication (NFC), telecommunications or other protocols. The customer receives, via the customer electronic device 102, the universal code associated with the payment transaction request. The universal code can then be provided as a confirmation code at the universal switch machine 104 by the customer, where the universal switch machine 104 is configured to determine if the confirmation code matches the universal code. In the event that the confirmation code matches the universal code, the universal switch machine 104 then transmits the payment transaction request to the payment network server 106.

[0027] In an embodiment, the universal switch machine 104 is configured to generate the universal code and to transmit the universal code together with the payment transaction request to the payment network server 106. After the universal code is received at the payment network server 106, the payment network server 106 is configured to transmit the universal code to the customer electronic device 102 associated with the customer electronic device identifier. The universal code can then be provided as a confirmation code at the universal switch machine 104, where the confirmation code is compared with the universal code at the universal switch machine 104. The results of the comparison is transmitted to the payment network server 106.

[0028] In an embodiment, the universal switch machine 104 is configured to transmit the payment transaction request to the payment network server 106 after receiving the transaction details from the customer. The payment network server 106 is configured to generate a universal code based on the payment transaction request. After the universal code is generated, the payment network server 106 is configured to transmit the universal code to the customer electronic device 102 associated with the customer electronic device identifier. The universal code may be transmitted to the customer electronic device 102

from the payment network server 106 wirelessly or contactlessly, for example using Near Field Communication (NFC), telecommunications or other protocols. The customer receives, via the customer electronic device 102, the universal code associated with the payment transaction request. The universal code can then be provided as a confirmation code and transmitted back to the payment network server 106 (either via the universal switch machine 104 or directly using the customer electronic device 102), where the confirmation code is compared to the universal code by the payment network server 106 to determine if the confirmation code matches the universal code.

[0029] In any of the above embodiments, once it is satisfied that the confirmation code received from the customer matches the universal code generated, the payment network server 106 is configured to initiate authorisation for the payment transaction. The payment network server 106 identifies a service provider server 108 associated with an electronic wallet service provider using the electronic wallet identifier, where the electronic wallet service provider is associated with the electronic wallet used for the payment transaction. This may be done through the use of the payment network database 114 which is operationally connected to the payment network server 106. The payment network database 114 comprises information associating electronic wallet identifiers to their corresponding electronic wallet service providers, thereby aiding the payment network server 106 in identifying a service provider server 108 associated with its corresponding electronic wallet service provider. The information may be received by the payment network database 114 when the electronic wallet service provider first registers with the payment network server 106. For example, an e-wallet A maybe associated with institution B. As such, if e-wallet A is used for a payment transaction, the payment network server 106 identifies institution B to be the electronic wallet service provider associated with e-wallet A for the payment transaction. The payment network server 106 then directs the payment transaction request for the payment transaction to the service provider server 108 associated with institution B to be processed.

[0030] Authorisation for the payment transaction can be transmitted to the service provider server 108 after the electronic wallet service provider associated with the service provider server 108 is identified at the payment network server 106. The authorisation for the payment transaction may be transmitted to the service provider server 108 in the form of an authorisation request. The authorisation request may comprise at least the payment amount and the customer electronic device identifier for the payment transaction. The service provider server 108 receives the authorisation request and is configured to identify an electronic wallet account associated with the customer electronic device identifier. In an embodiment, the authorisation request comprises a verification request to verify that an electronic wallet account is associated with the customer electronic device identifier. The

authorisation request may comprise a balance determination request to determine if a balance of the electronic wallet account is greater than or equal to the payment amount. Depending on the authorisation request received, the service provider server 108 determines if an electronic wallet account is associated with the customer electronic device identifier and/or if the balance of the electronic wallet account is more than or equal to the payment amount for the payment transaction. The payment transaction can be authorised if the customer electronic device identifier is verified and/or if the balance of the electronic wallet account is more than or equal to the payment amount for the payment transaction. The service provider server 108 communicates to the payment network server 106 an authorisation response indicating whether the payment transaction has been authorised.

[0031] The payment network server 106 in turn transmits a payment transaction response indicating whether the payment transaction has been authorised to the universal switch machine 104. Once the payment transaction response is received at the universal switch machine 104, the payment transaction is either completed where the customer collects the product, or the payment transaction is refused. In an embodiment, the payment transaction response is communicated by the payment network server 106 to the customer electronic device 102 to inform the customer whether the payment transaction has been authorised to proceed. The payment network server 106 may transmit the payment transaction response to an acquiring institution for the merchant of the payment transaction as a record for the payment transaction which may be used in clearing and settlement processes.

[0032] In an embodiment, the acquiring institution for the merchant, generates and sends via the acquirer server 110, a settlement transaction request to the payment network server 106. The settlement transaction request comprises a list of payment transactions made by electronic wallets via the universal switch machine 104 within a predetermined period of time. In an embodiment, the predetermined period of time can be decided by the merchant, which may typically be a day, a week, a month or a year or any other period of time which may be deemed suitable by the merchant. The settlement transaction request received at the payment network server 106 is sorted by associating each of the payment transactions to a corresponding electronic wallet service provider identified in each of the payment transactions. After sorting the settlement transaction request, the payment network server 106 transmits a settlement request to each of the corresponding electronic wallet service providers for payment transactions associated with each of the corresponding electronic wallet service providers made at the universal switch machine 104. Each of the electronic wallet service providers processes its corresponding payment transactions and transmits to the payment network server 106 a settlement response comprising funds to settle the payment transactions. The payment network server 106 transmits the funds to the acquiring institution once the settlement response has been received, where the funds can

be transferred to a merchant account maintained at the acquiring institution. In an embodiment, the acquiring institution maintaining the merchant account may be identified using the merchant identifier. Once the funds have been transmitted to the merchant account, the payment network server 106 sends a settlement transaction response to the universal switch machine 104 indicating that the list of payment transactions has been settled.

[0033] As will be understood by a skilled person, each of the various apparatuses in the computerised network 100 has a communication module such as a wireless interface for two-way communication via a communication network. The communication network could be any type of network, for example, virtual private network (VPN), the Internet, a local area and/or wide area network (LAN and/or WAN), and so on.

[0034] The computerised network for processing payment transactions using a plurality of electronic wallets advantageously allows merchants to effectively register with a plurality of electronic wallet service providers centrally. Any universal switch machine 104 with access to the payment network server 106 would be able to accept payment transactions of an electronic wallet so long as the electronic wallet service provider associated with the electronic wallet is registered with the payment network server 106. The use of the payment network server 106 thus reduces administrative costs for both the merchants and the electronic wallet service providers since payment transactions can be processed in a centralized way. At the same time, there are incentives for electronic wallet service providers to register with the electronic wallet database 112 through the payment network server 106 so that they can promote their services through any universal switch machine 104 that may be associated with the payment network server 106. Consequently, the payment network server 106 allows payment to be made by the customers through one of a multitude of different electronic wallets at the universal switch machine 104, thereby improving convenience for the customers as more payment options are made available.

[0035] Moreover, since the payment network server 106 is configured to sort and consolidate settled payment transactions for the merchants, it reduces the administrative costs for the merchants and allow them to consolidate their cash positions within a predetermined period of time, more easily.

[0036] A method 200 carried out by the universal switch machine 104 of the computerised network 100 is illustrated in Fig. 2.

[0037] Referring to Fig. 2, in a step 202, the universal switch machine 104 is configured to retrieve from an electronic wallet database 112, a list of electronic wallets associated with a plurality of electronic wallet server providers, where the plurality of electronic wallet service

providers are each registered for payment transactions using one or more of the electronic wallets. The electronic wallet database 112 is operationally connected to the universal switch machine 104 and the payment network server 106. The electronic wallet database 112 serves at least to store the list of electronic wallets associated with the plurality of electronic wallet service providers which are registered with the payment network server 106 for the payment transactions. In an embodiment, the payment network server 106 maintains the list of electronic wallets while the universal switch machine 104 is configured to retrieve and to provide the list of electronic wallets to customers for each payment transaction at the universal switch machine 104. The universal switch machine 104 may retrieve the list of electronic wallets from the electronic wallet database 112 directly, or via the payment network server 106.

[0038] In a step 204, the universal switch machine 104 receives, from a customer initiating a payment transaction, transaction details for the payment transaction. The transaction details comprise an electronic wallet identifier identifying at least one of the plurality of electronic wallets selected from a list of electronic wallets associated with a plurality of electronic wallet server providers, a payment amount and a customer electronic device identifier.

[0039] In a step 206, the universal switch machine 104 transmits a payment transaction request to a payment network server 106, the payment transaction request comprising the transaction details and the merchant account identifier. The merchant account identifier is associated with a merchant where the merchant is a party to the payment transaction.

[0040] Fig. 3 shows steps of a method 300 which may be performed by the universal switch machine 104 of Fig. 1 in accordance with an embodiment of the invention.

[0041] Referring to Fig. 3, in a step 302, the universal switch machine 104 is configured to generate a universal code based on the payment transaction request, the universal code being associated with the payment transaction. In an embodiment, the universal code comprises one or more of the following: a barcode, a Quick Response (QR) code, a one-time password (OTP) or a gesture. In an embodiment, the universal code may be generated after receiving the transaction details but prior to transmitting the payment transaction request to the payment network server 106.

[0042] In step 304, the universal switch machine 104 is configured to transmit the universal code to a customer electronic device using the customer electronic device identifier after the universal code is generated. The universal code may be transmitted to the customer electronic device 102 from the universal switch machine 104 wirelessly or contactlessly, for example using Near Field Communication (NFC), telecommunications or other protocols.

The customer receives, via the customer electronic device 102, the universal code associated with the payment transaction request. The universal code may then be provided as a confirmation code at the universal switch machine 104 by the customer, where the universal switch machine 104 receives the confirmation code and determines if the confirmation code matches the universal code. In the event that the confirmation code matches the universal code, the universal switch machine 104 transmits the payment transaction request to the payment network server 106.

[0043] A method 400 carried out by the payment network server 106 of the computerised network 100 is illustrated in Fig. 4.

[0044] Referring to Fig. 4, in a step 402, the payment network server 106 receives a payment transaction request from the universal switch machine 104 after the customer initiates a payment transaction. The payment transaction request comprises transaction details and a merchant identifier, the transaction details comprise a payment amount, a customer electronic device identifier and an electronic wallet identifier associated with one of the plurality of electronic wallets.

[0045] In a step 404, the payment network server 106 is configured to identify a service provider server 108 associated with an electronic wallet service provider using the electronic wallet identifier.

[0046] The payment network server 106 then initiates an authorisation for the payment transaction in a step 406 once the service provider server 108 associated with an electronic wallet service provider for the payment transaction has been identified. The authorisation is transmitted to the electronic wallet service provider via the service provider server 108 to seek an approval by the electronic service provider to authorise the payment transaction.

[0047] In an embodiment, the steps for the methods 200 and 400 are repeated for another payment transaction from the universal switch machine 104 for another electronic wallet. The payment transaction may be carried out by either the same customer or another customer. A skilled person in the art would understand that a plurality of universal switch machines 104 may be operationally connected to the payment network server 106 to carry out transactions using a plurality of electronic wallets by the methods 200 and 400 as described in Figs. 2 and 4.

[0048] Fig. 5 shows steps of a method 500 which may be performed by the payment network server 106 of Fig. 1 in accordance with an embodiment of the invention.

[0049] In a step 502, the payment network server 106 is configured to generate a universal code based on the payment transaction request or to receive from the universal switch machine 104 the universal code associated with the payment transaction request. In an embodiment, the universal code comprises one or more of the following: a barcode, a Quick Response (QR) code, a one-time password (OTP) or a gesture.

[0050] In a step 504, the payment network server 106 transmits the universal code to a customer electronic device 102 using the customer electronic device identifier. The universal code may be transmitted to the customer electronic device 102 from the payment network server 106 wirelessly for example using telecommunications or other protocols.

[0051] After the universal code is received at the customer electronic device 102, the customer is required to input the universal code as a confirmation code for the payment transaction request at the universal switch machine 104 or to transmit the confirmation code to the payment network server 106 via the customer electronic device 102. If the confirmation code is received at the universal switch machine 104, the universal switch machine 104 is configured to transmit the confirmation code to the payment network server 106. In either of these cases, the confirmation code is received at the payment network sever 106 in a step 506.

[0052] In a step 508, the payment network server 106 determines if the confirmation code received at step 506 matches the universal code associated with the payment transaction request. If it is determined that the confirmation code matches the universal code for the payment transaction request, an authorisation for the payment transaction can be initiated by the payment network server 106.

[0053] Fig. 6 shows steps of a method 600 which may be performed by the payment network server 106 in accordance with an embodiment of the invention.

[0054] In a step 602, the payment network server 106 transmits, to the service provider server 108, a verification request comprising a request to verify that an electronic wallet account is associated with the customer electronic device identifier, the customer electronic device identifier being comprised in the payment transaction request received in step 402. The verification request may be associated with an authorisation for the payment transaction such that the payment transaction can be authorized if the customer electronic device identifier is verified.

[0055] In a step 604, the payment network server 106 receives, from the service provider server 108, a verification response indicating whether the customer electronic device identifier is verified. The payment transaction can be authorised if the customer electronic device identifier is verified. If the service provider server 108 is unable to associate any

electronic wallet account to the customer electronic device identifier using the service provider database 116, the service provider server 108 transmits a verification response to the payment network server 106 indicating that the customer electronic device identifier is not verified. As a result of the non-verification of the customer electronic device identifier, the payment network server 106 may transmit a payment transaction response to the universal switch machine 104 indicating that the payment transaction is not authorised. In this case, the universal switch machine 104 may request for another electronic wallet to be used for the payment transaction. The customer may select another one of the electronic wallets at the universal switch machine 104 for use in the payment transaction.

[0056] Fig. 7 shows steps of a method 700 which may be performed by the payment network server 106 in accordance with an embodiment of the invention. The method 700 may be carried out by the payment network server 106 to determine if a balance of the electronic wallet account is greater than or equal to the payment amount before the payment transaction can be authorised.

[0057] In a step 702, the payment network server 106 is configured to transmit a balance determination request to the service provider server 108 to determine if a balance of the electronic wallet account is greater than or equal to the payment amount. The service provider server 108 associated with the electronic wallet service provider may identify an electronic wallet account using the customer electronic device identifier and check the balance of the electronic wallet account to determine if it is greater than or equal to the payment amount for the payment transaction.

[0058] After it is determined whether the balance of the electronic wallet account is greater than or equal to the payment amount for the payment transaction, the service provider server 108 transmits a balance determination response which is received at the payment network server 106 in a step 704, where the balance determination response indicates whether the balance of the electronic wallet account is greater than or equal to the payment amount. In an embodiment, the payment transaction can be authorised if the balance of the electronic wallet account is greater than or equal to the payment amount. If the service provider server 108 determines that the balance of the electronic wallet account is less than the payment amount, the service provider server 108 transmits a verification response to the payment network server 106 indicating the same. Similar to step 604, the payment network server 106 may then transmit a payment transaction response to the universal switch machine 104 indicating that the payment transaction is not authorised. In this case, the universal switch machine 104 may request for another electronic wallet to be used for the payment transaction. The customer may select another one of the electronic wallets at the universal switch machine 104 for use in the payment transaction.

[0059] It will be understood by a skilled person in the art that the methods 600 and 700 described in Figs. 6 and 7 may be used in isolation or in combination. The methods 600 and 700 can also be used in association with the authorisation of the payment transaction for the method 400 described in Fig. 4. Once the payment transaction has been authorised, the payment network server 106 may transmit a payment transaction response indicating whether the payment transaction has been authorised to the universal switch machine 104. In an embodiment, the payment transaction response is communicated by the payment network server 106 to the customer electronic device 102 to inform the customer whether the payment transaction has been authorised to proceed. The payment network server 106 may transmit the payment transaction response to an acquiring institution for the merchant of the payment transaction as a record for the authorised payment transaction.

[0060] Fig. 8 shows steps of a method 800 which may be performed by the payment network server 106 of Fig. 1 in accordance with an embodiment of the invention. In particular, the method 800 as shown in Fig. 8 relates to a clearing and settlement process which may be implemented by the payment network server 106 of the computerised network 100 in Fig. 1. The payment network server 106 advantageously acts as a centralized platform for the clearing and settlement process to be carried out and reduces administrative costs for the merchants and the electronic wallet service providers.

[0061] Referring to Fig. 8, in a step 802, the payment network server 106 receives a settlement transaction request from an acquiring institution for the merchant, the settlement transaction request comprising a list of payment transactions made by electronic wallets via the universal switch machine 104 within a predetermined period of time. The predetermined period of time may be decided by the merchant which may typically be a day, a week, a month or a year or any other period of time which may be deemed suitable by the merchant.

[0062] In a step 804, the payment network server 106 sorts the settlement transaction request received in step 802 by associating each of the payment transactions to a corresponding electronic wallet service provider identified in each of the payment transactions.

[0063] In a step 806, the payment network server 106 transmits a settlement request to each of the corresponding electronic wallet service providers for payment transactions associated with each of the corresponding electronic wallet service providers made at the universal switch machine 104, once the settlement transaction request is sorted in step 804.

[0064] In a step 808, the payment network server 106 receives a settlement response comprising funds to settle the payment transactions from each of the corresponding electronic wallet service providers.

[0065] The payment network server 106 then transmits the funds, via the acquirer server 110, to the acquiring institution in a step 810 once the settlement response has been received in step 808, where the acquiring institution maintains a merchant account associated with the merchant identifier.

[0066] In a step 812, the payment network server 106 sends a settlement transaction response to the universal switch machine 104 indicating that the list of payment transactions has been settled once the funds have been transmitted to the merchant account in step 810.

[0067] Fig. 9 shows schematically the structure of a universal switch machine 104 which may be used in the computerised network of Fig. 1 in an embodiment of the invention. The universal switch machine 104 comprises at least one I/O module 902, at least one processor 904, and at least one communication interface 906.

[0068] The I/O module 902 comprises at least an input terminal 908 and a display unit 910. The input terminal 908 is configured to receive transaction details of a payment transaction, the transaction details comprising an electronic wallet identifier identifying at least one of the plurality of electronic wallets selected from a list of electronic wallets associated with a plurality of electronic wallet server providers, a payment amount and a customer electronic device identifier. In an embodiment, the list of electronic wallets comprises a plurality of electronic wallets associated with a plurality of electronic wallet service providers who have been registered with the payment network server 106 to provide electronic wallets for use in payment transactions using a plurality of electronic wallets at the universal switch machine 104. The input terminal 908 of the universal switch machine 104 may be configured to receive manual or electronic input relating to one or more of the transaction details. In an embodiment, the input terminal 908 comprises a selection module 912 where it is configured to display, in conjunction with the display unit 910 operatively connected to the input terminal 908, the list of electronic wallets so that a customer can select an electronic wallet from the list of electronic wallets for use in a payment transaction at the universal switch machine 104. In particular, the input terminal 908 is configured to allow a customer or a merchant or a cashier associated with the merchant to provide one or more of the transaction details directly at the universal switch machine 104. As such, the input terminal 908 may comprise a touch screen, a keyboard, a key pad or any other forms of input devices which allow the customer or the merchant or the cashier to make available the transaction details for the payment transaction.

[0069] The processor 904 is operationally connected to a read only memory (ROM) and a random access memory (RAM), so that cooperatively, they are configured to process payment transactions received at the universal switch machine 104. The processor 904

comprises a transaction module 914, a retrieval module 916 and a code generation module 918. The transaction module 914 may be configured to obtain the transaction details from the input terminal 904. Moreover, the transaction module 914 may be configured to work together with the communication interface 906 to transmit a payment transaction request to a payment network server 106, where the payment transaction request comprises the transaction details and the merchant account identifier. The retrieval module 916 may be configured to work in conjunction with the communication interface 906to retrieve the list of electronic wallets associated with the plurality of electronic wallet server providers from an electronic wallet database 112. In addition, the code generation module 918 may be configured to generate a universal code based on the payment transaction request, and to work with the communication interface 906 to transmit the universal code to a customer electronic device 102 associated with the customer electronic device identifier comprised in the payment transaction request.

[0070] The communication interface 906 operationally connects the universal switch machine 104 to the payment network server 106 so that the universal switch machine 104 may function as part of the computerised network 100 described in Fig. 1. The communication interface 906 of the universal switch machine 104 may be configured to transmit, to the payment network server 106, the transaction details and a merchant identifier where the merchant identifier is associated with a merchant of the payment transaction. The communication interface 906 may also be configured to operationally connect the universal switch machine 104 to the electronic wallet database 112 and the customer electronic device 102 so as to facilitate the processes as described above. Communications as described may be achieved through any wired or wireless means known to the skilled person in the art. Although it is shown in Fig. 9 that the processor 904 and the communication interface 906 resides in the universal switch machine 104, they may also reside in other hardware(s) or peripherals operationally connected to the universal switch machine 104.

[0071] Fig. 10 shows schematically an exemplary input display 1000 associated with the input terminal 902 of the universal switch machine 104 in accordance with an embodiment of the invention.

[0072] The input display 1000 comprises at least three different input fields 1002, 1004, 1006. An input field 1002 is for an input of the customer electronic device identifier. An input field 1004 displays a list of electronic wallets which may be selected for use in a payment transaction carried out at the universal switch machine 104. An input field 1006 is for an input of a confirmation code received by a customer via a customer electronic device 102 associated with the customer electronic device identifier for the payment transaction.

[0073] In an embodiment, the list of electronic wallets displayed at the input field 1004 are associated with corresponding electronic wallet service providers which are registered for this service. In an embodiment, an electronic wallet service provider may be registered with the electronic wallet database 112 by registering with the payment network server 106 for payment transactions using one or more of a plurality of electronic wallets. In an embodiment, the payment network server 106 maintains the list of electronic wallet service providers registered. In an embodiment, the universal switch machine 104 communicates with the electronic wallet database 112 to retrieve the list of electronic wallet service providers registered. As shown in the computerised network of Fig. 1, the universal switch machine 104 may communicate with the electronic wallet database 112 directly or via the payment network server 106.

[0074] Fig. 11 is a block diagram showing a technical architecture of the payment network server 106 and/or the electronic wallet service provider server 108. The acquirer server 110 may also have this technical architecture.

[0075] The technical architecture includes a processor 1102 (which may be referred to as a central processor unit or CPU) that is in communication with memory devices including secondary storage 1104 (such as disk drives), read only memory (ROM) 1106, and random access memory (RAM) 1108. The processor 1102 may be implemented as one or more CPU chips. The technical architecture may further comprise input/output (I/O) devices 1110, and network connectivity devices 1112.

[0076] The secondary storage 1104 is typically comprised of one or more disk drives or tape drives and is used for non-volatile storage of data and as an over-flow data storage device if RAM 1108 is not large enough to hold all working data. Secondary storage 1104 may be used to store programs which are loaded into RAM 1108 when such programs are selected for execution.

[0077] In this embodiment, the secondary storage 1104 has a processing component 1104a comprising non-transitory instructions operative by the processor 1102 to perform various operations of the method of the present disclosure. The ROM 1106 is used to store instructions and perhaps data which are read during program execution. The secondary storage 1104, the RAM 1108, and/or the ROM 1106 may be referred to in some contexts as computer readable storage media and/or non-transitory computer readable media.

[0078] I/O devices 1110 may include printers, video monitors, liquid crystal displays (LCDs), plasma displays, touch screen displays, keyboards, keypads, switches, dials, mice, track balls, voice recognizers, card readers, paper tape readers, or other input devices.

[0079] The network connectivity devices 1112 may take the form of modems, modem banks, Ethernet cards, universal serial bus (USB) interface cards, serial interfaces, token ring cards, fiber distributed data interface (FDDI) cards, wireless local area network (WLAN) cards, radio transceiver cards that promote radio communications using protocols such as code division multiple access (CDMA), global system for mobile communications (GSM), long-term evolution (LTE), worldwide interoperability for microwave access (WiMAX), near field communications (NFC), radio frequency identity (RFID), and/or other air interface protocol radio transceiver cards, and other network devices. These network connectivity devices 1112 may enable the processor 1112 to communicate with the Internet or one or more intranets. With such a network connection, it is contemplated that the processor 1102 might receive information from the network, or might output information to the network in the course of performing the above-described method operations. Such information, which is often represented as a sequence of instructions to be executed using processor 1102, may be received from and outputted to the network, for example, in the form of a computer data signal embodied in a carrier wave.

[0080] The processor 1102 executes instructions, codes, computer programs, scripts which it accesses from hard disk, floppy disk, optical disk (these various disk based systems may all be considered secondary storage 1104), flash drive, ROM 1106, RAM 1108, or the network connectivity devices 1112. While only one processor 1102 is shown, multiple processors may be present. Thus, while instructions may be discussed as executed by a processor, the instructions may be executed simultaneously, serially, or otherwise executed by one or multiple processors.

[0081] Although the technical architecture is described with reference to a computer, it should be appreciated that the technical architecture may be formed by two or more computers in communication with each other that collaborate to perform a task. For example, but not by way of limitation, an application may be partitioned in such a way as to permit concurrent and/or parallel processing of the instructions of the application. Alternatively, the data processed by the application may be partitioned in such a way as to permit concurrent and/or parallel processing of different portions of a data set by the two or more computers. In an embodiment, virtualization software may be employed by the technical architecture to provide the functionality of a number of servers that is not directly bound to the number of computers in the technical architecture. In an embodiment, the functionality disclosed above may be provided by executing an application and/or applications in a cloud computing environment. Cloud computing may comprise providing computing services via a network connection using dynamically scalable computing resources. A cloud computing environment may be established by an enterprise and/or may be hired on an as-needed basis from a third party provider.

[0082] It is understood that by programming and/or loading executable instructions onto the technical architecture, at least one of the CPU 1102, the RAM 1108, and the ROM 1106 are changed, transforming the technical architecture in part into a specific purpose machine or apparatus having the novel functionality taught by the present disclosure. It is fundamental to the electrical engineering and software engineering arts that functionality that can be implemented by loading executable software into a computer can be converted to a hardware implementation by well-known design rules.

[0083] Whilst the foregoing description has described exemplary embodiments, it will be understood by those skilled in the art that many variations of the embodiments can be made within the scope of the present invention as defined by the claims. Moreover, features of one or more embodiments may be mixed and matched with features of one or more other embodiments.

Claims

1. A computerised network for processing payment transactions using a plurality of electronic wallets, the network comprising:

a point-of-sale (POS) terminal having a universal switch machine configured to:

accept payment transactions using the plurality of electronic wallets;

retrieve from an electronic wallet database, a list of electronic wallets associated with a plurality of electronic wallet server providers, wherein the plurality of electronic wallet service providers are each registered for payment transactions using one or more of the plurality of electronic wallets;

receive transaction details of each of the payment transactions, the transaction details comprising an electronic wallet identifier identifying at least one of the plurality of electronic wallets selected from the list of electronic wallets associated with the plurality of electronic wallet server providers, a payment amount and a customer electronic device identifier;

generate a payment transaction request for each of the payment transactions, the payment transaction request comprising the transaction details and a merchant identifier identifying the merchant, the merchant being a party to a payment transaction associated with the payment transaction request;

generate a universal code based on the payment transaction request for each of the payment transactions;

transmit, to a customer electronic device associated with the customer electronic device identifier, the universal code;

receive, from a customer directly or via the customer electronic device, a confirmation code associated with the payment transaction request;

determine if the confirmation code matches the universal code; and

transmit the payment transaction request for each of the payment transactions to a payment network server for authorisation if it is determined that the confirmation code matches the universal code.

2. A point-of-sale (POS) terminal having a universal switch machine for processing payment transactions of a plurality of electronic wallets, the universal switch machine comprising:

an input terminal for receiving transaction details of a payment transaction, the transaction details comprising an electronic wallet identifier identifying at least one of the plurality of electronic wallets selected from a list of electronic wallets associated with a plurality of electronic wallet server providers, a payment amount and a customer electronic device identifier;

a communication interface for transmitting the transaction details and a merchant identifier associated with a merchant, the merchant being a party to the payment transaction; and

a processor configured to:

obtain the transaction details from the input terminal;

generate a payment transaction request for transmitting to a payment network server, the payment transaction request comprising the transaction details and the merchant account identifier;

retrieve from an electronic wallet database, the list of electronic wallets associated with the plurality of electronic wallet server providers, wherein the plurality of electronic wallet service providers are each registered for payment transactions using one or more of the plurality of electronic wallets;

generate a universal code based on the payment transaction request;

transmit, to a customer electronic device associated with the customer electronic device identifier, the universal code;

receive, from a customer directly or via the customer electronic device, a confirmation code associated with the payment transaction request;

determine if the confirmation code matches the universal code; and

transmit the payment transaction request to the payment network server for authorisation if the confirmation code matches the universal code.

3. The POS terminal of claim 2, wherein the input terminal is configured to receive manual input relating to one or more of the transaction details.

4. A payment network server for processing payment transactions using a plurality of electronic wallets, the server comprising at least a computer processor and a data storage device, the data storage device comprising non-transitory instructions operative by the processor to:

receive, from a universal switch machine, a payment transaction request associated with a payment transaction, the payment transaction request comprising transaction details and a merchant identifier, the transaction details comprising a payment amount, a customer electronic device identifier and an electronic wallet identifier associated with one of the plurality of electronic wallets;

identify a service provider server associated with an electronic wallet service provider using the electronic wallet identifier;

initiate an authorisation for the payment transaction;

receive, from an acquiring institution for a merchant, a settlement transaction request comprising a list of payment transactions made via the universal switch machine within a predetermined time period;

sort the settlement transaction request by associating each of the payment transactions to a corresponding electronic wallet service provider identified in each of the payment transactions;

transmit, to each of the corresponding electronic wallet service providers, a settlement request for payment transactions associated with each of the corresponding electronic wallet service providers made at the universal switch machine;

receive, from each of the corresponding electronic wallet service providers, a settlement response comprising funds to settle the payment transactions;

transmit the funds to the acquiring institution, the acquiring institution maintaining a merchant account associated with the merchant identifier; and

transmit a settlement transaction response to the universal switch machine indicating that the list of payment transactions has been settled.

5. The server of claim 4, wherein the processor is further configured to:

generate a universal code based on the payment transaction request or receive from the universal switch machine the universal code associated with the payment transaction request;

transmit the universal code to a customer electronic device associated with the customer electronic device identifier;

receive, from the customer electronic device or from the customer electronic device via the universal switch machine, a confirmation code for the payment transaction request; and

determine if the confirmation code matches the universal code associated with the payment transaction request; and

wherein the authorisation for the payment transaction is initiated if the confirmation code matches the universal code.

6. The server of claim 4 or claim 5, wherein the authorisation for the payment transaction can be initiated, the processor is further configured to:

transmit, to the service provider server, a verification request comprising a request to verify that an electronic wallet account is associated with the customer electronic device identifier; and

receive, from the service provider server, a verification response indicating whether the customer electronic device identifier is verified; and

wherein the payment transaction can be authorised if the customer electronic device identifier is verified.

7. The server of any one of claims 4 to 6, wherein the authorisation for the payment transaction can be initiated, the processor is further configured to:

transmit, to the service provider server, a balance determination request to determine if a balance of the electronic wallet account is greater than or equal to the payment amount; and

receive, from the service provider server, a balance determination response, the balance determination response indicating whether the balance of the electronic wallet account is greater than or equal to the payment amount; and

wherein the payment transaction is authorised if the balance of the electronic wallet account is greater than or equal to the payment amount.

8. The server of any one of claims 4 to 7, wherein the processor is further configured to:

transmit, to the universal switch machine or to the customer electronic device, a payment transaction response indicating whether the payment transaction has been authorised.

9. The server of any one of claims 4 to 8 wherein the universal code comprises one or more of the following: a barcode, a Quick Response (QR) code, a one-time password (OTP) or a gesture.

10. A computer-implemented method for processing, at a payment network server, payment transactions using a plurality of electronic wallets, the method comprising:

receiving, from a universal switch machine, a payment transaction request associated with a payment transaction, the payment transaction request comprising transaction details and a merchant identifier, the transaction details comprising a payment amount, a customer electronic device identifier and an electronic wallet identifier associated with one of the plurality of electronic wallets;

identifying a service provider server associated with an electronic wallet service provider using the electronic wallet identifier;

initiating an authorisation for the payment transaction;

receiving, from an acquiring institution for a merchant, a settlement transaction request comprising a list of payment transactions made via the universal switch machine within a predetermined time period;

sorting the settlement transaction request by associating each of the payment transactions to a corresponding electronic wallet service provider identified in each of the payment transactions;

transmitting, to each of the corresponding electronic wallet service providers, a settlement request for payment transactions associated with each of the corresponding electronic wallet service providers made at the universal switch machine;

receiving, from each of the corresponding electronic wallet service providers, a settlement response comprising funds to settle the payment transactions;

transmitting the funds to the acquiring institution, the acquiring institution maintaining a merchant account associated with the merchant identifier; and

transmitting a settlement transaction response to the universal switch machine indicating that the list of payment transactions has been settled.

11. The method of claim 10, further comprising:

generating a universal code based on the payment transaction request or receiving from the universal switch machine the universal code associated with the payment transaction request;

transmitting the universal code to a customer electronic device associated with the customer electronic device identifier;

receiving, from the customer electronic device or from the customer electronic device via the universal switch machine, a confirmation code for the payment transaction request; and

determining if the confirmation code matches the universal code associated with the payment transaction request; and

wherein the authorisation for the payment transaction is initiated if the confirmation code matches the universal code.

12. The method of claim 10 or claim 11, wherein the authorisation for the payment transaction can be initiated, the method further comprises:

transmitting, to the service provider server, a verification request comprising a request to verify that an electronic wallet account is associated with the customer electronic device identifier; and

receiving, from the service provider server, a verification response indicating whether the customer electronic device identifier is verified; and

wherein the payment transaction is authorised if the customer electronic device identifier is verified.

13. The method of any one of claims 10 to 12, wherein the authorisation for the payment transaction can be initiated, the method further comprises:

transmitting, to the service provider server, a balance determination request to determine if a balance of the electronic wallet account is greater than or equal to the payment amount; and

receiving, from the service provider server, a balance determination response, the balance determination response indicating whether the balance of the electronic wallet account is greater than or equal to the payment amount; and

wherein the payment transaction is authorised if the balance of the electronic wallet account is greater than or equal to the payment amount.

14. The method of any one of claims 10 to 13, further comprising:

transmitting, to the universal switch machine or to the customer electronic device, a payment transaction response indicating whether the payment transaction has been authorised.

15. A non-transitory computer-readable medium having stored thereon program instructions for causing at least one processor to perform the method according to any one of claims 10 to 14.