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(54) **Title:** METHOD OF ELECTRONIC WALLET PAYMENTS USING NEAR FIELD COMMUNICATION

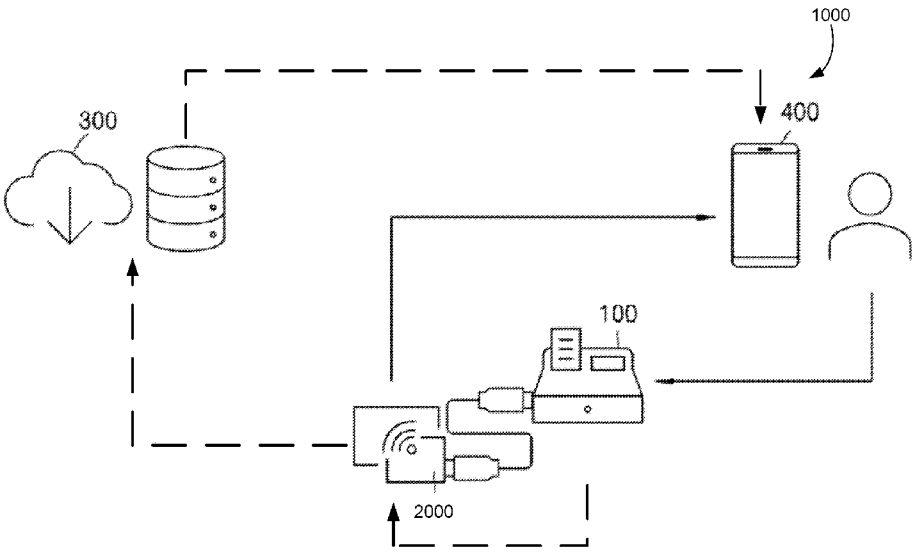

FIG. 1

(57) **Abstract:** Computing devices and methods for facilitating electronic wallet payments using Near Field Communication (NFC). In an example, the method includes receiving, from a Point-Of-Sale (POS) terminal, transaction information corresponding to a transaction and an identification of an electronic wallet payment application of an electronic wallet payment server; sending, to a server, the transaction information and the identification of the electronic wallet payment application; establishing a uniform resource locator (URL) which addresses the server and which identifies a first web resource which activates the electronic wallet payment application; generating, via a Near Field Communication (NFC) tag controller, an NFC data exchange format (NDEF) message comprising the URL as a payload; and emitting, via the NFC tag controller, an NFC signal corresponding to the NDEF message.

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METHOD OF ELECTRONIC WALLET PAYMENTS USING NEAR FIELD COMMUNICATION

CROSS-REFERENCE TO RELATED APPLICATION(S)

[0001] This application claims the benefit of priority to United States Patent Application No. 63/513,048 filed July 11, 2023 and Japan Patent Application No. JP2024-97236 filed June 17, 2024, all the contents of which are herein incorporated by reference into the DETAILED DESCRIPTION.

TECHNICAL FIELD

[0002] Example embodiments relate to Near Field Communication (NFC) technology, for example facilitating electronic wallet payments using NFC technology.

BACKGROUND

[0003] Conventional electronic wallet systems can require a Quick Response (QR) code for execution of payments at a point of sale (POS). For example, a transactee (e.g. consumer/shopper) or a transactor (e.g. merchant) may display a QR code for scanning. The other of the transactee or the transactor may capture an image of (image scan) the QR code in order to complete the transaction through an application. Some examples of such a process requires the transactee to manually launch an applicable electronic wallet payment application to present a QR code or to image scan a merchant/retailer static QR code. Another example of such a process requires the transactee to manually launch a camera application/camera function in the electronic wallet payment application in order for the camera to capture an image of the QR code. Such a process can be cumbersome and requires the usage of the camera application and the onboard camera on the part of the transactee.

[0004] Conventional electronic wallet systems typically provide a confirmation or electronic receipt (e-receipt) that only includes the amount and the transactee. Such conventional electronic wallet systems would not include identification and itemization of the particular goods and services of the transaction at the POS terminal.

[0005] Computing devices and methods for transacting with existing QR based electronic wallet payment applications without using cameras and image scanning are desired.

[0006] Computing devices and methods that work with existing payment applications and which do not require a NFC device, POS terminal, or e-receipt server to know the financial credentials of the transactee are desired.

[0007] When a consumer completes a transaction associated with the purchase of goods or use of a service, the consumer receives a receipt. In conventional payment systems, a point of sale (POS) terminal may promptly issue a paper receipt and may provide the consumer with an e-receipt at a future time. Drawbacks to paper receipts include the risk of leakage of personal information, challenges in efficient receipt management, and the cost of generating printed receipts. E-receipts are generally preferred, as they provide surety of personal information, are easier to retain and manage, are less expensive to produce, and are environmentally friendly.

[0008] Computing devices and methods for the convenient and seamless provision of e-receipts are desired. In some existing payment systems or servers, a user device may be required to register in order to obtain an e-receipt. This registration may include the registration of personal information such as an e-mail address, phone number, payment instrument number, or account information.

SUMMARY

[0009] Examples described herein can provide computing devices and methods for facilitating payments such as electronic wallet payments using Near Field Communication (NFC). The electronic wallet payments are for transactions by a user device which accesses a payment application associated with a payment server. In examples, the payment server processes the transactions and payments.

[0010] For example, a computing device can include an NFC device which has an NFC tag controller. In an example of a transaction, the NFC device sends an NFC data exchange format (NDEF) message comprising a uniform resource locator (URL) as a payload to the user device. The NDEF message is received by the user device. The URL, when accessed by the user device, automatically activates a payment application of the payment server on the user device for completion of the transaction.

[0011] In an example, the NFC device communicates with a server.

[0012] In an example, the server and the NFC device do not communicate with and do not send data to the payment server.

[0013] In an example, the server and the NFC device are third party to the payment server.

[0014] In an example, the payment server is an electronic wallet payment server that is electronic wallet based. For example, the payment server does not process credit cards and is non-credit card based. For example, electronic wallet payment server is debit based. For example, a client device or another device is used to load an electronic wallet account on the electronic wallet payment server.

[0015] For example, transfer cards or financial credentials do not need to be presented to the NFC device, the POS terminal, or the server.

[0016] In an example, the payment server is of a type that is conventionally activated or addressed using a QR code.

[0017] Examples described herein can allow a transactee, after a transaction has occurred, to receive and display a corresponding e-receipt using a web browser application or electronic wallet payment application. Examples described herein allow a transactee, after a transaction has occurred, to receive and display a corresponding e-receipt on a user device.

[0018] An example embodiment is a computer-implemented method comprising: receiving, from a Point-Of-Sale (POS) terminal, transaction information corresponding to a transaction and an identification of an electronic wallet payment application of an electronic wallet payment server; sending, to a server, the transaction information and the identification of the electronic wallet payment application; establishing a uniform resource locator (URL) which addresses the server and which identifies a first web resource which activates the electronic wallet payment application, wherein the URL includes a unique transaction identifier that includes: a hash function applied to the transaction information, and/or date information and time information of the transaction, and/or a unique device identifier; generating, via a Near Field Communication (NFC) tag controller, an NFC data exchange format (NDEF) message comprising the URL as a payload; and emitting, via the NFC tag controller, an NFC signal corresponding to the NDEF message.

[0019] In another example embodiment of any of the above described computer-implemented methods, the computer-implemented method further comprises: receiving from the POS terminal a confirmation of a successful completion of the transaction; and sending the confirmation to the server.

[0020] In another example embodiment of any of the above described computer-implemented methods, upon successful completion of the transaction, the URL identifies a second web resource for displaying an electronic receipt (e-receipt) of the transaction.

[0021] In another example embodiment of any of the above described computer-implemented methods, the e-receipt includes the unique transaction identifier.

[0022] In another example embodiment of any of the above described computer-implemented methods, the server has account information of the electronic wallet payment application that is associated with the POS terminal.

[0023] In another example embodiment of any of the above described computer-implemented methods, the account information of the electronic wallet payment application that is associated with the POS terminal includes a Quick Response (QR) code of the electronic wallet payment application that is unique to the POS terminal.

[0024] In another example embodiment of any of the above described computer-implemented methods, wherein the URL includes the identification of the electronic wallet payment application.

[0025] In another example embodiment of any of the above described computer-implemented methods, the URL is a deep link, wherein, in the URL, the identification of the electronic wallet payment application is nested from the unique transaction identifier.

[0026] In another example embodiment of any of the above described computer-implemented methods, the establishing includes generating the URL, the computer-implemented method further comprises comprising sending the URL to the server.

[0027] In another example embodiment of any of the above described computer-implemented methods, the establishing includes receiving the URL.

[0028] In another example embodiment of any of the above described computer-implemented methods, the receiving the transaction information is from a point of sale (POS)

terminal, wherein the computer-implemented method is performed by a NFC device that is a separate device to the POS terminal.

[0029] In another example embodiment of any of the above described computer-implemented methods, the computer-implemented method is performed by a NFC device that is third party to and does not communicate with the electronic wallet payment server.

[0030] In another example embodiment of any of the above described computer-implemented methods, the unique device identifier is an identifier of the POS terminal.

[0031] In another example embodiment of any of the above described computer-implemented methods, the first web resource automatically populates the electronic wallet payment application with at least part of the transaction information.

[0032] In another example embodiment of any of the above described computer-implemented methods, the first web resource automatically populates the electronic wallet payment application with a disbursement amount.

[0033] In another example embodiment of any of the above described computer-implemented methods, the first web resource is a Progressive Web Application, a Responsive Web Application, a Rich Internet Application, a Single Page Application, or a Multi Page Application.

[0034] In another example embodiment of any of the above described computer-implemented methods, the receiving the transaction information and the sending the transaction information does not include financial credentials.

[0035] In another example embodiment of any of the above described computer-implemented methods, the NDEF message only contains the URL as the payload and no other payload.

[0036] In another example embodiment of any of the above described computer-implemented methods, the electronic wallet payment server and the electronic wallet payment application are debit based.

[0037] Another example embodiment is a computing device comprising: an NFC tag controller; a communications module; a processor; and at least one memory storing instructions which, when executed by the processor, cause the processor to perform any of the above computer-implemented methods.

[0038] In another example embodiment of any of the above computing devices, the transaction information is from a point of sale (POS) terminal, wherein the computing device is a NFC device that is a separate device to the POS terminal

[0039] Another example embodiment is a computer-implemented method performed by a user device, the computer-implemented method comprising: receiving, via an Near Field Communication (NFC) tag reader, an NFC data exchange format (NDEF) message comprising a URL as a payload, wherein the URL addresses a server, wherein the URL includes a unique transaction identifier that includes: a hash function applied to transaction information of a transaction, and/or date information and time information of the transaction, and/or a unique device identifier; accessing the URL; accessing, responsive to the accessing the URL, a first web resource of the URL which activates an electronic wallet payment application on the user device; and activating the electronic wallet payment application for completing the transaction with an electronic wallet payment server.

[0040] In another example embodiment of any of the above described computer-implemented methods, the receiving the NDEF message is from a NFC device that is a third party to the electronic wallet payment server.

[0041] In another example embodiment of any of the above described computer-implemented methods, the first web resource automatically populates the electronic wallet payment application with at least part of the transaction information.

[0042] In another example embodiment of any of the above described computer-implemented methods, the first web resource automatically populates the electronic wallet payment application with a disbursement amount.

[0043] In another example embodiment of any of the above described computer-implemented methods, the computer-implemented method further comprises: receiving a confirmation of a successful completion of the transaction; accessing a second web resource of the URL; and displaying, responsive to the accessing the second web resource, an electronic receipt (e-receipt) of the transaction.

[0044] In another example embodiment of any of the above described computer-implemented methods, the e-receipt includes the unique transaction identifier.

[0045] In another example embodiment of any of the above described computer-implemented methods, the displaying includes displaying the receipt through a web page, an application page, or the electronic wallet payment application.

[0046] In another example embodiment of any of the above described computer-implemented methods, the computer-implemented method further comprises: receiving a confirmation of a successful completion of the transaction; generating, responsive to the confirmation of the successful completion of the transaction, an electronic receipt (e-receipt) of the transaction based on the transaction information; and displaying, the e-receipt.

[0047] Another example embodiment is a user device comprising: an NFC tag reader; a communications module; a processor; and at least one memory which stores instructions which, when executed by the processor, cause the processor to perform any of the above computer-implemented methods.

[0048] Another example embodiment is a computer-implemented method performed by a server, the computer-implemented method comprising: receiving transaction information corresponding to a transaction and an identification of an electronic wallet payment application of an electronic wallet payment server; establishing a uniform resource locator (URL) which addresses the server, wherein the URL includes a unique transaction identifier that includes: a hash function applied to the transaction information, and/or date information and time information of the transaction, and/or a unique device identifier; generating a first web resource associated with the URL which activates the electronic wallet payment application; receiving an access to the URL in response to an NFC data exchange format (NDEF) message comprising a URL as a payload; providing the first web resource through the access to the URL; receiving a confirmation of a successful completion of the transaction; generating a second web resource associated with the URL for displaying an electronic receipt (e-receipt) of the transaction; and providing the second web resource through the second access to the URL.

[0049] In another example embodiment of any of the above described computer-implemented methods, the receiving the transaction information is from a NFC device or a point-of-sale terminal.

[0050] In another example embodiment of any of the above described computer-implemented methods, the receiving the confirmation is from a NFC device or a point-of-sale terminal.

[0051] In another example embodiment of any of the above described computer-implemented methods, the server has account information of the electronic wallet payment application that is associated with a POS terminal.

[0052] In another example embodiment of any of the above described computer-implemented methods, the account information of the electronic wallet payment application that is associated with the POS terminal includes a Quick Response (QR) code of the electronic wallet payment application that is unique to the POS terminal.

[0053] In another example embodiment of any of the above described computer-implemented methods, the URL includes the identification of the electronic wallet payment application.

[0054] In another example embodiment of any of the above described computer-implemented methods, the URL is a deep link, wherein, in the URL, the identification of the electronic wallet payment application is nested from the unique transaction identifier.

[0055] In another example embodiment of any of the above described computer-implemented methods, the receiving the transaction information does not include financial credentials.

[0056] In another example embodiment of any of the above described computer-implemented methods, the server is an electronic receipt (e-server) that is third party to the electronic wallet payment application and does not communicate with the electronic wallet payment server.

[0057] In another example embodiment of any of the above described computer-implemented methods, the establishing includes generating the URL.

[0058] In another example embodiment of any of the above described computer-implemented methods, the establishing includes receiving the URL.

[0059] In another example embodiment of any of the above described computer-implemented methods, the computer-implemented method further comprises registering account information of the electronic wallet payment application that is associated with the POS terminal.

[0060] In another example embodiment of any of the above described computer-implemented methods, the account information includes a Quick Response (QR) code of the electronic wallet payment application that is unique to the POS terminal.

[0061] In another example embodiment of any of the above described computer-implemented methods, the receiving the transaction information is from a NFC device that is a separate device to a point-of-sale (POS) terminal.

[0062] In another example embodiment of any of the above described computer-implemented methods, wherein the unique device identifier is an identifier of the POS terminal.

[0063] In another example embodiment of any of the above described computer-implemented methods, the first web resource and the second web resource are each a Progressive Web Application, a Responsive Web Application, a Rich Internet Application, a Single Page Application, or a Multi Page Application.

[0064] In another example embodiment of any of the above described computer-implemented methods, the NDEF message only contains the URL as the payload and no other payload.

[0065] In another example embodiment of any of the above described computer-implemented methods, the electronic wallet payment server and the electronic wallet payment application are debit based.

[0066] Another example embodiment is a computing device, which includes a communications module; a processor; and at least one memory coupled to the processor, and storing instructions which, when executed by the processor, cause the processor to perform any of the above methods or computer-implemented methods.

[0067] In another example embodiment of any of the above computing devices, the communications module includes a NFC tag controller.

[0068] Another example embodiment is a non-transitory computer readable medium containing instructions which, when executed by the processor, cause the processor to perform any of the above methods or computer-implemented methods.

BRIEF DESCRIPTION OF THE DRAWINGS

[0069] Example embodiments are described in detail below, with reference to the following drawings, in which:

[0070] FIG. 1 is a schematic diagram showing a payment system according to example embodiments;

[0071] FIG. 2 is a block diagram showing an example of the internal configuration of an NFC device as shown in FIG. 1, according to example embodiments;

[0072] FIG. 3 is a block diagram showing an example of an internal configuration of a server as shown in FIG. 1, according to example embodiments;

[0073] FIG. 4 is a block diagram showing an example of an internal configuration of a user device as shown in FIG. 1, according to example embodiments;

[0074] FIG. 5 is a schematic diagram showing an example of a payment system, according to example embodiments;

[0075] FIG. 6 is a flowchart of an example method of facilitating an electronic wallet payment, according to example embodiments;

[0076] FIG. 7 is a flowchart of another example method of facilitating an electronic wallet payment, according to example embodiments;

[0077] FIG. 8 is a flowchart of yet other another example method of facilitating an electronic wallet payment, according to example embodiments;

[0078] FIG. 9 is a diagram of an example display of an e-receipt on a user device, according to example embodiments;

[0079] FIG. 10 is a schematic diagram showing a payment system according to example embodiments;

[0080] FIG. 11 is a schematic diagram showing another payment system according to example embodiments;

[0081] FIG. 12 is a schematic diagram showing another payment system according to example embodiments;

[0082] FIG. 13 is a flowchart of an example method performed by a NFC device for an electronic wallet payment, according to example embodiments;

[0083] FIG. 14 is a flowchart of an example method performed by a user device for an electronic wallet payment, according to example embodiments; and

[0084] FIG. 15 is a flowchart of an example method performed by a server for an electronic wallet payment, according to example embodiments.

[0085] Like reference numerals may be used in the drawings to denote like elements and features.

DETAILED DESCRIPTION

[0086] At least some example embodiments include a method electronic wallet payments and issuing electronic receipts (e-receipts or receipts), such that a user may conveniently use NFC through a smartphone rather than scanning a Quick Response (QR) code.

[0087] Since the example embodiments can apply various transformations and can have various embodiments, specific embodiments are illustrated in the drawings and described in detail in the detailed description. However, this is not intended to limit to particular modes of practice, and it is to be appreciated that all changes, equivalents, and substitutes that do not depart from the technical scope of the example embodiments. In the detailed description, certain detailed explanations of the related art are omitted when it is deemed that they may unnecessarily obscure the clarity of the example embodiments.

[0088] An example embodiment is a computer-implemented method comprising: receiving, from a Point-Of-Sale (POS) terminal, transaction information corresponding to a transaction and an identification of an electronic wallet payment application of an electronic wallet payment server; sending, to a server, the transaction information and the identification of the electronic wallet payment application; establishing a uniform resource locator (URL) which addresses the server and which identifies a first web resource which activates the electronic wallet

payment application, wherein the URL includes a unique transaction identifier that includes: a hash function applied to the transaction information, and/or date information and time information of the transaction, and/or a unique device identifier; generating, via a Near Field Communication (NFC) tag controller, an NFC data exchange format (NDEF) message comprising the URL as a payload; and emitting, via the NFC tag controller, an NFC signal corresponding to the NDEF message.

[0089] Another example embodiment is a computer-implemented method performed by a user device, the computer-implemented method comprising: receiving, via an Near Field Communication (NFC) tag reader, an NFC data exchange format (NDEF) message comprising a URL as a payload, wherein the URL addresses a server, wherein the URL includes a unique transaction identifier that includes: a hash function applied to transaction information of a transaction, and/or date information and time information of the transaction, and/or a unique device identifier; accessing the URL; accessing, responsive to the accessing the URL, a first web resource of the URL which activates an electronic wallet payment application on the user device; and activating the electronic wallet payment application for completing the transaction with an electronic wallet payment server.

[0090] Another example embodiment is a computer-implemented method performed by a server, the computer-implemented method comprising: receiving transaction information corresponding to a transaction and an identification of an electronic wallet payment application of an electronic wallet payment server; establishing a uniform resource locator (URL) which addresses the server, wherein the URL includes a unique transaction identifier that includes: a hash function applied to the transaction information, and/or date information and time information of the transaction, and/or a unique device identifier; generating a first web resource associated with the URL which activates the electronic wallet payment application; receiving an access to the URL in response to an NFC data exchange format (NDEF) message comprising a URL as a payload; providing the first web resource through the access to the URL; receiving a confirmation of a successful completion of the transaction; generating a second web resource associated with the URL for displaying an electronic receipt (e-receipt) of the transaction; and providing the second web resource through the second access to the URL.

[0091] Another example embodiment is a computing device, including a communications module; a processor; and at least one memory coupled to the processor, and storing instructions which, when executed by the processor, cause the processor to perform any of the methods or computer-implemented methods described herein.

[0092] Another example embodiment is a non-transitory computer readable medium containing instructions which, when executed by the processor, cause the processor to perform any of the methods or computer-implemented methods described herein.

[0093] FIGs. 10, 11 and 12 illustrate example embodiments of a payment system 1000, in according to example embodiments. In the example payment system 1000 of FIG. 10, a NFC device 2000 and not a POS terminal 100 is in communication with a server 300. In the example payment system 1000 of FIG. 11, both the POS terminal 100 and the NFC device 2000 are in communication with the server 300. In the example payment system 1000 of FIG. 12, the POS terminal 100 and not the NFC device 2000 is in communication with the server 300. Like reference numerals may be used in FIGs. 10, 11 and 12 to denote like elements and features.

[0094] Referring to FIG. 10, in examples, the payment system 1000 is used to facilitate payments using NFC. For example, the payment system 1000 can be used to facilitate electronic wallet payments. In examples, the payment system 1000 is used to issue and manage e-receipts for the payments (e.g. electronic wallet payments) that are facilitated through the payment system 1000. Referring to FIG. 10, the payment system 1000 is shown including a POS terminal 100, a NFC device 2000, a server 300, a payment server 1010, and a user device 400. The NFC device 2000 is a computing device.

[0095] The POS terminal 100, the server 300, the NFC device 2000, the payment server 1010, and the user device 400 may be in communication over a network (not shown), for example, a wireless network. In some implementations, the wireless network may be the Internet. In some implementations, the POS terminal 100, the server 300, the NFC device 2000, the payment server 1010, and the user device 400 may connect to the Internet via Wi-Fi technology. The user device 400 may include an NFC tag reader 480 (FIG. 4). In other words, the user device 400 may include NFC Reading or a Background NFC Tag reading capability.

[0096] As illustrated, the POS terminal 100 may communicate with the NFC device 2000, which may operate to facilitate payments and generate an e-receipt. Such communication may be

via a wired connection, such as, for example, a USB connection. Such communication may be via a wireless connection, such as Bluetooth (TM), for example.

[0097] The NFC device 2000 may communicate with the payment server 1010. Such communication may be via a network, such as a wireless network. In examples, the payment server 1010 is a payment processor, platform, server, or network infrastructure that allows electronic money transfers to be made between transactors and transactees. In examples, the transfers can be made regardless of country, currency, digital payment method, or whether the payer or payee is a business or consumer. Each payment server 1010 differs in how it carries out this process based on the payment type, speed, technology, or geographical location. In examples, the payment server 1010 is or includes an electronic wallet payment server, which can be accessed by way of an electronic wallet payment application. Examples of the payment server 1010 as an electronic wallet payment server include Paypay (TM), R Pay (TM), Line Pay (TM) in Japan, Naver Pay (TM) in Korea, Kakao Pay (TM) in Korea, PayTM (TM), UPI (TM), AliPay (TM), BharatQR (TM), SG QR (TM), GrabPay (TM) in SouthEast Asia, GoPay (TM) in SouthEast Asia, Paymongo (TM) in Philippines, GPay (TM) in Philippines, QR code based payment servers, and other non-credit card payment servers.

[0098] In an example, the server 300 has stored, registered or pre-registered the account information of the electronic wallet payment application that is associated with the POS terminal 100 or the transactee (or merchant). In an example, a plurality of the account information associated with the POS terminal 100 for a plurality of electronic wallet payment servers 1010 can be stored, registered or pre-registered at the server 300.

[0099] For example, the account information of the electronic wallet payment application that is associated with the POS terminal 100 includes a QR code, or information of the QR code, of the electronic wallet payment application that is unique to the POS terminal 100. In examples, a transactor may have a unique single QR code for each electronic wallet payment server 1010, which is used for any number of the POS terminal 100 owned and managed by the transactor.

[0100] In an example, the electronic wallet payment server 1010 and the electronic wallet payment application are debit based.

[0101] The POS terminal 100 may be located at a location that is associated with a transactor, such as a merchant. By way of example, the merchant may be a store, restaurant, gym,

etc. The acquirer may be a merchant bank that accepts deposits associated with transactions made at the POS terminal 100 and facilitates settlement and deposit of those deposits into an account associated with the merchant. In some examples, the POS terminal 100 can issue e-receipts for legal tender (cash) transactions as well.

[0102] While a single payment server 1010 is illustrated in FIG. 10, in examples the POS terminal 100 and/or the NFC device 2000 may communicate with multiple payment servers 1010. Other types of payment servers 1010 and payment applications may be used.

[0103] After a payment server 1010 (payment application) is identified, the user device 400 sends the payment server 1010 a message through a payment application. The message may be sent through a network. The message may include transaction information, including a value amount representing an amount of value that is to be transferred to complete a transaction.

[0104] The payment server 1010 then determines whether the transaction is approved or denied based on pre-defined rules. The rules may, for example, consider any one or more of: whether the user account of the user device 400 has available funds, whether the transactor or merchant is of a type that is permitted, whether the transaction violates any spending limits, etc.

[0105] When the payment server 1010 determines whether to approve or deny the transaction, the payment server 1010 sends a message indicating the result of this determination to the POS terminal 100 and/or the NFC device 2000. The result may then be displayed or otherwise output at the POS terminal 100.

[0106] FIG. 2 is a block diagram showing an example of the internal configuration of the NFC device 2000 shown in FIGs. 1 and 10. Referring to FIG. 2, the NFC device 2000 may include a variety of components. The variety of components may include, as shown, a network interface 2010, a communication module 2020, a memory 2030, a program storage 2040, a controller 2050, an address generator 2060, and an NFC tag controller 2070, for example. In an example, the NFC device 2000 can facilitate electronic wallet payments by sending an address (e.g. a URL) over NFC. In an example, the NFC device 2000 is or includes an e-receipt generator in which the e-receipt is accessible by the address.

[0107] Examples of the NFC device 2000 include a Pipos (TM) device, an existing Payment Card Industry (PCI) PIN Transaction Service Point of Interaction (PTS POI) device,

which can include a PCI Commercial off-the shelf (SPoC) device or a PCI PIN Transaction Service Point of Interaction (PCI PTS POI) device, or a non-PCI certified payment device. For example, some countries such as South Korea and Japan do not use PCI certification.

[0108] In some embodiments, two or more functionally connected components of the NFC device 2000 may be combined with each other and exist as a single component. In some embodiments, one component may be divided into a plurality of components according to one or more functions of the one component.

[0109] The network interface 2010 provides an interface for transmitting an address, e.g. a URL, and transaction information corresponding thereto to a server 300, in conjunction with a communication network.

[0110] The communication module 2020 allows the NFC device 2000 to communicate with other computer or computing devices and/or various communications networks. For example, the communication module 2020 may allow the NFC device 2000 to send or receive communications signals. Communications signals may be sent or received according to one or more protocols or according to one or more standards. For example, the communications module 2020 may allow the NFC device 2000 to communicate via a cellular data network, such as for example, according to one or more standards such as, for example, Global Computing device for Mobile Communications (GSM), Code Division Multiple Access (CDMA), Evolution Data Optimized (EVDO), Long-term Evolution (LTE) or the like. Additionally or alternatively, the communication module 2020 may allow the NFC device 2000 to communicate using NFC, via Wi-Fi (TM), using Bluetooth (TM) or via some combination of one or more networks or protocols. In some embodiments, all or a portion of the communication module 2020 may be integrated into a component of the NFC device 2000. For example, the communication module 2020 may be integrated into a communications chipset. The communication module 2020 may include a communication interface for receiving transaction information from the POS terminal 100.

[0111] The memory 2030 temporarily stores data processed by the controller 2050 and/or temporarily stores transaction information transmitted to the NFC device 2000.

[0112] The program storage 2040 stores control software for performing a task of transmitting data to the server 300, a task of receiving data from the POS terminal 100, a task of generating an address corresponding to transaction information, a task of generating a message

corresponding to an address and programming the message to an NFC tag, etc. In some embodiments, the program storage may form part of the memory 2030. In some embodiments, some or all of the control software stored in the program storage may form at least part of one or more applications within the memory 2030.

[0113] The controller 2050 is a kind of central processing module (CPU) and may control the process related to facilitating payment transactions (such as electronic wallet payment transactions) and the generation of an e-receipt using the NFC device 2000. In examples, the controller 2050 may perform various services such as executing control software stored in the program storage 2040.

[0114] The address generator 2060 may generate a unique address in correspondence to received transaction information. In some embodiments, an address refers to a URL for accessing a web site or a web page on the Internet, but the example embodiments are not limited thereto.

[0115] The address generator 2060 may generate a unique address by including therein a unique transaction identifier corresponding to transaction information. For example, the address is a deep link, a deferred deep link, or a nested link. For example, in some implementations, an address may have the format "www.domain/mobile app/unique transaction identifier". In some such implementations, the format of the unique transaction identifier may include various lengths and may be based on a combination of letters, numbers, and special characters, although the example embodiments are not limited thereto.

[0116] According to an embodiment, the NFC device 2000 may generate an identifier (unique transaction identifier) based on transaction-related information. For example, in some embodiments, an identifier may be generated based on information respecting the NFC device 2000 and/or based on a transaction date and a transaction time. According to another embodiment, the NFC device 2000 may generate an identifier using a hash technique. A hash technique refers to a technique for obtaining one result value corresponding to one input value using a hash function. In some such embodiments, an identifier may be a result value obtained through a hash technique using transaction information as an input value. However, methods of generating an identifier according to the example embodiments are not limited thereto.

[0117] The NFC tag controller 2070 generates a message corresponding to an address and emits the message as an NFC signal by controlling an NFC tag. According to an embodiment, a

message may be in a particular format used for NFC. In some implementations, the particular format may refer to a format that enables the user device 400 receiving a corresponding message to immediately perform a predetermined action. For example, the NFC tag controller 2070 may generate and emit an NDEF message including information to be transmitted to the user device 400. In some implementations, an address is included as a payload in the NDEF message. In such implementations, the user device 400 may perform a predetermined operation upon receiving the NDEF message. The predetermined operation may be, for example, opening, through a web browser application, a web page linked to the address.

[0118] FIG. 3 is a block diagram showing an example of an internal configuration of the server 300 shown in FIGs. 1 and 10. Referring to FIG. 3, the server 300 may include a variety of components. These components may include, as shown, a communication module 310, a memory 320, a program storage 330, a controller 340, a database 350, and an e-receipt application programming interface (API) 360, for example. In examples, the server 300 is or includes a receipt server or an e-receipt server.

[0119] The communication module 310 allows the server 300 to communicate with other computer or computing devices and/or various communications networks. For example, the communication module 310 may allow the server 300 to send or receive communications signals. Communications signals may be sent or received according to one or more protocols or according to one or more standards. For example, the communications module 310 may allow the server 300 to communicate via a cellular data network, such as for example, according to one or more standards such as, for example, Global Computing device for Mobile Communications (GSM), Code Division Multiple Access (CDMA), Evolution Data Optimized (EVDO), Long-term Evolution (LTE) or the like. Additionally or alternatively, the communication module 310 may allow the server 300 to communicate using NFC, via Wi-Fi (TM), using Bluetooth (TM) or via some combination of one or more networks or protocols. In some embodiments, all or a portion of the communication module 310 may be integrated into a component of the server 300. For example, the communication module 310 may be integrated into a communications chipset.

[0120] The communication module 310 may provide an interface for communication between the server 300 and the user device 400, and between the server 300 and the NFC device 2000. In some embodiments, the communication module 310 may include hardware and software

for transmitting and receiving control signals or data signals through a wireless connection with another network device.

[0121] The memory 320 may perform a function of temporarily or permanently storing data processed by the controller 340. In some implementations, the memory 320 may include a magnetic storage medium and/or a flash storage medium, although the example embodiments are not limited thereto.

[0122] The program storage 330 may store one or more programs composed of commands instructing one or more processes executed by a controller, as will be further discussed below. In some embodiments, the program storage 330 may form part of the memory 320. In some embodiments, one or more of the programs stored in the program storage may form at least part of one or more applications within the memory 2030.

[0123] The controller 340 is a type of CPU and may control processes related to issuance of an e-receipt, such as receiving data from the NFC device 2000, and providing an e-receipt to the user device 400. In examples, the controller 340 may perform one or more functions in connection with providing an e-receipt by executing control software stored in the program storage 330 and controlling each component in the server 300.

[0124] In some embodiments, the controller 340 may include a plurality of types of devices capable of processing data, such as one or more processors. In the example embodiments, a "processor" may refer to, for example, a data processing device embedded in hardware, having circuitry physically structured to perform functions represented by computing code and/or computer program instructions.

[0125] The database 350 may store address information and transaction information. Address information may include addresses (e.g., URLs), their corresponding identifiers, and other information related to addresses. The database 350 may store correspondences between the address information and the transaction information. In this way, the server 300 may easily determine transaction information using information related to an address.

[0126] In examples, the database 350 may store registration information between a transactor and one or more payment applications (associated with one or more of the payment servers 1010, FIG. 10) that are particular to the transactor. In an example, the payment applications

are electronic wallet payment applications. In an example, the registration information is a QR code that is typically presented at the POS or by the POS terminal 100 (FIG.s 1 and 10). Other registration information relating to the payment applications can be stored in the database 350. In examples, the registration information and/or the QR code contains information to activate an applicable electronic wallet payment application by the user device 400 in order to complete a transaction with the payment server 1010.

[0127] In examples, the e-receipt API 360 provides an interface for converting transaction information into the format of an e-receipt through various applications. The e-receipt API 360 also provides an interface for displaying a generated e-receipt in the form of a web page linked to an address.

[0128] In examples, the e-receipt API 360 is configured to provide an interface for providing a web resource which activates an electronic wallet payment application. In examples, the e-receipt API 360 is used to facilitate transactions such as electronic wallet payments, for example facilitated through NFC.

[0129] These components are merely examples, and the example embodiments are not limited thereto. In other words, as occasions demand, the server 300 may further include additional components or some of the above-stated components may be omitted.

[0130] FIG. 4 is a block diagram showing an example of an internal configuration of a user device 400 (FIGs. 1 and 10). Referring to FIG. 4, the user device 400 includes a variety of components. The variety of components may include, as shown, a network interface 410, a communication module 420, a memory 430, an input/output module 440, a program storage 450, a controller 460, and a display controller 470, for example.

[0131] The network interface 410 may provide an interface for receiving an e-receipt in conjunction with a communication network.

[0132] The communication module 420 allows the user device 400 to communicate with other computer or computing devices and/or various communications networks. For example, the communication module 420 may allow the user device 400 to send or receive communications signals. Communications signals may be sent or received according to one or more protocols or according to one or more standards. For example, the communications module 420 may allow the

user device 400 to communicate via a cellular data network, such as for example, according to one or more standards such as, for example, Global Computing device for Mobile Communications (GSM), Code Division Multiple Access (CDMA), Evolution Data Optimized (EVDO), Long-term Evolution (LTE) or the like. Additionally or alternatively, the communication module 420 may allow the user device 400 to communicate using NFC, via Wi-Fi (TM), using Bluetooth (TM) or via some combination of one or more networks or protocols. In some embodiments, all or a portion of the communication module 420 may be integrated into a component of the user device 400. For example, the communication module 420 may be integrated into a communications chipset.

[0133] The communication module 420 may provide an interface for receiving data from the NFC device 2000 through NFC technology. The user device 400 may include an NFC tag reader 480. In other words, the user device 400 may include NFC Reading or a Background NFC Tag reading capability. In examples, the NFC tag reader 480 can be part of the communication module 420 or can be a separate module.

[0134] The memory 430 may temporarily store data processed by the controller 460, and/or may temporarily store an address (e.g., a URL), received from the NFC device 2000.

[0135] The input/output module 440 may be configured to operate as a touch-sensitive display controller or as another input/output controller. In some examples where the I/O module is operating as a touch-sensitive display controller, the touch-sensitive display controller may provide an output interface and an input interface between a device and a user. In some implementations, the touch-sensitive display controller may transmit electrical signals to and receive electrical signals from the controller 460. In some implementations, the touch-sensitive display controller may display a visual output to the user, and the visual output may include texts, graphics, images, videos, and combinations thereof. In some embodiments, the I/O module 440 may be, for example, a certain display member such as an organic light emitting display (OLED) or a liquid crystal display (LCD), and be capable of recognizing touch input. The I/O module 440 may display, via a web browser application, an e-receipt on a web page accessed based on a received address. The I/O module 440 may display, via an application or the electronic mobile payment application, an e-receipt on an application page or electronic wallet payment application.

[0136] The program storage 450 may store control software for performing tasks such as receiving a message from the NFC device 2000, checking the format of a received message, and,

when a received message is an NDEF message, accessing, as a predetermined action, an address included in the NDEF message through a web browser application.

[0137] The controller 460 may be a CPU and may control processes related to performing payment transactions and displaying of an e-receipt via the user device 400. For example, the controller 460 may perform various services such as executing control software stored in the program storage 450.

[0138] Referring to FIG. 10, the payment system 1000 is used for facilitating payments such as electronic wallet payments using NFC. The electronic wallet payments are associated with the payment server 1010. In examples, the user device 400 accesses the payment server 1010 for making a transaction (e.g. a payment). In examples, the user device 400 accesses the server 300 for obtaining an e-receipt of the transaction. In other examples, the user device 400 had already received the transaction information from the server 300 (as payload of the first web resource or extracted from the URL address), and at least the transaction information is used by the user device 400 to generate an e-receipt of the transaction. In an example, the user device 400 can extract or parse the unique transaction identifier from the URL address itself, e.g. the "unique transaction identifier" from the format "www.domain/mobile app/unique transaction identifier".

[0139] In an example of a transaction, the NFC device 2000 sends an NDEF message comprising a URL as a payload to the user device 400. In an example, the URL is uniquely generated or established for each transaction. The NDEF message is received by the user device 400. The URL addresses the server 300. The URL, when accessed by the user device 400, includes a web resource which automatically activates a payment application on the user device 400 for the payment server 1010 to authorize and complete the transaction. In an example, after a confirmation of a successful completion of the transaction, the electronic wallet payment application can generate, based on the transaction information, an e-receipt of the transaction for access and display by the user device 400. In another example, after a confirmation of a successful completion of the transaction, the same URL which addresses the server 300 can provide an e-receipt of the transaction for access and display by the user device 400.

[0140] Referring to FIG. 11, in the example payment system 1000, both the POS terminal 100 and the NFC device 2000 are in communication with the server 300.

[0141] Referring to FIG. 12, in the example payment system 1000, the POS terminal 100 and not the NFC device 2000 is in communication with the server 300.

[0142] Reference is now made to FIG. 13, which illustrates a flowchart of an example method 1300 for facilitating an electronic wallet payment, according to example embodiments. The example method 1300 may be performed by a computing device such as the NFC device 2000 (FIG. 2). The example method 1300 may be performed, specifically, by a processor of the controller 2050 (FIG. 2) of the NFC device 2000 (FIG. 2). Particular examples of the method 1300 may be applied to one or all of the example payment system 1000 illustrated in FIGs. 10, 11, and 12, as applicable.

[0143] At operation 1302, the NFC device 2000 performs receiving, from the POS terminal 100, transaction information corresponding to a transaction and an identification of an electronic wallet payment application of an electronic wallet payment server 1010.

[0144] At operation 1304, the NFC device 2000 performs sending, to the server 300, the transaction information and the identification of the electronic wallet payment application.

[0145] At operation 1306, the NFC device 2000 performs establishing a uniform resource locator (URL) which addresses the server 300 and which identifies a first web resource which activates the electronic wallet payment application. In an example, the URL includes a unique transaction identifier that includes any one of: a hash function applied to the transaction information, and/or date information and time information of the transaction, and/or a unique device identifier.

[0146] At operation 1308, the NFC device 2000 performs generating, via a Near Field Communication (NFC) tag controller, an NFC data exchange format (NDEF) message comprising the URL as a payload.

[0147] At operation 1310, the NFC device 2000 performs emitting, via the NFC tag controller 2070 (FIG. 2), an NFC signal corresponding to the NDEF message.

[0148] In an example of the method 1300, the NFC device 2000 performs receiving from the POS terminal 100 a confirmation of a successful completion of the transaction, and sending the confirmation to the server 300.

[0149] In an example of the method 1300, wherein upon successful completion of the transaction, the server 300 generates a second web resource associated with the URL (the same URL at operation 1306 which activates the electronic wallet payment application), wherein the second web resource is for displaying an e-receipt of the transaction on the user device 400. Accordingly, the same URL, which can be a deep link or a deferred deep link, is re-used for multiple functions and purposes. For example, the user device 400 can access the same URL as in operation 1306 in order to access the second web resource.

[0150] In another example of the method 1300, wherein upon successful completion of the transaction, the server 300 provides the e-receipt through the first web resource. In an example, the server 300 generates the e-receipt and sends to the user device 400. In another example, the server 300 provides information, for example at least the transaction information, through the first web resource for the user device 400 to generate the e-receipt.

[0151] In an example of the method 1300, the URL is of the form "www.domain/mobile app/unique transaction identifier". In an example, the URL includes the mobile application, which is an identification of the electronic wallet payment application. In an example of the URL, the identification of the electronic wallet payment application is nested from the unique transaction identifier.

[0152] In an example of the method 1300, at operation 1306, the establishing includes generating the URL. In an example, the NFC device 2000 also performs sending the URL to the server 300.

[0153] In an example of the method 1300, at operation 1306, the establishing receiving the URL. For example, the URL is received from the server 300 or from the POS terminal 100.

[0154] In an example of the method 1300, at operation 1302, the receiving the transaction information is from the POS terminal 100 terminal.

[0155] In an example of the method 1300, the NFC device 2000 is third party to and does not communicate with the electronic wallet payment server 1010.

[0156] In an example of the method 1300, the unique device identifier is an identifier of the POS terminal 100.

[0157] In an example, the first web resource automatically populates the electronic wallet payment application on the user device 400 with the transaction information. In an examples, the first web resource automatically populates the electronic wallet payment application on the user device 400 with (at least) the disbursement amount.

[0158] In an example, the first web resource is a Progressive Web Application, a Responsive Web Application, a Rich Internet Application, a Single Page Application, or a Multi Page Application.

[0159] In an example, the second web resource is a Progressive Web Application, a Responsive Web Application, a Rich Internet Application, a Single Page Application, or a Multi Page Application.

[0160] In an example of the method 1300, at operation 1302, the receiving the transaction information does not include financial credentials of the user device 400 or the transactee. In an example of the method 1300, at operation 1304 the sending the transaction information does not include financial credentials of the user device 400 or the transactee.

[0161] In an example of the method 1300, the NDEF message only contains the URL as the payload and no other payload.

[0162] In an example, the transaction may include one or more items and a disbursement. The transaction information may include a plurality of receipt elements, which may include date information and time information. The transaction information may be of a text-based flat file format such as Extensible Markup Language (XML), JavaScript (TM) Object Notation (JSON), a delimited text file, etc.

[0163] The transaction information may include a value amount representing an amount of value that is to be transferred to complete a transaction and an identification of a payment application.

[0164] In some examples, the unique transaction identifier may be generated using a hash function applied to the transaction information. Alternatively, in some examples, the unique transaction identifier may be generated using a unique device identifier, and/or date information and time information associated with the transaction. In an example, the unique device identifier is of the NFC device 2000. In an example, the unique device identifier is of the POS terminal 100.

In an example, the unique device identifier is a serial number, ID number, International Mobile Equipment Identity (IMEI), or a Media Access Control (MAC) address of the NFC device 2000 or the POS terminal 100. In examples, the unique transaction identifier may be generated using a combination (concatenation) of the date information, the time information, and the unique device identifier.

[0165] The unique URL may be based on the unique transaction identifier. The unique URL may identify a web resource corresponding to activate a payment application. The unique URL may identify a web resource corresponding to an electronic receipt of the transaction. The web resource may reside on the server 300. The unique URL may be of the form: "www.domain/mobile app/unique transaction identifier".

[0166] If the transaction is declined by the payment server 1010, the NFC device 2000 receives the denial from the POS terminal 100. In an example, an e-receipt of the form of a cancelled or incomplete transaction can be issued in a similar manner as to the e-receipt that is generated in accordance with example embodiments.

[0167] In some embodiments, the NFC signal may be an NDEF formatted NFC Tag with the URL as the payload. Alternatively, in some embodiments, the NDEF formatted NFC Tag may be, for example, an NDEF formatted Tag with an Apple (TM) Universal Link URL. Alternatively, in some embodiments, the NDEF formatted NFC Tag may be, for example, an NDEF formatted Tag with an Apple (TM) Application Clips Link URL. Alternatively, in some embodiments, the NDEF formatted NFC Tag may be, for example, an NDEF formatted Tag with an Android (TM) App Link URL. Alternatively, in some embodiments, the NDEF formatted NFC Tag may be, for example, an NDEF formatted Tag with an Android (TM) Instant Apps Link URL. Alternatively, in some embodiments, the NDEF formatted NFC Tag may be, for example, an NDEF formatted Tag with a mini-apps (mini-application) link URL. In an example, the mini-application can be used as an intermediate application to allow the user device 400 to select a particular electronic wallet payment application. In another example, the mini-application can be used as an intermediate application to allow the user device 400 to be a stand alone e-receipt manager or application, which can have additional functionality that may not be found in the electronic wallet payment application. In some embodiments, the payload may be a Progressive Web Application

based URL. Examples include Apple (TM) "App Clips", Google (TM) "Instant Apps," and Snapchat (TM) "Snap Minis".

[0168] Once the NFC signal has been emitted, the NFC signal may be received by the user device 400 (FIG. 10). For example, a shopper may tap the user device 400 (FIG. 10) on the NFC device 2000, and receive the URL via the NFC signal. The user device 400 (FIG. 10) may receive the NFC signal, with the URL as a payload, via an NFC tag reader 480 (FIG. 4). The user device 400 may include a device, an application, and/or an application programming interface (API) that supports or helps to support the NFC function. In some embodiments, the user device 400 may receive an NDEF message including the address as a payload by approaching the NFC device 2000 within dozens of centimeters, or in some examples less than two centimeters.

[0169] Following the operation 1310, once the NFC signal has been emitted, it may be received by the user device 400 (FIG. 10). For example, a shopper may tap the user device 400 (FIG. 10) on the NFC device 2000 (FIG. 10) and receive the URL via the NFC signal. The user device 400 (FIG. 10) may receive the NFC signal, with the URL as a payload, via an NFC Tag reader 480 (FIG. 4).

[0170] In some embodiments once the user device 400 (FIG. 10) receives the NFC signal, the NFC tag may activate a web browser application. The web browser application may activate the web resource associated with the URL. As noted, the URL may be of the form "www.domain/mobile app/unique transaction identifier". In an example, the web resource may activate the identified wallet payment application on the user device 400.

[0171] The web resource may be launched or activated, for example, via a Progressive Web Application, via a Responsive Web Application (e.g., a JavaScript (TM)-Powered Web Application), via Rich Internet Application, via Single Page Application, or via Multi Page Application.

[0172] In some embodiments, the user device 400 (FIG. 10) may include an application or the electronic mobile payment application for the storage and display of receipts. The e-receipt may be displayed by the application in a format determined by the transactor associated with the transaction.

[0173] In some embodiments, a Web NFC framework may be used to provide a NFC signal corresponding to the NDEF message.

[0174] In some embodiments, the user device 400 (FIG. 10) may activate a web browser application rendering output at the location of the unique URL, comprising the e-receipt. The format of the e-receipt may be in a format decided by the transactor in connection with the e-receipt. The e-receipt may be generated using transaction data and may be displayed by the user device 400 using an application. The application may be, for example, a Progressive Web Application, a Responsive Web Application (such as a JavaScript (TM)-Powered Web Application), a Rich Internet Application, a Single page Application, or a Multi Page Application.

[0175] Reference is now made to FIG. 14, which illustrates a flowchart of an example method 1400 for facilitating an electronic wallet payment and issuing an e-receipt, according to example embodiments. The example method 1400 may be performed by a computing device such as the user device 400 (FIG. 4). The example method 1400 may be performed, specifically, by a processor of the controller 460 (FIG. 4) of the user device 400 (FIG. 4). Particular examples of the method 1400 may be applied to one or all of the example payment system 1000 illustrated in FIGs. 10, 11, and 12, as applicable.

[0176] At operation 1402, the user device 400 performs receiving, via a NFC tag reader 480, a NDEF message comprising a URL as a payload. In an example the URL addresses the server 300. In an example, the URL includes a unique transaction identifier that includes: a hash function applied to transaction information of a transaction, and/or date information and time information of the transaction, and/or a unique device identifier.

[0177] At operation 1404, the user device 400 performs accessing the URL.

[0178] At operation 1406, the user device 400 performs accessing, responsive to the accessing the URL, a first web resource of the URL. The first web resource activates an electronic wallet payment application on the user device 400. In examples, the electronic wallet payment application is associated with the electronic wallet payment server 1010.

[0179] In an example, at operation 1406, the first web resource also automatically populates the electronic wallet payment application on the user device 400 with at least part or all of the transaction information. In an example, the transaction information that is populated

includes the disbursement amount. In an example, the electronic wallet payment application is already installed on the user device 400.

[0180] At operation 1408, the user device 400 performs activating the electronic wallet payment application for completing the transaction with the electronic wallet payment server 1010.

[0181] In an example of the method 1400, at operation 1402, the receiving the NDEF message is from a NFC device 2000 that is a third party to the electronic wallet payment server 1010.

[0182] At operation 1410, the user device 400 performs receiving a confirmation of a successful completion of the transaction. At operation 1412, the user device 400 performs accessing a second web resource of the URL at the server 300. For example, the user device 400 can access the same URL of operation 1404 in order to access the second web resource.

[0183] At operation 1414, the user device 400 performs displaying, responsive to the accessing the second web resource, an e-receipt of the transaction. In an example, the displaying includes displaying the e-receipt through a web page, an application page, or the electronic mobile payment application, corresponding to the URL.

[0184] In an alternate example of operation 1414, the mobile payment application of the user device 400 performs generating the e-receipt in the format decided by the transactor (merchant), for example using the transaction information received from the server 300.

[0185] In an example of the method 1400, at operation 1414, the displaying of the e-receipt is performed by the user device 400 without using an e-mail address, a text message, or an exchange of financial credentials with the server 300.

[0186] Reference is now made to FIG. 15, which illustrates a flowchart of an example method 1500 for facilitating an electronic wallet payment, according to example embodiments. The example method 1500 may be performed by a computing device such as the server 300 (FIG. 3). The example method 1500 may be performed, specifically, by a processor of the controller 340 (FIG. 3) of the server 300 (FIG. 3). Particular examples of the method 1500 may be applied to one or all of the example payment system 1000 illustrated in FIGs. 10, 11, and 12, as applicable.

[0187] At operation 1502, the server 300 performs receiving transaction information corresponding to a transaction and an identification of an electronic wallet payment application of an electronic wallet payment server 1010.

[0188] At operation 1504, the server 300 performs establishing a URL which addresses the server 300. In examples, the URL includes a unique transaction identifier that includes: a hash function applied to the transaction information, and/or date information and time information of the transaction, and/or a unique device identifier.

[0189] At operation 1506, the server 300 performs generating a first web resource associated with the URL which activates the electronic wallet payment application to the electronic wallet payment server 1010.

[0190] At operation 1508, the server 300 performs receiving an access to the URL. For example, the access in in response to an NFC data exchange format (NDEF) message comprising a URL as a payload.

[0191] At operation 1510, the server 300 performs providing the first web resource through the access to the URL.

[0192] At operation 1512, the server 300 performs receiving a confirmation of a successful completion of the transaction.

[0193] At operation 1514, the server 300 performs generating a second web resource associated with the URL, in which the second web resource is for displaying an e-receipt of the transaction. For example, the e-receipt is generated using the transaction information. In an example, the e-receipt is generated using previously stored registration information or previously stored QR code of the POS terminal 100 or the transactee. In an example, financial credentials are not known by the server 300 and are therefore not included in the e-receipt.

[0194] At operation 1516, the server 300 performs providing the second web resource through the second access to the URL. In an example, the server 300 receives a second access to the same URL of operation 1508. For example, the server 300 performs providing the second web resource to the user device 400.

[0195] In an example of the method 1500, at operation 1502, the receiving the transaction information is from a NFC device 2000 generator or a POS terminal 100.

[0196] In an example of the method 1500, at operation 1502, the receiving the transaction information is from a NFC device 2000 that is a separate device to the POS terminal 100.

[0197] In an example of the method 1500, at operation 1502, the receiving the transaction information does not include financial credentials.

[0198] In an example of the method 1500, at operation 1512, the receiving the confirmation is from a NFC device 2000 or a POS terminal 100.

[0199] In an example of the method 1500, the server 300 has stored, registered, or pre-registered account information of the electronic wallet payment application that is associated with the POS terminal 100. For example, the account information of the electronic wallet payment application that is associated with the POS terminal 100 includes a Quick Response (QR) code of the electronic wallet payment application that is unique to the POS terminal 100.

[0200] In an example, prior to operation 1502, the server 300 has performed registering the account information of the electronic wallet payment application that is associated with the POS terminal 100

[0201] In an example of the method 1500, the server 300 is an e-receipt server that is third party to the electronic wallet payment application and does not communicate with the electronic wallet payment server 1010.

[0202] In an example of the method 1500, at operation 1504, the establishing includes the server 300 generating the URL.

[0203] In an example of the method 1500, at operation 1504, the establishing includes receiving the URL from the NFC device 2000 or from the POS terminal 100.

[0204] In an example of the method 1500, at operation 1504, the unique device identifier is an identifier of the POS terminal 100.

[0205] In an example of the method 1500, the first web resource and the second web resource are each a Progressive Web Application, a Responsive Web Application, a Rich Internet Application, a Single Page Application, or a Multi Page Application.

[0206] In an example of the method 1500, the NDEF message only contains the URL as the payload and no other payload.

[0207] Reference is now made to FIG. 1, which is a diagram showing the payment system 1000 according to an example embodiment. Referring to FIG. 1, the payment system 1000, according to an example embodiment, includes a Point of Sale (POS) terminal 100, an NFC device 2000, a server 300, and a user device 400.

[0208] The POS terminal 100, the NFC device 2000, the server 300, and the user device 400 may be in communication over a network (not shown), for example, a wireless network. In some implementations, the wireless network may be the Internet. In some implementations, the POS terminal 100, the NFC device, the server 300 and the user device 400 may connect to the Internet via Wi-Fi technology.

[0209] The POS terminal 100 is a device that, according to some example embodiments, may process a transaction. A transaction may correspond to one or more purchases (one or more items and/or one or more services) and a disbursement. Example embodiments may be described herein in relation to the purchases being for items, with the understanding that services would similarly apply, as well as charitable donations and goodwill. For example, a transaction may correspond to an exchange of one or more items, such as one or more goods and/or one or more services, for a disbursement amount. In some embodiments, a transaction may correspond to a purchase of one or more items. In addition to processing a transaction, the POS terminal 100 may determine a result of the transaction thereof and may manage information related to the transaction.

[0210] The POS terminal 100 may refer to one of various commercial types of POS terminal that would be known to those skilled in the art. A point of sale (POS) terminal 100 may be associated with an entity (not shown), such as a merchant or acquirer.

[0211] In some embodiments, as shown, the NFC device is a separate device to the POS terminal 100. In such embodiments, the POS terminal 100 and the NFC device 2000 may transmit and receive data through a communication computing device. For example, the communication computing device may include a wired communication computing device through a Universal Serial Bus (USB) cable or a wireless communication computing device such as Wi-Fi or Bluetooth (TM). However, example embodiments are not limited thereto.

[0212] In some embodiments, the POS terminal 100 and the NFC device 2000 may reside on the same device.

[0213] In some embodiments, although FIG. 1 illustrates the POS terminal 100 as a single device, the example embodiments are not limited thereto, and the POS terminal 100 may comprise a plurality of devices. The plurality of devices may be in communication with the NFC device 2000.

[0214] The NFC device 2000 is a computing device that allows a transactee (consumer) to automatically activate an electronic wallet payment application. This contrasts with a conventional electronic wallet payment application that is normally launched by the transactee on the user device 400, followed by QR codes scanning after launching said conventional electronic wallet payment application.

[0215] The NFC device 2000 may transmit data to and/or exchange data with the user device 400 using NFC wireless connectivity technologies. According to an embodiment, the NFC device 2000 may generate or include an NFC tag and may communicate using an NFC standard. However, the example embodiments are not limited thereto, and the NFC device 2000 may, additionally or alternatively, use standards such as Bluetooth, Radio Frequency Identification (RFID), Magnetic Secure Transmission (MST), Beacon, Zigbee, etc.

[0216] The NFC device 2000 may communicate with the server 300 through a communication network (not shown here). In some implementations, the communication network may be the Internet, such that the NFC device 2000 may communicate with server 300 to transmit and receive data via the Internet. However, the example embodiments are not limited thereto. In some implementations, the NFC device 2000 may communicate with the server 300 by connecting to the Internet through Wi-Fi, but the example embodiments are not limited thereto.

[0217] The server 300 may be a dedicated server or a cloud server, for example. However, the example embodiments are not limited thereto.

[0218] The server 300 may be connected to the NFC device 2000 through a communication network (not shown). The server 300 may receive data from the NFC device 2000, and may store the data in a database. The server 300 may be connected to the user device 400 through a communication network (not shown) and may thus transmit data to the user device 400. Here, the communication network may be the Internet, but the example embodiments are not limited thereto. The user device 400 may access the server 300 by accessing the Internet through Wi-Fi or a through a mobile network, however, the example embodiments are not limited thereto.

[0219] The user device 400 is a device through which a user, who is the subject of a transaction, may perform electronic wallet transactions and display an e-receipt. The user device 400 may include a smartphone, a smart watch, a smart device, a personal digital assistant (PDA), a wireless communication terminal, wearable technology (e.g., smartwatch. smartglasses) etc. However, the example embodiments are not limited thereto.

[0220] The user device 400 is a device that supports NFC technology to wirelessly communicate with the NFC device 2000. According to an embodiment, the user device 400 may support the NFC standard. However, the example embodiments are not limited thereto, and additionally or alternatively, the user device 400 may support standards such as Bluetooth, Radio Frequency Identification (RFID), Magnetic Secure Transmission (MST), Beacon, Zigbee, etc.

[0221] Reference is now made to FIG. 5, which is a diagram showing the payment system 1000 according to an example embodiment. Referring to FIG. 5, the payment system 1000 is shown including a POS terminal 100, a server 300, and a user device 400. In the embodiment of the payment system 1000 illustrated by FIG. 5, the POS terminal 100 includes the function of the NFC device 2000 and can interact with the NFC device 2000 in a similar manner according to examples described herein.

[0222] The payment system 1000 of FIG. 5 is similar to the payment system 1000 of FIG. 1. However, according to the example embodiment of FIG. 5, the NFC device 2000 is not implemented as a separate device to the POS terminal 100, but is rather implemented in the form of a computer program recorded on a recording medium that may be read by a POS terminal 100. In some examples, the NFC device 2000 is implemented in the form of one or more applications stored in the memory of the POS terminal 100. Therefore, according to the example embodiment of FIG. 5, the POS terminal 100 includes the function of the NFC device 2000 and can interact with the NFC device 2000 in a similar manner according to examples described herein.

[0223] FIG. 6 is a diagram showing a method 600 of facilitating an electronic wallet payment according to an example embodiment. The method 600 is illustrated as a message conversation diagram. FIG. 7 is a flowchart of another example method 700 of facilitating an electronic wallet payment, according to example embodiments. FIG. 8 is a flowchart of yet other another example method 800 of facilitating an electronic wallet payment, according to example embodiments.

[0224] In the example method 600 of FIG. 6, the NFC device 2000 and not the POS terminal 100 is in communication with the server 300. Aspects of the method 600 of FIG. 6 can be performed by the payment system 1000 illustrated in FIG. 10. In the example method 700 of FIG. 7, both the POS terminal 100 and the NFC device 2000 are in communication with the server 300. Aspects of the method 700 of FIG. 7 can be performed by the payment system 1000 illustrated in FIG. 11. In the example method 800 of FIG. 8, the POS terminal 100 and not the NFC device 2000 is in communication with the server 300. Aspects of the method 800 of FIG. 8 can be performed by the payment system 1000 illustrated in FIG. 12. Like reference numerals may be used in FIGs. 6, 8 and 9 to denote like elements and features.

[0225] At the beginning of the method 600 of FIG. 6, e.g., at the operation 602, the transaction has not yet been completed. For example, at the operation 602, the user has yet to provide disbursement for the one or more items associated with the transaction. For example, the operation 602 may correspond to a time after the scanning or entering of one or more items at a POS terminal 100. For example, although all items have been scanned or entered to the POS terminal 100, disbursement has not yet been provided. In some examples, discounts and purchase points have been applied as appropriate.

[0226] At operation 604, the POS terminal 100 sends, and the NFC device 2000 receives, transaction information corresponding to the transaction and an identification of an electronic wallet payment application of an electronic wallet payment server 1010.

[0227] At operation 606, the NFC device 2000 performs sending, to the server 300, the transaction information and the identification of the electronic wallet payment application.

[0228] At operation 608, the server 300 generates a first web resource which activates the electronic wallet payment application.

[0229] At operation 610, the NFC device 2000 performs generating a uniform resource locator (URL) which addresses the server 300 and which identifies the first web resource. Because the URL can be in a standard format as described herein, the server 300 also knows or can independently generate the same URL using the transaction information and the identification of the electronic wallet payment application.

[0230] As an alternate example to operation 610, not shown here, the server 300 generates the URL and sends the URL to the NFC device 2000.

[0231] In an example, the URL includes a unique transaction identifier that includes any one of: a hash function applied to the transaction information, and/or date information and time information of the transaction, and/or a unique device identifier. The server 300 associates the URL with the first web resource.

[0232] At operation 612, the NFC device 2000 performs generating and emitting, via a Near Field Communication (NFC) tag controller, an NFC data exchange format (NDEF) message comprising the URL as a payload.

[0233] At operation 614, the user device 400 receives the URL (address) by tapping the NFC device 200. At operation 616, the user device 400 accesses the URL on the server 300. At operation 618, the user device 400 receives the first web resource. At operation 620, the first web resource activates on the user device 400 the electronic wallet payment application that was identified.

[0234] At operation 622, the user device 400 activates the electronic wallet payment application and accesses the electronic wallet payment server 1010. In an example, as caused by the first web resource, the electronic wallet payment application on the user device 400 is automatically populated with the transaction information. For example, the first address can be a deep link or a deferred deep link.

[0235] In an example, the first web resource includes similar or same information as the QR code that is stored at the server 300. For example, the QR code is for the electronic wallet payment application that is unique to the POS terminal 100 or the transactor (merchant). In conventional systems, the QR code is used to manually perform the transaction by using a camera of the user device 400, which upon scanning the QR code activates the payment application and accesses the payment server 1010.

[0236] At operation 624, the payment server 1010 approves the transaction. For example, information such as passwords or biometrics can be send through the user device 400 to the payment server 1010.

[0237] At operation 626, the payment server 1010 sends a confirmation of a successful completion of the transaction to the user device 400. At operation 628, the payment server 1010 sends the confirmation to the POS terminal 100. At operation 630, the POS terminal 100 sends the confirmation to the NFC device 2000. At operation 632, the NFC device 2000 sends the confirmation to the server 300.

[0238] At operation 634, the server 300 generates a second web resource and associates the second web resource with the address (URL), which the same URL at operation 610.

[0239] At operation 636, based on the second web resource, the e-receipt is sent from the server 300 to the user device 400. For example, the user device 400 may once again access the same URL as in operation 616. Thereafter, at operation 638 the user device 400 may display a corresponding e-receipt, including corresponding transaction information, via the second web resource on the user device 400. In an example, the e-receipt is displayed on a web page corresponding to the address. According to an example, the e-receipt can be displayed on a web page using a standard web browser application.

[0240] In an alternate example of operation 638, a mobile application or the mobile payment application of the user device 400 generates the e-receipt in the format decided by the transactor (merchant), for example using the transaction information received from the server 300.

[0241] In an alternate example of operation 638, the server 300 generates the e-receipt in the format decided by the transactor (merchant), for example using the transaction information, and sends the e-receipt to the user device 400 for displaying using a mobile application or the electronic mobile payment application.

[0242] In examples of operation 604 and 606, the transaction information may be a set of information respecting a transaction for which disbursements have been received. For example, transaction information may include a transaction date and a transaction time, an identification of one or more items corresponding to the transaction (e.g., the names of one or more goods and/or services), a disbursement amount in connection with each of the one or more items, a disbursement amount in connection with all of the one or more items, a quantity of the one or more items, a total disbursement amount, a taxation amount, a disbursement type (e.g., identification of the electronic wallet payment server 1010), a receipt authorization number, a discount amount, a transactor name,

a transactor number (e.g., a business number), a transactor address, a transactor phone number, a transaction number, etc. However, the example embodiments are not limited thereto.

[0243] In an example, the transaction information includes the unique transaction identifier as described in example embodiments herein. In an example, the unique transaction identifier can be sent to the user device 400 as part of the transaction information (payload through the first web resource). In an example, the unique transaction identifier has been sent to the user device 400 in which the user device 400 can extract or parse the unique transaction identifier from the URL address itself, e.g. the "unique transaction identifier" from the format "www.domain/mobile app/unique transaction identifier".

[0244] In some embodiments, transaction information may be data, and may be recorded, for example, in a text (TXT) file format, and may include some or all of the above-recited transaction information. In some embodiments, the format of the transaction information may include a Rich Text Format (RTF) file format, an Extensible Markup Language (XML) file format, a JavaScript (TM) Object Notation (JSON) file format, a Comma-Separated Values (CSV) file format, and/or a Tab-Separated Values (TSV) file format. However, the example embodiments are not limited thereto.

[0245] In examples, the transaction information does not include financial credentials, which is often sensitive personal information, and in some cases is forbidden by financial standards to be transmitted to the server 300, as the server 300 may be a third party to the payment server 1010 in some examples.

[0246] Conventional electronic wallet systems typically provide a confirmation or e-receipt that only includes the amount and the transactee. Such conventional electronic wallet systems would not include identification and itemization of the particular goods and services of the transaction at the POS terminal 100.

[0247] The e-receipt can include the identification and itemization of the particular goods and services of the transaction at the POS terminal 100. In examples, the e-receipt can be used for auditing purposes, as the e-receipt can include such particular identifying information of the transaction. The e-receipt can include the unique transaction identifier (the same unique transaction identifier that was in the URL). The e-receipt can include any of the information that was used for

the unique transaction identifier, e.g. a hash function applied to the transaction information, and/or date information and time information of the transaction, and/or a unique device identifier.

[0248] In examples, the e-receipt can be used for refund and chargeback purposes, as the e-receipt can include particular unique identifying information of the transaction.

[0249] In some embodiments, the address refers to a URL for accessing a web site or a web page on the Internet, such as a deep link or a deferred deep link for addressing a web resource on the server 300.

[0250] According to an example embodiment, by using an identifier when generating an address (e.g., a URL) and by subsequently transmitting the address to the user device 400 via NFC, the following points may be ensured. In examples, the issuance of a particular e-receipt to only one user may be provided. Other users would receive different URLs having their own respective (unique) identifier. The particular e-receipt ensures one-to-one uniqueness of the e-receipt based on the use of the (unique) identifier or a hash thereof. In some examples, the particular e-receipt is deleted by the server 300 after retrieval by the user device 400.

[0251] In examples, as a result, the address (URL) may be visited by only one user device 400, e.g., by one user. Should another user attempt to subsequently access the same address (URL), the address may be deleted by the server 300 and therefore will no longer be functional after retrieval by the user device 400, and thus personal privacy and security of a user may be maintained.

[0252] In examples, the server 300 may store transaction information corresponding to the address. The server 300 may generate an e-receipt by converting the transaction information into an e-receipt format through an application. The server 300 may display the generated e-receipt on a web page linked to the address. As a result, the user device 400 may display the e-receipt by accessing the web page linked to the address via the user device 400.

[0253] In an example, the user device 400 displays the e-receipt through a web page corresponding to the web page URL or an application page.

[0254] For example, the user device 400 can operate without having to activate a camera to scan QR code, exchange email address or phone number, or exchange sensitive financial credentials with the server 300. Rather, through the URL the web resource can be loaded as part

of the NFC proximity between the user device 400 and the NFC tag controller 2070 to communicate the address and initiate the electronic wallet payment application on the user device 400.

[0255] An e-receipt may be generated by various types of applications, such as a Progressive Web Application, a Responsive Web Application, a Rich Internet Application, a Single Page Application, or a Multi Page Application, although the example embodiments are not limited thereto.

[0256] An e-receipt is a type of electronic document in which transaction information is displayed based on a set of rules according to a format determined by a provider. The provider may be the transactor in connection with the e-receipt. For example, the provider may be a merchant or a retailer, although the example embodiments are not limited thereto. The provider is distinct from the transactee (e.g., a consumer, a user, or a customer).

[0257] FIG. 9 illustrates an example e-receipt 900 according to an example embodiment. As shown in FIG. 9, an e-receipt 900 may be displayed on a web page via a web browser application, for example on the user device 400. In some embodiments, the e-receipt 900 may include a transaction date and a transaction time, an identification of one or more items associated with the transaction (e.g., the names of one or more goods and/or services associated with the transaction), a disbursement amount in connection with each of the one or more items, a quantity of the one or more items, a total disbursement amount, a taxation amount, a disbursement type, a receipt authorization number, a transactor name, a transactor number (e.g., a business number), a transactor address, a transactor phone number, a transaction number, etc. As noted, the format of an e-receipt 900 may be determined by a provider and is not limited to that shown in the drawings.

[0258] In some embodiments, the user device 400 can display an e-receipt 900 to a transactee and/or a user using a web browser, an application, or a wallet payment application on the user device 400. Conventionally, it is often necessary to complete a login process via the user device 400 in order to display the e-receipt. The example embodiments include computing devices and methods for displaying an e-receipt 900 on a web page through a conventional web browser application, an application, or the electronic wallet payment application of the user device 400.

[0259] In some embodiments, a consumer may receive and check an e-receipt 900 on a user device 400. Since a URL may thus be transmitted to the user device 400 through an NDEF

message according to example embodiments, the user device 400 may directly execute the URL using a pre-set command in the NDEF message. In this way, the user device 400 may initiate an electronic wallet payment application through a web browser application as a result of a simple tapping action and without any further action, and then display the e-receipt 900 upon completion.

[0260] In examples, the exchange of a URL over the NDEF message uses much less resources than the web resource itself.

[0261] In some embodiments, a consumer may be provided with an e-receipt 900 via a user device 400 without providing financial credentials to the server 300. As a result, according to example embodiments, unnecessary leakage of personal information during a transaction process may be prevented, the procedure and the time until issuance of an e-receipt 900 may be shortened, and an e-receipt 900 may be more conveniently displayed on a user device 400.

[0262] In some embodiments, a user may be provided with an e-receipt 900 including a plurality of transaction information. Conventionally, when an e-receipt is issued through a related application or a short message service (SMS) after a transaction, only limited transaction information may be displayed on the e-receipt. For example, in some conventional situations, only a total disbursement amount is displayed, and detailed transaction information (e.g., an identification of one or more items related to the transaction, the quantity of the one or more items, the disbursement amount associated with each item, the taxation amount, etc.) are not displayed. In contrast, however, according to embodiments described herein, a user device 400 may be provided with an e-receipt 900 including a plurality of transaction information.

[0263] In some other examples, the user device 400 can receive an e-receipt 900 from the payment server 1010, for display on the user device 400. For example, the server 300 generates the e-receipt and sends to the user device 400. In an example, the format of the e-receipt 900 is decided by the transactor (merchant).

[0264] In some other examples, the user device 400 generates the e-receipt 900 using at least the transaction information received from the server 300, for display on the user device 400. In an example, the format of the e-receipt 900 is decided by the transactor (merchant).

[0265] In an example, financial credentials of the transactee and the user device 400 are not known by the server 300 and are therefore not included in the e-receipt 900.

[0266] Referring again to FIG. 1, in some embodiments, the POS terminal 100 may transmit transaction information to the NFC device 2000 via a wired communication method or via a wireless communication method. In embodiments where the POS terminal and the e-receipt issuer are integrated with each other, such as that illustrated by FIG. 5, transaction information is transmitted internally.

[0267] In some embodiments where the address in a deep link URL, or a deferred deep link URL, the user device 400 may directly accesses a designated mobile application page or a designated web application page based on a received address and may subsequently activate the electronic wallet payment application or display an e-receipt. For example, the user device 400 may execute an application and may access a mobile application page or a web application page linked to a received address. The user device 400 may receive an address via an NDEF message and, as a predetermined action, may execute a related mobile application and may access a web page linked to the address.

[0268] In some embodiments, when a related application has yet to be installed on the user device 400, the user device 400 may install a related application and then may then access a mobile application page or a web application page linked to the address. In some such embodiments, the user device 400 may receive the address through an NDEF message and, as a predetermined action, may install a related application and may access a page linked to the address.

[0269] Reference is now made to the example method 700 of FIG. 7, in which both the POS terminal 100 and the NFC device 2000 are in communication with the server 300. Aspects of the method 700 of FIG. 7 can be performed by the payment system 1000 illustrated in FIG. 11.

[0270] Operation 702 is the same or similar to operation 602.

[0271] At operation 704, the POS terminal 100 sends, and the server 300 receives, transaction information corresponding to the transaction and an identification of an electronic wallet payment application of an electronic wallet payment server 1010.

[0272] At operation 706, the server 300 generates a first web resource which activates the electronic wallet payment application.

[0273] At operation 708, the server 300 performs generating a URL which addresses the server 300 and which identifies the first web resource.

[0274] At operation 710, the server 300 sends the URL to the NFC device 2000.

[0275] Operations 712, 714, 716, 718, 720, 722, 724, 726, 728, 730, 732, 734, 736, 738 are respectively the same or similar to operations 612, 614, 616, 618, 620, 622, 624, 626, 628, 630, 632, 634, 636, 638.

[0276] Reference is now made to the example method 800 of FIG. 8, in which the POS terminal 100 and not the NFC device 2000 is in communication with the server 300. Aspects of the method 800 of FIG. 8 can be performed by the payment system 1000 illustrated in FIG. 12.

[0277] Operation 802 is the same or similar to operation 602.

[0278] At operation 804, the POS terminal 100 sends, and the server 300 receives, transaction information corresponding to the transaction and an identification of an electronic wallet payment application of an electronic wallet payment server 1010.

[0279] At operation 806, the server 300 generates a first web resource which activates the electronic wallet payment application.

[0280] At operation 808, the server 300 performs generating a URL which addresses the server 300 and which identifies the first web resource.

[0281] At operation 810, the server 300 sends the URL to the POS terminal 100.

[0282] At operation 811, the POS terminal sends the URL to the NFC device 2000 and commands the NFC device 2000 emit an NFC signal.

[0283] At operation 830, the POS terminal 100 sends the confirmation to the NFC device 2000. Operation 830 differs from operation 630 and operation 632 in the method 600 of FIG. 6, in which the confirmation is sent via the NFC device 2000. Operation 830 differs from operation 730 and operation 732 in the method 700 of FIG. 7, in which the confirmation is sent via the NFC device 2000.

[0284] Operations 812, 814, 816, 818, 820, 822, 824, 826, 828, 834, 836, 838 are respectively the same or similar to operations 612, 614, 616, 618, 620, 622, 624, 626, 628, 634, 636, 638.

[0285] In some alternate example embodiments, any of the above examples which refer to QR codes can instead use other visually capturable or scannable codes such as 1D (linear) barcodes or 2D barcodes.

[0286] In example embodiment, unless explicitly described to the contrary, the word "comprise" and variations such as "comprises" or "comprising" will be understood to imply the inclusion of stated elements but not the exclusion of any other elements.

[0287] In example embodiments, a "module" may be a hardware component such as a processor or a circuit, and/or a software component executed on the hardware, such as, for example, a processor.

[0288] In example embodiments, each of components, functional blocks, or means may include one or more sub-components. Electrical, electronic, and mechanical functions performed by the components may be implemented by various well-known devices or mechanical elements, such as electronic circuits, integrated circuits, application specific integrated circuits (ASICs), etc. and may be implemented separately from one another or integrally implemented in combination of two or more thereof.

[0289] The modules described as separate parts may or may not be physically separate, and parts displayed as modules may or may not be physical modules, may be located in one position, or may be distributed on a plurality of network modules. Some or all of the modules may be selected according to actual requirements to achieve the objectives of the solutions of the embodiments.

[0290] In addition, functional modules in the example embodiments may be integrated into one processing module, or each of the modules may exist alone physically, or two or more modules are integrated into one module.

[0291] When the functions are implemented in the form of a software functional module and sold or used as an independent product, the functions may be stored in a computer-readable storage medium (which can be non-transitory). Based on such an understanding, the technical solutions of example embodiments may be implemented in a form of a software product. The software product is stored in a storage medium, and includes several instructions for instructing a computer device (which may be a personal computer, a server, or a network device) to perform all

or some of the operations or steps of the methods described in the example embodiments. The foregoing storage medium includes any medium that can store program code, such as a Universal Serial Bus (USB) flash drive, a removable hard disk, a read-only memory (Read-Only Memory, ROM), a random access memory (Random Access Memory, RAM), a magnetic disk, or an optical disc.

[0292] In the described methods or block diagrams, the boxes may represent events, operations, steps, functions, processes, modules, messages, and/or state-based operations, etc. While some of the example embodiments have been described as occurring in a particular order, some of the steps or processes may be performed in a different order provided that the result of the changed order of any given step will not prevent or impair the occurrence of subsequent steps. Furthermore, some of the messages or steps described may be removed or combined in other embodiments, and some of the messages or steps described herein may be separated into a number of sub-messages or sub-steps in other embodiments. Even further, some or all of the steps may be repeated, as necessary. Elements described as methods or steps similarly apply to computing devices or subcomponents, and vice-versa. Reference to such words as "sending" or "receiving" could be interchanged depending on the perspective of the particular device.

[0293] The described embodiments are considered illustrative and not restrictive. Example embodiments described as methods would similarly apply to computing devices or devices, and vice-versa.

[0294] The various example embodiments are merely examples and are in no way meant to limit the scope of the examples and example embodiments. Variations of the innovations described herein will be apparent to persons of ordinary skill in the art, such variations being within the intended scope. In particular, features from one or more of the example embodiments may be selected to create alternative embodiments comprises of a sub-combination of features which may not be explicitly described. In addition, features from one or more of the described example embodiments may be selected and combined to create alternative example embodiments comprised of a combination of features which may not be explicitly described. Features suitable for such combinations and sub-combinations would be readily apparent to persons skilled in the art upon. The subject matter described herein intends to cover all suitable changes in technology.

[0295] As mentioned above, the POS terminal 100 and NFC device 2000 may be provided as an all-in-one unit or as separate devices. In some merchants, a smartphone, a tablet computer, or a laptop including an NFC device may be provided as a cashier for checks, and the smartphone, tablet computer, or personal computer may perform the computer-implemented method described in this disclosure.

WHAT IS CLAIMED IS:

1. A computer-implemented method comprising:

receiving, from a Point-Of-Sale (POS) terminal, transaction information corresponding to a transaction and an identification of an electronic wallet payment application of an electronic wallet payment server;

sending, to a server, the transaction information and the identification of the electronic wallet payment application;

establishing a uniform resource locator (URL) which addresses the server and which identifies a first web resource which activates the electronic wallet payment application, wherein the URL includes a unique transaction identifier that includes: a hash function applied to the transaction information, and/or date information and time information of the transaction, and/or a unique device identifier;

generating, via a Near Field Communication (NFC) tag controller, an NFC data exchange format (NDEF) message comprising the URL as a payload; and

emitting, via the NFC tag controller, an NFC signal corresponding to the NDEF message.

2. The computer-implemented method of claim 1, further comprising: receiving from the POS terminal a confirmation of a successful completion of the transaction; and sending the confirmation to the server.

3. The computer-implemented method of claim 1, wherein upon successful completion of the transaction, the URL identifies a second web resource for displaying an electronic receipt (e-receipt) of the transaction.

4. The computer-implemented method of claim 3, wherein the e-receipt includes the unique transaction identifier.

5. The computer-implemented method of claim 1, wherein the server has account information of the electronic wallet payment application that is associated with the POS terminal.

6. The computer-implemented method of claim 5, wherein the account information of the electronic wallet payment application that is associated with the POS terminal includes a Quick Response (QR) code of the electronic wallet payment application that is unique to the POS terminal.

7. The computer-implemented method of claim 1, wherein the URL includes the identification of the electronic wallet payment application.

8. The computer-implemented method of claim 7, wherein the URL is a deep link, wherein, in the URL, the identification of the electronic wallet payment application is nested from the unique transaction identifier.

9. The computer-implemented method of claim 1, wherein the establishing includes generating the URL, further comprising sending the URL to the server.

10. The computer-implemented method of claim 1, wherein the establishing includes receiving the URL.

11. The computer-implemented method of claim 1, wherein the receiving the transaction information is from a point of sale (POS) terminal, wherein the computer-implemented method is performed by a NFC device that is a separate device to the POS terminal.

12. The computer-implemented method of claim 1, wherein the computer-implemented method is performed by a NFC device that is third party to and does not communicate with the electronic wallet payment server.

13. The computer-implemented method of claim 1, wherein the unique device identifier is an identifier of the POS terminal.

14. The computer-implemented method of claim 1, wherein the first web resource automatically populates the electronic wallet payment application with at least part of the transaction information.

15. The computer-implemented method of claim 1, wherein the first web resource automatically populates the electronic wallet payment application with a disbursement amount.

16. The computer-implemented method of claim 1, wherein the first web resource is a Progressive Web Application, a Responsive Web Application, a Rich Internet Application, a Single Page Application, or a Multi Page Application.

17. The computer-implemented method of claim 1, wherein the receiving the transaction information and the sending the transaction information does not include financial credentials.

18. The computer-implemented method of claim 1, wherein the NDEF message only contains the URL as the payload and no other payload.

19. The computer-implemented method of claim 1, wherein the electronic wallet payment server and the electronic wallet payment application are debit based.

20. A computing device comprising:

an NFC tag controller;

a communications module;

a processor; and

at least one memory storing instructions which, when executed by the processor, cause the processor to perform the computer-implemented method of any one of claims 1 to 19.

21. The computing device of claim 20, wherein the transaction information is from a point of sale (POS) terminal, wherein the computing device is a NFC device that is a separate device to the POS terminal.

22. A computer-implemented method performed by a user device, the computer-implemented method comprising:

receiving, via an Near Field Communication (NFC) tag reader, an NFC data exchange format (NDEF) message comprising a URL as a payload, wherein the URL addresses a server, wherein the URL includes a unique transaction identifier that includes: a hash function applied to transaction information of a transaction, and/or date information and time information of the transaction, and/or a unique device identifier;

accessing the URL;

accessing, responsive to the accessing the URL, a first web resource of the URL which activates an electronic wallet payment application on the user device; and

activating the electronic wallet payment application for completing the transaction with an electronic wallet payment server.

23. The computer-implemented method of claim 22, wherein the receiving the NDEF message is from a NFC device that is a third party to the electronic wallet payment server.

24. The computer-implemented method of claim 22, wherein the first web resource automatically populates the electronic wallet payment application with at least part of the transaction information.

25. The computer-implemented method of claim 22, wherein the first web resource automatically populates the electronic wallet payment application with a disbursement amount.

26. The computer-implemented method of claim 22, further comprising:

receiving a confirmation of a successful completion of the transaction;

accessing a second web resource of the URL; and

displaying, responsive to the accessing the second web resource, an electronic receipt (e-receipt) of the transaction.

27. The computer-implemented method of claim 26, wherein the e-receipt includes the unique transaction identifier.

28. The computer-implemented method of claim 26, wherein the displaying includes displaying the e-receipt through a web page, an application page, or the electronic wallet payment application.

29. The computer-implemented method of claim 22, further comprising:

receiving a confirmation of a successful completion of the transaction;

generating, responsive to the confirmation of the successful completion of the transaction, an electronic receipt (e-receipt) of the transaction based on the transaction information; and

displaying, the e-receipt.

30. A user device comprising:

an NFC tag reader;

a communications module;

a processor; and

at least one memory which stores instructions which, when executed by the processor, cause the processor to perform the computer-implemented method of any one of claims 20 to 29.

31. A computer-implemented method performed by a server, the computer-implemented method comprising:

receiving transaction information corresponding to a transaction and an identification of an electronic wallet payment application of an electronic wallet payment server;

establishing a uniform resource locator (URL) which addresses the server, wherein the URL includes a unique transaction identifier that includes: a hash function applied to the transaction information, and/or date information and time information of the transaction, and/or a unique device identifier;

generating a first web resource associated with the URL which activates the electronic wallet payment application;

receiving an access to the URL in response to an NFC data exchange format (NDEF) message comprising a URL as a payload;

providing the first web resource through the access to the URL;

receiving a confirmation of a successful completion of the transaction;

generating a second web resource associated with the URL for displaying an electronic receipt (e-receipt) of the transaction; and

providing the second web resource through the second access to the URL.

32. The computer-implemented method of claim 31, wherein the receiving the transaction information is from a NFC device or a point-of-sale terminal.

33. The computer-implemented method of claim 31, wherein the receiving the confirmation is from a NFC device or a point-of-sale terminal.

34. The computer-implemented method of claim 31, wherein the server has account information of the electronic wallet payment application that is associated with a POS terminal.

35. The computer-implemented method of claim 34, wherein the account information of the electronic wallet payment application that is associated with the POS terminal includes a Quick Response (QR) code of the electronic wallet payment application that is unique to the POS terminal.

36. The computer-implemented method of claim 31, wherein the URL includes the identification of the electronic wallet payment application.

37. The computer-implemented method of claim 36, wherein the URL is a deep link, wherein, in the URL, the identification of the electronic wallet payment application is nested from the unique transaction identifier.

38. The computer-implemented method of claim 31, wherein the receiving the transaction information does not include financial credentials.

39. The computer-implemented method of claim 31, wherein the server is an electronic receipt (e-server) that is third party to the electronic wallet payment application and does not communicate with the electronic wallet payment server.

40. The computer-implemented method of claim 31, wherein the establishing includes generating the URL.

41. The computer-implemented method of claim 31, wherein the establishing includes receiving the URL.

42. The computer-implemented method of claim 31, further comprising registering account information of the electronic wallet payment application that is associated with the POS terminal.

43. The computer-implemented method of claim 42, wherein the account information includes a Quick Response (QR) code of the electronic wallet payment application that is unique to the POS terminal.

44. The computer-implemented method of claim 31, wherein the receiving the transaction information is from a NFC device that is a separate device to a point-of-sale (POS) terminal.

45. The computer-implemented method of claim 44, wherein the unique device identifier is an identifier of the POS terminal.

46. The computer-implemented method of claim 31, wherein the first web resource and the second web resource are each a Progressive Web Application, a Responsive Web Application, a Rich Internet Application, a Single Page Application, or a Multi Page Application.

47. The computer-implemented method of claim 31, wherein the NDEF message only contains the URL as the payload and no other payload.

48. The computer-implemented method of claim 31, wherein the electronic wallet payment server and the electronic wallet payment application are debit based.

49. A server comprising:

a communications module;

a processor; and

at least one memory which stores instructions which, when executed by the processor, cause the processor to perform the computer-implemented method of any one of claims 31 to 48.

50. The server of claim 49, wherein the server is an electronic receipt (e-receipt) server that is third party to the electronic wallet payment application and does not communicate with the electronic wallet payment server.

51. A non-transitory computer readable medium storing instructions which, when executed by the processor, cause the processor to perform the computer-implemented method of any one of claims 1 to 19, or claims 20 to 29, or claims 31 to 48.

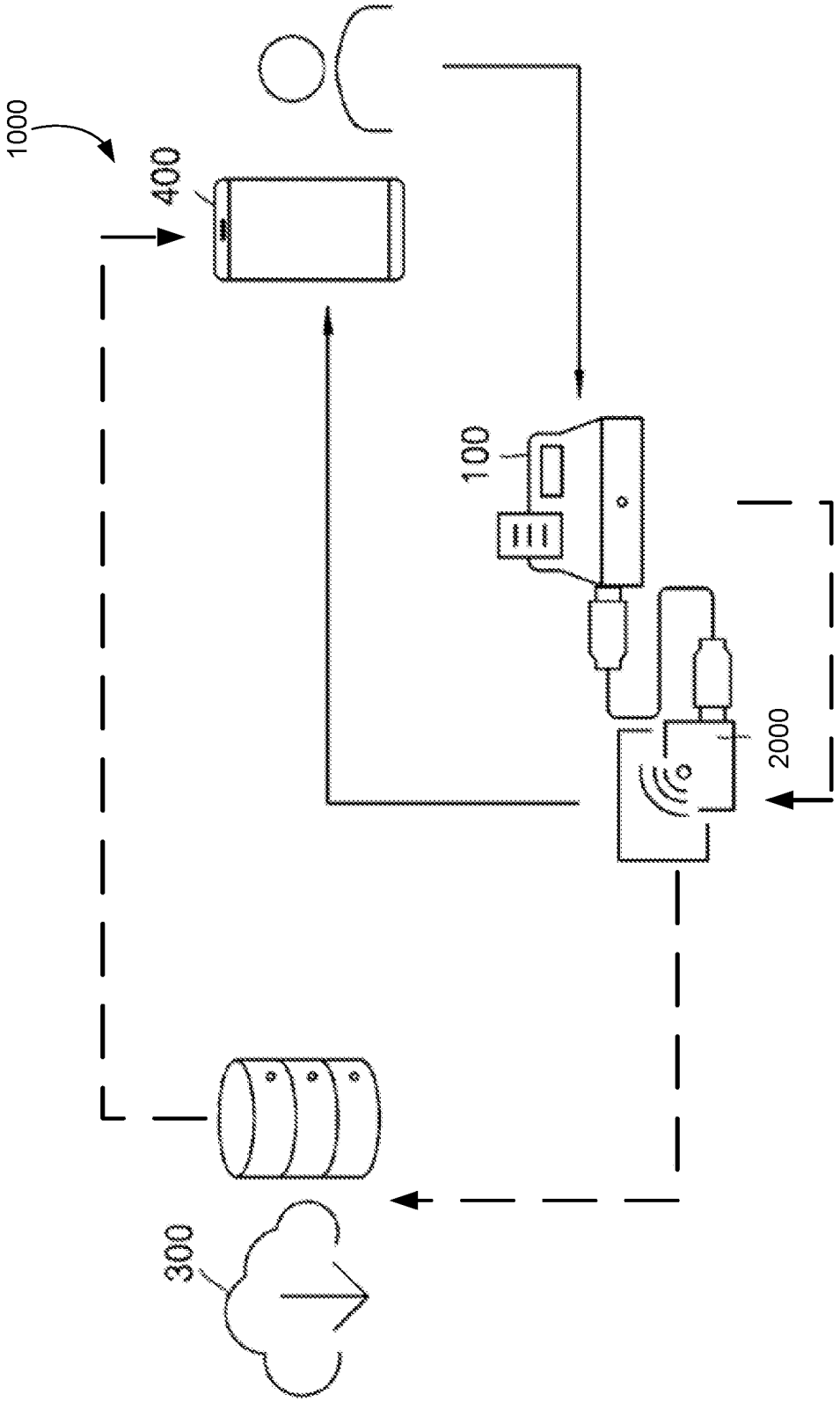

FIG. 1

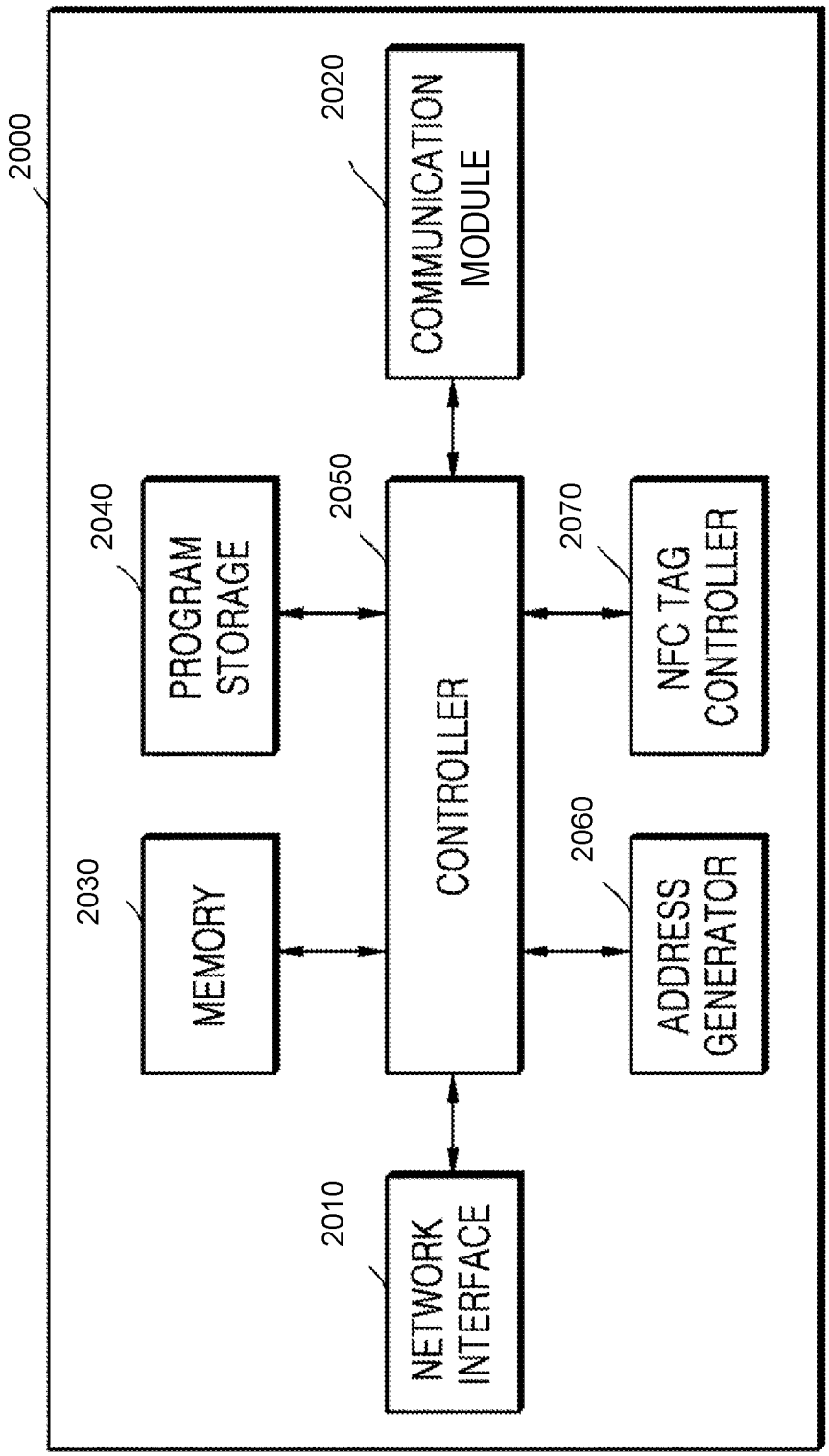
2000
2020
COMMUNICATION MODULE
2040
PROGRAM STORAGE
2050
CONTROLLER
2070
NFC TAG CONTROLLER
2030
MEMORY
2060
ADDRESS GENERATOR
2010
NETWORK INTERFACE

FIG. 2

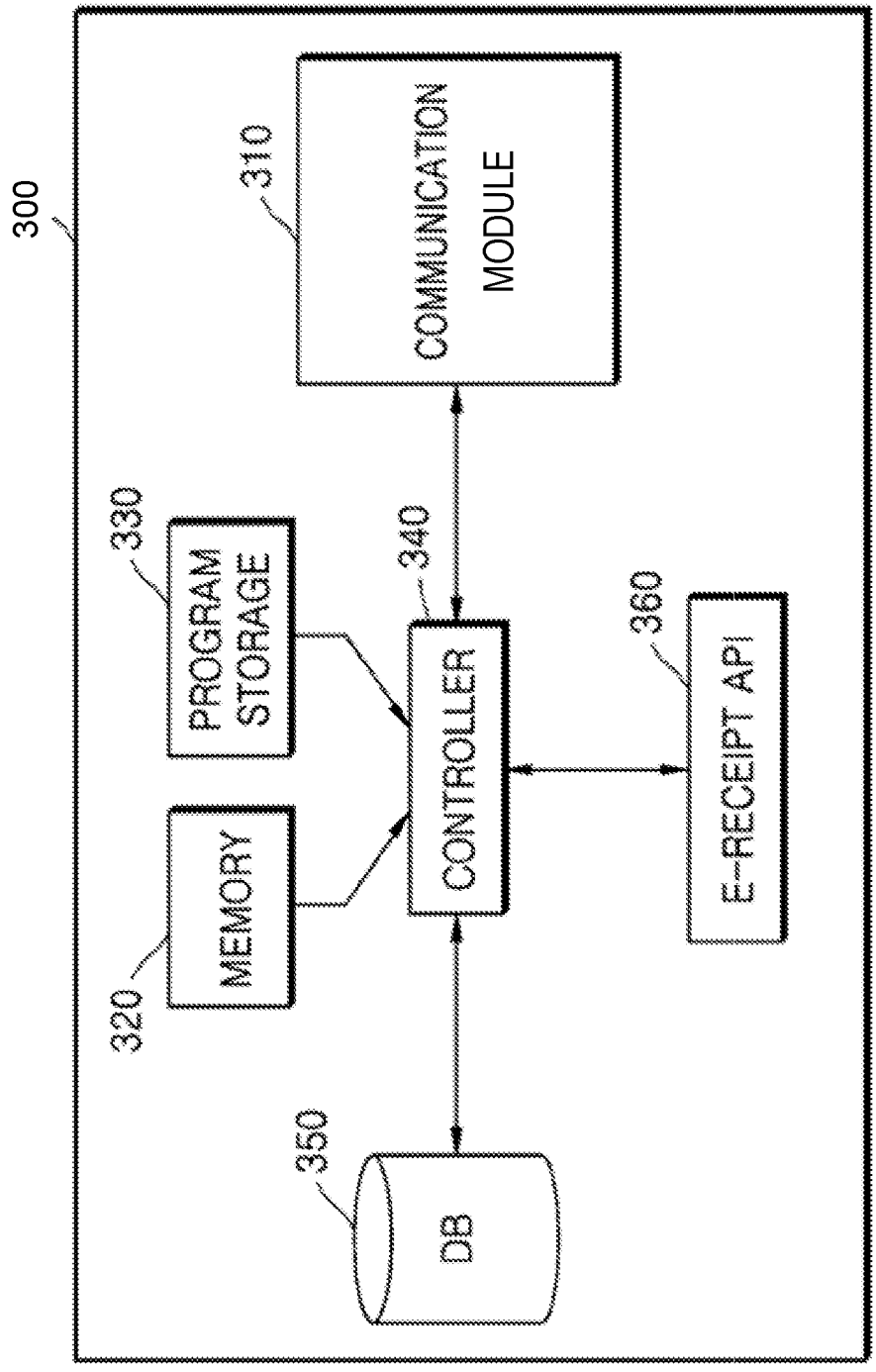
300
310
COMMUNICATION MODULE
330
PROGRAM STORAGE
340
CONTROLLER
360
E-RECEIPT API
320
MEMORY
350
DB

FIG. 3

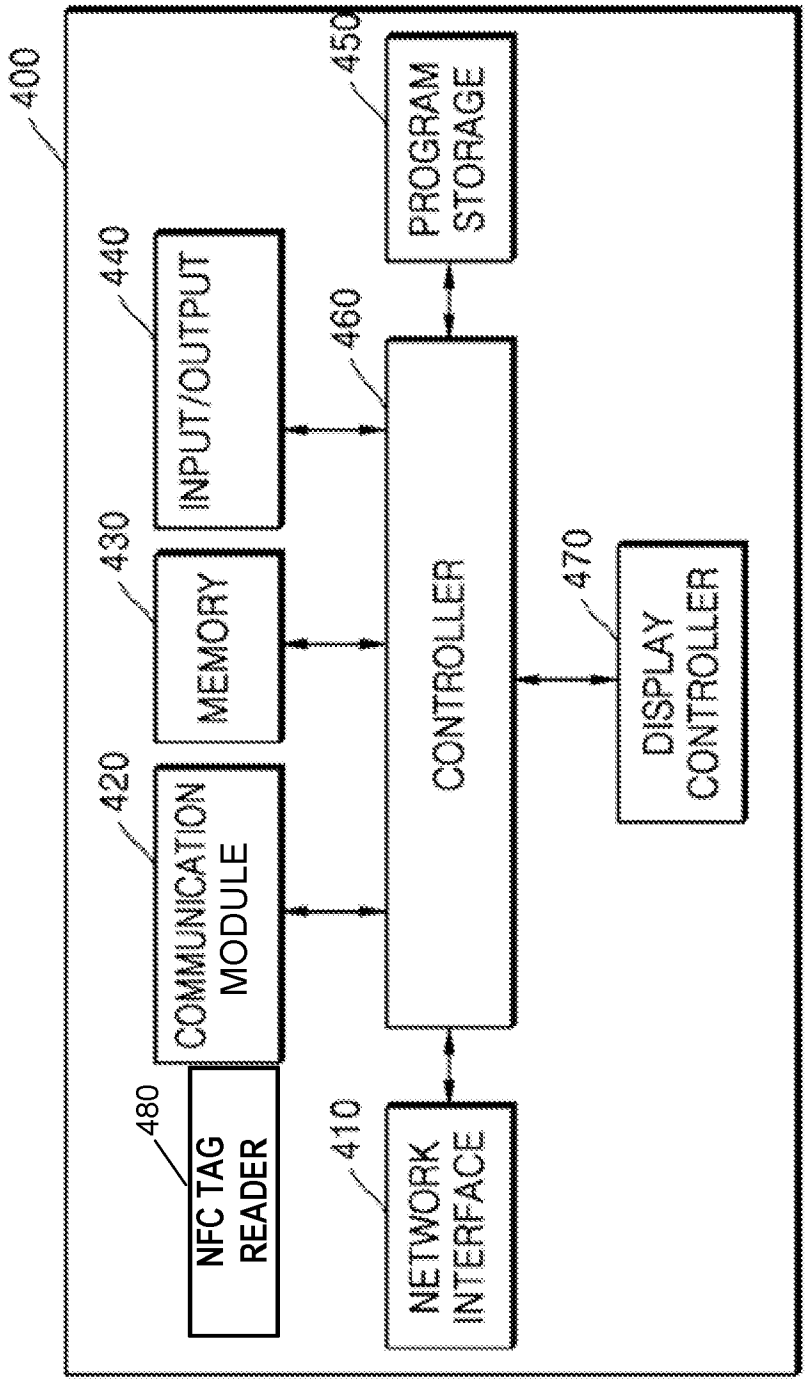
400
450
PROGRAM STORAGE
440
INPUT/OUTPUT
460
430
MEMORY
CONTROLLER
470
DISPLAY CONTROLLER
420
COMMUNICATION MODULE
480
NFC TAG READER
410
NETWORK INTERFACE

FIG. 4

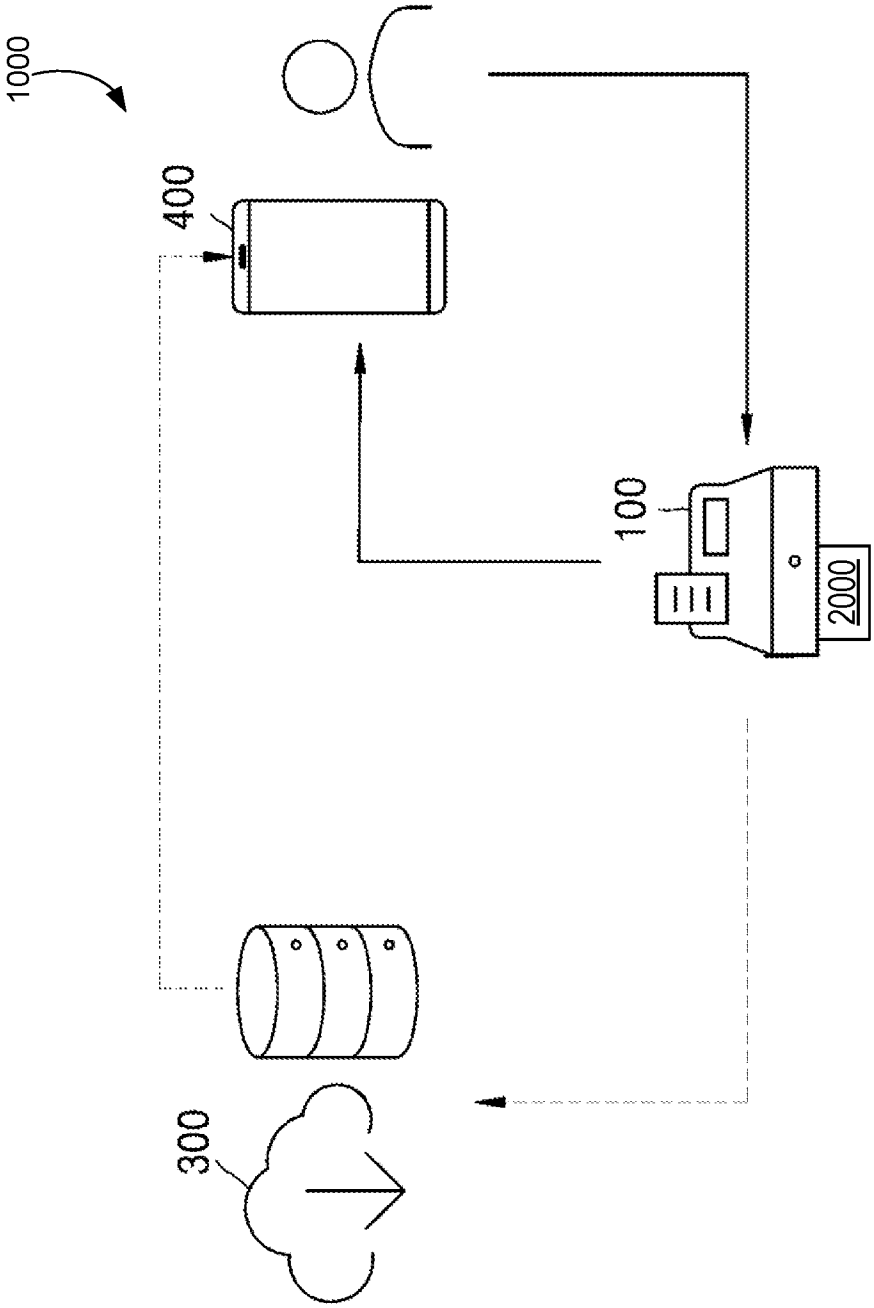

FIG. 5

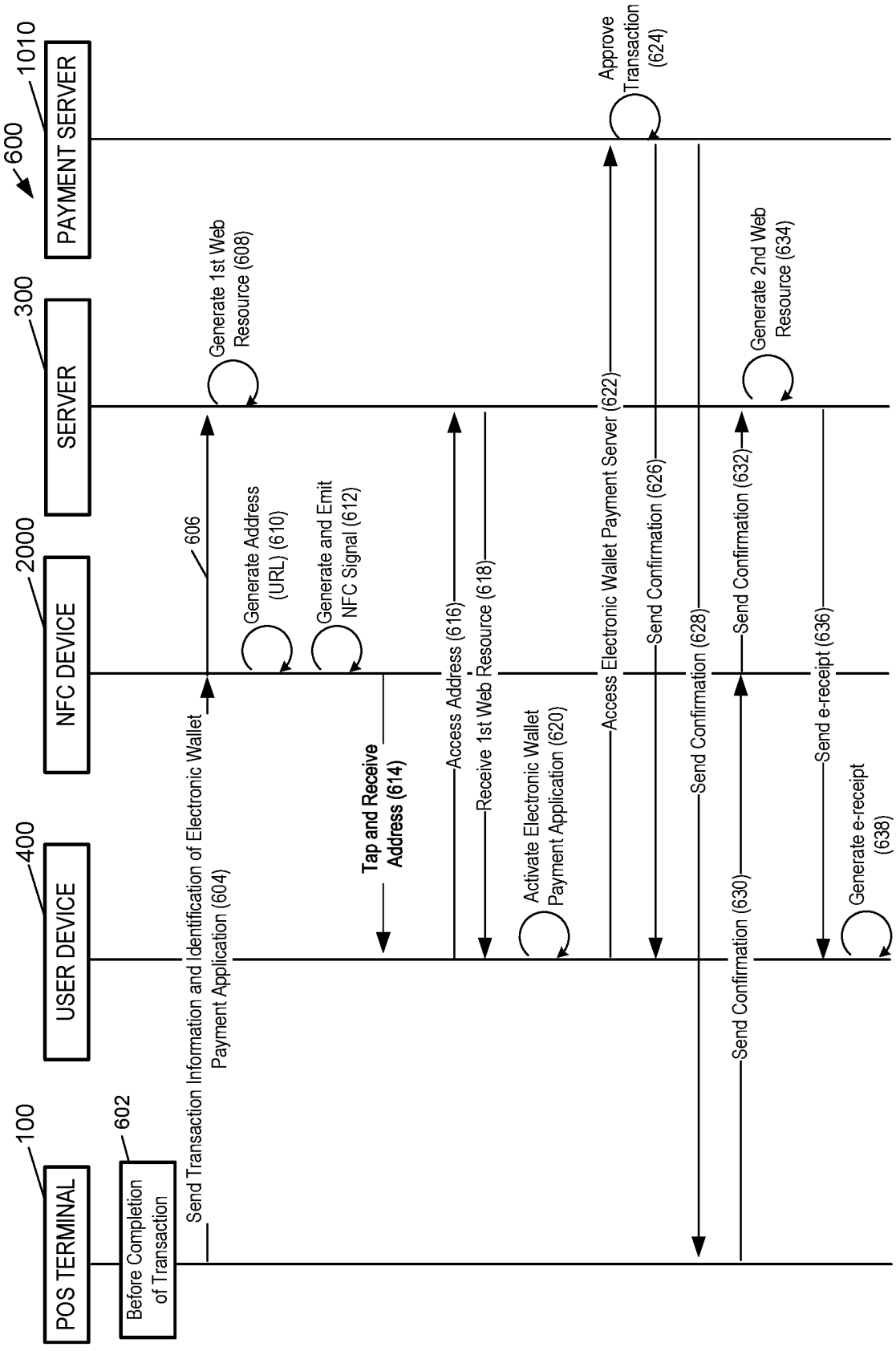
600
1010
PAYMENT SERVER
300
SERVER
2000
NFC DEVICE
400
USER DEVICE
100
POS TERMINAL
602
Before Completion of Transaction
Send Transaction Information and Identification of Electronic Wallet Payment Application (604)
606
Generate 1st Web Resource (608)
Generate Address (URL) (610)
Generate and Emit NFC Signal (612)
Tap and Receive Address (614)
Access Address (616)
Receive 1st Web Resource (618)
Activate Electronic Wallet Payment Application (620)
Access Electronic Wallet Payment Server (622)
Approve Transaction (624)
Send Confirmation (626)
Send Confirmation (628)
Send Confirmation (630)
Generate 2nd Web Resource (634)
Send Confirmation (632)
Send e-receipt (636)
Generate e-receipt (638)

FIG. 6

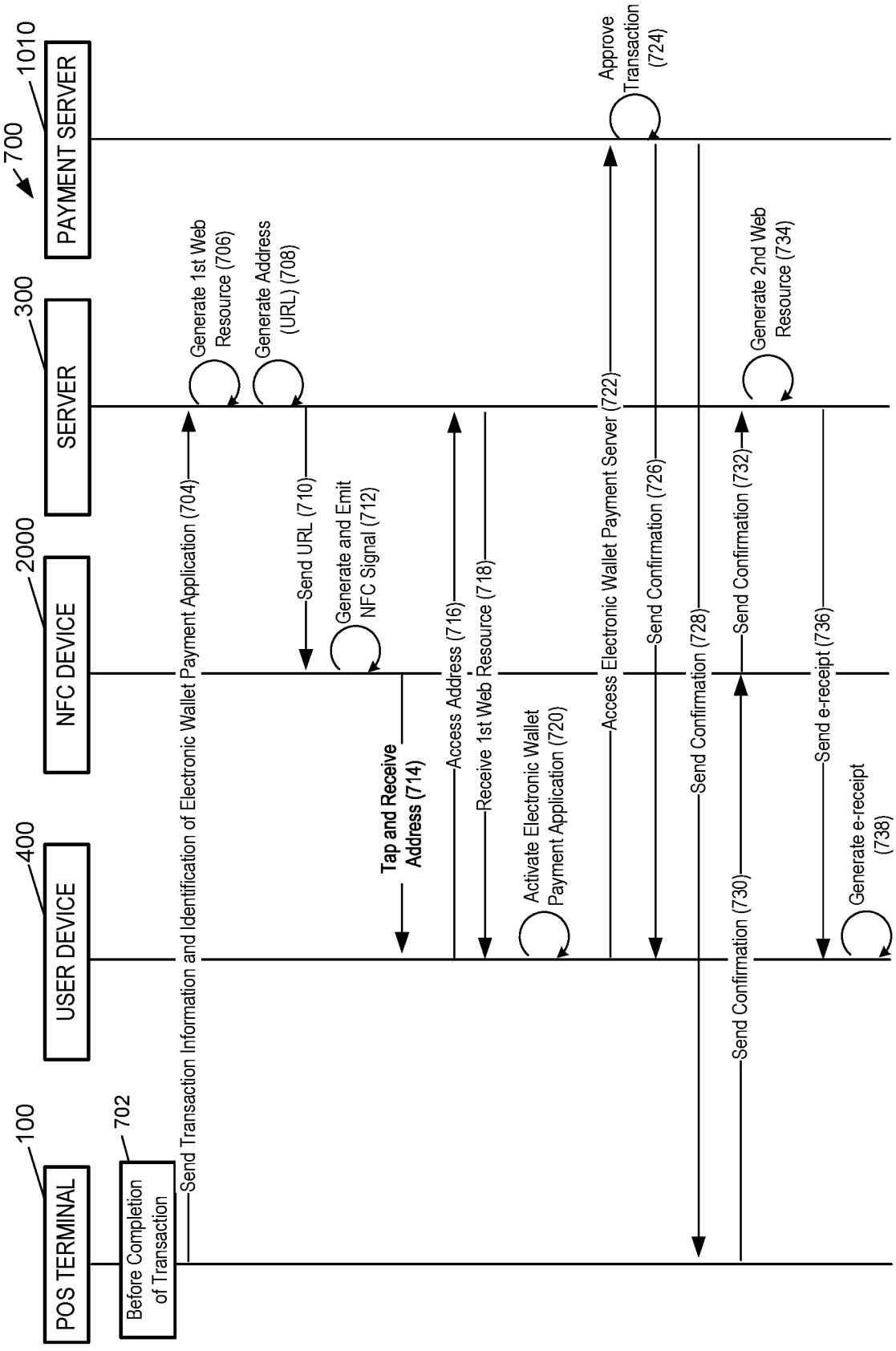
700
1010
PAYMENT SERVER
300
SERVER
2000
NFC DEVICE
400
USER DEVICE
100
POS TERMINAL
702
Before Completion of Transaction
Send Transaction Information and Identification of Electronic Wallet Payment Application (704)
Generate 1st Web Resource (706)
Generate Address (URL) (708)
Send URL (710)
Generate and Emit NFC Signal (712)
Tap and Receive Address (714)
Access Address (716)
Receive 1st Web Resource (718)
Activate Electronic Wallet Payment Application (720)
Access Electronic Wallet Payment Server (722)
Approve Transaction (724)
Send Confirmation (726)
Send Confirmation (728)
Send Confirmation (730)
Send Confirmation (732)
Generate 2nd Web Resource (734)
Send e-receipt (736)
Generate e-receipt (738)

FIG. 7

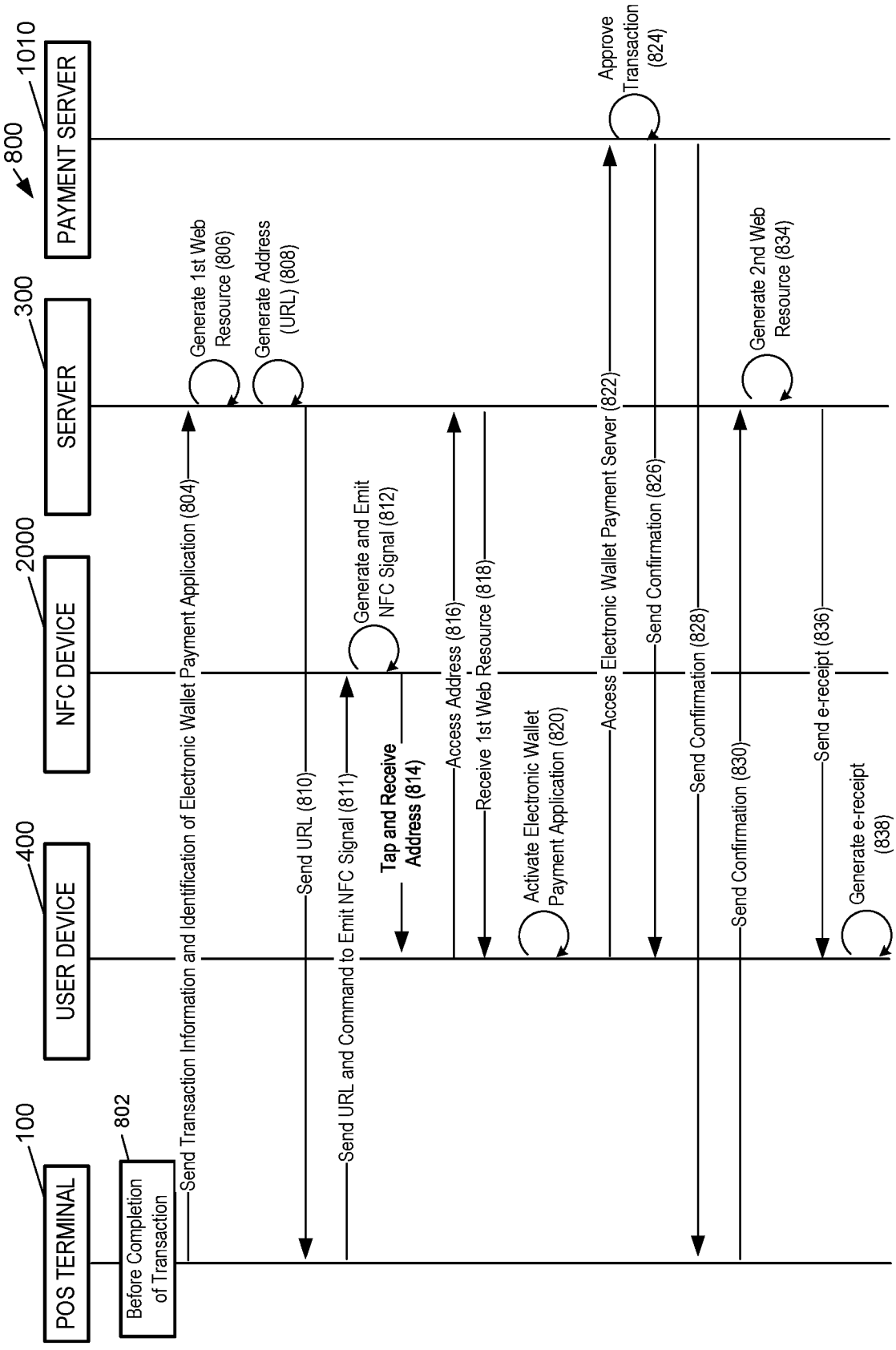
800
100
POS TERMINAL
802
Before Completion of Transaction
400
USER DEVICE
2000
NFC DEVICE
300
SERVER
1010
PAYMENT SERVER
Send Transaction Information and Identification of Electronic Wallet Payment Application (804)
Generate 1st Web Resource (806)
Generate Address (URL) (808)
Send URL (810)
Send URL and Command to Emit NFC Signal (811)
Generate and Emit NFC Signal (812)
Tap and Receive Address (814)
Access Address (816)
Receive 1st Web Resource (818)
Activate Electronic Wallet Payment Application (820)
Access Electronic Wallet Payment Server (822)
Approve Transaction (824)
Send Confirmation (826)
Send Confirmation (828)
Send Confirmation (830)
Generate 2nd Web Resource (834)
Send e-receipt (836)
Generate e-receipt (838)

FIG. 8

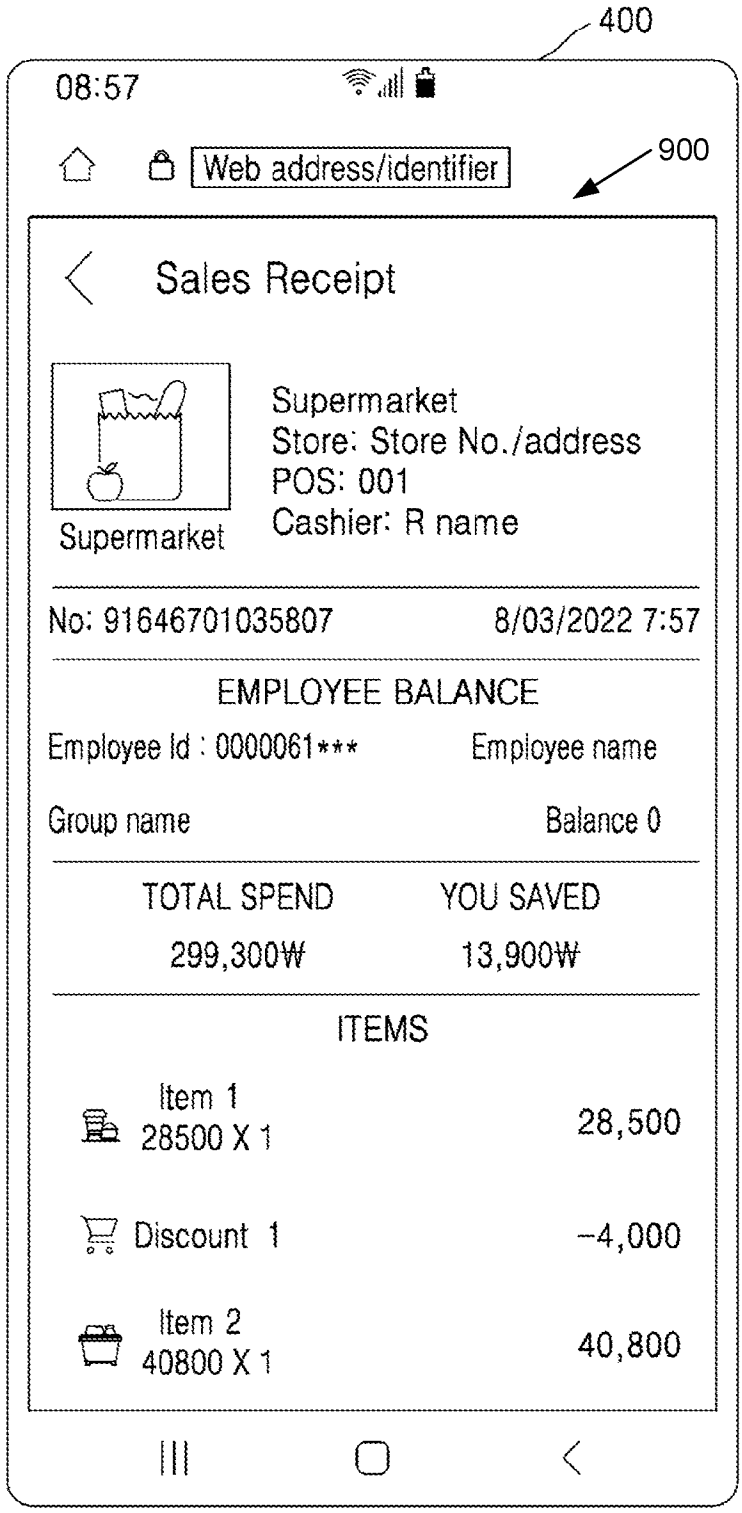
400
08:57
Web address/identifier
900
Sales Receipt
Supermarket
Supermarket
Store: Store No./address
POS: 001
Cashier: R name
No: 91646701035807
8/03/2022 7:57
EMPLOYEE BALANCE
Employee Id : 0000061***
Employee name
Group name
Balance 0
TOTAL SPEND
YOU SAVED
299,300₩
13,900₩
ITEMS
Item 1
28500 X 1
28,500
Discount 1
-4,000
Item 2
40800 X 1
40,800

FIG. 9

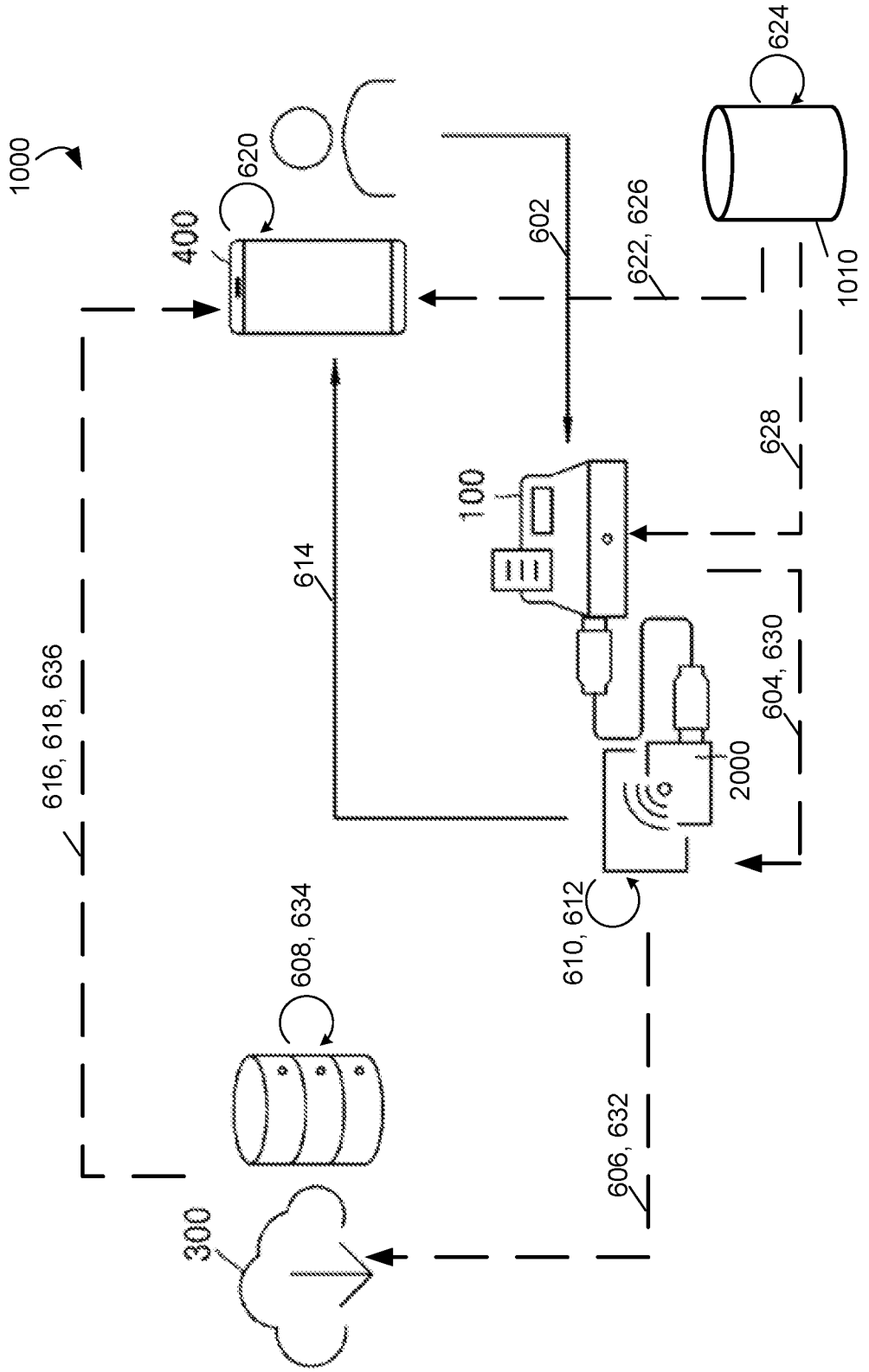
1000
620
400
602
622, 626
624
1010
628
100
614
604, 630
2000
616, 618, 636
610, 612
608, 634
606, 632
300

FIG. 10

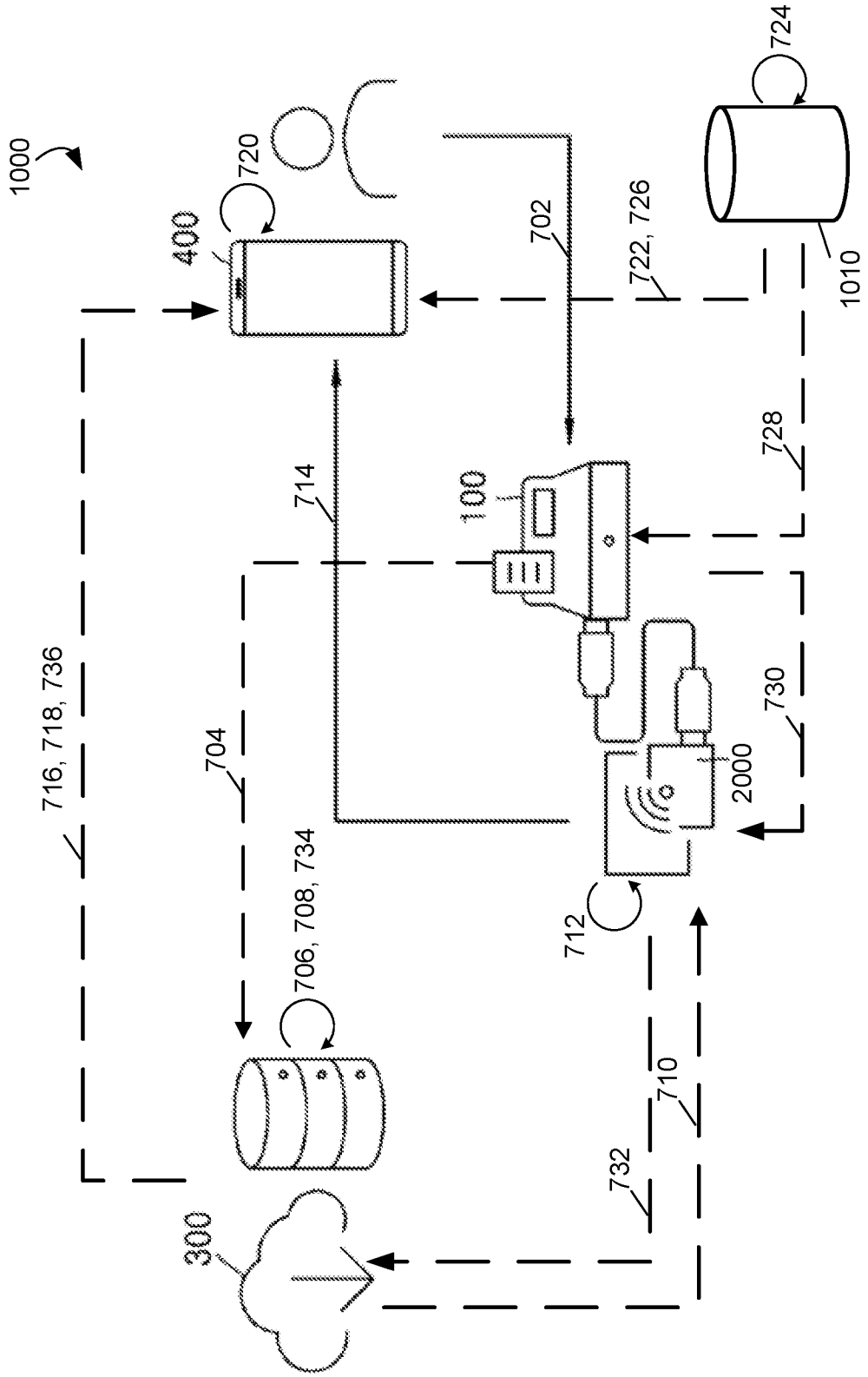
1000
720
400
702
722, 726
724
1010
728
714
100
716, 718, 736
704
730
2000
706, 708, 734
712
710
732
300

FIG. 11

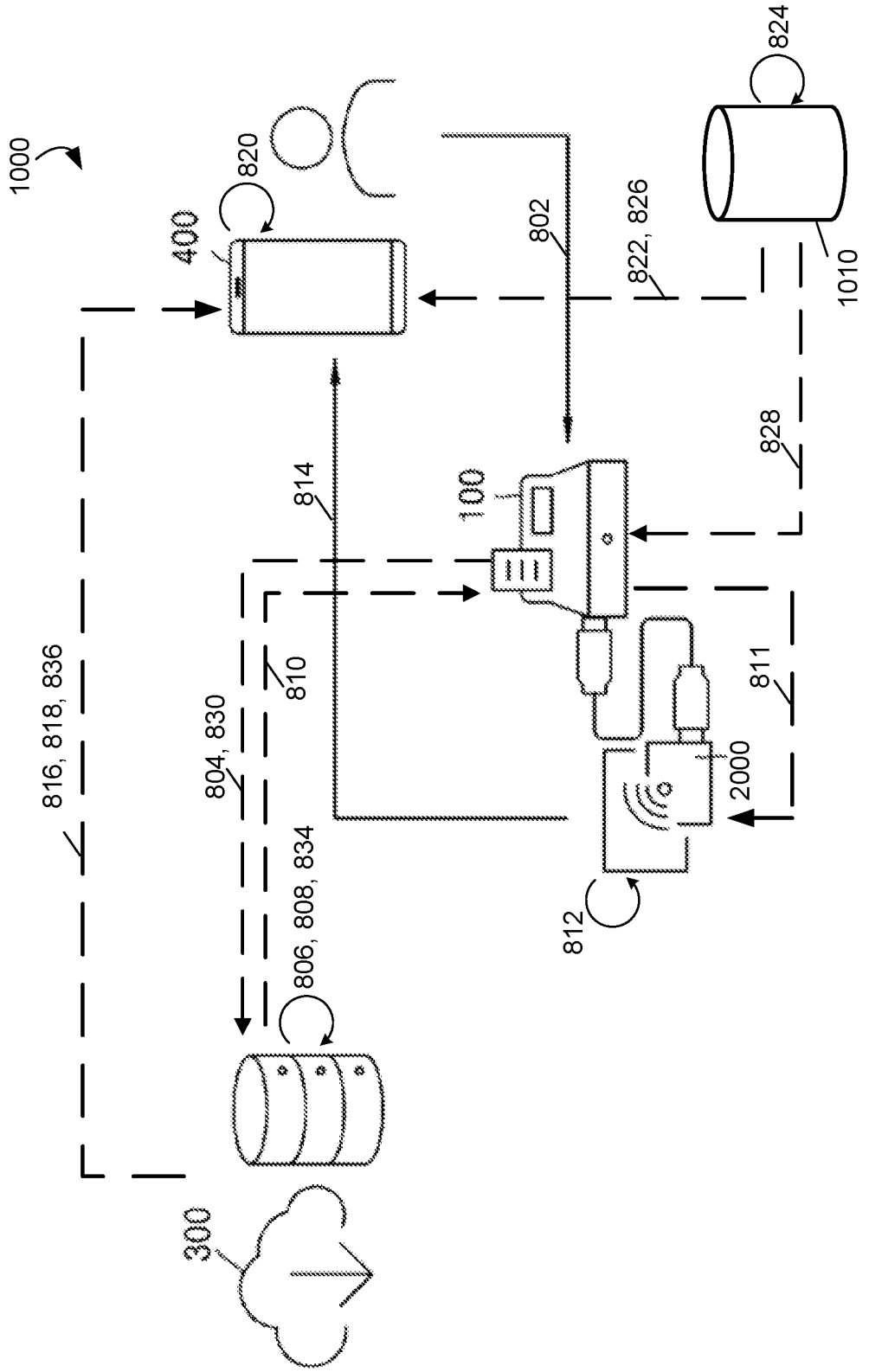
1000
820
400
802
822, 826
824
1010
828
814
100
810
811
816, 818, 836
804, 830
806, 808, 834
2000
812
300

FIG. 12

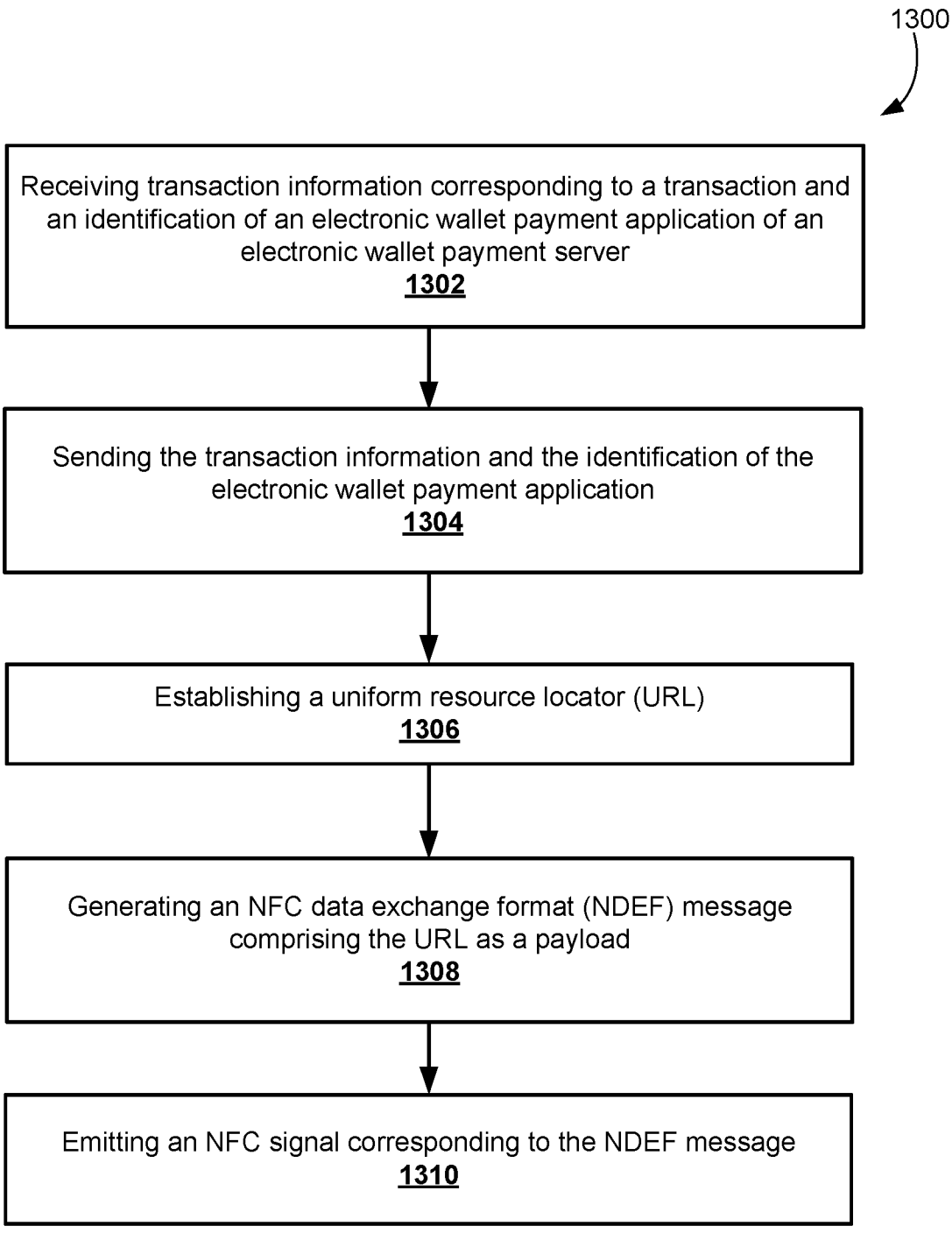
1300
Receiving transaction information corresponding to a transaction and an identification of an electronic wallet payment application of an electronic wallet payment server
1302
Sending the transaction information and the identification of the electronic wallet payment application
1304
Establishing a uniform resource locator (URL)
1306
Generating an NFC data exchange format (NDEF) message comprising the URL as a payload
1308
Emitting an NFC signal corresponding to the NDEF message
1310

FIG. 13

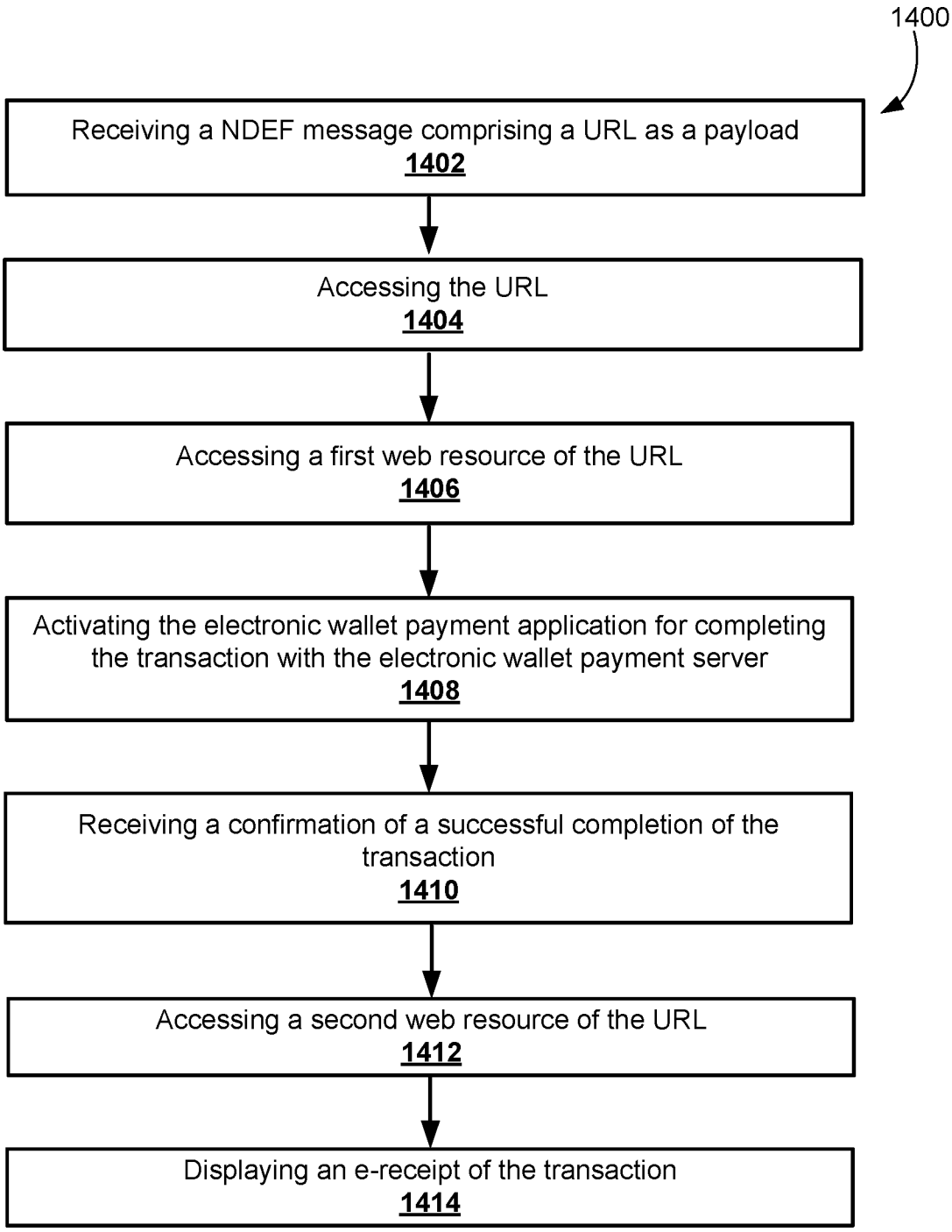
1400
Receiving a NDEF message comprising a URL as a payload
1402
Accessing the URL
1404
Accessing a first web resource of the URL
1406
Activating the electronic wallet payment application for completing the transaction with the electronic wallet payment server
1408
Receiving a confirmation of a successful completion of the transaction
1410
Accessing a second web resource of the URL
1412
Displaying an e-receipt of the transaction
1414

FIG. 14

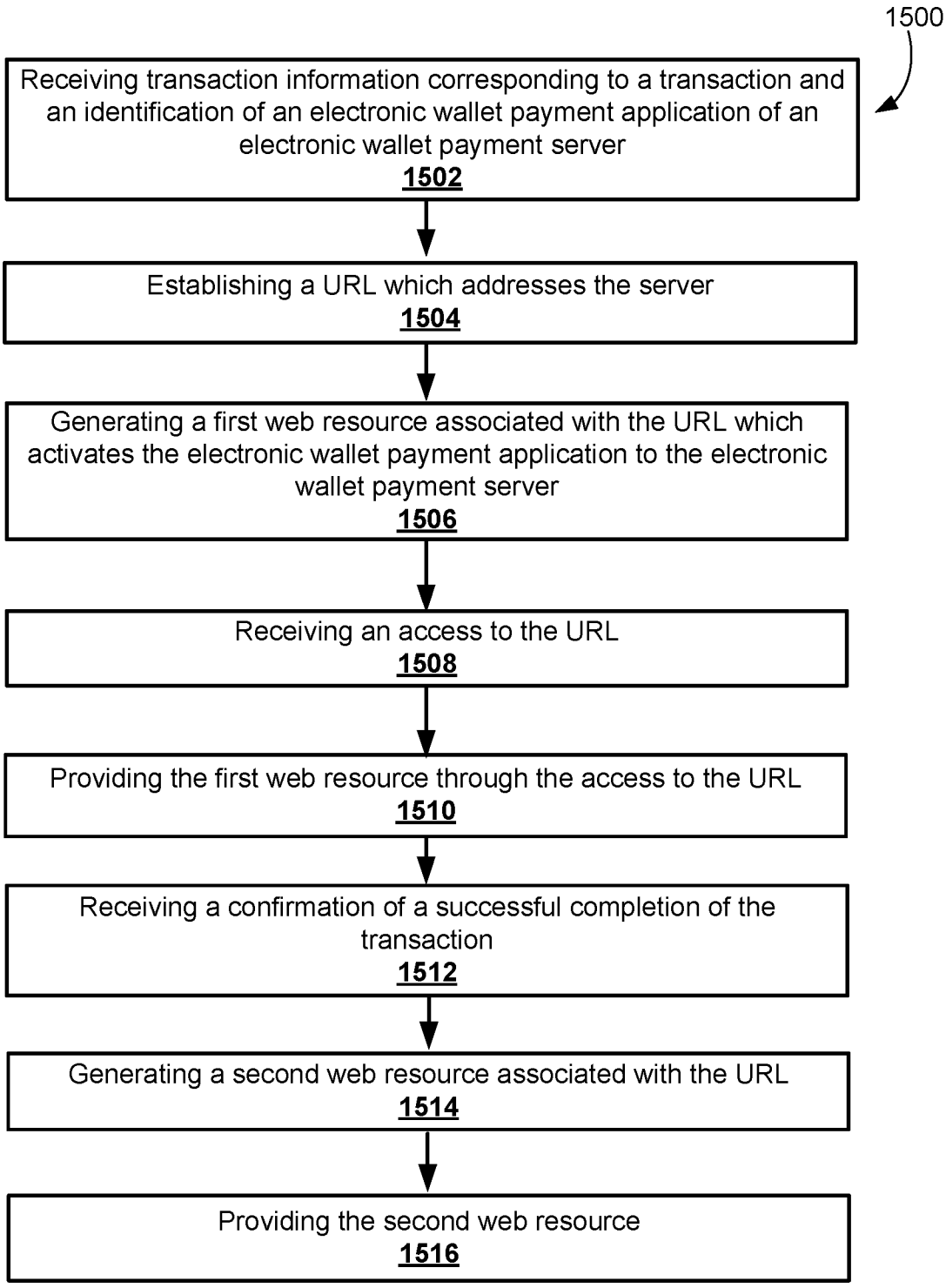
1500
Receiving transaction information corresponding to a transaction and an identification of an electronic wallet payment application of an electronic wallet payment server
1502
Establishing a URL which addresses the server
1504
Generating a first web resource associated with the URL which activates the electronic wallet payment application to the electronic wallet payment server
1506
Receiving an access to the URL
1508
Providing the first web resource through the access to the URL
1510
Receiving a confirmation of a successful completion of the transaction
1512
Generating a second web resource associated with the URL
1514
Providing the second web resource
1516

FIG. 15