



US012393921B2

(12) **United States Patent**
Zhang

(10) **Patent No.:** **US 12,393,921 B2**

(45) **Date of Patent:** ***Aug. 19, 2025**

(54) **ENROLLING MOBILE-PAYMENT
CUSTOMERS AFTER ONLINE
TRANSACTIONS**

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(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 50 days.

This patent is subject to a terminal dis-
claimer.

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(22) Filed: **Jul. 26, 2022**

(Continued)

(65) **Prior Publication Data**

US 2022/0366396 A1 Nov. 17, 2022

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Related U.S. Application Data

(63) Continuation of application No. 16/051,317, filed on
Jul. 31, 2018, now Pat. No. 11,410,153.

(51) **Int. Cl.**
G06Q 20/00 (2012.01)
G06F 8/61 (2018.01)
G06Q 20/32 (2012.01)

(52) **U.S. Cl.**
CPC **G06Q 20/3223** (2013.01); **G06F 8/61**
(2013.01); **G06Q 20/3227** (2013.01); **G06Q**
20/327 (2013.01)

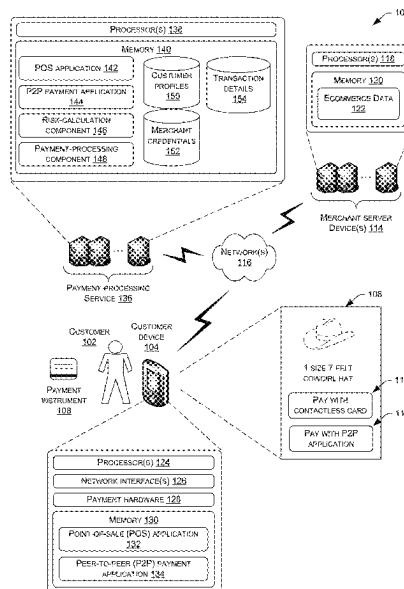
(58) **Field of Classification Search**

CPC G06Q 30/3223; G06Q 20/3223
See application file for complete search history.

(57) **ABSTRACT**

Techniques described herein are directed to, among other things, enabling the use of contactless payment technology when customers and merchant are remote from one another by, for example, authorizing merchants to use payment hardware components residing on customer devices. For example, when a customer requests to purchase an item from a merchant via a ecommerce page of the merchant, a payment-processing service may authorize, at the request of the customer, the merchant to use an NFC reader residing on the customer device to accept payment information from a contactless card of the customer for satisfying a cost of the transaction.

18 Claims, 7 Drawing Sheets



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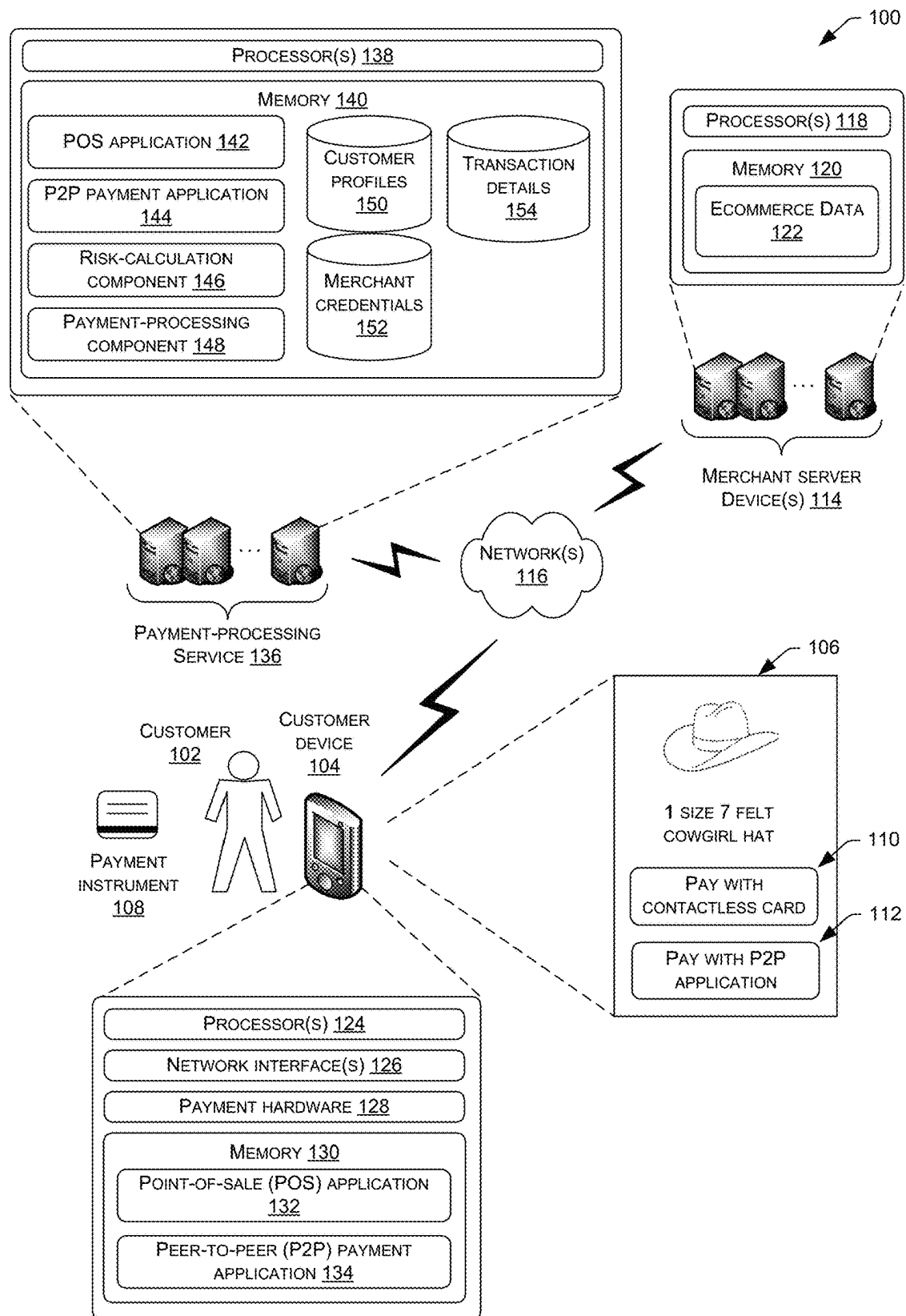


Fig. 1

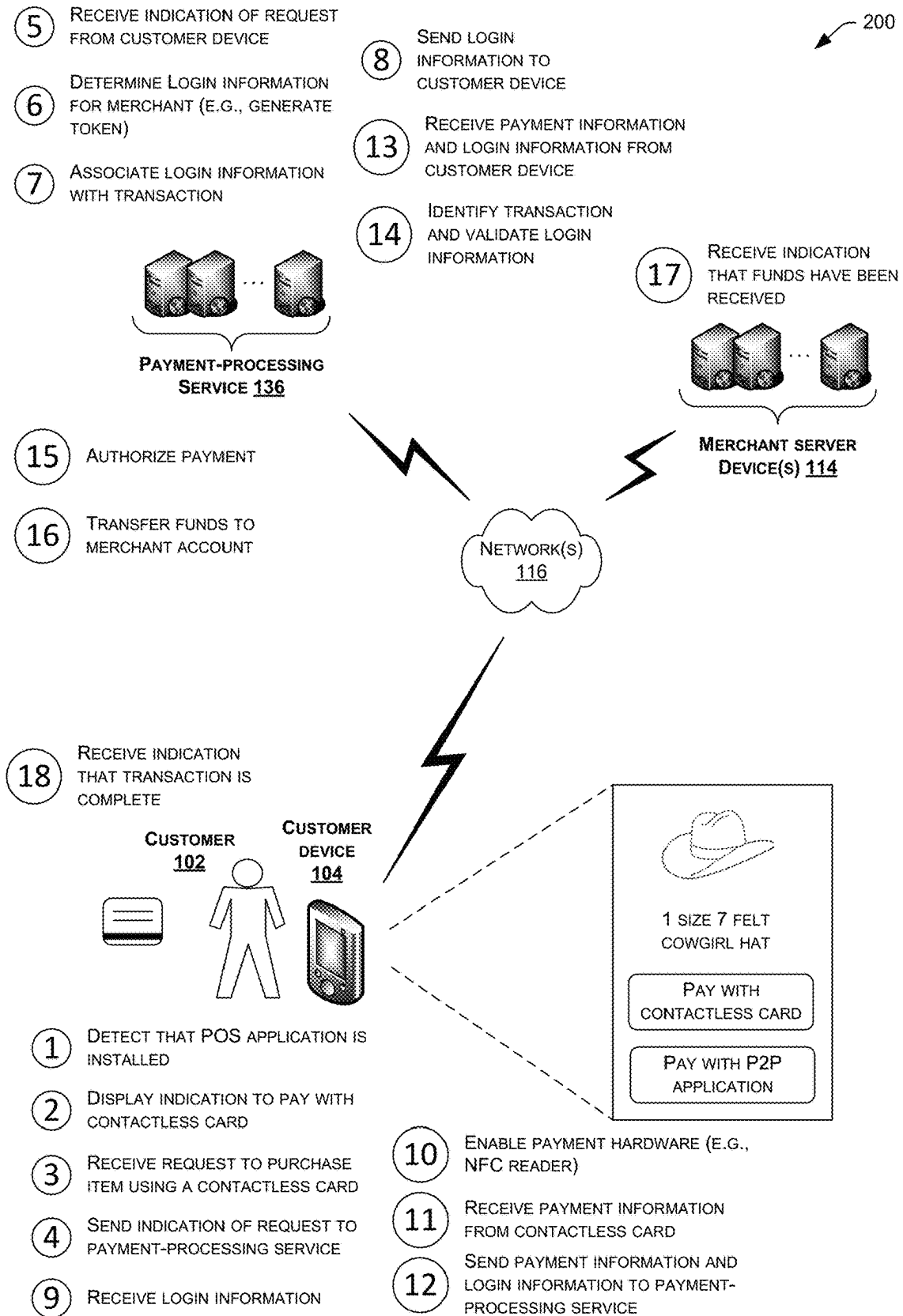


Fig. 2

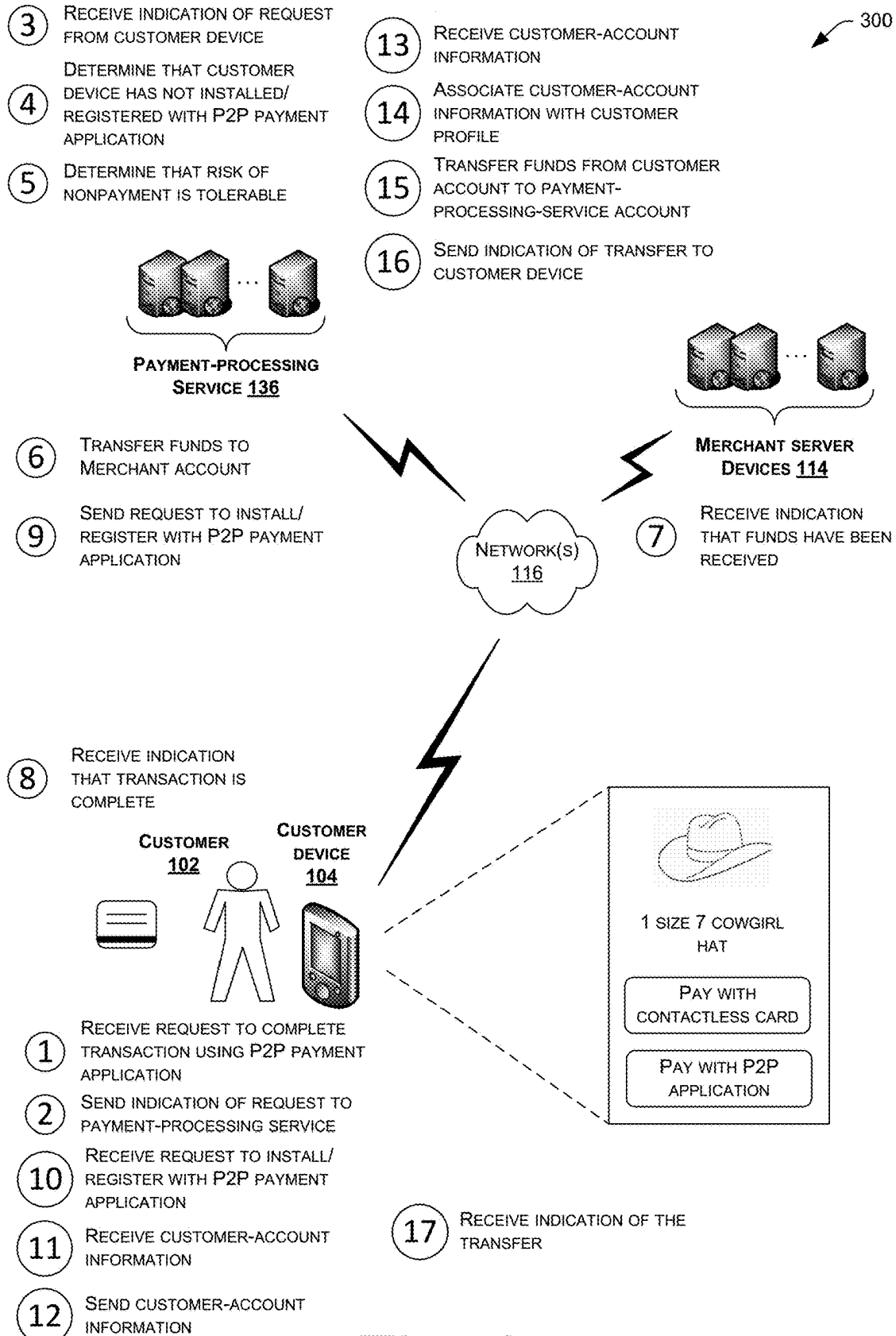


Fig. 3

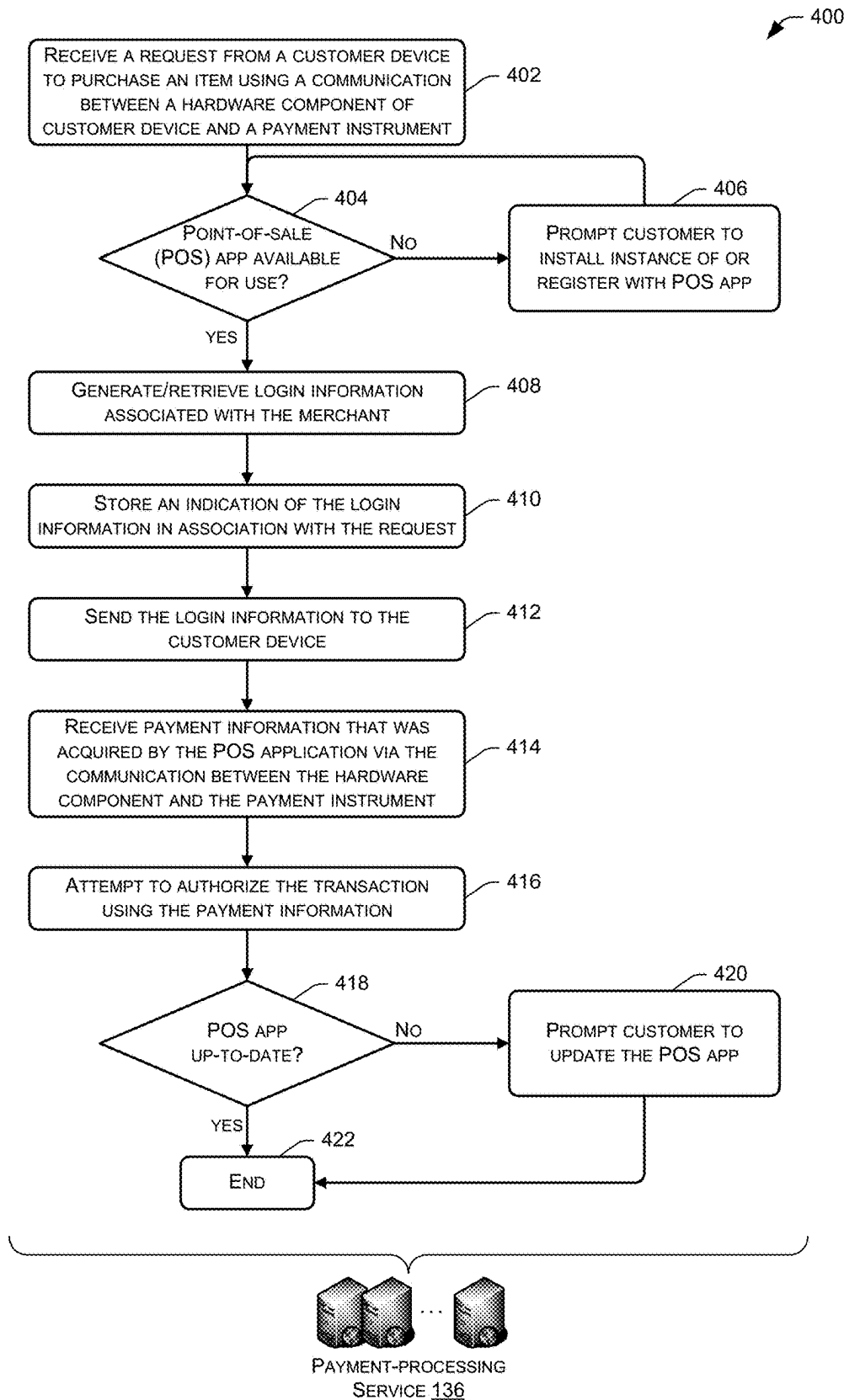


Fig. 4

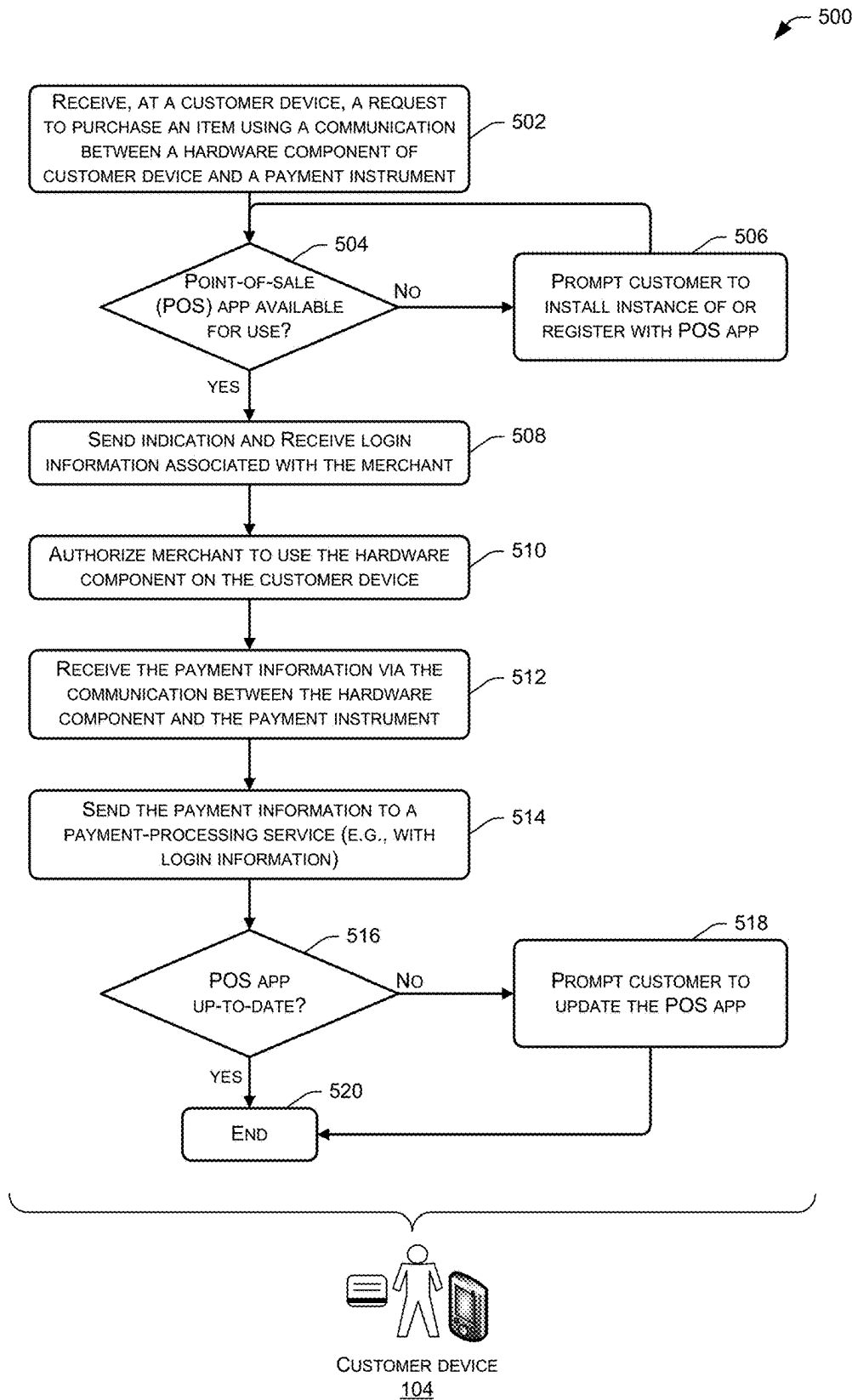


Fig. 5

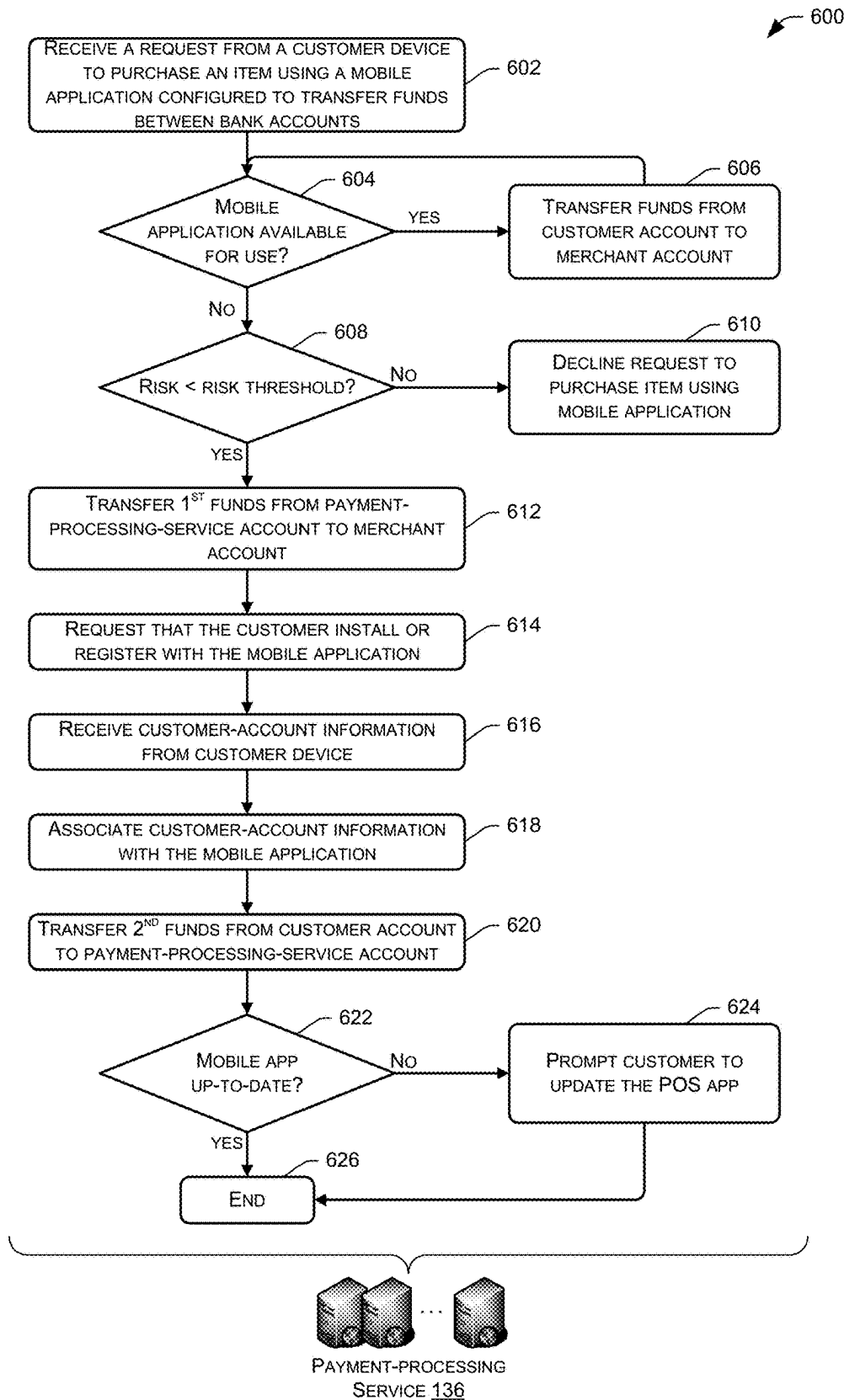


Fig. 6

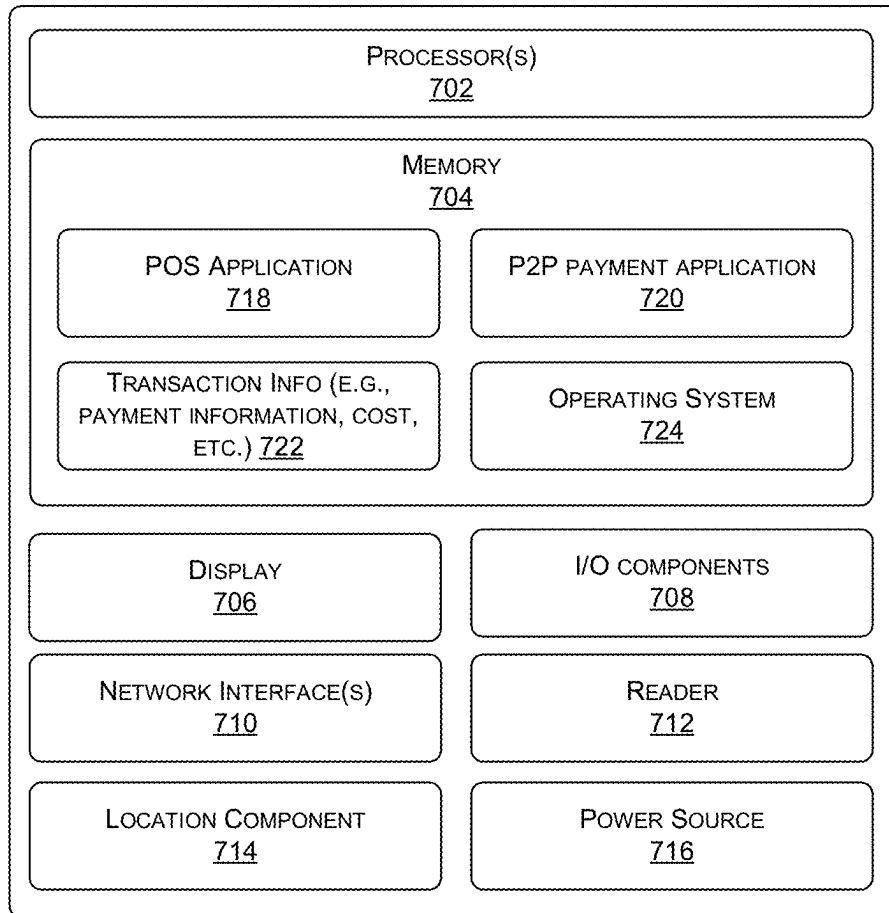
CUSTOMER DEVICE 700

Fig. 7

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ENROLLING MOBILE-PAYMENT CUSTOMERS AFTER ONLINE TRANSACTIONS

PRIORITY

This patent application is a continuation of, and claim priority to, U.S. patent application Ser. No. 16/051,317, filed on Jul. 31, 2018, entitled "Enrolling Mobile-Payment Customers After Online Transactions", and is fully incorporated in its entirety by reference herein.

BACKGROUND

In today's commerce more and more transactions between customers and merchants occur online or otherwise outside of brick-and-mortar locations of the merchants. As such, the process for completing these transactions has continued to evolve. Similarly, some brick-and-mortar merchants have recently begun moving away from large, stationary point-of-sale (POS) devices and towards the use of smaller, portable POS devices. In addition to the above, the technology of payment instruments and payment channels used in these transactions have also advanced. This advancement in technology continue to expand the possibilities for connecting merchants and customers in commerce.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other features of the present disclosure, its nature and various advantages, will be more apparent upon consideration of the following detailed description, taken in conjunction with the accompanying drawings in which:

FIG. 1 illustrates an example architecture that includes a customer operating a customer device to purchase an item via an ecommerce page of a merchant. In one example, the customer may use payment hardware, such as an NFC reader, on the customer device to provide payment information associated with a payment instrument of the customer, such as a contactless card, to a payment-processing service for satisfying a cost of the transaction. In another example, the payment-processing service may enable the customer to satisfy the cost of the transaction using a peer-to-peer (P2P) payment application before the customer has either installed or registered with the application.

FIG. 2 illustrates an example within the architecture of FIG. 1 where the customer device enables its payment hardware (e.g., an NFC reader) on behalf of the merchant such that the payment hardware is able to receive payment information from a payment instrument of the customer (e.g., a contactless card) for satisfying a cost of the transaction.

FIG. 3 illustrates an example within the architecture of FIG. 1 where the customer requests to satisfy the cost of the transaction using the P2P payment application prior to the customer installing an instance of the application or otherwise registering with the application. In this example, the payment-processing service pays the merchant on behalf of the customer, before requesting that the customer install or register with the P2P payment application and thereafter reimburse the payment-processing service for the cost of the transaction.

FIG. 4 illustrates an example process that the payment-processing service may implement for causing a customer device to enable its payment hardware for receiving pay-

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ment information from a payment instrument of a customer for satisfying a cost of a transaction between the customer and a merchant.

FIG. 5 illustrates an example process that the customer device may implement in response to a customer requesting to complete a transaction using the payment hardware of the customer device.

FIG. 6 illustrates an example process that the payment-processing service may implement in response to a customer requesting to complete a transaction using a P2P payment application prior to the customer installing or registering with the application.

FIG. 7 illustrates example components of a customer device that may be configured to acts as a POS device, as described herein.

In the figures, the left-most digit(s) of a reference number identifies the figure in which the reference number first appears. The use of the same reference numbers in different figures indicates similar or identical items or features. Moreover, multiple instances of the same part are designated by a common prefix separated from the instance number by a dash. The drawings are not to scale.

DETAILED DESCRIPTION

As described above, the process for completing payment transactions between customers and merchants continues to evolve. For example, recent developments allow customers to pay for items at brick-and-mortar locations of merchants using contactless payment cards of the customer. To enable this technology, the merchants utilize near-field-communication (NFC) readers communicatively coupled to merchant devices to receive payment information (e.g., card number, expiration date, etc.) from the contactless cards via NFC. That is, when a customer wishes to pay for an item at a physical location of a merchant using a contactless card of the customer, the customer simply taps his or her card against the NFC reader, which retrieves the payment information from the contactless card and passes this information to the merchant device. The merchant device then passes a request to authorize the contactless card and the payment information to a payment-processing service, which attempts to authorize the card for the cost of this transaction.

While this technology reduces the friction between the customer and the merchant during the checkout process, its use is limited to brick-and-mortar merchants. That is, because the NFC reader is owned and operated by the merchant, a customer wishing to pay with his or her contactless card must be in close proximity of the merchant to use his or her contactless card. As such, a customer is unable to pay a merchant for an item using the contactless technology of a contactless card of the customer when the customer is remote from the merchant, such as when the customer is operating a customer device to purchase an item from an ecommerce page of the merchant.

However, techniques described herein are directed to, among other things, enabling the use this contactless technology when customers and merchant are remote from one another by, for example, authorizing merchants to use payment hardware components residing on customer devices. For example, envision that a customer uses a customer device to browse an ecommerce page of a merchant, and that the customer requests to purchase an item from the merchant via the ecommerce page. Traditionally, the ecommerce page would allow the user to satisfy a cost of the transaction by typing in a credit-card number, paying with a third-party service (e.g., PayPal, etc.), or the like. In this instance,

however, the ecommerce page may display an indication that the customer may pay with his or her contactless card.

Upon receiving a customer selection of the indication to pay with the contactless card, the customer device may send an indication of the selection to a server computing device associated with the merchant and/or a server computing device associated with a payment-processing service that facilitates transactions between customers and merchants. Upon receiving the indication, the server computing device may retrieve credentials associated with the merchant for authorizing the merchant to use payment hardware (e.g., an NFC reader) residing on the customer device. For example, the server computing device may retrieve a username/password combination associated with the merchant, may generate a token for authorizing the merchant to take control of the payment hardware, and/or other login information for enabling the merchant to use the payment hardware. The server computing may then send this login information to the customer device.

Upon receiving the login information from the server computing device, the customer device may, essentially, login to the NFC reader as the merchant. That is, the customer device may use the login information to authorize the merchant to use the NFC reader for completing the transaction. In some instances, the login information may be associated with an expiration time such that the merchant is authorized to use the NFC reader for a predetermined amount of time, such as a few minutes or the like. In addition, or in the alternative, the login information may be associated with a particular transaction and, thus, may authorize the merchant use the NFC reader for the transaction associated with the request of the customer, but not for subsequent transactions.

In either instance, upon the customer device authorizing the merchant to use the NFC reader, the customer device may output a request (e.g., visually, audibly, etc.) to the customer to tap his or her contactless card to the customer device. Upon the contactless card coming into a threshold proximity of the NFC reader of the customer device, the NFC reader may retrieve payment information associated with the card. The customer device may then send this information, potentially along with the login information or other identifying information, back to the server device or another server device associated with the payment-processing service. The payment-processing service may then use the received payment information to attempt to authorize the contactless card for the cost of the transaction.

The above techniques thus solve the existing problem of the inability of customers to use contactless payment technology in instances where the customers are remote from physical merchant locations. That is, these techniques enable merchants to temporarily provision NFC readers on customer devices for merchant use to effectively turn the customer device into a merchant device for a limited period of time, thus closing the distance between the customer and the (temporary) merchant device.

These and other techniques are described in further detail below. Further, while some of the examples discussed herein are described with reference to NFC readers and contactless cards, it is to be appreciated that the techniques may apply equally to other payment-hardware components residing on customer devices. For example, customer devices may include card readers into which payment instruments and dipped or swiped, and the techniques for authorizing merchants to temporarily take control of payment hardware may apply equally to these card readers.

In addition, given that merchants are able to temporarily take control of payment hardware on customer devices using the techniques described herein, in some instances these techniques may be further leveraged to increase security of online transactions. For example, the techniques may be used to identify fraudulent purchase requests such that the requests are denied. For example, in response to a POS application executing on customer device sending a request to initiate payment using payment hardware of the customer device, login information of the merchant may be sent to the customer device for enabling the payment hardware for use by the merchant. In addition, code may be sent or otherwise executed on the client device for analyzing contents of the customer device to determine whether the customer device, and hence the payment hardware, has been compromised. If so, then the code may send an instruction to the payment-processing service and/or the merchant indicating that the request is fraudulent and requesting to refrain from consummating the transaction.

The techniques described herein are also directed to, among other things, enabling customers to purchase items from merchants using mobile payment applications (e.g., peer-to-peer (P2P) payment applications) prior to the customers having installed these applications on their respective devices and/or registering with the payment applications. As described above, payment technologies continue to advance and, as part of these advancements, customers and merchants are able to transfer money between one another's accounts (e.g., bank accounts, etc.) using mobile payment applications that are linked to these respective accounts. For example, a first user may transfer funds from his or her bank account to a bank account of another user or a merchant using a mobile payment application installed on his or her mobile device. However, a user is typically unable to take advantage of these applications until he or she has downloaded an instance of the application onto his or her mobile device and registered with the application by, for example, linking an account (e.g., a bank account) of the user to the mobile application.

As described below, however, a user may be able to purchase an item from a merchant using a mobile payment application prior to downloading the application onto his or her device and/or prior to registering with the application. For example, a customer may use his or her customer device to navigate to an ecommerce page of a merchant. Upon requesting to purchase one or more items from the merchant, the ecommerce page may display an indication that the user is able to purchase the item(s) using a mobile payment application. Upon receiving a selection of the indication, the customer device and/or a server computing device associated with a payment-processing service may determine whether the customer device has installed the application and/or whether the customer has registered with the mobile payment application (e.g., whether the user has linked a bank account to the application). If so, then the customer may complete the transaction by transferring funds from the linked customer account to an account of the merchant. In some instances, the payment-processing service may facilitate this transfer.

If, however, mobile payment application is not available because, either because the customer device does not store an instance of the application or the customer has not registered with the application, then the payment-processing service may determine whether to nevertheless complete the transaction on behalf of the customer and thereafter request that the customer reimburse the payment-processing service. For example, the payment-processing service may perform

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a risk analysis on the customer and/or the transaction to calculate a risk. If this risk score is greater than a risk threshold, the payment-processing service may refrain from paying the merchant on behalf of the customer and, thus, the customer may download and/or register with the application or may choose to pay for the item(s) using another payment method. If, however, the risk score is less than the risk threshold, then the payment-processing service may transfer first funds equal to the cost of the item (plus tax, shipping, etc.) from an account of the payment-processing service to the merchant account to complete the transaction.

Thereafter, the payment-processing service may send a request to the customer device requesting that the customer download the application and/or register with the application. Upon the customer device downloading the application and/or linking an account to the application, the mobile payment application may transfer second funds, in an amount equal to or otherwise based on an amount of the first funds, from the linked customer account to the payment-processing service account.

Using the above techniques, customers are therefore able to utilize mobile payment applications, such as P2P payment applications, to complete transactions with merchants, even prior to the customers downloading instances of the applications to their devices and/or registering with these applications. Similar to the techniques described above with reference to authorizing merchants to use NFC readers residing on customer devices, this payment technology thus provides additional ways in which customers may transact with merchants outside of brick-and-mortar establishments.

Examples of these techniques are described below with reference to FIGS. 1-7. It is to be appreciated, however, that the following description and examples are merely illustrative and that the techniques may apply in other environments and architectures.

FIG. 1 illustrates an example architecture 100 that includes a customer 102 operating a customer device 104 to purchase an item via an ecommerce page 106 of a merchant. In one example, the customer 102 may use payment hardware, such as an NFC reader, on the customer device 104 to provide payment information associated with a payment instrument 108 of the customer 102, such as a contactless card, to a payment-processing service for satisfying a cost of the transaction. As illustrated, in this example the ecommerce page 106 includes an icon 110 that, when selected, allows the customer 102 to purchase the illustrated item using the payment hardware, such as the NFC reader, of the customer device 104. In another example, the payment-processing service may enable the customer to satisfy the cost of the transaction using a peer-to-peer (P2P) payment application before the customer has either installed or registered with the application. Also illustrated, in this example the ecommerce page 106 includes an icon 112 that, when selected, allows the customer 102 to purchase the item using the P2P payment application.

FIG. 1 further illustrates one or more merchant server devices 114 associated with the merchant, with which the customer device 104 may communicate with over a network 116. As illustrated, the merchant server devices 114 may include one or more processors 118 and memory 120, which may store ecommerce data 122. The merchant server devices may generate one or more ecommerce pages, such as the ecommerce page 106, using the ecommerce data 122. As used herein, an ecommerce page may include any type of visual and/or audible content rendered on the customer

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device 104 or other devices, including content displayed on a webpage, content displayed on a merchant-provided application, or the like.

The customer device 104 may also include one or more processors 124, one or more network interfaces 126, one or more pieces of payment hardware 128, and memory 130. The payment hardware 128 may include an NFC reader configured to receive payment information from a contactless card via NFC, a card reader configured to receive payment information from a payment card via a swipe or dip, and/or the like. The memory 130 may store or otherwise have access to an instance of a point-of-sale (POS) application 132 and/or an instance of a P2P payment application 134. The POS application 132 may comprise an application that is configured to facilitate a transaction between the customer 102 and a merchant via a payment-processing service 136. That is, the POS application 132 may be configured to receive, from the payment hardware 128, payment information associated with a payment instrument and provide this payment information and one or more transaction details associated with the transaction the payment-processing service 136. The payment-processing service 136 may thereafter attempt to authorize the payment instrument for the cost of the transaction. In some instances, the customer 102 may utilize the POS application 132 to operate as a merchant, while in other instances the customer 102 may utilize the POS application 132 to complete a transaction as a customer with a merchant, as described in detail below.

The P2P payment application 134, meanwhile, may facilitate the transfer of funds from one or more accounts of the customer 102 to one or more accounts of other users and/or merchants. In some instances, the customer 102 may be able to acquire an item from a merchant prior to downloading and/or registering with the P2P payment application, as described in further detail below.

The payment-processing service 136, meanwhile, may function to facilitate transactions between customers and merchants, such as between the customer 102 and the merchant 114. The payment-processing service 136 can be implemented by one or more servers computing devices that include one or more processors 138 and memory 140. The memory 140 may store the POS application 142, the P2P payment application 144, a risk-calculation component 146, and a payment-processing component 148. The payment-processing component 148 may function to receive requests to authorize transactions from merchants and/or customers and, in response, may use received payment information to attempt to authorize the transactions. The risk-calculation component 146, meanwhile, may function to determine a risk associated with a particular customer and/or transaction and determine whether to front the cost of a transaction on behalf of a customer. FIGS. 3 and 6 and their corresponding discussion describe operation of the risk-calculation component 146 in further detail.

The memory 140 may also store or otherwise have access to one or more customer profiles 150, merchant credentials 152, and transaction details 154. The payment-processing service 136 may use the customer profiles when determining how to process a transaction. For example, the payment-processing service 136 may reference a customer profile associated with the illustrated customer 102 for determining whether the customer 102 has installed an instance of the P2P payment application on a corresponding device, for calculating a risk score associated with a particular customer or transaction of the customer, and/or the like. The merchant credentials 152, may be used for authorizing a merchant,

such as the merchant **114** to operate payment hardware of a particular customer device, such as the payment hardware **128** of the customer device **104**. For instance, the merchant credentials **152** may comprise username/password pairs, generated tokens, and/or other types of login information that may be used to enable payment hardware on a customer device to operate on behalf of a corresponding merchant. Finally, the transaction details **154** may correspond to information associated with a transaction, such as a cost of the transaction, item(s) being purchased as part of the transaction, payment information used to satisfy a cost of the transaction, an identity of a user and/or merchant associated with the transaction, and/or the like.

Within the architecture **100** of FIG. 1, the customer **102** may use the customer device **104** to navigate to the e-commerce page **106**. From the page **106**, the customer **102** may request to purchase an item, such as the illustrated hat in this example. In one instance, the customer may select the icon **110** to request to purchase the item from the merchant **114** using a contactless card of the customer **102**. In response to selecting this icon **110**, in some instances code operating on the customer device **104** may determine whether the POS application **132** is available for use (e.g., whether the customer device **104** has installed the application **132** and/or whether the user has registered with the application **132**). If not, then the code on the customer device may prompt the customer **102** to install and/or register with the POS application **132**.

However, if the code determines that the POS application **132** is available for use, then the code may send an indication of the request the payment-processing service **136**. In some instances, the indication may include details associated with the transaction, such as an identity of the merchant, an identity of the item(s) being purchased, an identity of the customer **102** and/or device **104**, a cost of the item(s), and/or the like. In response to receiving the indication, the payment-processing service **136** may retrieve login credentials associated with the identified merchant, in this instance merchant **114**. This may include, for example, generating a token and storing an indication that the generated token is associated with this particular transaction. Regardless of the particular type of login information being used, the payment-processing service **136** may send the login information to the customer device **104**.

Upon receiving the login information, the customer device **104** may enable the payment hardware **128**, such as the NFC reader, for use. That is, the customer device **104** may authorize the merchant to use the payment hardware **128** to receive payment information from the contactless card of the customer **102**. In some instances, the customer device **104** may display an indication requesting that the customer **102** tap his or her contactless card to the device **104**. Upon the customer **102** doing so, the NFC reader may receive and store the payment information associated with the card (e.g., number, expiration date, name, etc.) and the device **104** may send this information to the payment-processing service **136**, which may use the payment information to authorize purchase of the item for the customer **102**. FIGS. 2 and 4-5 and the corresponding discussion describe these techniques in further detail below.

In another example, the customer **102** may instead select the icon **112** to request to purchase the item using the P2P payment application **134**. Upon receiving the selection, code on the customer device **104** or at the payment-processing service **136** may initially determine whether the P2P payment application **134** is available for use on the customer device **104**. If so, then the P2P payment application **134** may

be launched to enable the customer **102** to transfer funds from the linked account of the customer **102** to an account of the merchant **114** to satisfy the cost of the item. If not, however, the risk-calculation component **146** may calculate a risk score associated with a risk of the customer **102** not reimbursing the payment-processing service **136** for the cost of the item(s) if the payment-processing service **136** were to transfer funds to the merchant account on behalf of the customer. The risk-calculation component **146** may then compare this risk score to a risk threshold. If the score is greater than the threshold, then the payment-processing service **136** may refrain from transferring the funds on behalf of the customer and thereafter requesting reimbursement from the customer **102**. If, however, the risk score is less than a risk threshold, then the payment-processing service **136** may complete the transaction by transferring funds equal to the cost of the item (including tax, shipping, etc.) to the merchant account and notifying the customer device and the merchant server devices **114** that the transaction has been completed.

After completing the transaction, the payment-processing service **136** may thereafter send a request to the customer device **104** to install and/or register the P2P payment application and transfer funds equal to or otherwise based on the amount of funds previously transferred to the payment-processing service **136** to the merchant **114**. FIGS. 3 and 6 and their accompanying description discuss these techniques in further detail below.

FIG. 2 illustrates an example within the architecture of **100** where the customer device **104** enables its payment hardware **128** (e.g., an NFC reader) on behalf of the merchant **114** such that the payment hardware is able to receive payment information from a payment instrument **108** of the customer **102** (e.g., a contactless card) for satisfying a cost of the transaction. While FIG. 2 illustrates one example implementation, it is to be appreciated that other implementations may include more, fewer, and/or different operations.

At "1", code operating on a customer device **104** may determine whether an instance of the POS application **132** is available for use on the customer device **104**. This may include determining whether an instance of the application **132** is installed on the device **104**, whether the customer has registered with the application **132**, and/or the like. In some instances, the customer **102** may have navigated to an e-commerce page **106** of a merchant **114**, causing the code to make this determination. If the code determines that the POS application **132** is not available for use, then the device **104** may prompt the customer **102** to install and/or register with the application **132**. In some instances, in response to determining that the POS application **132** is available for use, at "2" the e-commerce page **106** of the merchant **114** may display an icon or other indication indicating that the customer **102** may pay for one or more items using a contactless card of the user.

In this example, at "3" the customer **102** selects the icon requesting to purchase an item with a contactless card of the customer **104**. At "4", the customer device **104** sends an indication of the request to the payment-processing service **136**, which receives the indication of the request at "5". In some instances, this indication is accompanied by information associated with the transaction, such as the identity of the customer **102**, the customer device **104**, the merchant **114**, the cost of the item, and/or the like. At "6", the payment-processing service **136** may determine login information of the merchant based on receiving the request. This may include generating a token and storing an indication at the payment-processing service **136** indicating that the token

is associated with the particular transaction. That is, the payment-processing service **136** may store an indication that the generated token authorizes the merchant to use payment hardware **128** on the customer device **104** for the instant transaction with the customer **102**, but not for other transactions with other customers. In some instances, the payment-processing service **136** may also store an indication that the token is available for use for a limited amount of time, but not after an expiration time. In other instances, meanwhile, the payment-processing service **136** may retrieve an existing username/password combination or other login information associated with the merchant. At “7”, the payment-processing service **136** may associate the login information with the transaction, as discussed above, while at “8” the payment-processing service **136** may send the login information to the customer device **104**.

At “9”, the customer device **104** may receive the login information and, at “10”, may use the login information to enable the payment hardware **128**, such as the NFC reader, on the customer device. That is, the customer device **104** may use the login information to authorize the merchant **114** to use the payment hardware **128** on the device **104** for purposes of completing the transaction with the customer **102**. At “11”, the customer device **104** may receive, via the enabled NFC reader in this example, payment information from the contactless card of the customer **102** in response to the customer placing the contactless card in proximity of the NFC reader. At “12”, the customer device **104** may send the payment information associated with the contactless card to the payment-processing service **136**. In some instances, the customer device **104** may also append or otherwise send along the login information, such as the token associated with the merchant or the transaction.

At “13”, the payment-processing service **136** receives the payment information and, potentially, the login information from the customer device. At “14”, the payment-processing service **136** may use the login information to identify the transaction and validate the login information. At “15”, the payment-processing service **136** may attempt to authorize the payment using the received payment information. At “16”, in response to receiving an indication that the contactless card has been authorized for the cost of the transaction, the payment-processing service **136** (or another component of a payment network) may transfer funds to an account of the merchant **114**. At “17”, the merchant **114** may receive an indication that the funds have been transferred, while at “18” the customer device **104** may receive an indication that the transaction has been completed.

FIG. 3 illustrates an example within the architecture **100** where the customer **102** requests to satisfy the cost of the transaction using the P2P payment application **134** prior to the customer installing an instance of the application or otherwise registering with the application. In this example, the payment-processing service **136** pays the merchant **114** on behalf of the customer **102**, before requesting that the customer **102** install or register with the P2P payment application **134** and thereafter reimburse the payment-processing service **136** for the cost of the transaction. While FIG. 4 illustrates one example implementation, it is to be appreciated that other implementations may include more, fewer, and/or different operations.

At “1”, the customer device **104** receives, from the customer **102**, a request to complete a payment transaction using a mobile payment application configured to transfer funds between bank accounts, such as the P2P payment application **134**. At “2”, the customer device **104** may send an indication of the request to the payment-processing service

136, which receives the indication of the request at “3”. At “4”, the payment-processing service **136** determines whether the mobile payment application, such as the P2P payment application, available for use at the customer device **104**. For example, the payment-processing service **136** may use information identifying the customer, from the indication received from the customer device, to identify a customer profile associated with the customer and may use the customer profile to determine whether the mobile payment application is available for use at the customer device **104**. In this example, the payment-processing service **136** determines that the P2P payment application **134** is not available for use at the customer device **104**.

At “5”, the payment-processing service **136** may determine a risk associated with paying the merchant for the cost of the transaction on behalf of the customer **102** prior to requesting reimbursement from the customer **102**. In some instances, the payment-processing service **136** may calculate a risk score based on information in a customer profile of the customer **102**, such as a prior transaction history of the customer **102**, and/or the like. In other instances, the payment-processing service **136** may additionally or alternatively calculate this risk score based on a cost of the item(s) being purchased. For example, if the cost of the item(s) is less than a threshold, the payment-processing service **136** may determine that the risk is tolerable and, thus, may front the cost of the transaction for the customer **102**. In addition or in the alternative, the payment-processing service **136** may analyze information associated with the merchant, the item being purchased, and/or the like in determining the risk. After calculating the risk score, the payment-processing service **136** may determine whether the score is greater than or less than a risk threshold. In this example, the payment-processing service **136** determines that the risk score is less than the threshold and, thus, that the risk of purchasing the item for the customer **102** is tolerable.

At “6”, the payment-processing service **136** transfers first funds from an account of the payment-processing service **136** to an account of the merchant **114** and, at “7”, the merchant **114** receives an indication of the transfer. At “8”, the customer device **104** receives an indication that the transaction is complete.

At “9”, after completing the transaction, the payment-processing service **136** sends a request to the customer device **104** to install and/or register with the P2P payment application **134**. At “10”, the customer device **104** receives the request and, at “11”, receives customer-account information from the customer. This account information may, in some instances, comprise a bank-account information, debit-card information, credit-card information, stored-value information, and/or the like. At “12”, the customer device **104** sends the customer-account information to the payment-processing service **136**.

At “13”, the payment-processing service **136** receives the customer-account information and, at “14”, associates the customer-account information with the customer profile of the customer **102**. At “15”, after receiving consent from the customer **102**, the payment-processing service **136** initiates a transfer of second funds from the customer account to the payment-processing-service account. The second funds may be equal to or otherwise based on the amount of the first funds. At “16”, the payment-processing service **136** sends an indication of the transfer of the second funds to the customer device **104**, which receives the indication at “17”.

FIGS. 4-6 are flow diagrams illustrating example processes according to some implementations. The processes of FIGS. 4-6 are illustrated as collections of blocks in logical

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flow diagrams, which represent a sequence of operations, some or all of which can be implemented in hardware, software or a combination thereof. In the context of software, the blocks can represent computer-executable instructions stored on one or more computer-readable media that, when executed by one or more processors, program the processors to perform the recited operations. Generally, computer-executable instructions include routines, programs, objects, components, data structures and the like that perform particular functions or implement particular data types. The order in which the blocks are described should not be construed as a limitation. Any number of the described blocks can be combined in any order and/or in parallel to implement the process, or alternative processes, and not all of the blocks need be executed. Further, in some examples, some or all of the operations illustrated in one or more of FIGS. 4-6 can be combined with some or all of the operations illustrated in others of FIGS. 4-6. For discussion purposes, the processes are described with reference to the environments, architectures and devices described in FIGS. 1-3 above, although the processes can be implemented in a wide variety of other environments, architectures and devices.

FIG. 4 illustrates an example process 400 that the payment-processing service 136 may implement for causing a customer device 104 to enable its payment hardware 128 for receiving payment information from a payment instrument 108 of a customer 102 for satisfying a cost of a transaction between the customer 102 and a merchant 102. While this process 400 is described as being performed by the payment-processing service 136, in some instances some or all of the operations may be performed by the customer device 104 and/or other components.

At an operation 402, the payment-processing service 136 may receive a request from a customer device to purchase an item using a communication between a hardware component of the customer device and a payment instrument of the customer. The hardware component may comprise an NFC reader that reads payment information from a contactless card, a card reader that reads payment information based on a payment instrument being swiped or dipped, or the like.

At an operation 404, the payment-processing service 136 determines whether the POS application 132 is available for use at the customer device 104. If not, then at an operation 406 the payment-processing service 136 may prompt the customer 102 to install an instance of the POS application 132 and/or register with the POS application. After the customer 102 does so, or after determining that the POS application is available for use, at an operation 408 the payment-processing service 136 may generate and/or retrieve login information associated with the merchant. At an operation 410, the payment-processing service 136 may store an association between the login information (e.g., a generated token) and the request. At an operation 412, the payment-processing service 136 sends the login information to the customer device 104.

At an operation 414, the payment-processing service 136 receives payment information that was acquired by the POS application 132 via the communication between the hardware component of the customer device 104 and the payment instrument of the customer 102. For example, the customer device 104 may have enabled the hardware component in response to receiving the login information and, thus, may have acquired the payment information from a swiped, inserted, or tapped payment instrument. At an

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operation 416, the payment-processing service 136 may attempt to authorize the transaction using the received payment information.

After attempting to authorize the payment transaction, the payment-processing service 136 may determine whether the instance of the POS application 132 stored on the customer device 104 is up-to-date. That is, the payment-processing service 136 may determine whether the version of the POS application 132 stored on the customer device is a most current version available. If not, then at an operation 420 the payment-processing service 136 may prompt the customer 102 to update the POS application 132. If the current instance is up-to-date, then the process 400 may end at an operation 422. It is to be appreciated, however, that the process 400 may, in this example, complete the payment transaction prior to requesting that the customer 102 update the POS application, this avoiding the situation where an update request interrupts a payment transaction.

FIG. 5 illustrates an example process 500 that the customer device 104 may implement in response to a customer 102 requesting to complete a transaction using the payment hardware 128 of the customer device 104. While this process 500 is described as being performed by the customer device, in some instances some or all of the operations may be performed by the payment-processing service 136 and/or other components.

At an operation 502, the customer device 104 receives a request to purchase an item from a merchant 114 using a communication between a hardware component of the customer device 104 and a payment instrument 108 of the customer. The hardware component may comprise an NFC reader that reads payment information from a contactless card, a card reader that reads payment information based on a payment instrument being swiped or dipped, or the like. At an operation 504, the customer device 504 may determine whether the POS application 132 is available for use. If not, then at an operation 506 the customer device 104 may prompt the customer 102 to install and/or register with the POS application 132. After the customer 102 does so, or after determining that the POS application 132 is available for use, at an operation 508 the customer device 104 may send an indication of the request to the payment-processing service 136 and receive, from the payment-processing service 136, login information associated with the merchant for enabling the hardware component.

At an operation 510, the customer device 104 authorizes the merchant to use the hardware component of the customer device and, at an operation 512, the customer device 104 receives the payment information via the communication between the hardware component and the payment instrument. At an operation 514, the customer device 104 sends the payment information to the payment-processing service 136, potentially along with the login information associated with the merchant. At an operation 516, after sending the payment information for completing the transaction to the payment-processing service 136, the customer device 104 may determine whether the instance of the POS application 132 stored on the customer device 104 is up-to-date. That is, the customer device 104 may determine whether the version of the POS application 132 stored on the customer device 104 is a most current version available. If not, then at an operation 518 the customer device 104 may prompt the customer 102 to update the POS application 132. If the current instance is up-to-date, then the process 500 may end at an operation 520. It is to be appreciated, however, that the process 500 may, in this example, complete the payment transaction prior to requesting that the customer 102 update

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the POS application, this avoiding the situation where an update request interrupts a payment transaction.

FIG. 6 illustrates an example process 600 that the payment-processing service 136 may implement in response to a customer 102 requesting to complete a transaction using a P2P payment application 134 prior to the customer 102 installing or registering with the application 134. While this process 600 is described as being performed by the payment-processing service 136, in some instances some or all of the operations may be performed by the customer device 104 and/or other components.

At an operation 602, the payment-processing service 136 receives, from a customer device 104, a request to purchase an item from a merchant using a mobile application configured to transfer funds between bank accounts, such as between customer accounts, between a customer account and a merchant account, and the like. At an operation 604, the payment-processing service 136 determines whether the mobile application is available for use. That is, the payment-processing service 136 may determine whether the customer device 104 has installed an instance of the mobile application (e.g., the P2P payment application 134), whether the customer 102 has registered with the mobile application (e.g., linked a bank account with the application), or the like. If the mobile application is available, then at an operation 606 the payment-processing service 136 may initiate transfer of funds from the linked customer account to the merchant account to satisfy the cost of the transaction.

If the mobile application is not available for use at the customer device 104, however, at an operation 608 the payment-processing service 136 may calculate a risk associated with the paying for the transaction on behalf of the customer 102 and determine whether this risk is less than a risk threshold. That is, the payment-processing service 136 may determine the risk of the customer 102 not reimbursing the payment-processing service 136 if the payment-processing service 136 were to pay the merchant on behalf of the customer 102 and thereafter request reimbursement. If the risk score is not tolerable, that is not less than the risk threshold, then at an operation 610 the payment-processing service 136 may decline the request to purchase the item using the mobile application.

If the risk score is tolerable, however, then at an operation 612 the payment-processing service 136 may transfer first funds from an account of the payment-processing service 136 to the merchant account to complete the transaction between the customer 102 and the merchant 114. At an operation 614, and after paying for the item on behalf of the customer 102, the payment-processing service 136 may request that the customer install and/or register with the mobile payment application. After the customer 102 does so, the payment-processing service 136 may receive customer-account information at an operation 616 and, at an operation 618, may associate the customer-account information with the instance of the mobile application installed on the customer device 104. Thus, the customer 102 may thereafter use the mobile application to transfer funds to other merchants, customers, and/or the like. In addition, after associating the customer-account information with the mobile application, at an operation 620 the payment-processing service 136 may initiate transfer of second funds from the customer account to the payment-processing-service account to reimburse the payment-processing service 136 for the payment of the first funds to the merchant account.

At an operation 622, after the payment-processing service 136 may determine whether the instance of the mobile application stored on the customer device 104 is up-to-date.

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That is, the payment-processing service 136 may determine whether the version of the mobile application stored on the customer device 104 is a most current version available. If not, then at an operation 624 the payment-processing service 136 may prompt the customer 102 to update the mobile application. If the current instance is up-to-date, then the process 600 may end at an operation 626. It is to be appreciated, however, that the process 600 may, in this example, complete the transfer of the first and second funds prior to requesting that the customer 102 update the mobile application, this avoiding the situation where an update request interrupts a payment transaction.

FIG. 7 illustrates example components of the customer device 104 that may be configured to act as a POS device, as described herein. The customer device 104 may be any suitable type of computing device, e.g., mobile, semi-mobile, semi-stationary, or stationary. Some examples of the customer device 104 may include tablet computing devices; smart phones and mobile communication devices; laptops, netbooks and other portable computers or semi-portable computers; desktop computing devices, terminal computing devices and other semi-stationary or stationary computing devices; dedicated register devices; wearable computing devices, or other body-mounted computing devices; or other computing devices capable of sending communications and performing the functions according to the techniques described herein.

In the illustrated example, the customer device 104 includes at least one processor 702, memory 704, a display 706, one or more input/output (I/O) components 708, one or more network interfaces 710, at least one card reader 712, at least one location component 714, and at least one power source 716. Each processor 702 may itself comprise one or more processors or processing cores. For example, the processor 702 can be implemented as one or more microprocessors, microcomputers, microcontrollers, digital signal processors, central processing units, state machines, logic circuitries, and/or any devices that manipulate signals based on operational instructions. In some cases, the processor 702 may be one or more hardware processors and/or logic circuits of any suitable type specifically programmed or configured to execute the algorithms and processes described herein. The processor 702 can be configured to fetch and execute computer-readable processor-executable instructions stored in the memory 704.

Depending on the configuration of the customer device 104, the memory 704 may be an example of tangible non-transitory computer storage media and may include volatile and nonvolatile memory and/or removable and non-removable media implemented in any type of technology for storage of information such as computer-readable processor-executable instructions, data structures, program modules or other data. The memory 704 may include, but is not limited to, RAM, ROM, EEPROM, flash memory, solid-state storage, magnetic disk storage, optical storage, and/or other computer-readable media technology. Further, in some cases, the customer device 104 may access external storage, such as RAID storage systems, storage arrays, network attached storage, storage area networks, cloud storage, or any other medium that can be used to store information and that can be accessed by the processor 702 directly or through another computing device or network. Accordingly, the memory 704 may be computer storage media able to store instructions, modules or components that may be executed by the processor 702. Further, when

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mentioned, non-transitory computer-readable media exclude media such as energy, carrier signals, electromagnetic waves, and signals per se.

The memory **704** may be used to store and maintain any number of functional components that are executable by the processor **702**. In some implementations, these functional components comprise instructions or programs that are executable by the processor **702** and that, when executed, implement operational logic for performing the actions and services attributed above to the customer device **104**. Functional components of the customer device **104** stored in the memory **704** may include a POS application **718**, which may be similar or the same as the POS application **132** discussed above. The POS application **718** may present an interface on the customer device **104** to enable the customer **102** and/or the merchant **114** to conduct transactions, receive payments, and so forth, as well as communicating with the payment service **136** for processing payments and sending transaction information. In addition, the memory **704** may include a P2P payment application **720**, which may be same as or similar to the P2P payment application **134** described above. Additional functional components may include an operating system **724** for controlling and managing various functions of the customer device **104** and for enabling basic user interactions with the customer device **104**. The memory **704** may also store transaction information/data **722** that is received based on the customer and/or merchant engaging in various transactions, such as the transactions discussed above.

In addition, the memory **704** may also store data, data structures and the like, that are used by the functional components. For example, this data may include item information that includes information about the items offered by the merchant, which may include images of the items, descriptions of the items, prices of the items, and so forth. Depending on the type of the customer device **104**, the memory **704** may also optionally include other functional components and data, which may include programs, drivers, etc., and the data used or generated by the functional components. Further, the customer device **104** may include many other logical, programmatic and physical components, of which those described are merely examples that are related to the discussion herein.

The network interface(s) **710** may include one or more interfaces and hardware components for enabling communication with various other devices over the network or directly. For example, network interface(s) **710** may enable communication through one or more of the Internet, cable networks, cellular networks, wireless networks (e.g., Wi-Fi) and wired networks, as well as close-range communications such as Bluetooth®, Bluetooth® low energy, and the like, as additionally enumerated elsewhere herein.

FIG. 7 further illustrates that the customer device **104** may include the display **706** mentioned above. Depending on the type of computing device used as the customer device **104**, the display **706** may employ any suitable display technology. For example, the display **706** may be a liquid crystal display, a plasma display, a light emitting diode display, an OLED (organic light-emitting diode) display, an electronic paper display, or any other suitable type of display able to present digital content thereon. In some examples, the display **706** may have a touch sensor associated with the display **706** to provide a touchscreen display configured to receive touch inputs for enabling interaction with a graphic interface presented on the display **706**. Accordingly, implementations herein are not limited to any particular display technology.

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Alternatively, in some examples, the customer device **104** may not include the display **706**, and information may be presented by other means, such as aurally.

The I/O components **708**, meanwhile, may include speakers, a microphone, a camera, various user controls (e.g., buttons, a joystick, a keyboard, a keypad, etc.), and/or a haptic output device, and so forth.

In addition, the customer device **104** may include or may be connectable to one or payment instrument reader **712**, which may be same or similar as the payment hardware **128** discussed above. In some examples, the reader **712** may comprise an NFC reader integral with or communicatively coupled to the customer device **104** may plug in to a port in the merchant device, such as a microphone/headphone port, a data port, or other suitable port. In other instances, the reader **712** is integral with the entire customer device **104**. The reader may include a read head for reading a magnetic strip of a payment card, and further may include encryption technology for encrypting the information read from the magnetic strip. Alternatively, numerous other types of card readers may be employed with the POS devices **700** herein, depending on the type and configuration of a particular Customer device **104**.

The location component **714** may include a GPS device able to indicate location information, or the location component **714** may comprise any other location-based sensor. The customer device **700** may also include one or more additional sensors (not shown), such as an accelerometer, gyroscope, compass, proximity sensor, and the like. Additionally, the customer device **700** may include various other components that are not shown, examples of which include removable storage, a power control unit, and so forth.

Various instructions, methods and techniques described herein can be considered in the general context of computer-executable instructions, such as program modules stored on computer-readable media, and executed by the processor(s) herein. Generally, program modules include routines, programs, objects, components, data structures, etc., for performing particular tasks or implementing particular abstract data types. These program modules, and the like, can be executed as native code or can be downloaded and executed, such as in a virtual machine or other just-in-time compilation execution environment. Typically, the functionality of the program modules can be combined or distributed as desired in various implementations. An implementation of these modules and techniques can be stored on computer storage media or transmitted across some form of communication media.

Furthermore, the foregoing is merely illustrative of the principles of this disclosure and various modifications can be made by those skilled in the art without departing from the scope of this disclosure. The above described examples are presented for purposes of illustration and not of limitation. The present disclosure also can take many forms other than those explicitly described herein. Accordingly, it is emphasized that this disclosure is not limited to the explicitly disclosed methods, systems, and apparatuses, but is intended to include variations to and modifications thereof, which are within the spirit of the following claims.

As a further example, variations of apparatus or process parameters (e.g., dimensions, configurations, components, process step order, etc.) can be made to further optimize the provided structures, devices and methods, as shown and described herein. In any event, the structures and devices, as well as the associated methods, described herein have many applications. Therefore, the disclosed subject matter should not be limited to any single example described herein, but

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rather should be construed in breadth and scope in accordance with the appended claims.

What is claimed is:

1. A method comprising:
 - determining that a customer device does not store a point-of-sale (POS) application;
 - prompting a customer associated with the customer device to acquire the POS application at least partly in response to the determining that the customer device does not store the POS application;
 - detecting, by code on the customer device, while the code is being executed by a merchant-provided application displaying an ecommerce page of a merchant, that the a point-of-sale (POS) application is installed on the customer device, the POS application being associated with a payment processing service (PPS);
 - displaying, by the code, on the ecommerce page of the merchant-provided application and based on the detecting, an indication that the POS application is available for use to complete a payment for a purchase of an item from the merchant;
 - receiving, by the code, a selection of the indication to complete the payment for the purchase of the item using the POS application;
 - sending, by the code, an indication of the selection to the POS application;
 - receiving, by the POS application and from the code, the indication of the selection;
 - receiving, by the POS application and from a server computing device of the PPS, login information of the merchant;
 - authorizing, by the POS application and using the login information, the merchant to use near-field-communication (NFC) payment hardware of the customer device to receive payment information from a contactless credit card of the customer;
 - receiving, by the POS application, from the contactless credit card, and via the NFC payment hardware in response to the contactless credit card being moved within a threshold proximity of the NFC payment hardware, the payment information for satisfying the payment for the purchase of the item; and
 - sending, by the POS application, the payment information to the PPS, the PPS being configured to finalize the purchase of the item on behalf of the merchant.
2. The method as recited in claim 1, wherein the NFC payment hardware comprises a NFC reader.
3. The method as recited in claim 1, wherein:
 - the login information of the merchant comprises a token generated by the PPS; and
 - the token is configured to authorize the merchant to use the NFC payment hardware of the customer device for a specified amount of time.
4. The method as recited in claim 1, wherein the login information of the merchant further comprises a username and password associated with an account of the merchant at the PPS.
5. The method as recited in claim 1, wherein the login information of the merchant comprises a token generated by the PPS, and further comprising:
 - sending the token to the PPS with the payment information for authorizing the purchase of the item, the PPS using the token to identify at least one of the merchant or a transaction associated with the purchase of the item.

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6. The method as recited in claim 1, wherein the login information of the merchant comprises a token generated by the PPS, and further comprising:

- sending one or more transaction details associated with the purchase of the item to the PPS, the PPS configured to associate the token with the one or more transaction details.

7. A system comprising:

- one or more processors; and
- one or more computer-readable media storing computer-executable instructions that, when executed, cause the one or more processors to perform acts comprising:
 - determining that a customer device does not store a point-of-sale (POS) application;
 - prompting a customer associated with the customer device to acquire the POS application at least partly in response to the determining that the customer device does not store the POS application;
 - detecting, via code on the customer device, while the code is being executed by a merchant-provided application displaying an ecommerce page of a merchant, that the POS application is installed on the customer device, the POS application being associated with a payment processing service (PPS);
 - displaying, via the code, on the ecommerce page of the merchant-provided application and based on the detecting, an indication that the POS application is available for use to complete a payment for a purchase of an item from the merchant;
 - receiving, via the code, a selection of the indication to complete the payment for the purchase of the item using the POS application;
 - sending, via the code, an indication of the selection to the POS application;
 - receiving, via the POS application and from the code, the indication of the selection;
 - receiving, via the POS application and from a server computing device of the PPS, login information of the merchant;
 - authorizing, via the POS application and using the login information, the merchant to use near-field-communication (NFC) payment hardware of the customer device to receive payment information from a contactless credit card of the customer;
 - receiving, via the POS application, from the contactless credit card, and via the NFC payment hardware in response to the contactless credit card being moved within a threshold proximity of the NFC payment hardware, the payment information for satisfying the payment for the purchase of the item; and
 - sending, via the POS application, the payment information to the PPS, the PPS being configured to finalize the purchase of the item on behalf of the merchant.
8. The system as recited in claim 7, wherein the NFC payment hardware comprises a NFC reader.
9. The system as recited in claim 7, wherein:
 - the login information of the merchant comprises a token generated by the PPS; and
 - the token is configured to authorize the merchant to use the NFC payment hardware of the customer device for a specified amount of time.
10. The system as recited in claim 7, wherein the login information of the merchant further comprises a username and password associated with an account of the merchant at the PPS.

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11. The system as recited in claim 7, wherein the login information of the merchant comprises a token generated by the PPS, and the acts further comprising:

5 sending the token to the PPS with the payment information for authorizing the purchase of the item, the PPS using the token to identify at least one of the merchant or a transaction associated with the purchase of the item.

12. The system as recited in claim 7, wherein the login information of the merchant comprises a token generated by the PPS, and the acts further comprising:

15 sending one or more transaction details associated with the purchase of the item to the PPS, the PPS configured to associate the token with the one or more transaction details.

13. One or more non-transitory computer-readable media storing computer-executable instructions that, when executed, cause one or more processors to perform acts comprising:

20 determining that a customer device does not store a point-of-sale (POS) application;

prompting a customer associated with the customer device to acquire the POS application at least partly in response to the determining that the customer device does not store the POS application;

25 detecting, via code on the customer device, while the code is being executed by a merchant-provided application displaying an ecommerce page of a merchant, that the POS application is installed on the customer device, the POS application being associated with a payment processing service (PPS);

30 displaying, via the code, on the ecommerce page of the merchant-provided application and based on the detecting, an indication that the POS application is available for use to complete a payment for a purchase of an item from the merchant;

35 receiving, via the code, a selection of the indication to complete the payment for the purchase of the item using the POS application;

40 sending, via the code, an indication of the selection to the POS application;

receiving, via the POS application and from the code, the indication of the selection;

45 receiving, via the POS application and from a server computing device of the PPS, login information of the merchant;

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authorizing, via the POS application and using the login information, the merchant to use near-field-communication (NFC) payment hardware of the customer device to receive payment information from a contactless credit card of the customer;

receiving, via the POS application, from the contactless credit card, and via the NFC payment hardware in response to the contactless credit card being moved within a threshold proximity of the NFC payment hardware, the payment information for satisfying the payment for the purchase of the item; and

sending, via the POS application, the payment information to the PPS, the PPS being configured to finalize the purchase of the item on behalf of the merchant.

14. The one or more non-transitory computer-readable media as recited in claim 13, wherein the NFC payment hardware comprises a NFC reader.

15. The one or more non-transitory computer-readable media as recited in claim 13, wherein:

the login information of the merchant comprises a token generated by the PPS; and

the token is configured to authorize the merchant to use the NFC payment hardware of the customer device for a specified amount of time.

16. The one or more non-transitory computer-readable media as recited in claim 13, wherein the login information of the merchant further comprises a username and password associated with an account of the merchant at the PPS.

17. The one or more non-transitory computer-readable media as recited in claim 13, wherein the login information of the merchant comprises a token generated by the PPS, and the acts further comprising:

35 sending the token to the PPS with the payment information for authorizing the purchase of the item, the PPS using the token to identify at least one of the merchant or a transaction associated with the purchase of the item.

18. The one or more non-transitory computer-readable media as recited in claim 13, wherein the login information of the merchant comprises a token generated by the PPS, and the acts further comprising:

40 sending one or more transaction details associated with the purchase of the item to the PPS, the PPS configured to associate the token with the one or more transaction details.

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