

TITLE

METHOD AND SYSTEM FOR PROCESSING SMART QR CODE TRANSACTIONS

TECHNICAL FIELD

[0001] A method and system for processing smart QR codes with a transit payment system.

SUMMARY

[0002] In one aspect, the present disclosure provides a method for processing a transit transaction, the method comprising: receiving, by a payment processing server, a first transaction authorization request, wherein the first transaction authorization request is initiated based on a first smart QR code with a transit payment system, wherein the first transaction authorization request comprises a payment token and a first transaction information associated with a first location in a transit infrastructure system; determining, by the payment processing server, a payment account associated with the payment token; determining, by the payment processing server, an issuer system associated with the payment account; transmitting, by the payment processing server, the first transaction authorization request to the issuer system; receiving, by the payment processing server, a first authorization response from the issuer system, wherein the first authorization response is associated with the first transaction information; and transmitting, by the payment processing server, the first authorization response to the transit payment system, wherein the transit payment system is configured to grant access to a user of a user device to enter the transit infrastructure system based on the first authorization response.

[0003] In another aspect, the present disclosure provides a method for processing a transaction with a smart QR code, the method comprising: receiving, by a payment processing server, a first transaction authorization request, wherein the first transaction authorization request is initiated based on a first smart QR code with a transit payment system, and wherein the first transaction authorization request comprises a payment token and a first transaction information associated with a first location in a transit infrastructure system; transmitting, by the payment processing server, the first transaction authorization request to an issuer system associated with a payment account, wherein the payment account is associated with the payment token; receiving, by the payment processing server, a first authorization response from the issuer system, wherein the first authorization response is associated with the first transaction information; transmitting, by the payment processing server, the first authorization response to an acquirer system associated with the transit payment system; receiving, by the payment processing server, a second transaction

authorization request, wherein the second transaction authorization request is initiated based on a second smart QR code with the transit payment system, wherein the second transaction authorization request comprises the payment token and a second transaction information associated with a second location; transmitting, by the payment processing server, the second transaction authorization request to the issuer system associated with the payment account, wherein the payment account is associated with the payment token; receiving, by the payment processing server, a second authorization response from the issuer system, wherein the second authorization response is associated with the second transaction information; and transmitting, by the payment processing server, the second authorization response to the acquirer system associated with the transit payment system, wherein the transit payment system is configured to grant access to a user of a user device to exit the transit infrastructure system based on the second authorization response.

[0004] In yet another aspect, the present disclosure provides a transit payment system comprising: a fare collection server; a first payment gateway of a plurality of payment gateways; a second payment gateway of a plurality of payment gateways; the fare collection server is communicably couples to the first payment gateway and the second payment gateway, wherein the fare collection server is configured to: receive a first transaction authorization request, wherein the first transaction authorization request is initiated based on a first smart QR code with the first payment gateway, and wherein the first transaction authorization request comprises a payment token and a first transaction information associated with a first location in a transit infrastructure system; transmit the first transaction authorization request to an issuer system associated with a payment account, wherein the payment account is associated with the payment token; receive a first authorization response, wherein the first authorization response is associated with the first transaction information; transmit the first authorization response to the first payment gateway based on the first authorization response; receive a second transaction authorization request, wherein the second transaction authorization request is initiated based on a second smart QR code with the second payment gateway, wherein the second transaction authorization request comprises the payment token and a second transaction information associated with a second location; and transmit the second transaction authorization request to the issuer system associated with the payment account, wherein the payment account is associated with the payment token; receive a second authorization response from the issuer system, wherein the second authorization response is associated with the second transaction information; and transmit the second authorization response to the second payment gateway based on the second authorization response.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] In the description, for purposes of explanation and not limitation, specific details are set forth, such as particular aspects, procedures, techniques, etc. to provide a thorough understanding of the present technology. However, it will be apparent to one skilled in the art that the present technology may be practiced in other aspects that depart from these specific details.

[0006] The accompanying drawings, where like reference numerals refer to identical or functionally similar elements throughout the separate views, together with the detailed description below, are incorporated in and form part of the specification, and serve to further illustrate aspects of concepts that include the claimed disclosure and explain various principles and advantages of those aspects.

[0007] The systems and methods disclosed herein have been represented where appropriate by conventional symbols in the drawings, showing only those specific details that are pertinent to understanding the various aspects of the present disclosure so as not to obscure the disclosure with details that will be readily apparent to those of ordinary skill in the art having the benefit of the description herein.

[0008] FIG. 1 shows a payment processing system comprising a user device, transit payment system, an acquirer server, an issuer server, and a payment processing server, according to at least one aspect of the present disclosure.

[0009] FIG. 2 shows a payment processing system comprising a first payment gateway and second payment gateway configured to communicate with the fare collection server, according to at least one aspect of the present disclosure.

[0010] FIG. 3 shows a payment processing system comprising a first payment gateway and second payment gateway configured to communicate with the fare collection server, according to at least one aspect of the present disclosure.

[0011] FIG. 4 shows a logic flow diagram for accessing a transit infrastructure system by authorizing a first payment account at a first payment gateway, according to at least one aspect of the present disclosure.

[0012] FIG. 5 shows a logic flow diagram for exiting a transit infrastructure system at a second payment gateway, according to at least one aspect of the present disclosure.

[0013] FIG. 7 is a block diagram of a computer apparatus with data processing subsystems or components, according to at least one aspect of the present disclosure.

[0014] FIG. 8 is a diagrammatic representation of an example system that includes a host machine within which a set of instructions to perform any one or more of the methodologies discussed herein may be executed, according to at least one aspect of the present disclosure.

DESCRIPTION

[0015] The following disclosure may provide exemplary systems, devices, and methods for conducting a financial transaction and related activities. Although reference may be made to such financial transactions in the examples provided below, aspects are not so limited. That is, the systems, methods, and apparatuses may be utilized for any suitable purpose.

[0016] Before discussing specific embodiments, aspects, or examples, some descriptions of terms used herein are provided below.

[0017] An “application” may include any software module configured to perform a specific function or functions when executed by a processor of a computer. For example, a “mobile application” may include a software module that is configured to be operated by a mobile device. Applications may be configured to perform many different functions. For instance, a “payment application” may include a software module that is configured to store and provide account credentials for a transaction. A “wallet application” may include a software module with similar functionality to a payment application that has multiple accounts provisioned or enrolled such that they are usable through the wallet application. An “application” may be computer code or other data stored on a computer readable medium (e.g., memory element or secure element) that may be executable by a processor to complete a task.

[0018] An “acquirer” may refer to an entity licensed by the payment network service provider and/or approved by the payment network service provider to originate transactions (e.g., payment transactions) using a computing device associated with the payment network service provider. The acquirer may also refer to one or more computer systems operated by or on behalf of an acquirer, such as a server computer executing one or more software applications (e.g., “acquirer server”, “acquirer system”). An “acquirer” may be a merchant bank, or in some cases, the merchant system may be the acquirer. The acquirer may contract with payment facilitators to enable the facilitators to sponsor merchants. The acquirer may monitor compliance of the payment facilitators in accordance with regulations of the transaction service provider. The acquirer may conduct due diligence of payment facilitators and ensure that proper due diligence occurs before signing a sponsored merchant. The “acquirer” is typically a business entity (e.g., a commercial bank) that has a

business relationship with a particular merchant or other entity. Some entities can perform both issuer and acquirer functions. Some embodiments or aspects may encompass such single entity issuer-acquirers.

[0019] As used herein, an “electronic wallet,” “digital wallet” or “mobile wallet” can store user profile information, payment information (including tokens), bank account information, and/or the like and can be used in a variety of transactions, such as but not limited to eCommerce, social networks, money transfer/personal payments, mobile commerce, proximity payments, gaming, and/or the like for retail purchases, digital goods purchases, utility payments, purchasing games or gaming credits from gaming websites, transferring funds between users, and/or the like.

[0020] As used herein, the terms “electronic wallet,” “electronic wallet mobile application,” and “digital wallet” may refer to one or more electronic devices and/or one or more software applications configured to initiate and/or conduct transactions (e.g., payment transactions, electronic payment transactions, and/or the like). For example, an electronic wallet may include a user device (e.g., a mobile device, smart watch) executing an application program and server-side software and/or databases for maintaining and providing transaction data to the user device.

[0021] As used herein, the term “electronic wallet provider” may include an entity that provides and/or maintains an electronic wallet and/or an electronic wallet mobile application for a user (e.g., a customer). Examples of an electronic wallet provider include, but are not limited to, Google Wallet™, Android Pay®, Apple Pay®, and Samsung Pay®, and/or other like electronic payment systems. In some non-limiting examples, a financial institution (e.g., an issuer institution) may be an electronic wallet provider. As used herein, the term “electronic wallet provider system” may refer to one or more computer systems, computer devices, servers, groups of servers, and/or the like operated by or on behalf of an electronic wallet provider.

[0022] The electronic wallet provider may provide standalone user-facing software applications that store account numbers, or representations of the account numbers (e.g., payment tokens), on behalf of a cardholder (or other user) to facilitate payments at more than one unrelated merchant, perform person-to-person payments, or load financial value into the electronic wallet or digital wallet. An electronic wallet provider may enable a user to access its account via a personal computer, mobile device or access device. Additionally, an electronic wallet provider may also provide one or more of the following functions: storing multiple payment cards and other payment products on behalf of a user, storing other

information including billing address, shipping addresses, and transaction history, initiating a transaction by one or more methods, such as providing a user name and password, NFC or a physical token, and may facilitate pass-through or two-step transactions.

[0023] As used herein, the term “electronic wallet transaction processing system” may refer to one or more electronic devices and/or software applications configured to process and/or a request to authenticate a user for a transaction initiated and/or conducted by an electronic wallet application. For example, an electronic wallet transaction processing system may include server-side software and/or databases for maintaining and providing transaction data and/or account data to a merchant system and/or a payment gateway system for processing and/or authenticating a user for an electronic wallet transaction. An “electronic wallet transaction processing system provider” may include an entity that provides and/or maintains an electronic wallet transaction processing system, such as Visa Checkout, Mastercard MasterPass™, PayPal Checkout, and/or other like electronic wallet transaction processing system providers. In some non-limiting examples, a transaction service provider system may be an electronic wallet transaction processing system.

[0024] The terms “issuer system,” “issuer,” or “issuer bank” may refer to one or more entities that provide one or more accounts (e.g., a credit account, a debit account, a credit card account, a debit card account, and/or the like) to a user (e.g., customer, consumer, and/or the like) for conducting transactions (e.g., payment transactions), such as initiating credit and/or debit payments. For example, an issuer may provide an account identifier, such as a personal account number (PAN), to a user that uniquely identifies one or more accounts associated with the user. The account identifier may be used by the user to conduct a payment transaction. The account identifier may be embodied on a portable financial device, such as a physical financial instrument, e.g., a payment card, and/or may be electronic and used for electronic payments. In some non-limiting embodiments or aspects, an issuer may be associated with a bank identification number (BIN) that uniquely identifies the issuer. As used herein “issuer system” or “issuer institution system” may refer to one or more computing systems or servers operated by or operated on behalf of an issuer. For example, an issuer system may refer to a server executing one or more software applications associated with the issuer. In some non-limiting embodiments or aspects, an issuer system may include one or more servers (e.g., one or more authorization servers) for authorizing a payment transaction.

[0025] As used herein, the term “merchant” may refer to one or more individuals or entities (e.g., operators of retail businesses that provide goods and/or services, and/or access to goods and/or services, to a user (e.g., a customer, a consumer, a customer of the

merchant, and/or the like) based on a transaction (e.g., a payment transaction)). As used herein “merchant system” may refer to one or more computer systems operated by or on behalf of a merchant, such as a server computer executing one or more software applications.

[0026] As used herein, a “user device” or “mobile device” may comprise any electronic device that may be transported and operated by a user or customer, which may also provide remote communication capabilities to a network. Examples of remote communication capabilities include using a mobile phone (wireless) network, wireless data network (e.g., 3G, 4G or similar networks), Wi-Fi, Wi-Max, or any other communication medium that may provide access to a network such as the Internet or a private network. Examples of mobile devices include mobile phones (e.g., cellular phones), PDAs, tablet computers, net books, laptop computers, personal music players, hand-held specialized readers, etc. Further examples of mobile devices include wearable devices, such as smart watches, fitness bands, ankle bracelets, rings, earrings, etc., as well as automobiles with remote communication capabilities. A mobile device may comprise any suitable hardware and software for performing such functions, and may also include multiple devices or components (e.g., when a device has remote access to a network by tethering to another device—e.g., using the other device as a modem—both devices taken together may be considered a single mobile device). A detailed description of an exemplary mobile device is provided below.

[0027] A “payment network” may refer to an electronic payment system used to accept, transmit, or process transactions made by payment devices for money, goods, or services. The payment network may transfer information and funds among issuers, acquirers, merchants, and payment device users. One illustrative non-limiting example of a payment network is VisaNet, which is operated by Visa, Inc.

[0028] The terms “payment gateway”, “point-of-sale system,” “POS system,” or “POS terminal,” as used herein, may refer to one or more computers and/or peripheral devices used by a merchant to engage in payment transactions with customers, including one or more card readers, near-field communication (NFC) receivers, radio-frequency identification (RFID) receivers, QR code reader, and/or other contactless transceivers or receivers, contact-based receivers, payment terminals, computers, servers, input devices, and/or other like devices that can be used to initiate a payment transaction. A payment gateway may be located proximal to a user, such as at a physical store location, or a payment gateway may be remote from the user, such as a server interacting with a user browsing on their personal computer.

[0029] A “real account identifier” may refer to an original account identifier associated with an account. For example, a real account identifier may be a primary account number (PAN) issued by an issuer for a card account (e.g., credit card, debit card, etc.). For instance, in some embodiments, a real account identifier may include a sixteen-digit numerical value such as “4147 0900 0000 1234.” The first six digits of the real account identifier (e.g., “414709”), may represent a real issuer identifier (BIN) that may identify an issuer associated with the real account identifier.

[0030] A “server” or “server computer” may typically be a computer or cluster of computers. For example, the server computer can be a large mainframe, a minicomputer cluster, or a group of servers functioning as a unit. The server computer may be associated with an entity such as a payment processing network, a wallet provider, a merchant, an authentication cloud, an acquirer or an issuer. In one example, the server computer may be a database server coupled to a Web server. The server computer may be coupled to a database and may include any hardware, software, other logic, or combination of the preceding for servicing the requests from one or more client computers. The server computer may comprise one or more computational apparatuses and may use any of a variety of computing structures, arrangements, and compilations for servicing the requests from one or more client computers. In some embodiments or aspects, the server computer may provide and/or support payment network cloud service.

[0031] “Tokenization” may refer to a process by which data is replaced with substitute data. For example, an account identifier (e.g., a primary account number (PAN)) may be tokenized by replacing the account identifier with a substitute number (e.g., a token) that is associated with the account identifier. Further, tokenization may be applied to other information which may be replaced with a substitute value. Tokenization may be used to enhance transaction efficiency, improve transaction security, increase service transparency, or to provide a method for third-party enablement.

[0032] A “token service provider” may refer to an entity including one or more server computers that generates, processes, and/or maintains tokens. A token service provider may include or be in communication with a token vault where the generated tokens are stored. Specifically, the token vault may maintain one-to-one mapping between a token and the data (e.g., a real account identifier) represented by the token. A token service provider may provide reports or data output to reporting tools regarding approved, pending, and/or declined token requests. The token service provider may provide data output related to token-based transactions to reporting tools and applications and present the token and/or the data substituted by the token (e.g., real account identifiers) as appropriate in the

reporting output.

[0033] A “transaction” may be any interaction or exchange between two or more parties. For example, a transaction may include a first entity requesting resources from a second entity. In this example, the transaction is completed when the resources are either provided to the first entity or the transaction is declined.

[0034] In various aspects, the present disclosure describes a method and system for processing and facilitating payment transactions through a smart QR code, with a transit payment system. The smart QR code reduces the overall time that the users spend engaging with a transit payment system and expedites the entry and exit process in a transit infrastructure system by utilizing an existing user payment method or account. In one example, payment with a smart QR code reduces the wait time at entry and exit points by removing the need to replenish a depleted account balances for a specific transit system. Additionally, the smart QR code allows a user to pay for a transit fare with an existing payment account rather than a specific payment account for a transit payment system.

[0035] In one example, time delays may be created when a transit rider (e.g., user) approaches a transit entry point only to discover that they do not have a special payment device for the payment system (e.g., metro card, metro pass). The user may stop to look for their payment device and which can create delays by impeding the flow of other users from entering the transit location. In various aspects, the present disclosure provides a payment through a user device. In many instances, a user does not leave home with a user device unlike a transit payment device that maybe left at a home or office.

[0036] In various aspect, the present disclosure describes a transit payment system that does not require a user (e.g., rider, driver) to pre-fund a transit account and does not tie-up user funds that can only be used with specific transit payment systems. In traditional transit payment systems, a user must pre-fund an account with a minimum balance regardless of the frequency that they used the transit infrastructure system. A user may rarely uses the transit system but must still maintains a balance on the transit account. Additionally, the traditional transit payment systems require a minimum balance to be added once the account drops below a predetermined amount.

[0037] In another example, it may be difficult for a user on vacation in a foreign city to determine how much money is needed to pre-fund a transit account. If the user overfunds the transmit account, the remaining unused portion may not be refundable and results in the loss of the remaining balance. In contrast to a traditional transit payment system, the present

disclosure provides a system that allows a rider to directly pay for a transit fare from an existing payment account with a smart QR code that transmits the user's tokenized payment information.

[0038] In various aspects, a user of a transit infrastructure system (e.g., subway system, metro railway system, interstate highway system, etc.) may enter and exit the transit infrastructure system by scanning a QR code and submitting a tokenized payment method through the payment gateways of a transit payment system. The user may display the QR code on a smart watch or smartphone that comprises a payment service provider (PSP) application (e.g., apple pay, google pay, e-wallet). In various aspects, the PSP application may be configured to use a first payment account as a default account and a secondary payment account as a back-up account.

[0039] A user accesses the PSP application to establish access to a transit infrastructure system, through a first payment gateway. The PSP application is in communication with a token service provider and generates a tokenized PAN that is representative of payment account information. The tokenized PAN may be communicated to a fare collection server through the QR code or a short-range wireless communication protocol (e.g., Wi-fi, RFID, near field communication, etc.). A payment gateway receives the payment information from the user device and transmits this information to a fare collection. The fare collection server may authorize a maximum fare amount based on a maximum possible fare. The authorization of the maximum fare amount, ensures that the initially submitted payment method will be authorized for an actual fare amount but the actual fare amount is not known until the user reaches their destination and exits the transit infrastructure system. Although the maximum fare amount is authorized, the final amount charged to the user is the actual fare amount.

[0040] FIG. 1 shows a payment processing system 100 comprising a user device 114, transit payment system 120, an acquirer system 106, an issuer system 104, and a payment processing server 102, according to at least one aspect of the present disclosure. The transit payment system 120 further comprises a first payment gateway 110, a second payment gateway 112, and a fare collection server 108. In various aspects, a user associated with the user device 114 accesses the PSP application on their user device 114, makes a selection to generate a one-time QR code, and initiates a transaction at a first payment gateway 110 comprising a QR code reader at a first location 116. The QR code reader scans a first QR code, receives tokenized payment information from the PSP application and may grant access to the user for a transit infrastructure system. Once the user reaches a destination within transit infrastructure system, such as a stop or an exit, the user can exit the transit

infrastructure system by scanning a second QR code with a code reader of a second payment gateway 112. The second payment gateway 112 transmits the tokenized payment information to the fare collection server 108, where the fare collection server 108 determines that final fare amount based on the location 116 of the first payment gateway 110 and the location 118 second payment gateway 112. In various aspects, the first payment gateway 110 and the second payment gateway 112 may grant access to the user based on the authorization of an actual payment amount and a maximum payment amount.

[0041] FIG. 2 shows a payment processing system 200 comprising a first payment gateway 210 and second payment gateway 212 configured to communicate with the fare collection server 108, according to at least one aspect of the present disclosure. The payment processing system 200 comprising the first payment gateway 210, the second payment gateway 212, the fare collection server 108, a user device 114, an acquirer system 106, an issuer system 104, and a payment processing server 102. A user enters a transit infrastructure system by scanning a QR code on their user device 114 on a code reader 216 of the first payment gateway 210. The first payment gateway 210 transmit the transaction information to the fare collection server 108 and grants access to the user based on a response from the fare collection server 108. The first payment gateway 210 may electronically open a gate to allow the user to enter the transit infrastructure system. The user may exit the transit infrastructure system by scanning a QR code on their user device 114 on a code reader 218 of the second payment gateway 212. The second payment gateway 212 transmits the transaction information to the fare collection server 108 and grants access to the user based on a response from the fare collection server 108. The second payment gateway 212 may electronically open a gate to allow the user to exit the transit infrastructure system.

[0042] FIG. 3 shows a payment processing system 300 comprising a first payment gateway 310 and second payment gateway 312 configured to communicate with the fare collection server 108, according to at least one aspect of the present disclosure. The payment processing system 300 comprising the first payment gateway 310, the second payment gateway 312, the fare collection server 108, a user device 114, an acquirer system 106, an issuer system 104, and a payment processing server 102. A user enters a transit infrastructure system and a code scanner of a first payment gateway 310 identifies and scans a QR code displayed on a user device 114. The first payment gateway 310 transmits the transaction information to the fare collection server 108 for the purposes of calculating the actual fare amount. The fare amount may be charged to a payment account associated with the QR code based on the location that the user exits the transit infrastructure system.

When the user exits the transit infrastructure system, the second payment gateway 312 may scan a QR code on the user device 114 and automatically charge the payment account associated with the QR code. In one example, the user may not need to be directly proximate to the first payment gateway 310 and the second payment gateway 312 to read and scan the QR codes. The user may receive feedback from the fare collection system 108 to indicate that the QR code was scanned by the first payment gateway 310 and the second payment gateway 312. The feedback can be in the form of any suitable notification including a displayed message on the user device or the first payment gateway 310 and the second payment gateway 312.

[0043] FIG. 4 shows a logic flow diagram for accessing a transit infrastructure system by authorizing a first payment account at a first payment gateway 110, 210, 310, according to at least systems 100, 200, and 300 of the present disclosure. The user accesses the payment service provider application on their user device 114 and selects that their payment information is displayed as a smart QR code. The user presents 402 the smart QR code displayed on their user device 114 to the code reader of the first payment gateway 110. The code reader scans the QR code and the first payment gateway 110, 210, 310 transmits 404 the tokenized payment information along with transit information for the entry location, to the fare collection server 108. The fare collection server 108 may comprise a database that creates a user entry when a user enters the transit system at a first payment gateway. The fare collection server 108 may use the tokenized payment information to determine an existing entry associated with the user. The user entry in the database may indicate the time of access and the location of the first payment gateway 110, 210, 310 in the transit system. The user entry may also indicate a maximum fare that may be collected based on the location of the first payment gateway 110, 210, 310 in the transit system. The maximum fare may be determined based on specific direction of the transit route and/or may be based on any exit point of the transit system from the location of the first payment gateway 110, 210, 310. In one example, if there are only three stops remaining on a south bound transit route, the maximum fare would be determined by the last fare on the transit route. The maximum fare may also be assigned as a predetermined amount for all payment gateways in the transit system.

[0044] Once the fare collection server 108 creates or updates the user entry for the first payment gateway 110, 210, 310, the fare collection server 108 transmits 406 a transaction authorization request to the acquirer system 106. The transaction authorization request comprises the tokenized payment information and the maximum fare amount. The acquirer system 106 determines a payment processing server 102 associated with the tokenized

payment information and forwards 408 the transaction authorization request to the payment processing server 102. The payment processing server determines the actual PAN associated with the tokenization payment information from a tokenization service. Once the payment processing server 102 determines the actual PAN of the user account, the payment processing server 102 forwards the transaction authorization request to the issuer system 104 associated with the user account. The issuer system 104 determines a first authorization response and transmits an authorization response to 412 the payment processing server 102. The payment processing server 102 forwards 414 the first authorization response to the acquirer system 106, and the acquirer system 106 forwards 416 the first authorization response to the fare collection server 108.

[0045] The fare collection server 108 updates the user entry in the database based on the authorization response by the issuer system 104. The fare collection server 108 transmits 418 an access granted message to the first payment gateway 110, 210, 310 based on the first authorized response from issuer system 104. The first payment gateway 110, 210, 310 indicates 420 that the user is granted access to the transit system through an access indicator such as a light or physical gate. Alternatively, an access denied indication may be displayed if the authorization is declined. Although the fare collection server 108 submitted an authorization for a maximum fare amount, only the actual fare amount will be charged to the user's account based the user's exit location.

[0046] FIG. 5 shows a logic flow diagram for exiting a transit infrastructure system at a second payment gateway 112, 212, 312, according to at least systems 100, 200, and 300 of the present disclosure. After the user enters the transit infrastructure system and reaches their destination, the user may exit the transit infrastructure system at a second payment gateway 112, 212, 312. The user again accesses the PSP application on their user device 114 and selects that their payment information is displayed as a smart QR code. The user scans 502 the second QR code displayed on their user device 114 on the code reader of the second payment gateway 112, 212, 312. The second payment gateway 112, 212, 312 transmits 504 the tokenized payment information along with transit information for the exit location, to the fare collection server 108. The fare collection server 108 accesses the user entry in the database to determine the entry location and the actual fare amount.

[0047] The fare collection server 108 transmits 506 a second transaction authorization request to the acquirer system 106. The second transaction authorization request comprises the tokenized payment information and the actual fare amount. The acquirer system 106 determines a payment processing server 102 associated with the tokenized payment information and forwards 508 the transaction authorization request to the payment

processing server 102. The payment processing server determines the actual PAN associated with the tokenization payment information from a tokenization service. Once the payment processing server 102 determines the actual PAN of the user account, the payment processing server 102 forwards 510 the second transaction authorization request to the issuer system 104 associated with the user account. The issuer system 104 determines a second authorization response and transmits 512 a second authorization response to the payment processing server 102. The payment processing server 102 forwards 514 the second authorization response to the acquirer system 106, and the acquirer system 106 forwards 516 the second authorization response for the transaction to the fare collection server 108. The fare collection server 108 determines that the user's payment information was authorized by the issuer system 104 and received by the acquirer system 106. The fare collection server 108 transmits 518 an access granted message to the second payment gateway 112, 212, 312 based on the second authorized response from issuer system 104. The second payment gateway 112, 212, 312 indicates 520 that the user is granted access to exit the transit system through an access indicator such as a light or physical gate. Alternatively, an access denied indication may be displayed if the authorization is declined. The fare collection server 108 disregards the first authorization response for a maximum fare amount and only submits the second authorization response as a clearing draft, for the actual fare amount.

[0048] FIG. 6 is a block diagram of a computer apparatus 800 with data processing subsystems or components, according to at least one aspect of the present disclosure. The subsystems shown in FIG. 6 are interconnected via a system bus 810. Additional subsystems such as a printer 818, keyboard 826, fixed disk 828 (or other memory comprising computer readable media), monitor 822, which is coupled to a display adapter 820, and others are shown. Peripherals and input/output (I/O) devices, which couple to an I/O controller 812 (which can be a processor or other suitable controller), can be connected to the computer system by any number of means known in the art, such as a serial port 824. For example, the serial port 824 or external interface 830 can be used to connect the computer apparatus to a wide area network such as the Internet, a mouse input device, or a scanner. The interconnection via system bus allows the central processor 816 to communicate with each subsystem and to control the execution of instructions from system memory 814 or the fixed disk 828, as well as the exchange of information between subsystems. The system memory 814 and/or the fixed disk 828 may embody a computer readable medium.

[0049] FIG. 7 is a diagrammatic representation of an example system 900 that includes

a host machine 902 within which a set of instructions to perform any one or more of the methodologies discussed herein may be executed, according to at least one aspect of the present disclosure. In various aspects, the host machine 902 operates as a standalone device or may be connected (e.g., networked) to other machines. In a networked deployment, the host machine 902 may operate in the capacity of a server or a client machine in a server-client network environment, or as a peer machine in a peer-to-peer (or distributed) network environment. The host machine 902 may be a computer or computing device, a personal computer (PC), a tablet PC, a set-top box (STB), a personal digital assistant (PDA), a cellular telephone, a portable music player (e.g., a portable hard drive audio device such as an Moving Picture Experts Group Audio Layer 3 (MP3) player), a web appliance, a network router, switch or bridge, or any machine capable of executing a set of instructions (sequential or otherwise) that specify actions to be taken by that machine. Further, while only a single machine is illustrated, the term "machine" shall also be taken to include any collection of machines that individually or jointly execute a set (or multiple sets) of instructions to perform any one or more of the methodologies discussed herein.

[0050] The example system 900 includes the host machine 902, running a host operating system (OS) 904 on a processor or multiple processor(s)/processor core(s) 906 (e.g., a central processing unit (CPU), a graphics processing unit (GPU), or both), and various memory nodes 908. The host OS 904 may include a hypervisor 910 which is able to control the functions and/or communicate with a virtual machine ("VM") 912 running on machine readable media. The VM 912 also may include a virtual CPU or vCPU 914. The memory nodes 808 may be linked or pinned to virtual memory nodes or vNodes 916. When the memory node 808 is linked or pinned to a corresponding vNode 916, then data may be mapped directly from the memory nodes 808 to their corresponding vNodes 916.

[0051] All the various components shown in host machine 902 may be connected with and to each other, or communicate to each other via a bus (not shown) or via other coupling or communication channels or mechanisms. The host machine 902 may further include a video display, audio device or other peripherals 818 (e.g., a liquid crystal display (LCD), alpha-numeric input device(s) including, e.g., a keyboard, a cursor control device, e.g., a mouse, a voice recognition or biometric verification unit, an external drive, a signal generation device, e.g., a speaker,) a persistent storage device 920 (also referred to as disk drive unit), and a network interface device 922. The host machine 902 may further include a data encryption module (not shown) to encrypt data. The components provided in the host machine 902 are those typically found in computer systems that may be suitable for use with aspects of the present disclosure and are intended to represent a broad category of such computer components that are known in the art. Thus, the system 900 can be a server,

minicomputer, mainframe computer, or any other computer system. The computer may also include different bus configurations, networked platforms, multi-processor platforms, and the like. Various operating systems may be used including UNIX, LINUX, WINDOWS, QNX ANDROID, IOS, CHROME, TIZEN, and other suitable operating systems.

[0052] The disk drive unit 924 also may be a Solid-state Drive (SSD), a hard disk drive (HDD) or other includes a computer or machine-readable medium on which is stored one or more sets of instructions and data structures (e.g., data/instructions 926) embodying or utilizing any one or more of the methodologies or functions described herein. The data/instructions 926 also may reside, completely or at least partially, within the main memory node 908 and/or within the processor(s) 906 during execution thereof by the host machine 902. The data/instructions 926 may further be transmitted or received over a network 928 via the network interface device 922 utilizing any one of several well-known transfer protocols (e.g., Hyper Text Transfer Protocol (HTTP)).

[0053] The processor(s) 906 and memory nodes 908 also may comprise machine-readable media. The term "computer-readable medium" or "machine-readable medium" should be taken to include a single medium or multiple medium (e.g., a centralized or distributed database and/or associated caches and servers) that store the one or more sets of instructions. The term "computer-readable medium" shall also be taken to include any medium that is capable of storing, encoding, or carrying a set of instructions for execution by the host machine 902 and that causes the host machine 902 to perform any one or more of the methodologies of the present application, or that is capable of storing, encoding, or carrying data structures utilized by or associated with such a set of instructions. The term "computer-readable medium" shall accordingly be taken to include, but not be limited to, solid-state memories, optical and magnetic media, and carrier wave signals. Such media may also include, without limitation, hard disks, floppy disks, flash memory cards, digital video disks, random access memory (RAM), read only memory (ROM), and the like. The example aspects described herein may be implemented in an operating environment comprising software installed on a computer, in hardware, or in a combination of software and hardware.

[0054] One skilled in the art will recognize that Internet service may be configured to provide Internet access to one or more computing devices that are coupled to the Internet service, and that the computing devices may include one or more processors, buses, memory devices, display devices, input/output devices, and the like. Furthermore, those skilled in the art may appreciate that the Internet service may be coupled to one or more databases, repositories, servers, and the like, which may be utilized to implement any of the various aspects of the disclosure as described herein.

[0055] The computer program instructions also may be loaded onto a computer, a server, other programmable data processing apparatus, or other devices to cause a series of operational steps to be performed on the computer, other programmable apparatus or other devices to produce a computer implemented process such that the instructions which execute on the computer or other programmable apparatus provide processes for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks.

[0056] Suitable networks may include or interface with any one or more of, for instance, a local intranet, a PAN (Personal Area Network), a LAN (Local Area Network), a WAN (Wide Area Network), a MAN (Metropolitan Area Network), a virtual private network (VPN), a storage area network (SAN), a frame relay connection, an Advanced Intelligent Network (AIN) connection, a synchronous optical network (SONET) connection, a digital T1, T3, E1 or E3 line, Digital Data Service (DDS) connection, DSL (Digital Subscriber Line) connection, an Ethernet connection, an ISDN (Integrated Services Digital Network) line, a dial-up port such as a V.90, V.34 or V.34bis analog modem connection, a cable modem, an ATM (Asynchronous Transfer Mode) connection, or an FDDI (Fiber Distributed Data Interface) or CDDI (Copper Distributed Data Interface) connection. Furthermore, communications may also include links to any of a variety of wireless networks, including WAP (Wireless Application Protocol), GPRS (General Packet Radio Service), GSM (Global System for Mobile Communication), CDMA (Code Division Multiple Access) or TDMA (Time Division Multiple Access), cellular phone networks, GPS (Global Positioning System), CDPD (cellular digital packet data), RIM (Research in Motion, Limited) duplex paging network, Bluetooth radio, or an IEEE 802.11-based radio frequency network. The network 930 can further include or interface with any one or more of an RS-232 serial connection, an IEEE-1394 (Firewire) connection, a Fiber Channel connection, an IrDA (infrared) port, a SCSI (Small Computer Systems Interface) connection, a USB (Universal Serial Bus) connection or other wired or wireless, digital or analog interface or connection, mesh or Digi® networking.

[0057] In general, a cloud-based computing environment is a resource that typically combines the computational power of a large grouping of processors (such as within web servers) and/or that combines the storage capacity of a large grouping of computer memories or storage devices. Systems that provide cloud-based resources may be utilized exclusively by their owners or such systems may be accessible to outside users who deploy applications within the computing infrastructure to obtain the benefit of large computational or storage resources.

[0058] The cloud is formed, for example, by a network of web servers that comprise a plurality of computing devices, such as the host machine 902, with each server 930 (or at

least a plurality thereof) providing processor and/or storage resources. These servers manage workloads provided by multiple users (e.g., cloud resource customers or other users). Typically, each user places workload demands upon the cloud that vary in real-time, sometimes dramatically. The nature and extent of these variations typically depends on the type of business associated with the user.

[0059] It is noteworthy that any hardware platform suitable for performing the processing described herein is suitable for use with the technology. The terms "computer-readable storage medium" and "computer-readable storage media" as used herein refer to any medium or media that participate in providing instructions to a CPU for execution. Such media can take many forms, including, but not limited to, non-volatile media, volatile media, and transmission media. Non-volatile media include, for example, optical or magnetic disks, such as a fixed disk. Volatile media include dynamic memory, such as system RAM. Transmission media include coaxial cables, copper wire and fiber optics, among others, including the wires that comprise one aspect of a bus. Transmission media can also take the form of acoustic or light waves, such as those generated during radio frequency (RF) and infrared (IR) data communications. Common forms of computer-readable media include, for example, a flexible disk, a hard disk, magnetic tape, any other magnetic medium, a CD-ROM disk, digital video disk (DVD), any other optical medium, any other physical medium with patterns of marks or holes, a RAM, a PROM, an EPROM, an EEPROM, a FLASH EPROM, any other memory chip or data exchange adapter, a carrier wave, or any other medium from which a computer can read.

[0060] Various forms of computer-readable media may be involved in carrying one or more sequences of one or more instructions to a CPU for execution. A bus carries the data to system RAM, from which a CPU retrieves and executes the instructions. The instructions received by system RAM can optionally be stored on a fixed disk either before or after execution by a CPU.

[0061] Computer program code for carrying out operations for aspects of the present technology may be written in any combination of one or more programming languages, including an object-oriented programming language such as Java, Smalltalk, C++, or the like and conventional procedural programming languages, such as the "C" programming language, Go, Python, or other programming languages, including assembly languages. The program code may execute entirely on the user's computer, partly on the user's computer, as a stand-alone software package, partly on the user's computer and partly on a remote computer or entirely on the remote computer or server. In the latter scenario, the remote computer may be connected to the user's computer through any type of network, including a local area network (LAN) or a wide area network (WAN), or the connection may be made to

an external computer (for example, through the Internet using an Internet Service Provider).

[0062] Examples of the method according to various aspects of the present disclosure are provided below in the following numbered clauses. An aspect of the method may include any one or more than one, and any combination of, the numbered clauses described below.

[0063] Example 1. A method for processing a transit transaction, the method comprising: receiving, by a payment processing server, a first transaction authorization request, wherein the first transaction authorization request is initiated based on a first smart QR code with a transit payment system, wherein the first transaction authorization request comprises a payment token and a first transaction information associated with a first location in a transit infrastructure system; determining, by the payment processing server, a payment account associated with the payment token; determining, by the payment processing server, an issuer system associated with the payment account; transmitting, by the payment processing server, the first transaction authorization request to the issuer system; receiving, by the payment processing server, a first authorization response from the issuer system, wherein the first authorization response is associated with the first transaction information; and transmitting, by the payment processing server, the first authorization response to the transit payment system, wherein the transit payment system is configured to grant access to a user of a user device to enter the transit infrastructure system based on the first authorization response.

[0064] Example 2. The method of Example 1, further comprising: receiving, by the payment processing server, a second transaction authorization request, wherein the second transaction authorization request is initiated based on a second smart QR code with a transit payment system, and wherein the second transaction authorization request comprises the payment token and a second transaction information associated with a second location; determining, by the payment processing server, the payment account associated with the payment token; determining, by the payment processing server, the issuer system associated with the payment account; transmitting, by the payment processing server, the second transaction authorization request to the issuer system; receiving, by the payment processing server, a second authorization response from the issuer system, wherein the second authorization response is associated with the second transaction information; and transmitting, by the payment processing server, the second authorization response to the transit payment system, wherein the transit payment system is configured to grant access to the user of the user device to exit the transit infrastructure system based on the second authorization response.

[0065] Example 3. The method of Examples 1-2, wherein the transit payment system comprises: a fare collection server; a first payment gateway at the first location in the transit infrastructure system; and a second payment gateway at the second location in the transit infrastructure system.

[0066] Example 4. The method of Examples 1-3, wherein the second transaction information is associated with an actual fare amount based on the first location of the first payment gateway and the first location of the first payment gateway.

[0067] Example 5. The method of Examples 1-3, wherein the first transaction information is associated with a maximum fare amount based on the first location of the first payment gateway.

[0068] Example 6. The method of Examples 1-3, wherein the first transaction information is associated with a maximum fare amount, wherein the maximum fare amount is a predetermined amount not based on the first location of the first payment gateway.

[0069] Example 7. A method for processing a transaction with a smart QR code, the method comprising: receiving, by a payment processing server, a first transaction authorization request, wherein the first transaction authorization request is initiated based on a first smart QR code with a transit payment system, and wherein the first transaction authorization request comprises a payment token and a first transaction information associated with a first location in a transit infrastructure system; transmitting, by the payment processing server, the first transaction authorization request to an issuer system associated with a payment account, wherein the payment account is associated with the payment token; receiving, by the payment processing server, a first authorization response from the issuer system, wherein the first authorization response is associated with the first transaction information; transmitting, by the payment processing server, the first authorization response to an acquirer system associated with the transit payment system; receiving, by the payment processing server, a second transaction authorization request, wherein the second transaction authorization request is initiated based on a second smart QR code with the transit payment system, wherein the second transaction authorization request comprises the payment token and a second transaction information associated with a second location; transmitting, by the payment processing server, the second transaction authorization request to the issuer system associated with the payment account, wherein the payment account is associated with the payment token; receiving, by the payment processing server, a second authorization response from the issuer system, wherein the second authorization response is associated with the second transaction information; and transmitting, by the payment

processing server, the second authorization response to the acquirer system associated with the transit payment system, wherein the transit payment system is configured to grant access to a user of a user device to exit the transit infrastructure system based on the second authorization response.

[0070] Example 8. The method of Example 7, wherein the transit payment system comprises: a fare collection server; a first payment gateway at the first location in the transit infrastructure system; and a second payment gateway at the second location in the transit infrastructure system.

[0071] Example 9. The method of Examples 7-8, wherein the second transaction information is associated with an actual fare amount based on the first location of the first payment gateway and the first location of the first payment gateway.

[0072] Example 10. The method of Examples 7-8, wherein the first transaction information is associated with a maximum fare amount based on the first location of the first payment gateway.

[0073] Example 11. The method of Examples 7-8, wherein the first transaction information is associated with a maximum fare amount, and wherein the maximum fare amount is a predetermined amount not based on the first location of the first payment gateway.

[0074] Example 12. The method of Examples 7-8, wherein the first payment gateway is configured to grant access to the user of the user device to enter the transit infrastructure system based on the first authorization response.

[0075] Example 13. A transit payment system comprising: a fare collection server; a first payment gateway of a plurality of payment gateways; a second payment gateway of a plurality of payment gateways; the fare collection server is communicably couples to the first payment gateway and the second payment gateway, wherein the fare collection server is configured to: receive a first transaction authorization request, wherein the first transaction authorization request is initiated based on a first smart QR code with the first payment gateway, and wherein the first transaction authorization request comprises a payment token and a first transaction information associated with a first location in a transit infrastructure system; transmit the first transaction authorization request to an issuer system associated with a payment account, wherein the payment account is associated with the payment token; receive a first authorization response, wherein the first authorization response is associated with the first transaction information; transmit the first authorization response to the first

payment gateway based on the first authorization response; receive a second transaction authorization request, wherein the second transaction authorization request is initiated based on a second smart QR code with the second payment gateway, wherein the second transaction authorization request comprises the payment token and a second transaction information associated with a second location; and transmit the second transaction authorization request to the issuer system associated with the payment account, wherein the payment account is associated with the payment token; receive a second authorization response from the issuer system, wherein the second authorization response is associated with the second transaction information; and transmit the second authorization response to the second payment gateway based on the second authorization response.

[0076] Example 14. The transit payment system of Example 13, wherein the second transaction information is associated with an actual fare amount based on the first location of the first payment gateway and the first location of the first payment gateway.

[0077] Example 15. The transit payment system of Examples 13-14, wherein the first transaction information is associated with a maximum fare amount based on the first location of the first payment gateway.

[0078] Example 16. The transit payment system of Examples 13-15, wherein the first transaction information is associated with a maximum fare amount, wherein the maximum fare amount is a predetermined amount not based on the first location of the first payment gateway.

[0079] Example 17. The transit payment system of Examples 13-16, wherein the first payment gateway is configured to grant access to a user of a user device to enter the transit infrastructure system based on the first authorization response.

[0080] Example 18. The transit payment system of Examples 13-17, wherein the second payment gateway is configured to grant access to a user of a user device to exit the transit infrastructure system based on the second authorization response.

[0081] The foregoing detailed description has set forth various forms of the systems and/or processes via the use of block diagrams, flowcharts, and/or examples. Insofar as such block diagrams, flowcharts, and/or examples contain one or more functions and/or operations, it will be understood by those within the art that each function and/or operation within such block diagrams, flowcharts, and/or examples can be implemented, individually and/or collectively, by a wide range of hardware, software, firmware, or virtually any combination thereof. Those skilled in the art will recognize that some aspects of the forms

disclosed herein, in whole or in part, can be equivalently implemented in integrated circuits, as one or more computer programs running on one or more computers (e.g., as one or more programs running on one or more computer systems), as one or more programs running on one or more processors (e.g., as one or more programs running on one or more microprocessors), as firmware, or as virtually any combination thereof, and that designing the circuitry and/or writing the code for the software and or firmware would be well within the skill of one of skill in the art in light of this disclosure. In addition, those skilled in the art will appreciate that the mechanisms of the subject matter described herein are capable of being distributed as one or more program products in a variety of forms, and that an illustrative form of the subject matter described herein applies regardless of the particular type of signal bearing medium used to actually carry out the distribution.

[0082] Instructions used to program logic to perform various disclosed aspects can be stored within a memory in the system, such as dynamic random access memory (DRAM), cache, flash memory, or other storage. Furthermore, the instructions can be distributed via a network or by way of other computer readable media. Thus a machine-readable medium may include any mechanism for storing or transmitting information in a form readable by a machine (e.g., a computer), but is not limited to, floppy diskettes, optical disks, compact disc, read-only memory (CD-ROMs), and magneto-optical disks, read-only memory (ROMs), random access memory (RAM), erasable programmable read-only memory (EPROM), electrically erasable programmable read-only memory (EEPROM), magnetic or optical cards, flash memory, or a tangible, machine-readable storage used in the transmission of information over the Internet via electrical, optical, acoustical or other forms of propagated signals (e.g., carrier waves, infrared signals, digital signals, etc.). Accordingly, the non-transitory computer-readable medium includes any type of tangible machine-readable medium suitable for storing or transmitting electronic instructions or information in a form readable by a machine (e.g., a computer).

[0083] Any of the software components or functions described in this application, may be implemented as software code to be executed by a processor using any suitable computer language such as, for example, Python, Java, C++ or Perl using, for example, conventional or object-oriented techniques. The software code may be stored as a series of instructions, or commands on a computer readable medium, such as RAM, ROM, a magnetic medium such as a hard-drive or a floppy disk, or an optical medium such as a CD-ROM. Any such computer readable medium may reside on or within a single computational apparatus, and may be present on or within different computational apparatuses within a system or network.

[0084] As used in any aspect herein, the term “logic” may refer to an app, software, firmware and/or circuitry configured to perform any of the aforementioned operations. Software may be embodied as a software package, code, instructions, instruction sets and/or data recorded on non-transitory computer readable storage medium. Firmware may be embodied as code, instructions or instruction sets and/or data that are hard-coded (e.g., nonvolatile) in memory devices.

[0085] As used in any aspect herein, the terms “component,” “system,” “module” and the like can refer to a computer-related entity, either hardware, a combination of hardware and software, software, or software in execution.

[0086] As used in any aspect herein, an “algorithm” refers to a self-consistent sequence of steps leading to a desired result, where a “step” refers to a manipulation of physical quantities and/or logic states which may, though need not necessarily, take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared, and otherwise manipulated. It is common usage to refer to these signals as bits, values, elements, symbols, characters, terms, numbers, or the like. These and similar terms may be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities and/or states.

[0087] A network may include a packet switched network. The communication devices may be capable of communicating with each other using a selected packet switched network communications protocol. One example communications protocol may include an Ethernet communications protocol which may be capable of permitting communication using a Transmission Control Protocol/Internet Protocol (TCP/IP). The Ethernet protocol may comply or be compatible with the Ethernet standard published by the Institute of Electrical and Electronics Engineers (IEEE) titled “IEEE 802.3 Standard”, published in December, 2008 and/or later versions of this standard. Alternatively or additionally, the communication devices may be capable of communicating with each other using an X.25 communications protocol. The X.25 communications protocol may comply or be compatible with a standard promulgated by the International Telecommunication Union-Telecommunication Standardization Sector (ITU-T). Alternatively or additionally, the communication devices may be capable of communicating with each other using a frame relay communications protocol. The frame relay communications protocol may comply or be compatible with a standard promulgated by Consultative Committee for International Telegraph and Telephone (CCITT) and/or the American National Standards Institute (ANSI). Alternatively or additionally, the transceivers may be capable of communicating with each other using an Asynchronous Transfer Mode (ATM) communications protocol. The ATM communications protocol may

comply or be compatible with an ATM standard published by the ATM Forum titled "ATM-MPLS Network Interworking 2.0" published August 2001, and/or later versions of this standard. Of course, different and/or after-developed connection-oriented network communication protocols are equally contemplated herein.

[0088] Unless specifically stated otherwise as apparent from the foregoing disclosure, it is appreciated that, throughout the present disclosure, discussions using terms such as "processing," "computing," "calculating," "determining," "displaying," or the like, refer to the action and processes of a computer system, or similar electronic computing device, that manipulates and transforms data represented as physical (electronic) quantities within the computer system's registers and memories into other data similarly represented as physical quantities within the computer system memories or registers or other such information storage, transmission or display devices.

[0089] One or more components may be referred to herein as "configured to," "configurable to," "operable/operative to," "adapted/adaptable," "able to," "conformable/conformed to," etc. Those skilled in the art will recognize that "configured to" can generally encompass active-state components and/or inactive-state components and/or standby-state components, unless context requires otherwise.

[0090] Those skilled in the art will recognize that, in general, terms used herein, and especially in the appended claims (e.g., bodies of the appended claims) are generally intended as "open" terms (e.g., the term "including" should be interpreted as "including but not limited to," the term "having" should be interpreted as "having at least," the term "includes" should be interpreted as "includes but is not limited to," etc.). It will be further understood by those within the art that if a specific number of an introduced claim recitation is intended, such an intent will be explicitly recited in the claim, and in the absence of such recitation no such intent is present. For example, as an aid to understanding, the following appended claims may contain usage of the introductory phrases "at least one" and "one or more" to introduce claim recitations. However, the use of such phrases should not be construed to imply that the introduction of a claim recitation by the indefinite articles "a" or "an" limits any particular claim containing such introduced claim recitation to claims containing only one such recitation, even when the same claim includes the introductory phrases "one or more" or "at least one" and indefinite articles such as "a" or "an" (e.g., "a" and/or "an" should typically be interpreted to mean "at least one" or "one or more"); the same holds true for the use of definite articles used to introduce claim recitations.

[0091] In addition, even if a specific number of an introduced claim recitation is explicitly

recited, those skilled in the art will recognize that such recitation should typically be interpreted to mean at least the recited number (e.g., the bare recitation of “two recitations,” without other modifiers, typically means at least two recitations, or two or more recitations). Furthermore, in those instances where a convention analogous to “at least one of A, B, and C, etc.” is used, in general such a construction is intended in the sense one having skill in the art would understand the convention (e.g., “a system having at least one of A, B, and C” would include but not be limited to systems that have A alone, B alone, C alone, A and B together, A and C together, B and C together, and/or A, B, and C together, etc.). In those instances where a convention analogous to “at least one of A, B, or C, etc.” is used, in general such a construction is intended in the sense one having skill in the art would understand the convention (e.g., “a system having at least one of A, B, or C” would include but not be limited to systems that have A alone, B alone, C alone, A and B together, A and C together, B and C together, and/or A, B, and C together, etc.). It will be further understood by those within the art that typically a disjunctive word and/or phrase presenting two or more alternative terms, whether in the description, claims, or drawings, should be understood to contemplate the possibilities of including one of the terms, either of the terms, or both terms unless context dictates otherwise. For example, the phrase “A or B” will be typically understood to include the possibilities of “A” or “B” or “A and B.”

[0092] With respect to the appended claims, those skilled in the art will appreciate that recited operations therein may generally be performed in any order. Also, although various operational flow diagrams are presented in a sequence(s), it should be understood that the various operations may be performed in other orders than those which are illustrated, or may be performed concurrently. Examples of such alternate orderings may include overlapping, interleaved, interrupted, reordered, incremental, preparatory, supplemental, simultaneous, reverse, or other variant orderings, unless context dictates otherwise. Furthermore, terms like “responsive to,” “related to,” or other past-tense adjectives are generally not intended to exclude such variants, unless context dictates otherwise.

[0093] It is worthy to note that any reference to “one aspect,” “an aspect,” “an exemplification,” “one exemplification,” and the like means that a particular feature, structure, or characteristic described in connection with the aspect is included in at least one aspect. Thus, appearances of the phrases “in one aspect,” “in an aspect,” “in an exemplification,” and “in one exemplification” in various places throughout the specification are not necessarily all referring to the same aspect. Furthermore, the particular features, structures or characteristics may be combined in any suitable manner in one or more aspects.

[0094] As used herein, the singular form of “a,” “an,” and “the” include the plural

references unless the context clearly dictates otherwise.

[0095] Any patent application, patent, non-patent publication, or other disclosure material referred to in this specification and/or listed in any Application Data Sheet is incorporated by reference herein, to the extent that the incorporated materials is not inconsistent herewith. As such, and to the extent necessary, the disclosure as explicitly set forth herein supersedes any conflicting material incorporated herein by reference. Any material, or portion thereof, that is said to be incorporated by reference herein, but which conflicts with existing definitions, statements, or other disclosure material set forth herein will only be incorporated to the extent that no conflict arises between that incorporated material and the existing disclosure material. None is admitted to be prior art.

[0096] In summary, numerous benefits have been described which result from employing the concepts described herein. The foregoing description of the one or more forms has been presented for purposes of illustration and description. It is not intended to be exhaustive or limiting to the precise form disclosed. Modifications or variations are possible in light of the above teachings. The one or more forms were chosen and described in order to illustrate principles and practical application to thereby enable one of ordinary skill in the art to utilize the various forms and with various modifications as are suited to the particular use contemplated. It is intended that the claims submitted herewith define the overall scope.

CLAIMS

What is claimed is:

1. A method for processing a transit transaction, the method comprising:
 - receiving, by a payment processing server, a first transaction authorization request, wherein the first transaction authorization request is initiated based on a first smart QR code with a transit payment system, wherein the first transaction authorization request comprises a payment token and a first transaction information associated with a first location in a transit infrastructure system;
 - determining, by the payment processing server, a payment account associated with the payment token;
 - determining, by the payment processing server, an issuer system associated with the payment account;
 - transmitting, by the payment processing server, the first transaction authorization request to the issuer system;
 - receiving, by the payment processing server, a first authorization response from the issuer system, wherein the first authorization response is associated with the first transaction information; and
 - transmitting, by the payment processing server, the first authorization response to the transit payment system, wherein the transit payment system is configured to grant access to a user of a user device to enter the transit infrastructure system based on the first authorization response.
2. The method of claim 1, further comprising:
 - receiving, by the payment processing server, a second transaction authorization request, wherein the second transaction authorization request is initiated based on a second smart QR code with a transit payment system, and wherein the second transaction authorization request comprises the payment token and a second transaction information associated with a second location;
 - determining, by the payment processing server, the payment account associated with the payment token;
 - determining, by the payment processing server, the issuer system associated with the payment account;
 - transmitting, by the payment processing server, the second transaction authorization request to the issuer system;

receiving, by the payment processing server, a second authorization response from the issuer system, wherein the second authorization response is associated with the second transaction information; and

transmitting, by the payment processing server, the second authorization response to the transit payment system, wherein the transit payment system is configured to grant access to the user of the user device to exit the transit infrastructure system based on the second authorization response.

3. The method of claim 2, wherein the transit payment system comprises:
 - a fare collection server;
 - a first payment gateway at the first location in the transit infrastructure system; and
 - a second payment gateway at the second location in the transit infrastructure system.
4. The method of claim 3, wherein the second transaction information is associated with an actual fare amount based on the first location of the first payment gateway and the second location of the second payment gateway.
5. The method of claim 3, wherein the first transaction information is associated with a maximum fare amount based on the first location of the first payment gateway.
6. The method of claim 3, wherein the first transaction information is associated with a maximum fare amount, wherein the maximum fare amount is a predetermined amount not based on the first location of the first payment gateway.
7. The method of claim 3, wherein further comprising:
 - generating, by the fare collection server, a settlement draft for only the second authorization response.
8. A method for processing a transaction with a smart QR code, the method comprising:
 - receiving, by a payment processing server, a first transaction authorization request, wherein the first transaction authorization request is initiated based on a first smart QR code with a transit payment system, and wherein the first transaction authorization request comprises a payment token and a first transaction information associated with a first location in a transit infrastructure system;
 - transmitting, by the payment processing server, the first transaction authorization request to an issuer system associated with a payment account, wherein the payment account is associated with the payment token;

receiving, by the payment processing server, a first authorization response from the issuer system, wherein the first authorization response is associated with the first transaction information;

transmitting, by the payment processing server, the first authorization response to an acquirer system associated with the transit payment system;

receiving, by the payment processing server, a second transaction authorization request, wherein the second transaction authorization request is initiated based on a second smart QR code with the transit payment system, wherein the second transaction authorization request comprises the payment token and a second transaction information associated with a second location;

transmitting, by the payment processing server, the second transaction authorization request to the issuer system associated with the payment account, wherein the payment account is associated with the payment token;

receiving, by the payment processing server, a second authorization response from the issuer system, wherein the second authorization response is associated with the second transaction information; and

transmitting, by the payment processing server, the second authorization response to the acquirer system associated with the transit payment system, wherein the transit payment system is configured to grant access to a user of a user device to exit the transit infrastructure system based on the second authorization response.

9. The method of claim 8, wherein the transit payment system comprises:
 - a fare collection server;
 - a first payment gateway at the first location in the transit infrastructure system; and
 - a second payment gateway at the second location in the transit infrastructure system.
10. The method of claim 9, wherein the second transaction information is associated with an actual fare amount based on the first location of the first payment gateway and the first location of the first payment gateway.
11. The method of claim 9, wherein the first transaction information is associated with a maximum fare amount based on the first location of the first payment gateway.
12. The method of claim 9, wherein the first transaction information is associated with a maximum fare amount, and wherein the maximum fare amount is a predetermined amount not based on the first location of the first payment gateway.

13. The method of claim 9, wherein the first payment gateway is configured to grant access to the user of the user device to enter the transit infrastructure system based on the first authorization response.
14. The method of claim 9, wherein further comprising:
generating, by the fare collection server, a settlement draft for only the second authorization response.
15. A transit payment system comprising:
a fare collection server;
a first payment gateway of a plurality of payment gateways;
a second payment gateway of a plurality of payment gateways;
the fare collection server is communicably couples to the first payment gateway and the second payment gateway, wherein the fare collection server is configured to:
receive a first transaction authorization request, wherein the first transaction authorization request is initiated based on a first smart QR code with the first payment gateway, and wherein the first transaction authorization request comprises a payment token and a first transaction information associated with a first location in a transit infrastructure system;
transmit the first transaction authorization request to an issuer system associated with a payment account, wherein the payment account is associated with the payment token;
receive a first authorization response, wherein the first authorization response is associated with the first transaction information;
transmit the first authorization response to the first payment gateway based on the first authorization response;
receive a second transaction authorization request, wherein the second transaction authorization request is initiated based on a second smart QR code with the second payment gateway, wherein the second transaction authorization request comprises the payment token and a second transaction information associated with a second location; and
transmit the second transaction authorization request to the issuer system associated with the payment account, wherein the payment account is associated with the payment token;
receive a second authorization response from the issuer system, wherein the second authorization response is associated with the second transaction information;
and

transmit the second authorization response to the second payment gateway based on the second authorization response.

16. The transit payment system of claim 15, wherein the second transaction information is associated with an actual fare amount based on the first location of the first payment gateway and the first location of the first payment gateway.

17. The transit payment system of claim 15, wherein the first transaction information is associated with a maximum fare amount based on the first location of the first payment gateway.

18. The transit payment system of claim 15, wherein the first transaction information is associated with a maximum fare amount, wherein the maximum fare amount is a predetermined amount not based on the first location of the first payment gateway.

19. The transit payment system of claim 15, wherein the first payment gateway is configured to grant access to a user of a user device to enter the transit infrastructure system based on the first authorization response.

20. The transit payment system of claim 15, wherein the second payment gateway is configured to grant access to a user of a user device to exit the transit infrastructure system based on the second authorization response.