US 20140149267A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2014/0149267 A1

(43) Pub. Date: May 29, 2014

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(54) SYSTEMS AND METHODS FOR PROVIDING A VENDING NETWORK

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(21) Appl. No.: **14/171,598**

(22) Filed: **Feb. 3, 2014**

Related U.S. Application Data

(63) Continuation of application No. 12/035,181, filed on Feb. 21, 2008, now Pat. No. 8,645,273.

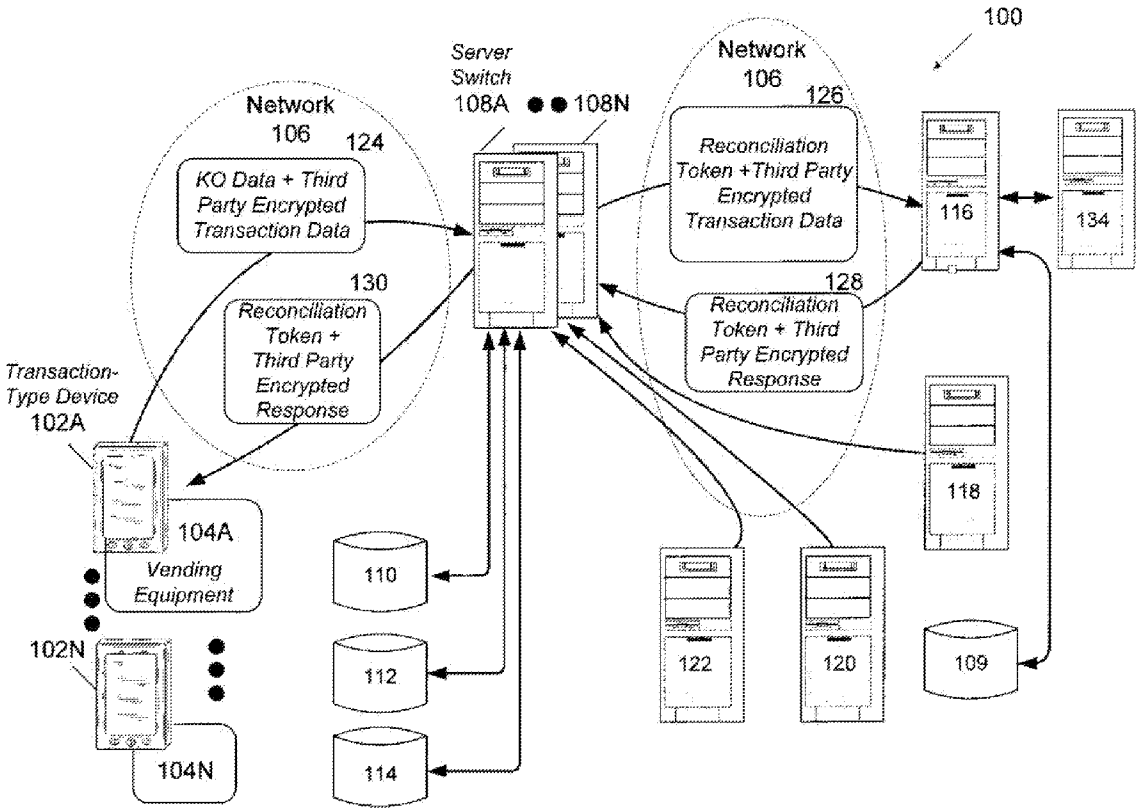
Publication Classification

(51) **Int. Cl.**
G06Q 40/00 (2006.01)

(52) **U.S. Cl.**
CPC *G06Q 40/12* (2013.12)
USPC **705/30**

(57) **ABSTRACT**

In one embodiment, a server includes a memory device and a processor configured to execute a set of instructions to communicate with a property management system, wherein the server receives transaction data from the property management system, the transaction data associated with a transaction and comprising a transaction type or a transaction class. The processor may inspect each transaction type or transaction class, compare each transaction type or transaction class to one or more allowed transaction types or transaction classes, and communicate approval of the respective transaction when the transaction type or transaction class has been previously approved to perform with the property management system.



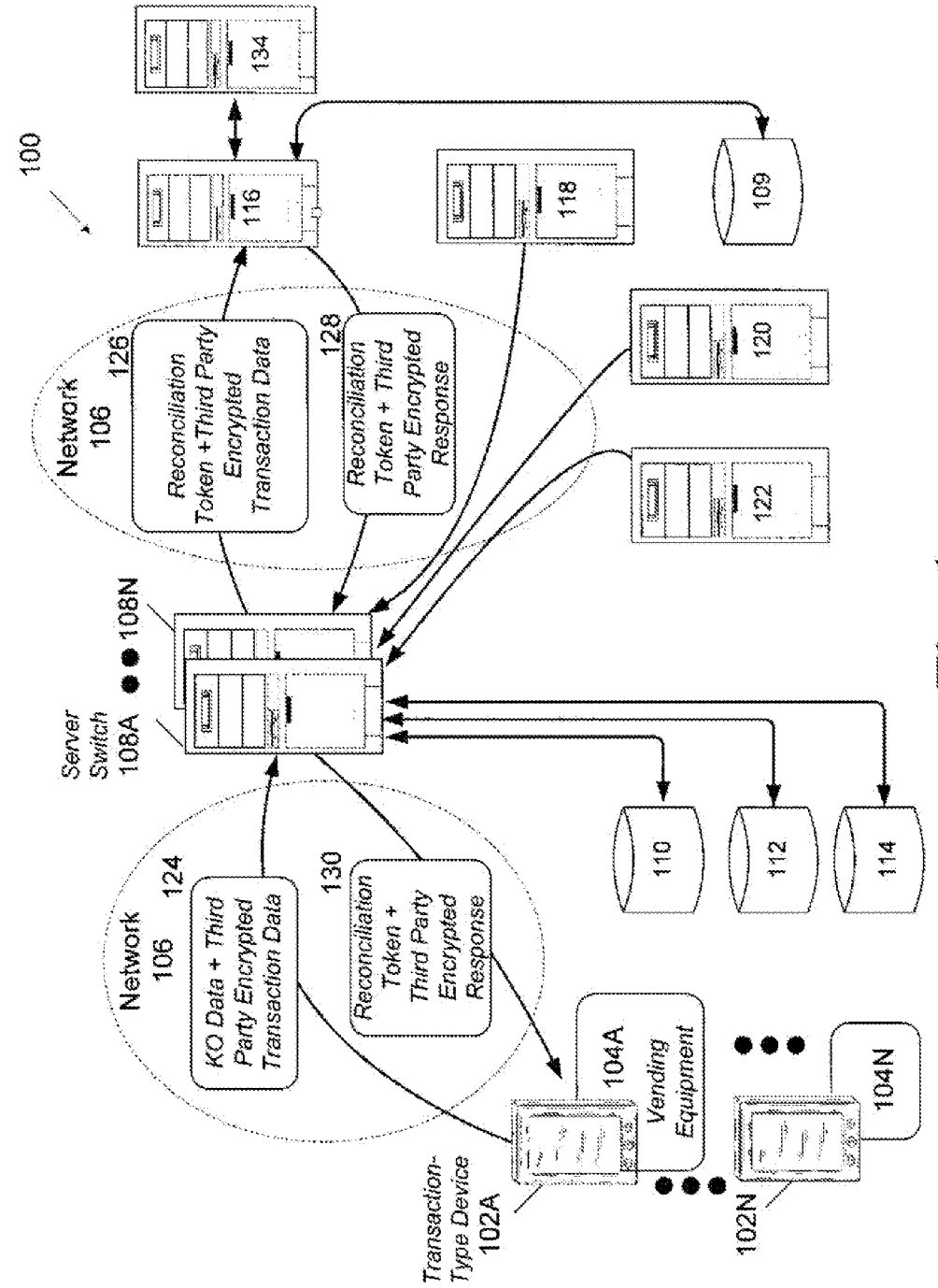

100
134
116
118
109
120
122
Network
106
126
Reconciliation Token +Third Party Encrypted Transaction Data
128
Reconciliation Token + Third Party Encrypted Response
Server Switch
108A
108N
110
112
114
Network
106
124
KO Data + Third Party Encrypted Transaction Data
130
Reconciliation Token + Third Party Encrypted Response
104A
Vending Equipment
104N
Transaction-Type Device
102A
102N

Fig. 1

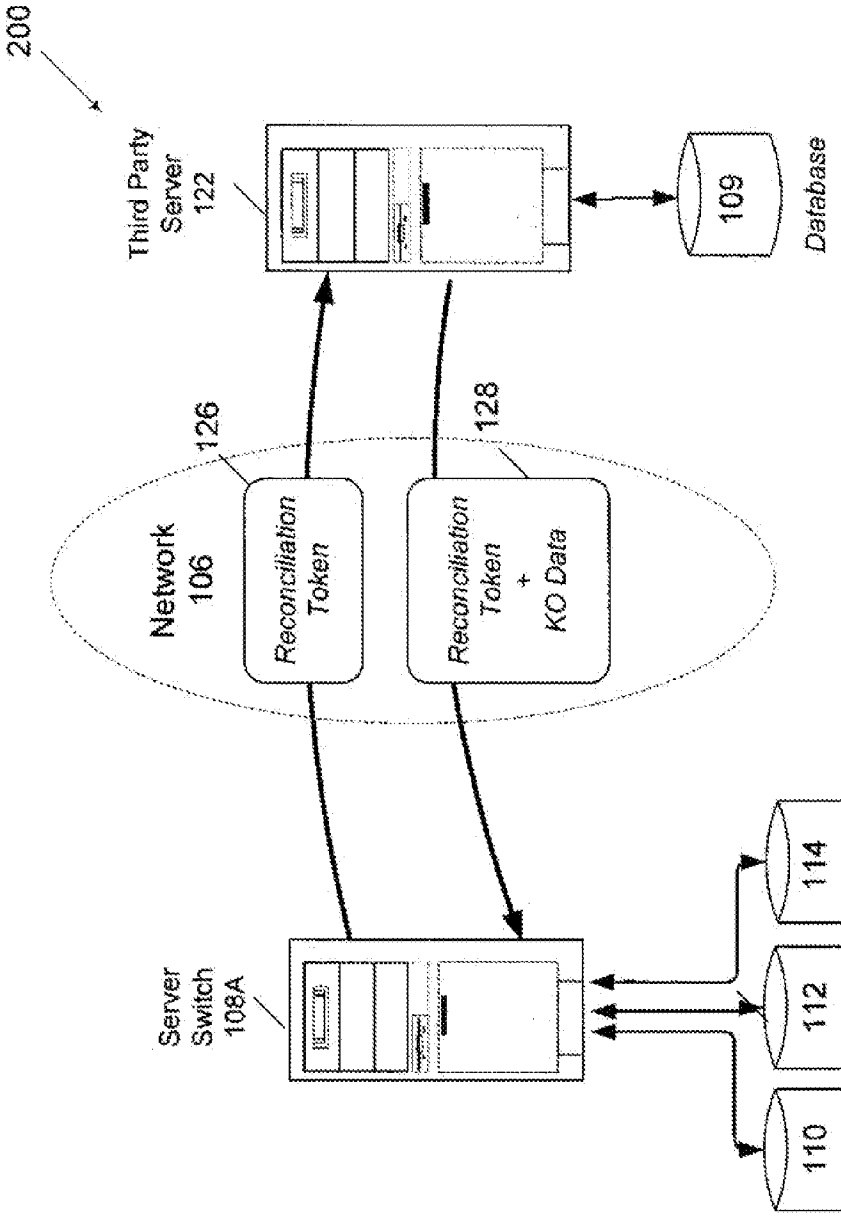

200
Third Party Server 122
109
Database
126
128
Network 106
Reconciliation Token
Reconciliation Token + KO Data
Server Switch 108A
114
112
110

Fig. 2

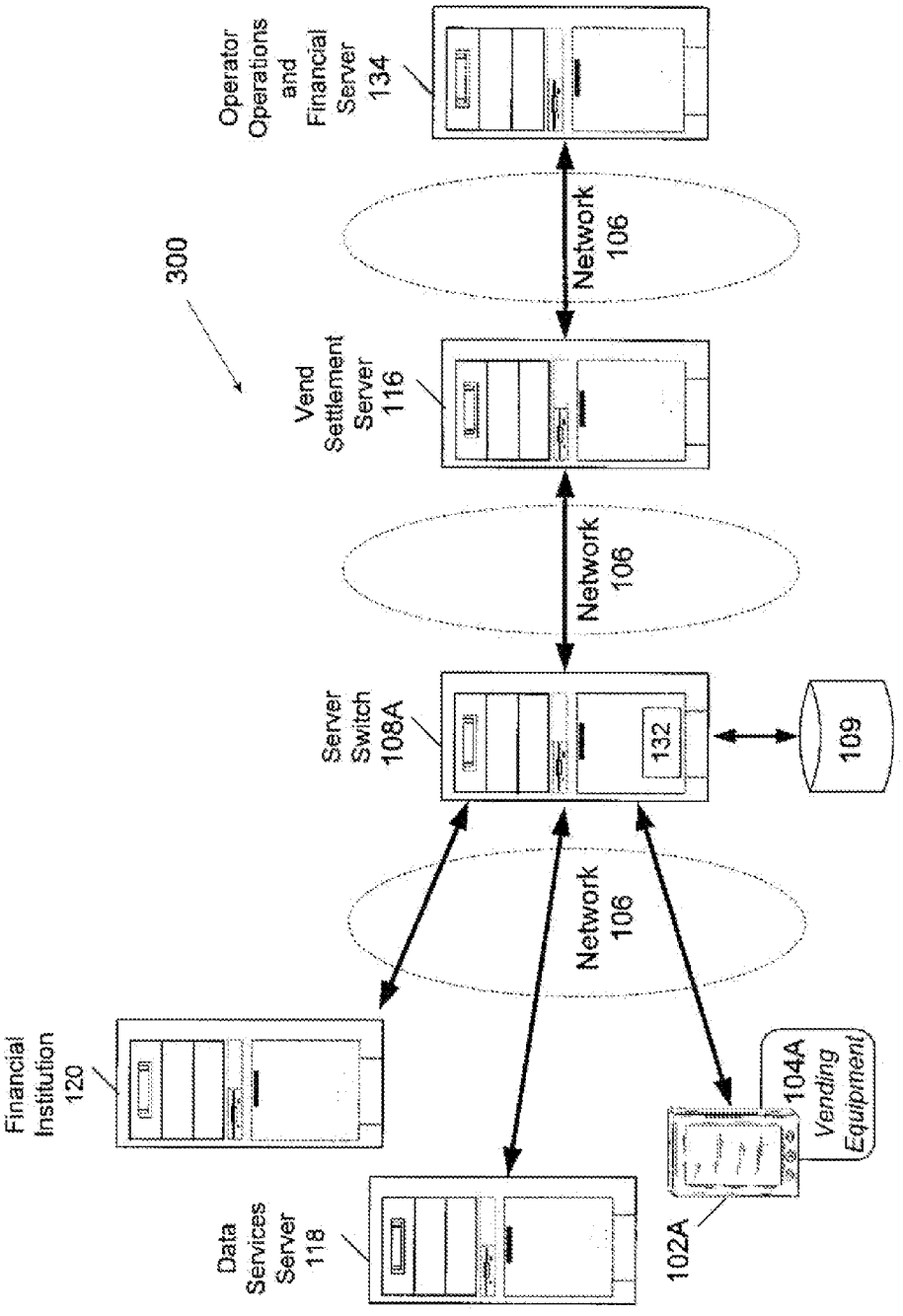

300
Operator Operations and Financial Server 134
Network 106
Vend Settlement Server 116
Network 106
Server Switch 108A
132
109
Network 106
Financial Institution 120
Data Services Server 118
102A
104A Vending Equipment

Fig. 3

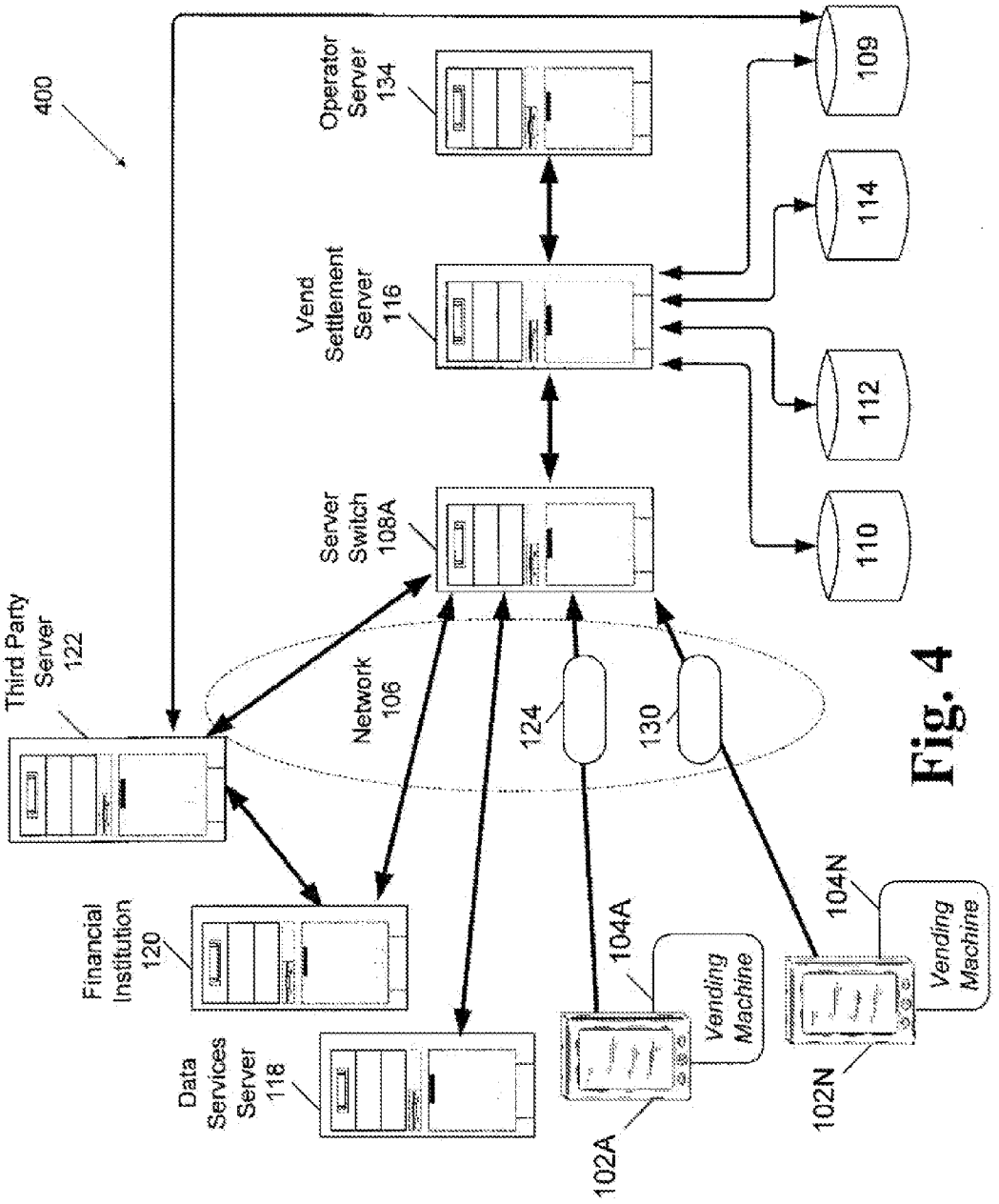

400
Operator Server 134
109
Vend Settlement Server 116
114
112
Server Switch 108A
110
Third Party Server 122
Network 106
124
130
Financial Institution 120
104A
Vending Machine
104N
Vending Machine
Data Services Server 118
102A
102N

Fig. 4

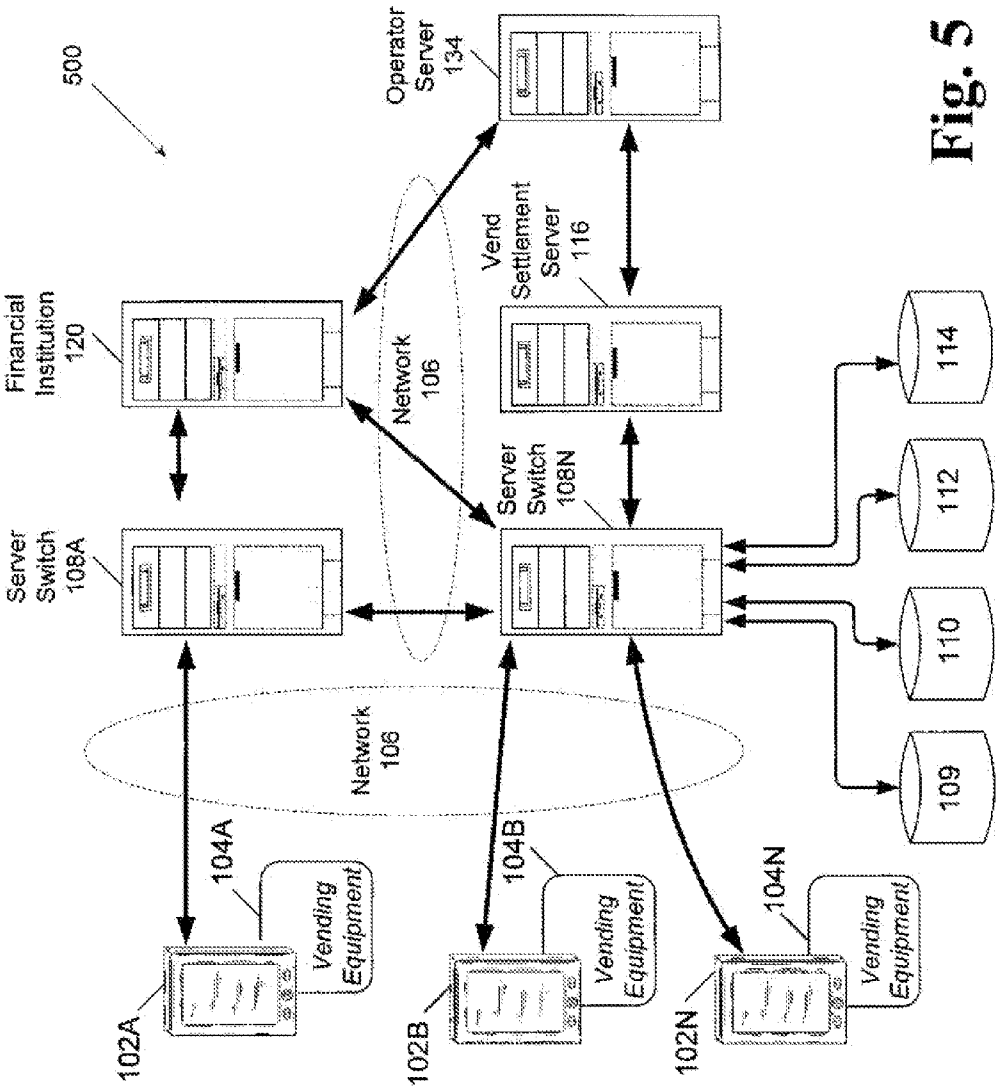

500
Operator Server 134
Vend Settlement Server 116
Financial Institution 120
Network 106
Server Switch 108N
Server Switch 108A
Network 106
114
112
110
109
104A
104B
104N
Vending Equipment
Vending Equipment
Vending Equipment
102A
102B
102N

Fig. 5

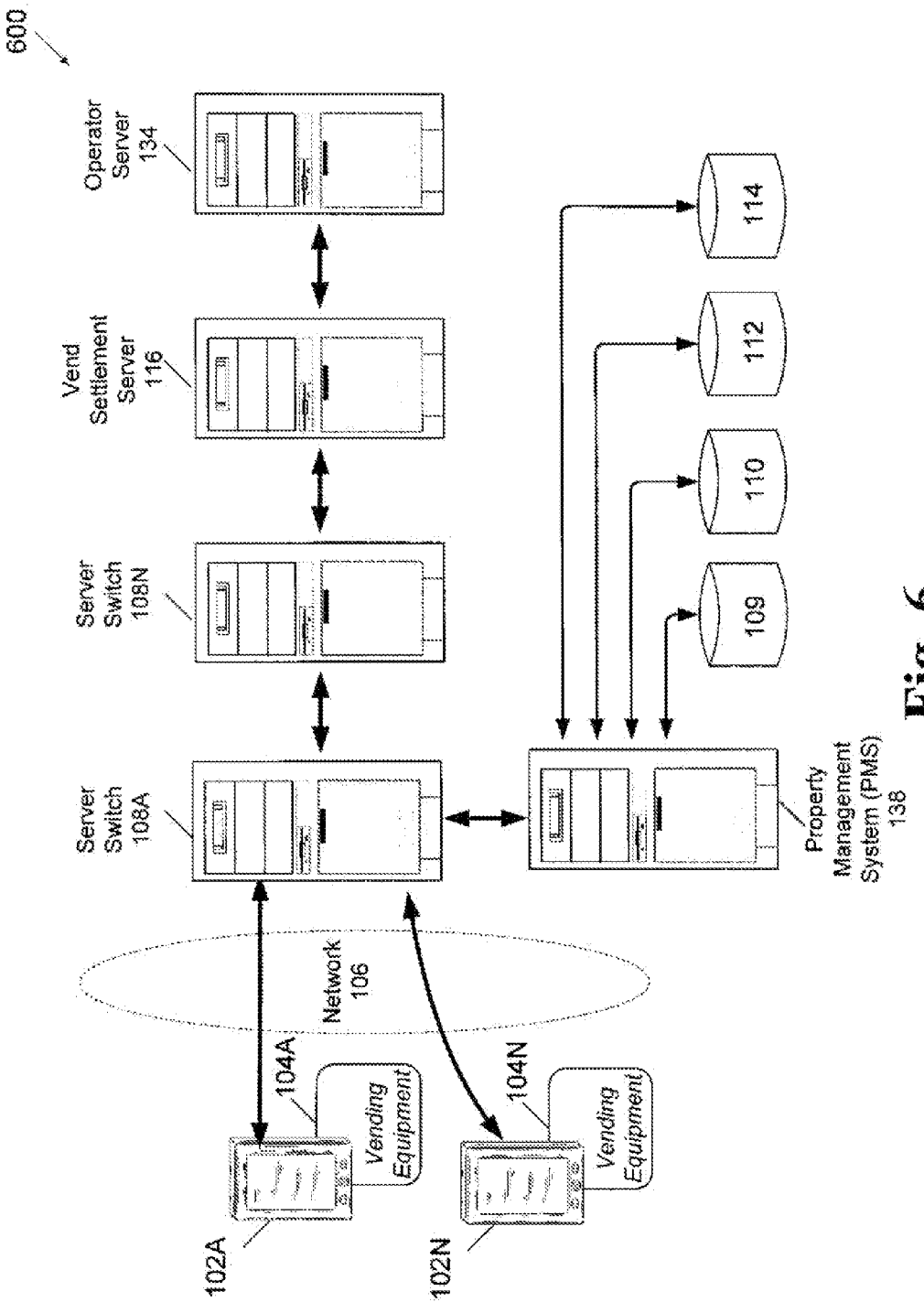
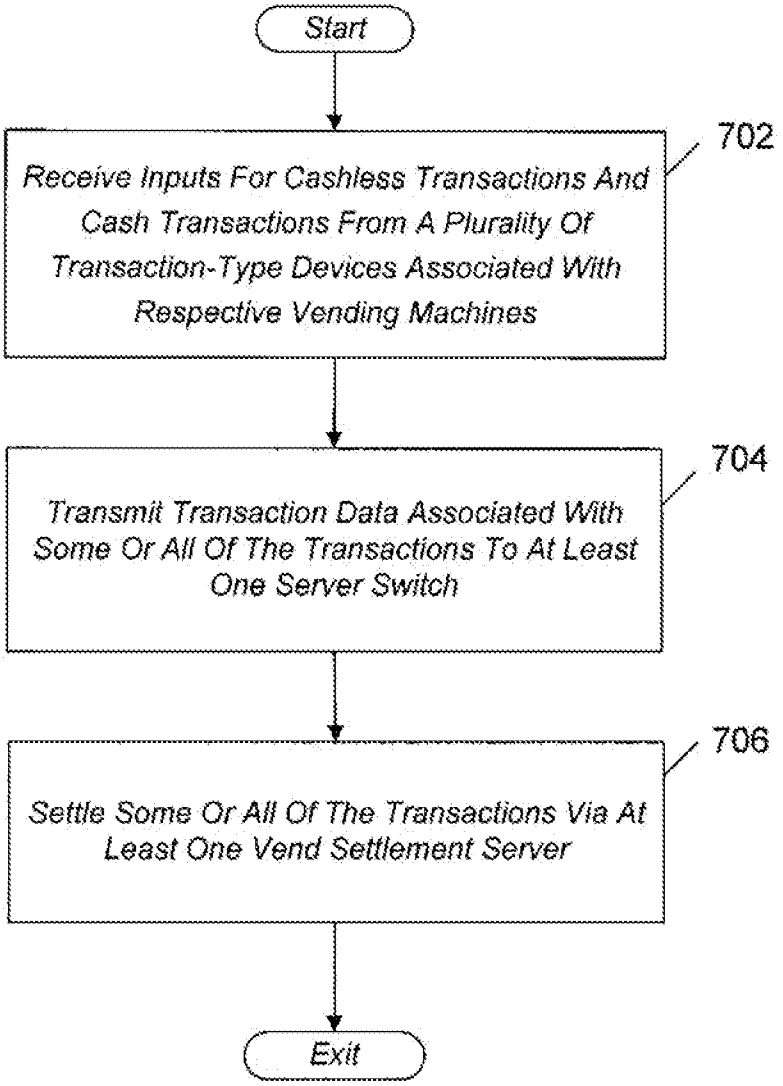
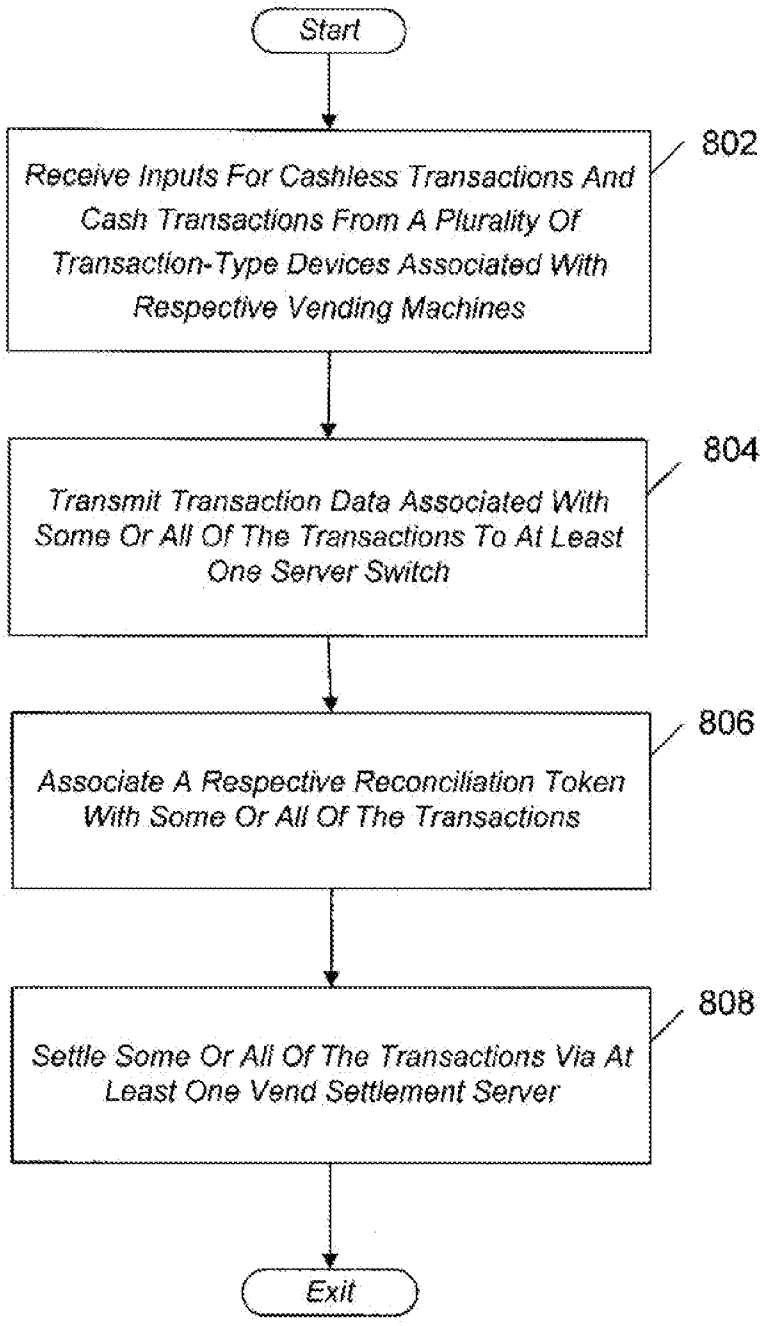

600
Operator Server 134
Vend Settlement Server 116
Server Switch 108N
Server Switch 108A
Property Management System (PMS) 138
114
112
110
109
Network 106
104A
Vending Equipment
104N
Vending Equipment
102A
102N

Fig. 6


Start
Receive Inputs For Cashless Transactions And Cash Transactions From A Plurality Of Transaction-Type Devices Associated With Respective Vending Machines
702
Transmit Transaction Data Associated With Some Or All Of The Transactions To At Least One Server Switch
704
Settle Some Or All Of The Transactions Via At Least One Vend Settlement Server
706
Exit

700
Fig. 7


Start
Receive Inputs For Cashless Transactions And Cash Transactions From A Plurality Of Transaction-Type Devices Associated With Respective Vending Machines
802
Transmit Transaction Data Associated With Some Or All Of The Transactions To At Least One Server Switch
804
Associate A Respective Reconciliation Token With Some Or All Of The Transactions
806
Settle Some Or All Of The Transactions Via At Least One Vend Settlement Server
808
Exit

800

Fig. 8

SYSTEMS AND METHODS FOR PROVIDING A VENDING NETWORK

TRADEMARKS

[0001] COCA-COLA® is a registered trademark of The Coca-Cola Company, Atlanta, Ga., U.S.A. Other names used herein may be registered trademarks, trademarks or product names of The Coca-Cola Company or other companies.

TECHNICAL FIELD OF THE INVENTION

[0002] This invention relates to a vending network, and more particularly to systems and methods for providing a vending network.

BACKGROUND OF THE INVENTION

[0003] In the vending industry, coins and bills have been one manner used to pay for vended goods and services. In this regard, when a vending account is to be settled, coins and bills can be collected from vending equipment, and the coins and bills can be reconciled with the physical inventory to determine what was sold and how much money was collected.

[0004] In recent years, cashless payments, for example credit cards, have become an option for payments. In this regard, a user of vending equipment may now be able to use cashless payments, in addition to coin and bill payments, for vended goods and services. In the case of cashless payments, a cashless payment can typically be processed by a third party server. Subsequently, an electronic funds transfer (EFT) can remit the cashless payment received, less any transaction processing fees and/or other fees, to an operator of the vending equipment. Even so, in some instances, the EFT may not reconcile an actual vend event with an associated actual cashless transaction. To further complicate matters, the vend sale amount may not match the EFT amount since fees may be deducted from the cashless funds, and oftentimes, the EFT transactions may represent an aggregated batch or bundling of multiple transactions, thus obscuring each individual vend transaction.

[0005] The processing of cashless transactions can cause numerous problems for processors handling cashless transactions, vendors offering goods and/or services by way of a vending machine accepting cashless transactions, and others involved in the cashless transaction process. For example, in one settlement process, coins, bills, and cashless transactions may not be timely reconciled with inventory since many cashless transactions may still be stored in a vending machine or other associated data storage device. In other instances, cashless transactions may still be en route to a third party server, not settled yet and/or aggregated with little or no transaction level detail. Oftentimes, only after vend settlement is initiated, may an associated EFT transaction occur, which can further frustrate the settlement process because of the aggregated nature of EFTs.

[0006] In addition, the routing of cashless transactions to one or more third party servers can also create an accountability problem. In some instances, multiple items can be vended from a vending machine, and one or more customers may attempt to pay with a cashless implement, such as a credit or debit card. However, in such instances, there is no guarantee that a vending equipment operator will ever see funds for vends paid for by cashless transactions, and no further guarantee that a customer was correctly charged for the vended goods and/or services. As such, there may be little or no accountability as to when vends occurred or what was charged to the customer. Moreover, there may be little or no accountability as to whether a customer was timely and accurately charged, and little or no assurance that a vending equipment operator timely received the correct funds for vends paid for by cashless transactions.

[0007] Furthermore, a problem exists in auditing third party servers to verify accuracy and/or correctness of cashless transactions. In this regard, cashless transaction vending can lack oversight, accountability, auditing controls, and the ability to control how a device in the vending equipment operates and how data is communicated with or between various servers or other data processing devices.

[0008] Another problem occurs when route personnel attempt to reconcile transaction amounts and inventory at a vending equipment location. In some instances, the amount of bills, coins, cashless vends, and inventory must be known at the same point in time. As related to cashless transactions, this means knowing what the value of each transaction is without any fees removed, knowing which of the cashless transactions have been settled, and also knowing which of the settled cashless transactions have a corresponding EFT record indicating that an operator of the vending equipment has been paid for the cashless transactions. Without this level of detail, it may be unlikely that an accurate or timely vending equipment settlement can be performed without error across multiple vending equipment locations. For vending equipment in global locations, the settlement process may not be performed efficiently.

[0009] Therefore, a need exists for systems and methods for providing a vending network.

SUMMARY OF THE INVENTION

[0010] Some or all of the above needs can be addressed by various embodiments of the invention. Embodiments of the invention can provide systems and methods for providing a vending network.

[0011] In one embodiment, a system for providing a vending network can be implemented. The system can include at least one transaction-type device associated with a vending machine, wherein the at least one transaction-type device is operable to facilitate cash transactions and/or cashless transactions associated with one or more products or services offered by the vending machine. The system can also include at least one server operable to communicate with the at least one transaction-type device, wherein the at least one server is operable to receive data associated with the transactions. Furthermore, the system can include at least one vend settlement server operable to communicate with the at least one server, wherein the at least one vend settlement server can settle some or all of the transactions.

[0012] In another embodiment, a method for providing a vending network can be implemented. The method can include receiving inputs for cash transactions and/or cashless transactions from a plurality of transaction-type devices associated with respective vending machines. In addition, the method can include transmitting transaction data associated with some or all of the transactions to at least one server. Moreover, the method can include settling some or all of the transactions via at least one vend settlement server.

[0013] In yet another embodiment, a system for providing a vending network can be implemented. The system can include at least one transaction-type device associated with a vending machine, wherein the at least one transaction-type

device is operable to facilitate cash transactions and/or cashless transactions associated with one or more products or services offered by the vending machine. In addition, the system can include at least one server operable to communicate with the at least one transaction-type device, wherein the at least one server is operable to receive data associated with the transactions and is further operable to associate a unique identifier with each of the transactions. Moreover, the system can include at least one vend settlement server operable to communicate with the at least one server, wherein the at least one vend settlement server can settle some or all of the transactions.

[0014] In an additional embodiment, a method for providing a vending network can be implemented. The method can include receiving inputs for cash transactions and/or cashless transactions from a plurality of transaction-type devices associated with respective vending machines. The method can also include transmitting transaction data associated with some or all of the transactions to at least one server. Further, the method can include associating a respective unique identifier with some or all of the transactions. Moreover, the method can include settling some or all of the transactions via at least one vend settlement server.

[0015] In yet another embodiment, a vending network can be provided. The vending network can include at least one server operable to receive inputs for cash transactions and/or cashless transactions from a plurality of transaction-type devices associated with respective vending machines. Furthermore, the vending network can include at least one vend settlement server operable to communicate with the at least one server, wherein the at least one vend settlement server can settle some or all of the transactions. In addition, the vending network can include an operator server operable to communicate with the at least one vend settlement server to facilitate management of at least one operational function comprising the following: vending machine fill-to-fill management, route management, and vend transaction management.

[0016] Other embodiments and aspects of the invention are described in detail herein and are considered a part of the claimed invention. For a better understanding of embodiments of the invention with features and aspects, refer to the description and to the drawings.

BRIEF DESCRIPTION OF THE FIGURES

[0017] The foregoing and other features, and aspects of the invention are apparent from the following detailed description taken in conjunction with the accompanying drawings in which:

[0018] FIG. **1** illustrates an example system for providing a vending network in accordance with an embodiment of the invention.

[0019] FIG. **2** illustrates an example of a system that uses a reconciliation token during communications between a server switch and a third party server and/or a settlement engine in accordance with an embodiment of the invention.

[0020] FIG. **3** illustrates an example of a system that utilizes a settlement engine to provide operational and financial data processing for an operator server in accordance with an embodiment of the invention.

[0021] FIG. **4** illustrates an example of a system that utilizes a server switch to interface to devices, vend settlement servers, third party servers, financial institutions, and other data services in accordance with an embodiment of the invention.

[0022] FIG. **5** illustrates an example of a system that uses a plurality of server switches, and provides for flexible financial transaction handling and device network connectivity via the plurality of server switches and/or the settlement engine in accordance with an embodiment of the invention.

[0023] FIG. **6** illustrates an example of the server switch interfacing to a property management system (PMS) in accordance with an embodiment of the invention.

[0024] FIG. **7** illustrates an example method for providing a vending network in accordance with an embodiment of the invention.

[0025] FIG. **8** illustrates another example method for providing a vending network in accordance with an embodiment of the invention.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0026] As used herein, the term "transaction" can refer to a cash or cashless payment associated with a purchase of a good and/or service. Embodiments of the invention are intended to cover any combination of cash and/or cashless payments or transactions as well as payments or transactions relating to any combination of goods and/or services.

[0027] As used herein, the terms "server switch" and "server" can be used interchangeably. Embodiments of the invention are intended to cover any combination of servers, server switches, or other processing devices with similar functionality to a server or server switch.

[0028] As used herein, the terms "reconciliation token" and "unique identifier" can be used interchangeably. Embodiments of the invention are intended to cover any type of unique identifier including, but not limited to, a reconciliation token or any other device, code, or identifying instrument with similar functionality.

[0029] Referring now to FIG. **1**, an example of a system such as a vending network system **100** in accordance with an embodiment of the invention is shown. Embodiments of the invention can provide systems and methods for providing a vending network. Other embodiments of a vending network are shown in FIGS. **1-6**. In general, embodiments of the invention can use one or more reconciliation tokens to track or otherwise mark any number of transactions handled by the vending network system **100** during communications between at least one server switch and one or more third party servers and/or a settlement engines.

[0030] In the embodiment shown in FIG. **1**, a vending network system **100** can include one or more transaction devices **102**A-N associated with respective vending equipment **104**A-N. Some or all of the transaction-type devices **102**A-N can be in communication via at least one network, such as **106**, with one or more server switches, such as **108**A-N. In one embodiment, one or more transaction-type devices **102**A-N can be in communication with each other via one or more networks, such as **106**.

[0031] Transaction-type devices **102**A-N can be any processor-type device, and may be referred to individually as a data processing device. Some or all transaction-type devices **102**A-N can be operable to receive and transmit data associated with at least one cash and/or cashless transaction, or a consumer. Such data may be referred to as transaction data. Transaction data can include, but is not limited to, vending equipment load-to-load (also referred to as fill-to-fill) information, vend transaction matching and reconciliation processing data, electronic fund transaction (EFT) reconciliation

data, cash vending transactions, cashless vending transactions, cashless transaction data, cash transaction data, transaction records, DEX data, MDB data, transaction refunds (also referred to as reversals) data, accounting data, auditing data, electronic funds charge back data, route management data, business management data, and any other type of data associated with a vending equipment transaction or a consumer. Examples of transaction-type devices can include, but are not limited to, a cash transaction reader, a cashless transaction reader, a combination cash and cashless transaction reader, a RFID reader, a biometric reader, an energy management system (EMS)-type device, a vending machine controller (VMC), and any other type of payment transaction devices. In some instances, a transaction device can be manufactured by HP™, DELL™, IBM/LENOVO™, and GATEWAY™, and may operate software provided by MICROSOFT™, and LINUX™.

[0032] In one embodiment, a transaction-type device, such as **102**A, can be a payment device operable to accept a cash and/or cashless payment from a consumer, and further operable to facilitate the dispensing of goods and/or services from associated vending equipment, such as **104**A. In another embodiment, a transaction-type device, such as **102**A, can be a vending equipment controller operable to facilitate the operation of associated vending equipment, such as **104**A.

[0033] Vending equipment **104**A-N can include, but is not limited to, a product or beverage dispenser, a vending machine, a snack dispenser, a device capable of dispensing or providing a consumable food or drink item, a device capable of dispensing or providing a non-consumable item, or a device capable of facilitating purchase of a good and/or service. Vending equipment, such as **104**A, can also be referred to individually as a vending machine. In some embodiments, vending equipment **104**A-N may conform to vending industry standards including, but not limited to, the National Automatic Merchandising Association (NAMA) MDB specification, and the European Vending Association (EVA) DEX specification. In one embodiment, vending equipment **104**A-N can include a vending industry standard-type multi-drop-bus (MDB) interface, and/or a data exchange (DEX) interface.

[0034] In one embodiment, multi-drop-bus (MDB) data can be collected from vending equipment, such as **104**A-N, and the collected MDB data used to form transaction data records. In this regard, MDB data can include, but is not limited to, inventory, product pricing, and other data during vend events that can be combined with payment ID (for example a PIN number or credit card number) to form a transaction record. In addition, MDB data can be collected during non-vend events and used to form transaction records such as service requests, energy management records, and other types of transaction records.

[0035] In the embodiment shown in FIG. **1**, a network **106** can be wired or wireless-type network, and may be more than one network to facilitate both wired and wireless-type communications between system components. The network **106** shown in FIG. **1** is shown by way of example. Examples of a network **106** can include, but are not limited to, a local area network (LAN), a wide area network (WAN), the Internet, a global network, a wireless network, a wired network, and any combination thereof. Wireless network communications can be implemented, for example, by way of GSM, GPRS, CDMA2000, 1XRTT, EDGE, 802.11 types and kinds including but not limited to 'a', 'b', 'g', 'n', 900 MHz, 2.4 GHz, 5 GHz, spread spectrum, open wireless standards, proprietary wireless techniques, 3G, 3.5G, 4G technologies ('G' stands for generation), and any other wireless-type communication device, standard, or methodology. Wired network communications can be implemented, for example, by way of Ethernet, Firewire, serial communications, USB, RS232, and any other wired-type communication device, standard, or methodology. In one embodiment, a network can be the Internet, which may be referred to as a global network.

[0036] In the embodiment shown, a server switch **108**A can be a processor-based platform, such as a server. In one embodiment, a server switch **108**A can be operable to store a copy of some or all of transaction data received from one or more transaction devices **102**A-N. The server switch **108**A may store some or all of the transaction data in an associated database or data storage device, such as **110**, **112**, or **114**. In another embodiment, a server switch, such as **108**A, can be operable to generate a unique identifier, such as a reconciliation token, and associate the unique identifier or token with or otherwise add the unique identifier or token to a transaction record. In some embodiments, a server switch, such as **108**A, can generate and associate a unique identifier or reconciliation token with some or all transactions which may be transmitted via a network, such as **106**, by the system **100**.

[0037] As shown in FIG. **1**, the system **100** can also facilitate communications with one or more servers **116**, **118**, **122** and/or third parties **120**. In the embodiment shown, some or all of the transaction-type devices **102**A-N can be in communication with at least one of the following: a vend settlement server **116**, a data services server **118**, a financial institution **120**, a third party server **122**, and/or any device associated with a third party. In this embodiment, a transaction-type device, such as **102**A, can transmit data via a network, such as **106**, to a server switch, such as **108**A. The server switch **108**A can selectively transmit some or all of the received data to another transaction-type device, such as **102**N; another server switch, such as **108**N; a vend settlement server, such as **116**; a data services server, such as **118**; a financial institution, such as **120**; a third party server, such as **122**; or any other device associated with a third party. Data received by a vend settlement server **116**, a data services server **118**, a financial institution **120** and/or a third party server **122** can be stored in an associated database, such as **109**, or other data storage device.

[0038] In one embodiment, a transaction-type device, such as **102**A, can transmit data to a vend settlement server, such as **116**, via a network, such as **106**, and server switch, such as **108**A. Data initially received or otherwise collected by the transaction-type device **102**A can be transmitted to the server switch **108**A in a format such as a data packet **124**. The data can include, but is not limited to, vending equipment load-to-load (also referred to as fill-to-fill) information, vend transaction matching and reconciliation processing data, electronic fund transaction (EFT) reconciliation data, cash vending transactions, cashless vending transactions, cashless transaction data, cash transaction data, transaction records, DEX data, MDB data, transaction refunds (also referred to as reversals) data, accounting data, auditing data, electronic funds charge back data, route management data, business management data, and/or any other type of data associated with a vending equipment transaction or a consumer. Ultimately, some or all of the data can be transmitted by the server switch, such as **108**A, to a vend settlement server, such as **116**.

[0039] In one embodiment, one or more reconciliation tokens can facilitate auditing some or all of the transaction

data handled by one or more vend settlement servers **116** and/or third party servers **122**. For example, a server switch, such as **108**A, can communicate at least one reconciliation token with each transaction to a vend settlement server **116** and/or third party server **122**, and receive transaction data from the vend settlement server **116** and/or third party server **122** in response to each reconciliation token. In this example, a server switch **108**A can transmit at least one reconciliation token in a data packet **126** to a vend settlement server **116** and/or third party server **122**. In response to the receiving one or more reconciliation tokens, the vend settlement server **116** and/or third party server **122** can transmit a data packet **128** with response data including the one or more reconciliation tokens to the server switch **108**A. Such response data can be compared to previously transmitted transaction data or other data previously stored in a database, such as **110**, **112**, or **114**, or other data storage device associated with the server switch **108**A. In one embodiment, a vend settlement server such as **116** can be referred to as a third party server and can be audited in a similar manner described above.

[0040] Furthermore, in one embodiment, a server switch, such as **108**A, can be operable to switch or otherwise transfer one or more transaction records between various destination servers. For example, transaction data stored on a particular server can be transferred to another server by way of a server switch, such as **108**A. Moreover, a server switch **108**A can be operable to issue a data packet **130** with one or more reconciliation tokens in response to transaction data received or transmitted by the server switch **108**A. In addition, a server switch **108**A can be operable to maintain at least one transaction database for storing transaction data, such as a plurality of databases including a KO database **110**, reconciliation database **112**, and device database **114**.

[0041] In one embodiment, a server switch, such as **108**A, can be operable to control access to a network, such as **106**, by inspecting each transaction received at the server switch **108**A. For example, before passing transaction data from a transaction-type device, such as **102**A, to a destination location, the server switch **108**A can check a database, such as the device database **114**, to ensure that the transaction-type device, for instance **102**A, from which the transaction is received is allowed to use the network **106**. If the transaction-type device **102**A is not allowed to use the network **106**, the transaction data is not forwarded to the destination location and optionally the transaction-type device **102**A can be informed by the server switch **108**A that access to the network **106** is denied.

[0042] In another embodiment, a server switch, such as **108**A, can be operable to control the types or classes of transactions a particular transaction-type device, such as **102**A, is allowed to transmit on a network, such as **106**. In this regard, the server switch **108**A can inspect the type or class of transaction being transmitted, compare each transaction type or class to one or more allowed types or classes of transactions stored in a database, such as device database **114**, and determine if such a transaction is allowed from the particular transaction-type device **102**A. For example, if a transaction-type device **102**A is deployed to accept a particular class of transactions, such as hotel room key cards, the server switch **108**A can prevent or otherwise limit all other transactions, such as non-hotel room key cards, from being used.

[0043] Referring to FIG. **2**, an example system **200** for tracking one or more transactions in a vending network in accordance with an embodiment of the invention is shown. The system **200** can be implemented using some or all of the system components shown in FIG. **1**, and in this example, some of the system components of system **100** are utilized. In this embodiment, the system **200** can include a data flow which commence when a transaction-type device, such as **102**A, can initiate communication with a third party server, such as **118**, by way of server switch, such as **108**A. For example, the transaction-type device **102**A can generate and transmit at least one data packet, such as **124**, which can include transaction data that can be encrypted such that a third party server, such as **118**, can decrypt the data by way of at least one decryption key. In some instances, the encrypted transaction data can include other data, such as KO data, and can be further encrypted wherein the server switch **108**A can decrypt the data by way of another decryption key. In any instance, the server switch **108**A can receive the encrypted data, or data packet **124**, and after processing the encrypted data or data packet **124**, the sever switch **108**A can transmit a corresponding data packet, such as **126**, to the third party server **122**. After receipt and processing of the data packet **126**, the third party server **118** can transmit a corresponding data packet, such as **128**, to the server switch **108**A, wherein the server switch **108**A decrypts and processes the data. Processing of the data by a server switch, such as **108**A, can include some or all of the following activities: verifying that a transaction-type device, such as **102**A, is authorized to access a network, such as **106**; verifying that a transaction-type device, such as **102**A, is authorized to perform a particular transaction type or class; generating at least one reconciliation token; and storing data, such as KO data, in a database or data storage device, such as **110**, **112**, and/or **114**.

[0044] Referring back to the server switch, the server switch, such as **108**A, can generate at least one data packet by either generating at least one new reconciliation token if a particular transaction requires it (such as when an initial authorization request is made) or identifying and/or retrieving a previously assigned reconciliation token (such as when a third party server **122** is communicating a response to transaction-type device, such as **102**A). The data packet, for example **126**, can include at least one reconciliation token and previously received third party or transaction data. In some instances, the previously received third party or transaction data can be encrypted if desired. The data packet **128** can be communicated to the third party server **122**.

[0045] Referring to the third party server, upon receipt of the data packet **126**, the third party server, such as **122**, can process the received data packet **126**. Such processing can include, but is not limited to, decrypting the encrypted packet and acting on the data, or storing a reconciliation token and/or other associated transaction data in a database or data storage device, such as **110**, **112**, or **114**.

[0046] During or after completion of processing the data packet **126** at the third party server **122**, the third party server **122** can wait for a response to be communicated to transaction-type device **102**A. In this regard, a data packet, such as **128**, can be generated by the third party server **122** to include at least one previously received reconciliation token that was associated with the particular transaction at the server switch **108**A, as well as response data from the third party server **122**. In some instances, the response data from the third party server **122** can be encrypted if desired).

[0047] The third party server **122** can communicate the data packet **128** to the server switch **108**A. The server switch **108**A receiving the data packet **128** can use at least one reconcilia-

tion token to verify that a predefined transaction state sequence is being followed, and can update one or more state fields associated with the instant transaction. The server switch **108**A can update one or more databases as necessary, and/or otherwise process the received data packet **128**. The server switch **108**A can communicate a corresponding data packet **130** to the transaction-type device **102**A. The data packet **130** can be received at the transaction-type device, such as **102**A, where the transaction-type device **102**A can process the data packet **130** and associated response data. In this example, data packets **124**, **126**, **128**, and **130** can be of the same or similar format.

[0048] In one embodiment, a state machine data structure can be established by a server switch, such as **108**A, for a particular class of transaction. In this regard, the server switch **108**A can determine if a particular transaction-type device, such as **102**A, is allowed to perform a particular class of transaction (for example, a hotel room key card-type-transaction) and prevent or otherwise limit the transaction-type device **102**A from performing certain types of transactions (for example, RFID credit card-type transactions). Using state machine logic or a set of instructions, the server switch **108**A can ensure that a prescribed sequence of communications between the transaction-type device **102**A and the third party server **122** is maintained.

[0049] For example, when a transaction-type device, such as **102**A, facilitates a sales or vending transaction at a vending machine, such as **104**A, by way of a user paying with a credit card, a state of the transaction can be as follows. Initially, a first state can be recorded by a server switch, such as **108**A, as an initial authorization request by the transaction-type device **102**A. Another state can be a response to the initial authorization request by a third party server, such as **122**. Yet another state can be a completed sales record communicated from the transaction-type device **102**A when the user completes the sales or vending transaction. Another state can be when the third party server **122** acknowledges the receipt of the completed sales transaction record communicated from the transaction-type device **102**A.

[0050] In this embodiment, the state tracking capability of a server switch, such as **108**A, related to each class of transactions and for each individual transaction can permit the server switch **108**A to provide accountability for some or all transactions. This can include, but is not limited to, tracking which transactions are in a particular state of processing, and instructing a transaction-type device, such as **102**A, and an associated third party server, such as **122**, to adhere to a predetermined sequence of communications (also referred to as "state machine type logic"). In the case where a transaction sequence is unsuitable or otherwise incorrect, a server switch, such as **108**A, can stop or delay a particular transaction from proceeding and/or send a message to either or both the transaction-type device **102**A and the third party server **122**. This feature can permit the server switch **108**A to maintain accountability of each transaction-type device **102**A-N, each third party server, such as **122**, and to also maintain oversight of the manner in which transaction-type devices, such as **102**A-N, and an associated third party server, such as **122**, communicate to perform certain classes of transactions.

[0051] One aspect of using one or more state conditions to monitor, control and/or track transactions is that at any time a server switch, such as **108**A, can determine which transactions have been completed. In this regard, such information can be used, for example, to more accurately identify transactions that may appear to have been lost. Such transactions may have been authorized, but never settled, as such, the state of these missing transactions is that the transactions may only have been partially completed (no sales information, no settlement, no EFT, etc.). This aspect permits a user, via the server switch, such as **108**A, to identify possible issues related to payment for products and/or services. In addition, the user can identify issues related to any number of transaction-type devices **102**A-N, servers such as a third party server **122**, and/or other issues related to transaction processing by the system **100**.

[0052] Referring to FIG. **3**, an example system **300** for providing a vending network in accordance with an embodiment of the invention is shown. The system **300** can be implemented using some or all of the system components shown in FIG. **1**, and in this example, some of the system components of system **100** are utilized.

[0053] In the embodiment shown in FIG. **3**, a vend settlement server, such as **116**, can provide some or all operational and financial data processing for an associated operator server, such as **134**. An operational server can be operable to manage vending equipment, such as **104**A-N, and/or one or more associated vending routes. The vend settlement server **116** can be operable to coordinate the reconciliation of coins, bills, cashless transactions, and other types of inventory management data. As shown, the vend settlement server **116** can communicate with the operator server **134**. With data provided by the vend settlement server **116**, the operator server **134** can provide route management for vending equipment, such as **104**A-N, including, but not limited to, reporting, route management, accountability, service, financial management, business analysis, asset management, product inventory management, and data processing. In this regard, a vend settlement server such as **116** can be operable for money reconciliation, pre-cashless settlement processing (determining the revenue cashless transactions should produce), post settlement processing (determining the revenue actually received from cashless transaction processing—as an example from EFTS), and coordinate the delivery of funds, inventory, and other vending equipment data to an associated operator server such as **134**.

[0054] In operation, the operator server **134** can communicate with the vend settlement server **116**. Initially, transaction data from one or more transaction-type devices, such as **102**A, and associated vending equipment, such as **104**A, can be received or otherwise collected by the server switch **108**A. The server switch **108**A can communicate further as needed or desired with a data services server, such as **118** and/or a third party such as a financial institution **120**. As discussed previously, transaction data can be communicated by the server switch **108**A to the vend settlement server **116** for processing and/or storage. Optionally, a vend settlement server, such as **116**, can utilize one or more databases to store data as may be required or desired, such as a transaction database **109**. In any instance, the vend settlement server **116** can communicate with the operator server **134** to handle some or all of the following activities: reconciliation of coins, bills, cashless transactions, and other types of inventory management data; reporting; route management; transaction accountability; service; financial management; business analysis; asset management; product inventory management; data processing; money reconciliation; pre-cashless settlement processing (determining the revenue cashless transactions should produce); post settlement processing (determin-

ing the revenue actually received from cashless transaction processing—as an example from EFTS); and coordinate the delivery of funds, inventory, and other vending equipment data.

[0055] In this manner, reconciliation of bills, coins, and cashless transactions can be synchronized with the product or inventory that a route operators fills the vending equipment with, or otherwise restocks the vending equipment with. Delays in processing certain types of cashless transactions, such as credit card transactions, can result in less than 100% accountability of payment detail (bills, coins, and cashless revenues) at the time the route operator is restocking the vending equipment. As such, the ability to determine what has been sold and paid for can be difficult to determine at any given time and especially when cashless transactions are delayed by processing, such as pending electronic funds transfers (EFTS). In addition, the inability to accurately determine what has been purchased from the vending equipment can cause the route personnel to incorrectly select the restock product to load on to the route truck before traveling to the vending equipment location, which may cause too much or too little restock product to be carried on the route for subsequent restocking.

[0056] In FIG. **4**, an example system **400** for providing a vending network in accordance with an embodiment of the invention is shown. The system **400** can be implemented using some or all of the system components shown in FIG. **1**, and in this example, some of the system components of system **100** are utilized. In the system shown, a server switch **108**A can be in communication with a plurality of third party servers **122**, such third party servers **122** utilizing a plurality of databases, such as transaction database **109**. At least one of the third party servers **122** can be in communication with one or more financial institution servers **120**, and by way of server switch **108**A in communication with a plurality of transaction-type devices **102**A-N. In this configuration, at least one third party server **122** can process transactions from the plurality of transaction-type devices **102**A-N, and via server switch **108**A can provide transaction level detail data and EFT level detail data to at least one vend settlement server **116**, where such data is processed or otherwise reconciled with other data (non-cashless and other data) and then data communicated to the operator server **134**.

[0057] In addition, optionally the server switch **108**A can communicate with at least one financial institution server **120**A and/or at least one data services server **118**. In this regard, the server switch **108**A can process transactions, providing as may be required and/or desired transaction level detail data, EFT level detail data, and/or other types of data or detail data to at least one vend settlement server **116**, wherein the vend settlement server **116** with other data including data from at least one third party server **122** can process data and communicate as necessary with at least one operator server **134** to facilitate route management for vending equipment, such as **104**A-N, including reporting, route management, accountability, service, financial management, business analysis, asset management, product inventory management, and data processing.

[0058] In the embodiment shown, a server switch, such as **108**A can be in communication with one or more transaction-type devices, such as **102**A-N, at least one vend settlement server **116**, one or more third party servers **122**, one or more financial institutions **120**, and one or more data services servers **118**. The transaction-type devices **102**A-N can communicate different types of data, such data formatted in one or more data packets, to the server switch **108**A. For example, a data packet **124** can include KO data and third party transaction data (encrypted if necessary). A second transaction-type device, such as **102**B, may communicate formatted KO data illustrated as data packet **136**. The flexibility of the server switch **108**A to accommodate a plurality of different types of data, associated data packets, and data formats permits relevant data to be inspected and processed at the server switch **108**A, such as KO data, as well as allow, if necessary, third party data (encrypted and/or otherwise proprietary) to be transmitted by the server switch **108**A to a destination third party server, such as **122**, and/or to a vend settlement server, such as **116**.

[0059] An aspect of this embodiment is that collection of data from a plurality of transaction-type devices, such as **102**A-N, at the server switch, such as **108**A, can be relatively homogeneous across the plurality of devices, such as **102**A-N. This can be implemented by some embodiments regardless of the type or purpose of the plurality of transaction-type devices. Another aspect of this embodiment is that oversight and accountability at the server switch, such as **108**A and vend settlement server, such as **116**, can be relatively easily maintained due in part to relatively homogenous data being received at the server switch **108**A.

[0060] In another embodiment, an aspect is the ability for third party servers such as third party server **122** to receive data from the same transaction-type devices, such as **102**A-N, in a format that allows the third party server **122** to continue operating as designed. In other words, transaction-type device, such as **102**A, is operable to send a data packet (for instance, KO data and/or third party data) that can be both understood by the server switch, such as **108**A, and by the third party server, such as **122**. This permits both servers, the server switch **108**A and the third party server **122**, to function with minimal or no changes. This "shared data type function" can permit one or more third parties with their own information technology (IT) infrastructure, perhaps tailored to provide a particular product and/or service to their own customers, to use a vending network in accordance with an embodiment of the invention to both satisfy their third party data needs as well as satisfy needs of the server switch, such as **108**A, a vend settlement server, such as **116**, and/or an operator server, such as **134**.

[0061] Another aspect of this embodiment can permit one or more third parties to provide various services to customers (web based and/or otherwise) from their own IT infrastructure while allowing a vending network in accordance with an embodiment of the invention, managed by the server switch, such as **108**A, to maintain accountability, audit ability of the network, and utilize a vend settlement server, such as **116**, to meet some or all of the needs of one or more vending route operators by way of an operator server, such as **134**, and vending equipment personnel that may rely on the operator server **134** to operate or otherwise manage their respective businesses.

[0062] In one embodiment of a system for providing a vending network, as illustrated in FIG. **4**, one or more databases, such as **109**, **110**, **112**, and **114**, or data storage devices can be associated with either or both a vend settlement server, such as **116**, and/or the server switch, such as **108**A.

[0063] In one embodiment of a system for providing a vending network, as illustrated in FIG. **4**, a vend settlement server, such as **116**, can initiate an audit of a third party server,

such as **122**. In this regard, a vend settlement server, such as **116**, can generate and transmit one or more reconciliation tokens to a third party server, such as **122**, by way of transmitting a data packet to the third party server **122**, and the vend settlement server **116** can receive a data packet including a response from the third party server **122**.

[0064] Another embodiment of a system for providing a vending network can include a combination of servers, wherein a server originating an audit of a third party server, such as **122**, can either be a server switch, such as **108**A, or a vend settlement server, such as **116**, and a data packet including a response from a third party server, such as **122**, can be sent to a non-originating server, such as either the server switch **108**A or a vend settlement server **116**.

[0065] Referring to FIG. **5**, an example system **500** for providing a vending network in accordance with an embodiment of the invention is shown. The system **500** can be implemented using some or all of the system components shown in FIG. **1**, and in this example, some of the system components of system **100** are utilized. In this embodiment, the system **500** can include a plurality of server switches, such as **108**A-N in communication with a plurality of transaction-type devices, such as **102**A-N, and at least one vend settlement server, such as **116**. The plurality of transaction-type devices **102**A-N can utilize one or more of the plurality of server switches **108**A-N to communicate with various data processing equipment, such as financial institution **120**, the vend settlement server **116**, and/or other third party servers, such as **122**. The system embodiment shown can provide relatively flexible financial transaction handling and device network connectivity. In this manner, different transaction-type devices and server switches can be utilized to aggregate bills, coins, cashless, inventory, and/or other types and kinds of transaction data.

[0066] The flexibility and connectivity of the system embodiment shown can permit in some instances, certain cashless transactions to be processed where a sale amount is known but the actual funds are not yet available. For example, on occasion certain cashless transaction types, such as credit cards, may appear as a "good account" when authorized, but when it comes time to settle the transaction with the actual sale amount, the settlement process may sometimes fail. Such failures can occur for various reasons including the expiration of a credit card, an account being closed sometime after authorization but before settlement, and for many other reasons. In addition, there can be typically about a 24-72 hour delay from the time the settlement process occurs and the time the funds are actually available.

[0067] These circumstances, in combination with the fact that operators of vending equipment may need to synchronize coins, bills, and cashless transactions in a timely manner (often quicker then cashless funds are available) to facilitate route and inventory management, can provide a need to track cashless transactions in a pre-settled state, a post-settled state, and/or by EFT summary detail.

[0068] Pre-settled cashless transaction can be characterized as transactions that have been completed at vending equipment, such as **104**A-N, and include a sale amount and any associated vend detail but still have to be communicated to a financial institution for settlement. Post-settled cashless transactions can be characterized as cashless transactions that have been communicated to a financial institution for settlement but funds may not be available. EFT summary detail can be characterized as the actual funds available that have been deposited (wired into a bank account).

[0069] In operation, there may be times when pre-settled cashless transaction details (sales that have not been settled) need to be combined with coins, and to reconcile vending equipment as well as to manage inventory. During other situations, post-settled cashless transaction detail may need to be relied upon, and finally EFTs may be reconciled to better manage the operator business. In one embodiment, the various states and conditions related to cashless transaction handling can be accommodated by the example system shown in FIG. **5**.

[0070] As shown in FIG. **5**, a financial institution, such as **120**, can be in communication with at least one server switch, such as **108**A-N, and at least one vend settlement server, such as **116**. In this manner, the system **500** can handle various cashless transactions as well as provide a plurality of communication paths such that the server switches **108**A-N and the vend settlement server **116** can synchronize some or all of the cashless transactions in a variety of states. The system **500** can also handle EFTs, coins, and bills, thus facilitating route management of vending equipment, products and service inventory, and/or financial accountability at an operator server, such as **134**.

[0071] Referring to FIG. **6**, an example system for providing a vending network in accordance with an embodiment of the invention is shown. The system **600** can be implemented using some or all of the system components shown in FIG. **1**, and in this example, some of the system components of system **100** are utilized. In this embodiment, the system **600** can include at least one server switch in communication with at least one property management system (PMS). For example in the embodiment shown in FIG. **6**, server switch **108**A can be in communication with property management system **138**. In one embodiment, a property management system can be used in a hotel or other places to manage guest portfolios including check-in guests, assign rooms, accrue guest charges, and for performing other services. In another embodiment, a property management system can be used in a location where third party information is desired to be managed in a relatively secure location associated with the third party.

[0072] In one embodiment, the system **600** can process transactions associated with hotel room keys. For example, one or more hotel room key cards can be utilized to allow hotel guests to use a respective hotel room key card at one or more transaction-type devices, such as **102**A-N. In some instances, a hotel guest may desire to have a product or service purchase added to his or her portfolio or invoice managed by a property management system, such as **138**. In this regard, by using his/her hotel room key card, a guest can have his/her purchases at transaction-type devices **102**A-N billed to his/her room and pay for the vended products and/or services when the hotel bill is paid.

[0073] In one embodiment, one or more transaction-type devices, such as **102**A-N, can generate and send transaction data, such as data packets **124** shown in FIG. **1**, to a server switch, such as **108**A. In certain instances, property management may not want certain transaction data, such as hotel key card data, to leave the premises for security reasons, and the use of a wide area network (WAN) configuration where a server switch is located at a remote location may not be acceptable to property management. One aspect of a server switch, such as **108**A, can be the location of the server switch

at or on property owned or otherwise controlled by property management. In this manner, a server switch, such as **108**A, can communicate with a plurality of transaction-type devices, such as **102**A-N, which may be hotel key card reading devices, and also communicate with the property management system, such as **138**.

[0074] In one embodiment, certain transaction data such as hotel key card data can remain onsite, but other transaction data, such as credit card transactions, sales information, inventory, service, and other data may be acceptable to communicate remotely. In this example, a first server switch, such as **108**A, can communicate with one or more other server switches, such as **108**N, and as necessary, to one or more vend settlement servers, such as **116**, third party servers, such as **122**, operator servers, such as **134**, and/or to other data processing equipment.

[0075] In one embodiment, a server switch, such as **108**A, can be integrated into at least one transaction-type device, such as **102**A-N. In this example, at least one of a plurality of transaction-type devices, such as **102**A-N, can function as a server switch in addition to performing various features and functions as a transaction-type device, such as **102**A-N. In this regard, a system in accordance with an embodiment of the invention may implement one or more micro-type server switches with respective transaction-type devices rather than having an independent server switch serving the transaction-type devices.

[0076] FIG. **7** illustrates an example method for providing a vending network in accordance with an embodiment of the invention. In this embodiment, a method **700** for providing a vending network can be implemented by a system such as **100** in FIG. **1**.

[0077] The method **700** can begin at block **702**, in which inputs for cashless transactions and cash transactions are received from a plurality of transaction-type devices associated with respective vending machines. In the embodiment shown in FIG. **7**, one or more transaction-type devices, such as **102**A-N, associated with respective vending machines can receive inputs for cashless transactions and cash transactions.

[0078] Block **702** is followed by block **704**, in which transaction data associated with some or all of the transactions is transmitted to at least one server switch. In the embodiment shown in FIG. **7**, transaction data associated with some or all of the cashless transactions and cash transactions are transmitted by the transaction-type devices **102**A-N to a server switch, such as **108**A.

[0079] Block **704** is followed by block **706**, in which some or all of the transactions can be settled via at least one vend settlement server. In the embodiment shown in FIG. **7**, the server switch **108**A can transmit some or all of the transactions to a vend settlement server, such as **116**, where some or all of the transactions can be settled or otherwise reconciled. In one embodiment, a server switch such as **108**A can associate a respective reconciliation token with some or all of the transactions.

[0080] The method **700** ends after block **706**.

[0081] FIG. **8** illustrates another example method for providing a vending network in accordance with an embodiment of the invention. In this embodiment, a method **800** for providing a vending network can be can be implemented by a system such as **100** in FIG. **1**.

[0082] The method **800** can begin at block **802**, in which inputs for cashless transactions and cash transactions are received from a plurality of transaction-type devices associated with respective vending machines. In the embodiment shown in FIG. **8**, one or more transaction-type devices, such as **102**A-N, associated with respective vending machines can receive inputs for cashless transactions and cash transactions.

[0083] Block **802** is followed by block **804**, in which transaction data associated with some or all of the transactions is transmitted to at least one server switch. In the embodiment shown in FIG. **8**, transaction data associated with some or all of the cashless transactions and cash transactions are transmitted by the transaction-type devices **102**A-N to a server switch, such as **108**A.

[0084] Block **804** is followed by block **806**, in which a respective reconciliation token is associated with some or all of the transactions. In the embodiment shown in FIG. **8**, the server switch **108**A can associate a respective reconciliation token with some or all of the transactions.

[0085] Block **806** is followed by block **808**, in which some or all of the transactions are settled via at least one vend settlement server. In the embodiment shown in FIG. **8**, the server switch **108**A can transmit some or all of the transactions to a vend settlement server, such as **116**, where some or all of the transactions can be settled or otherwise reconciled.

[0086] The method **800** ends after block **808**.

[0087] The capabilities of various embodiments of the invention can be implemented in software, firmware, hardware or some combination thereof.

[0088] As one example, one or more aspects of embodiments of the invention can be implemented in an article of manufacture (e.g., one or more computer program products) having, for instance, computer usable media. The media has embodied therein, for instance, computer readable program code as a means for providing and facilitating the capabilities of embodiments of the invention. The article of manufacture can be included as a part of a computer system or sold separately.

[0089] Additionally, at least one program storage device readable by a machine, tangibly embodying at least one program of instructions executable by the machine to perform the capabilities of an embodiment of the invention can be provided.

[0090] The flow diagrams depicted herein are just examples. There may be many variations to these diagrams or the elements (or operations) described therein without departing from the scope of the invention. For instance, the elements may be performed in a differing order, or elements may be added, deleted or modified. All of these variations are considered a part of the claimed invention.

[0091] While various embodiments of the invention have been described, it will be understood that those skilled in the art, both now and in the future, may make various improvements and enhancements which fall within the scope of the claims which follow. These claims should be construed to maintain suitable protection for embodiments of the invention described herein.

The claimed invention is:

1. A server comprising:

a memory device;

a processor in communication with the memory device, and configured to execute a set of instructions to:

communicate with a property management system, wherein the server receives transaction data from the property management system, the transaction data associated with a transaction and comprising a transaction type or a transaction class;

inspect each transaction type or transaction class;

compare each transaction type or transaction class to one or more allowed transaction types or transaction classes; and

communicate approval of the respective transaction when the transaction type or transaction class has been previously approved to perform with the property management system.

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