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(54) **DIGITAL WALLET SYSTEMS AND METHODS WITH RESPONSIBLE GAMING**

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(21) Appl. No.: **17/491,523**

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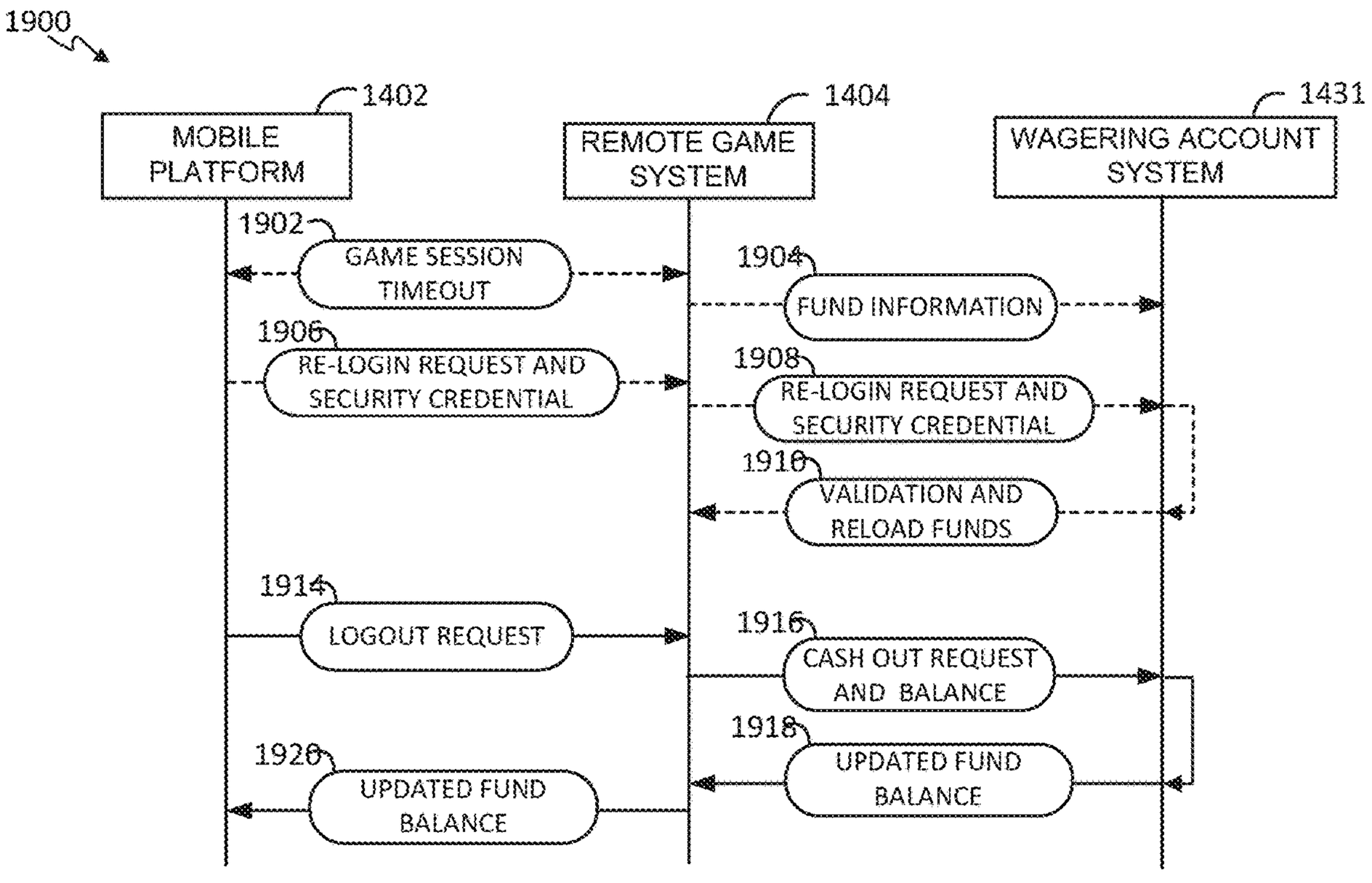
(57) **ABSTRACT**

A digital wallet computing system is described including at least one processor in communication with a memory storing instructions. The instructions cause the at least one processor to establish wireless connectivity between a mobile device and an electronic gaming device, the electronic gaming device including a device identifier, receive a funds transfer request from the mobile device, the funds transfer request identifying a funds transfer amount and an external player account, and identify an operator identity based on the device identifier. The instructions also cause the at least one processor to identify a player account, the player account associated with the operator, perform a first withdrawal transaction moving the funds transfer amount from the electronic gaming device to the player account, and in response to the first withdrawal transaction, automatically perform a second withdrawal transaction moving the funds transfer amount from the player account to the external player account.



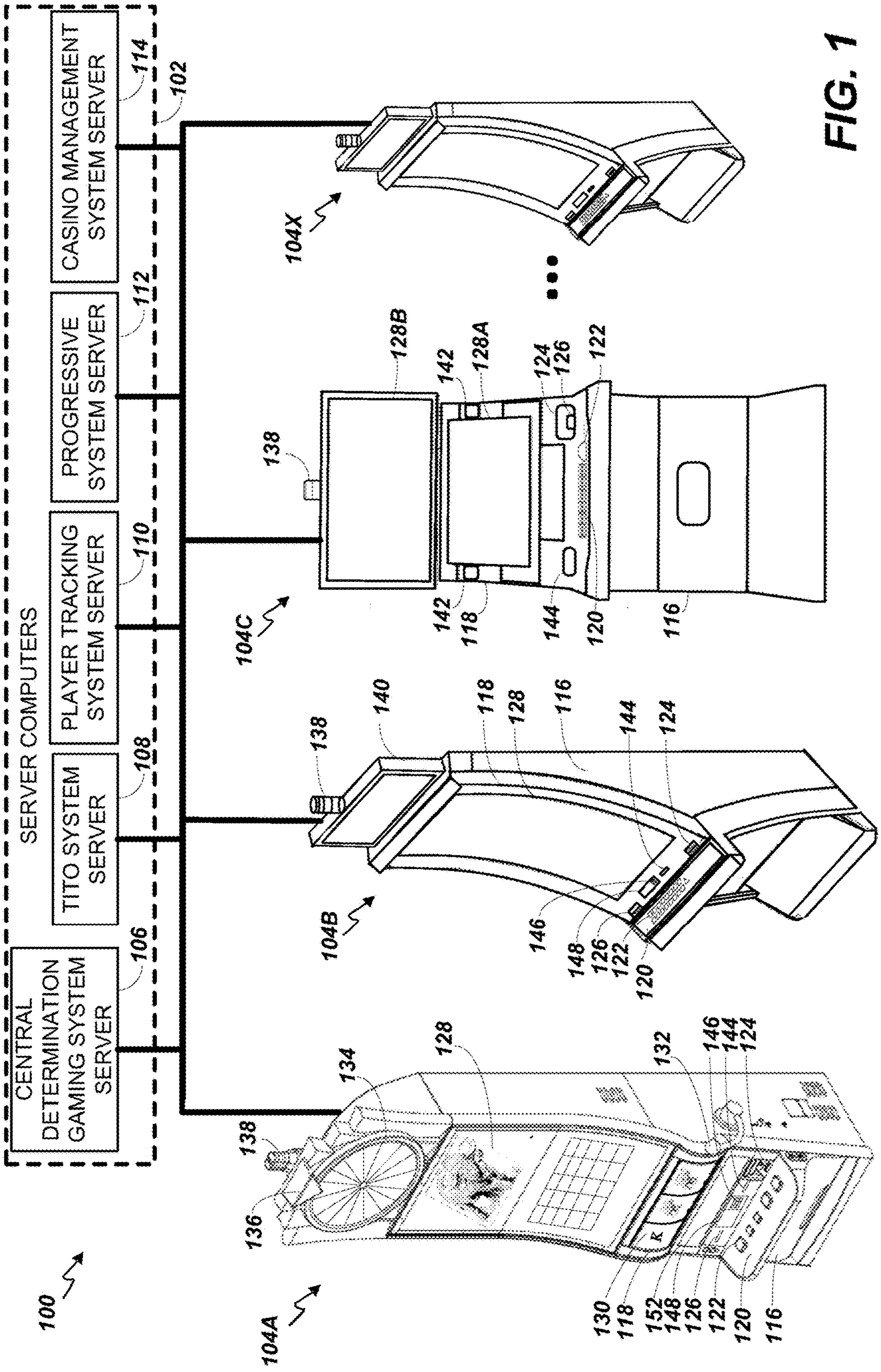

SERVER COMPUTERS
CENTRAL DETERMINATION GAMING SYSTEM SERVER
106
TITO SYSTEM SERVER
108
PLAYER TRACKING SYSTEM SERVER
110
PROGRESSIVE SYSTEM SERVER
112
CASINO MANAGEMENT SYSTEM SERVER
114
102
100
104A
104B
104C
104X
128B
128A
142
124
126
122
138
140
118
128
116
144
146
148
120
132
134
136
130
152

FIG. 1

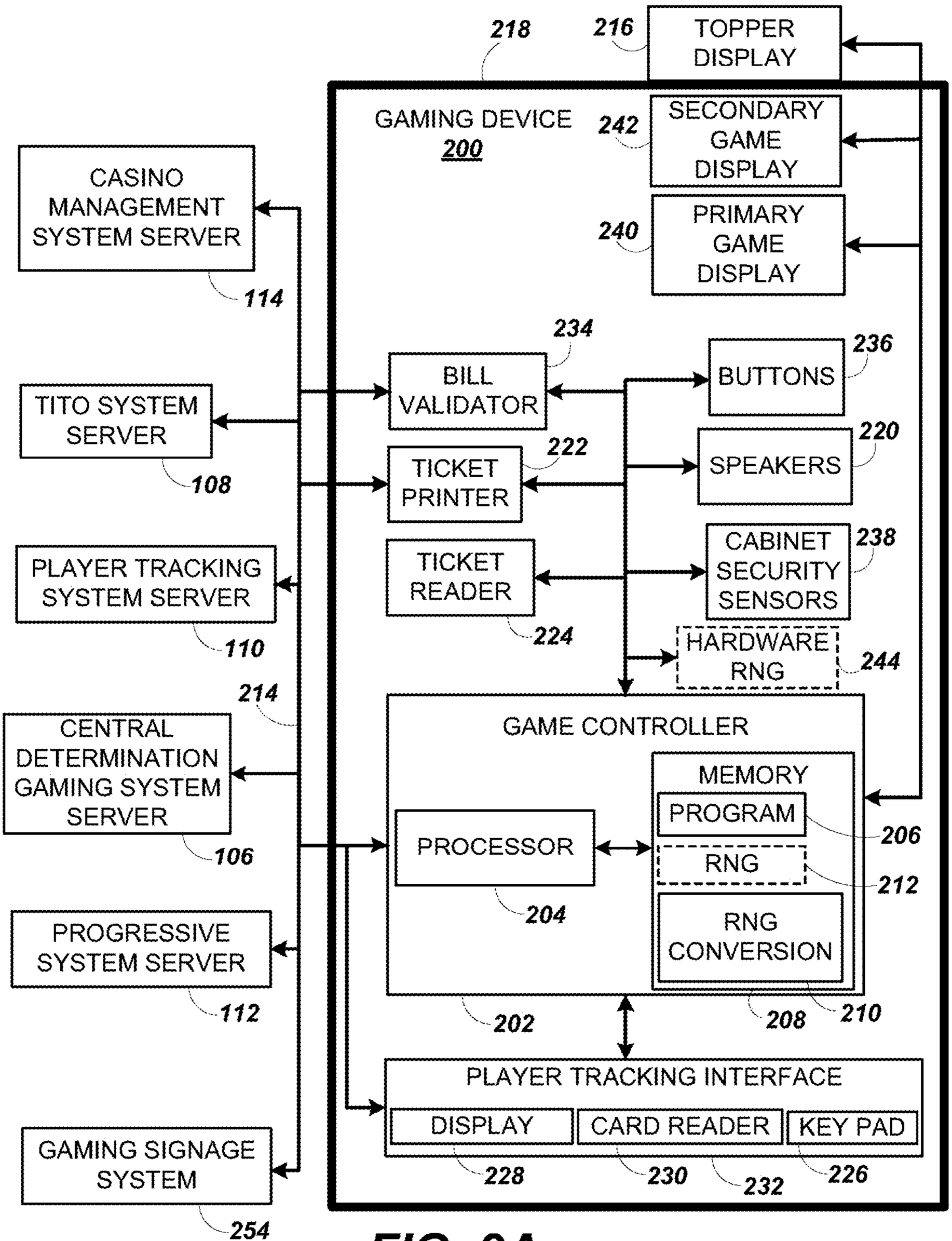

218
216
TOPPER DISPLAY
GAMING DEVICE
200
242
SECONDARY GAME DISPLAY
240
PRIMARY GAME DISPLAY
CASINO MANAGEMENT SYSTEM SERVER
114
234
BILL VALIDATOR
236
BUTTONS
TITO SYSTEM SERVER
108
222
TICKET PRINTER
220
SPEAKERS
PLAYER TRACKING SYSTEM SERVER
110
TICKET READER
224
CABINET SECURITY SENSORS
238
HARDWARE RNG
244
214
CENTRAL DETERMINATION GAMING SYSTEM SERVER
106
GAME CONTROLLER
MEMORY
PROGRAM
206
PROCESSOR
204
RNG
212
RNG CONVERSION
PROGRESSIVE SYSTEM SERVER
112
202
208
210
PLAYER TRACKING INTERFACE
DISPLAY
CARD READER
KEY PAD
228
230
232
226
GAMING SIGNAGE SYSTEM
254

FIG. 2A

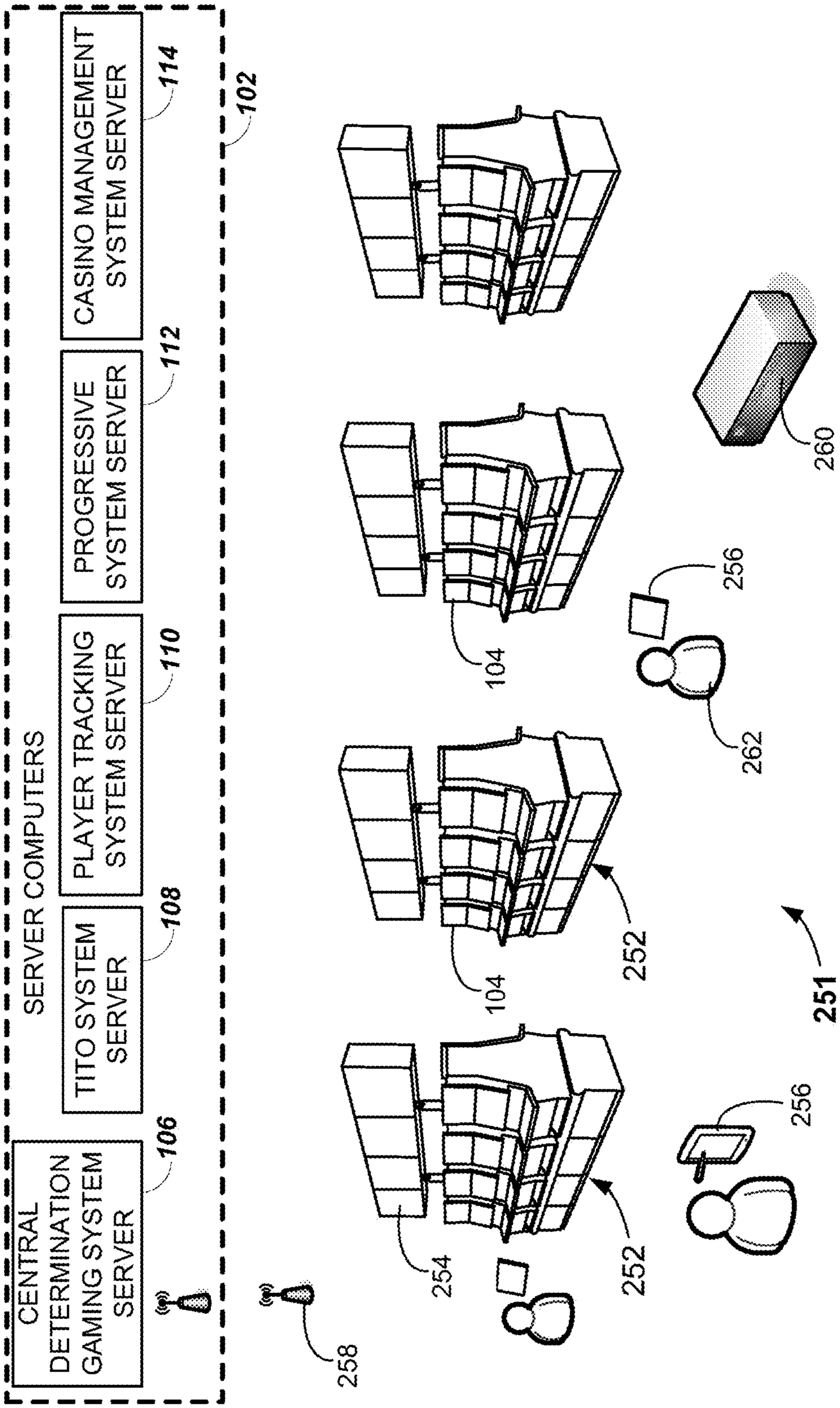
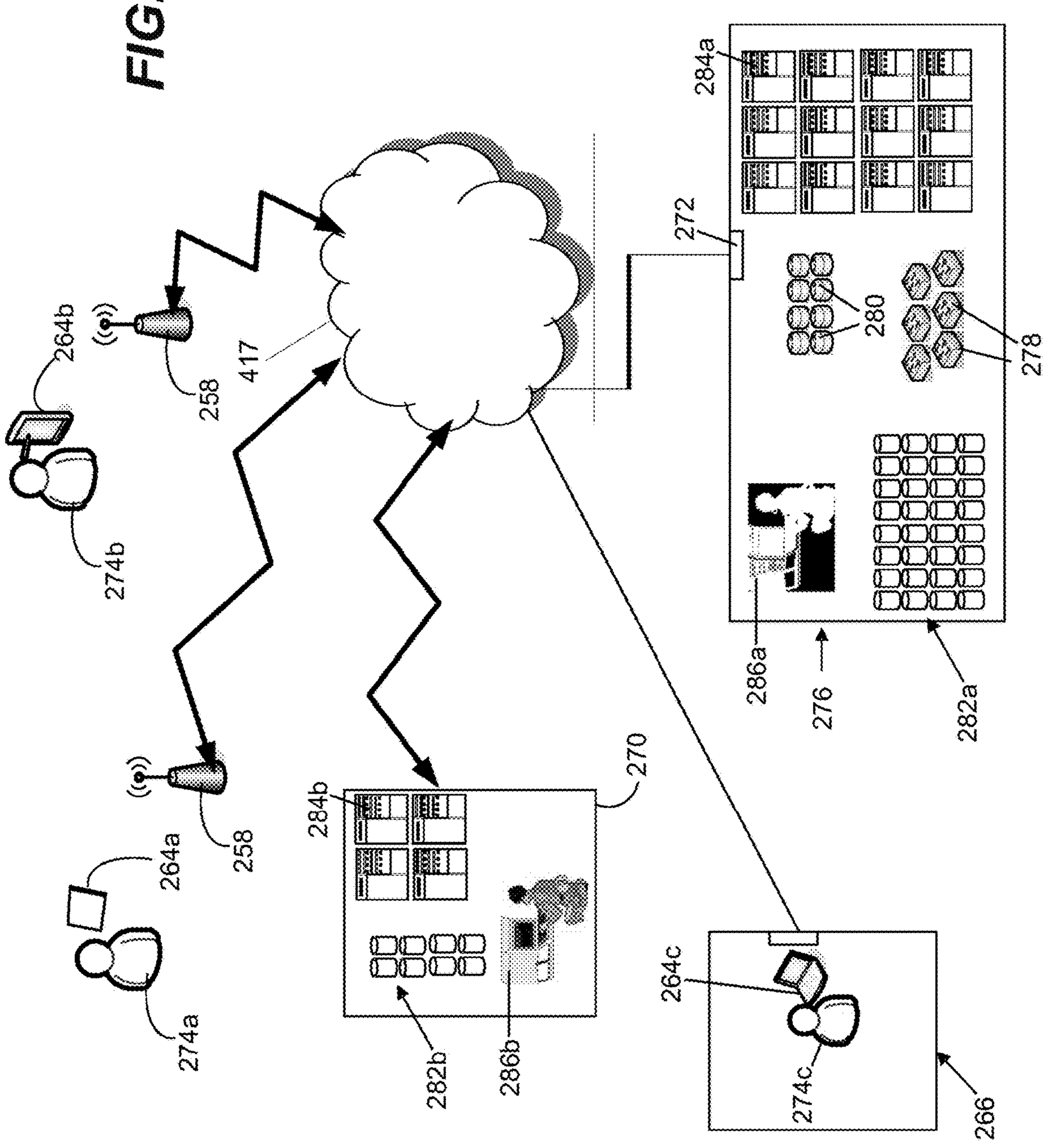

CASINO MANAGEMENT SYSTEM SERVER
114
102
SERVER COMPUTERS
PROGRESSIVE SYSTEM SERVER
112
PLAYER TRACKING SYSTEM SERVER
110
TITO SYSTEM SERVER
108
CENTRAL DETERMINATION GAMING SYSTEM SERVER
106
104
252
254
256
258
260
262
251

FIG. 2B

FIG. 2C


284a
272
280
278
286a
276
282a
270
284b
264b
258
417
274b
264a
258
274a
282b
286b
264c
274c
266

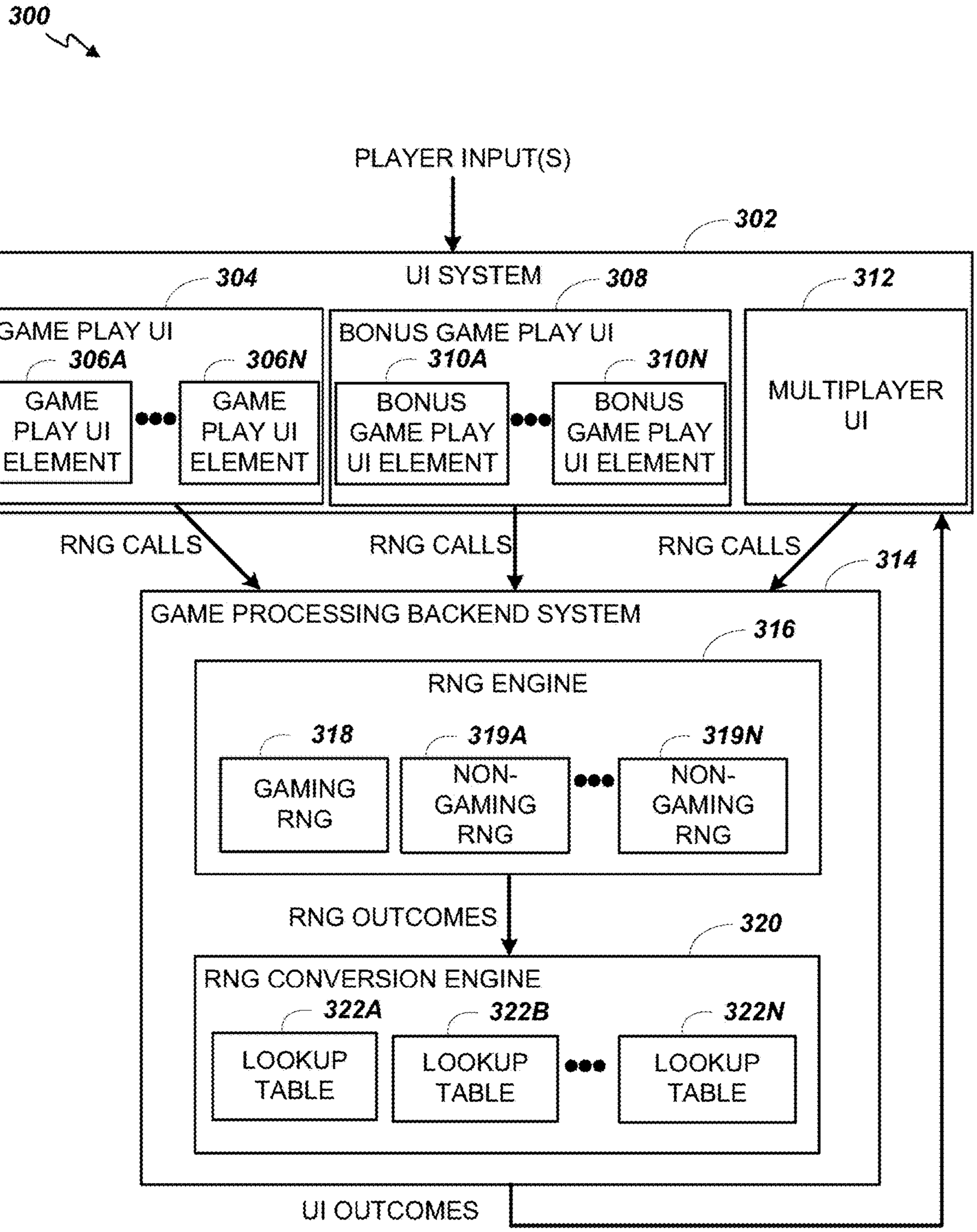

300
PLAYER INPUT(S)
302
304
UI SYSTEM
308
312
GAME PLAY UI
306A
306N
GAME PLAY UI ELEMENT
GAME PLAY UI ELEMENT
BONUS GAME PLAY UI
310A
310N
BONUS GAME PLAY UI ELEMENT
BONUS GAME PLAY UI ELEMENT
MULTIPLAYER UI
RNG CALLS
RNG CALLS
RNG CALLS
314
GAME PROCESSING BACKEND SYSTEM
316
RNG ENGINE
318
319A
319N
GAMING RNG
NON-GAMING RNG
NON-GAMING RNG
RNG OUTCOMES
320
RNG CONVERSION ENGINE
322A
322B
322N
LOOKUP TABLE
LOOKUP TABLE
LOOKUP TABLE
UI OUTCOMES

FIG. 3

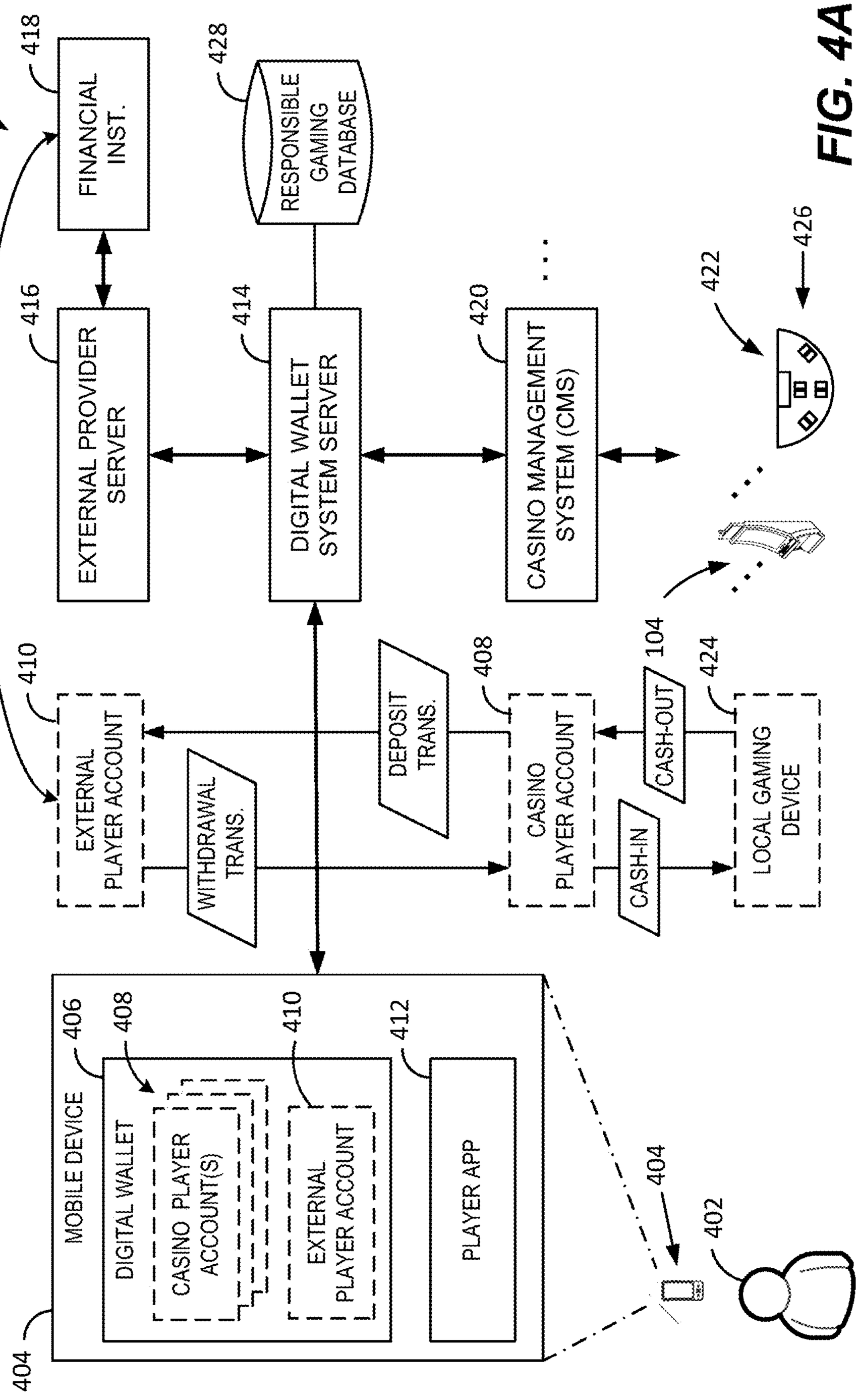

400
404
MOBILE DEVICE
DIGITAL WALLET
CASINO PLAYER ACCOUNT(S)
EXTERNAL PLAYER ACCOUNT
PLAYER APP
406
408
410
412
402
FINANCIAL INST.
418
RESPONSIBLE GAMING DATABASE
428
EXTERNAL PROVIDER SERVER
416
DIGITAL WALLET SYSTEM SERVER
414
CASINO MANAGEMENT SYSTEM (CMS)
420
426
422
EXTERNAL PLAYER ACCOUNT
410
WITHDRAWAL TRANS.
DEPOSIT TRANS.
408
CASINO PLAYER ACCOUNT
CASH-IN
CASH-OUT
104
LOCAL GAMING DEVICE
424

FIG. 4A

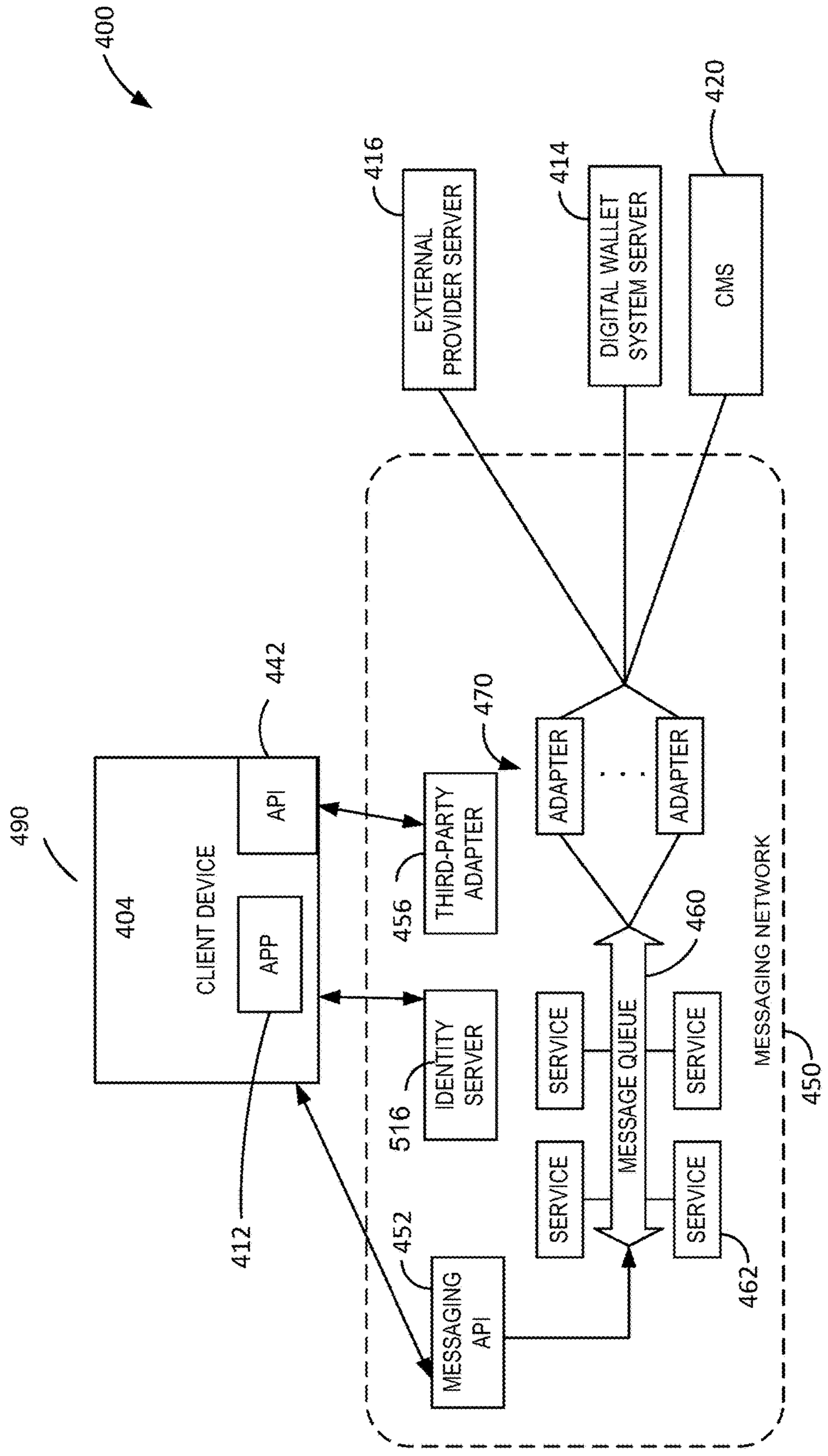

400
490
404
CLIENT DEVICE
APP
API
442
412
416
EXTERNAL PROVIDER SERVER
414
DIGITAL WALLET SYSTEM SERVER
420
CMS
456
THIRD-PARTY ADAPTER
470
ADAPTER
ADAPTER
460
516
IDENTITY SERVER
SERVICE
SERVICE
MESSAGE QUEUE
452
MESSAGING API
SERVICE
SERVICE
462
MESSAGING NETWORK
450

FIG. 4B

FIG. 5

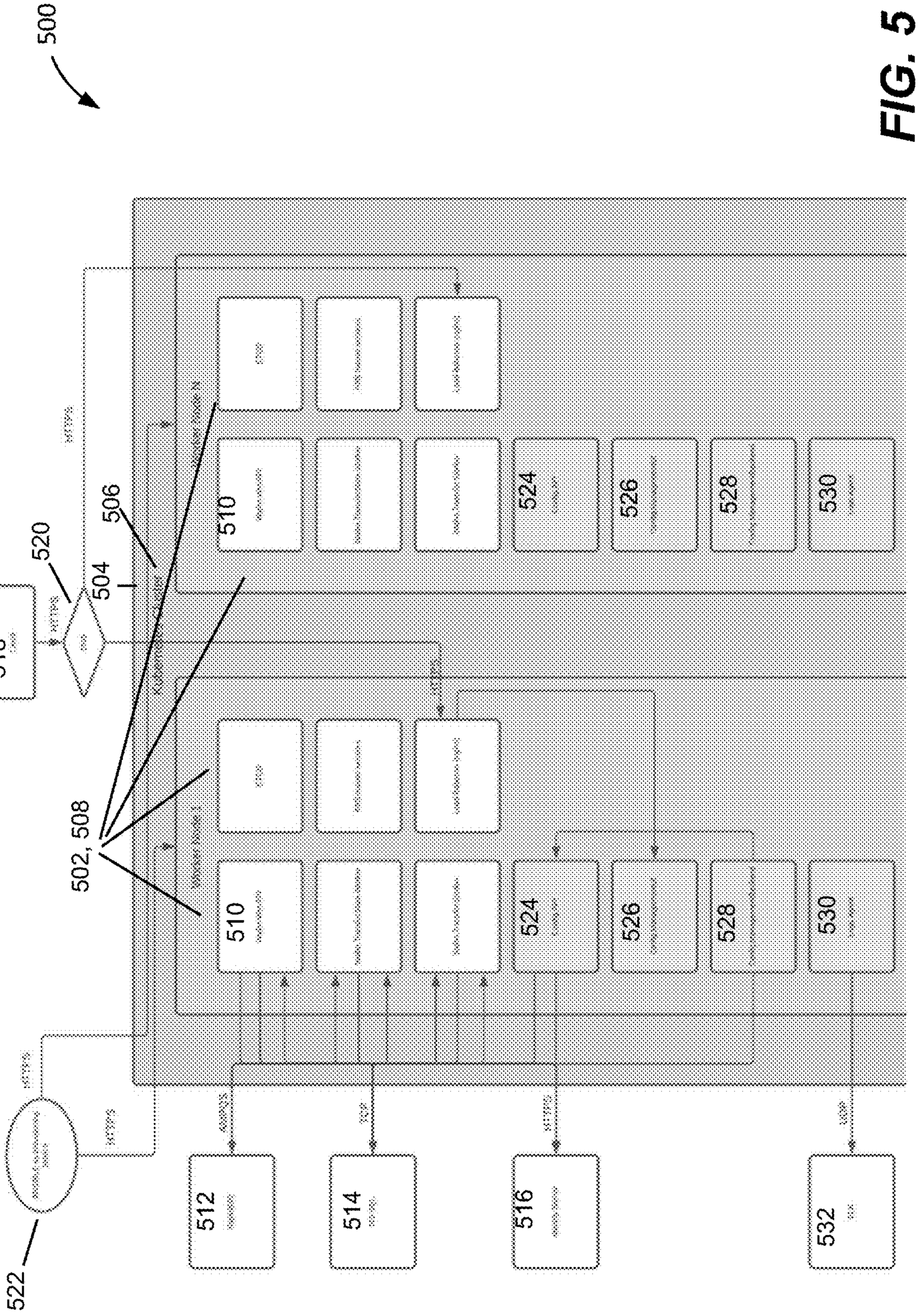
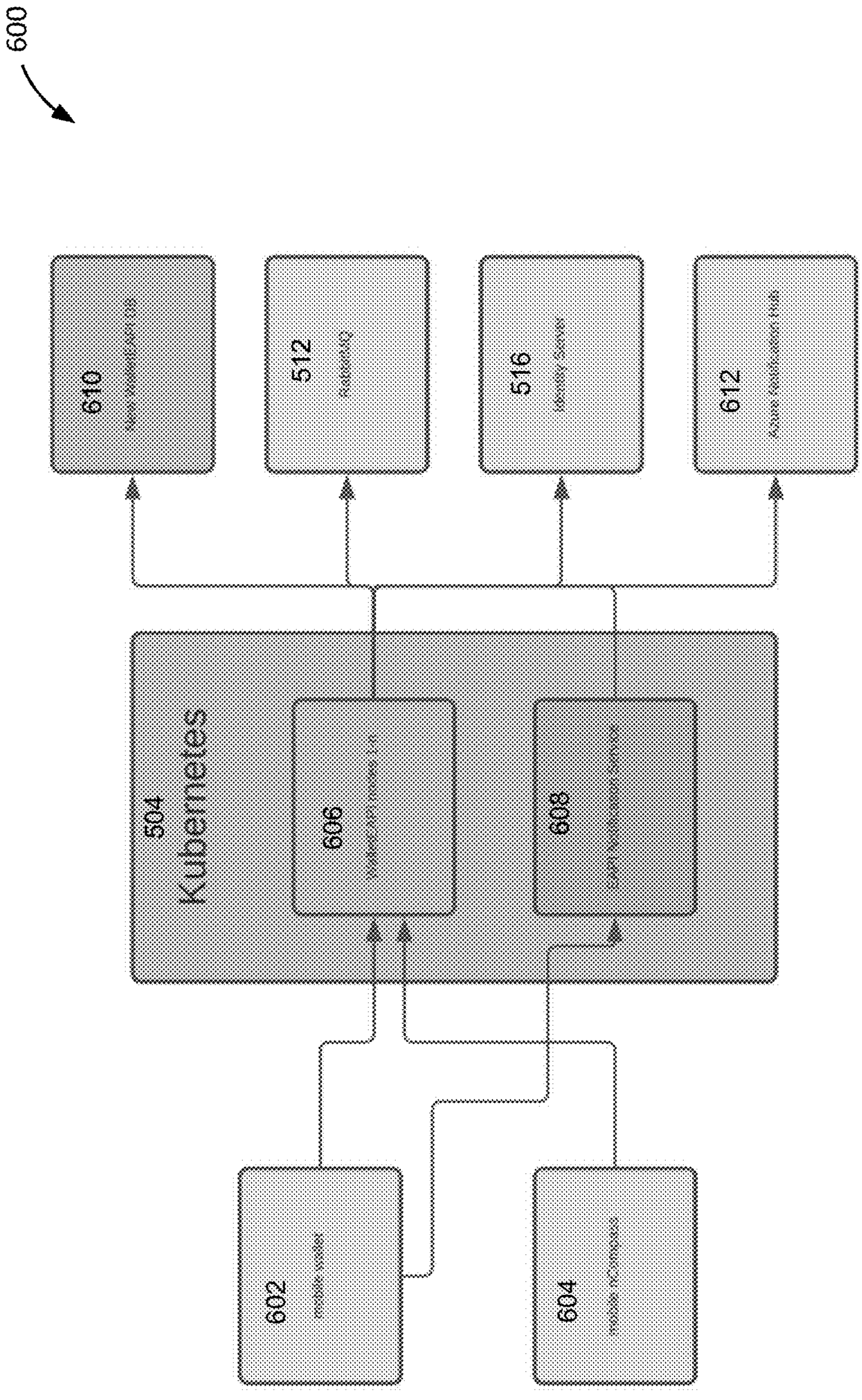

500
502, 508
504
506
510
512
514
516
518
520
522
524
526
528
530
532

FIG. 6



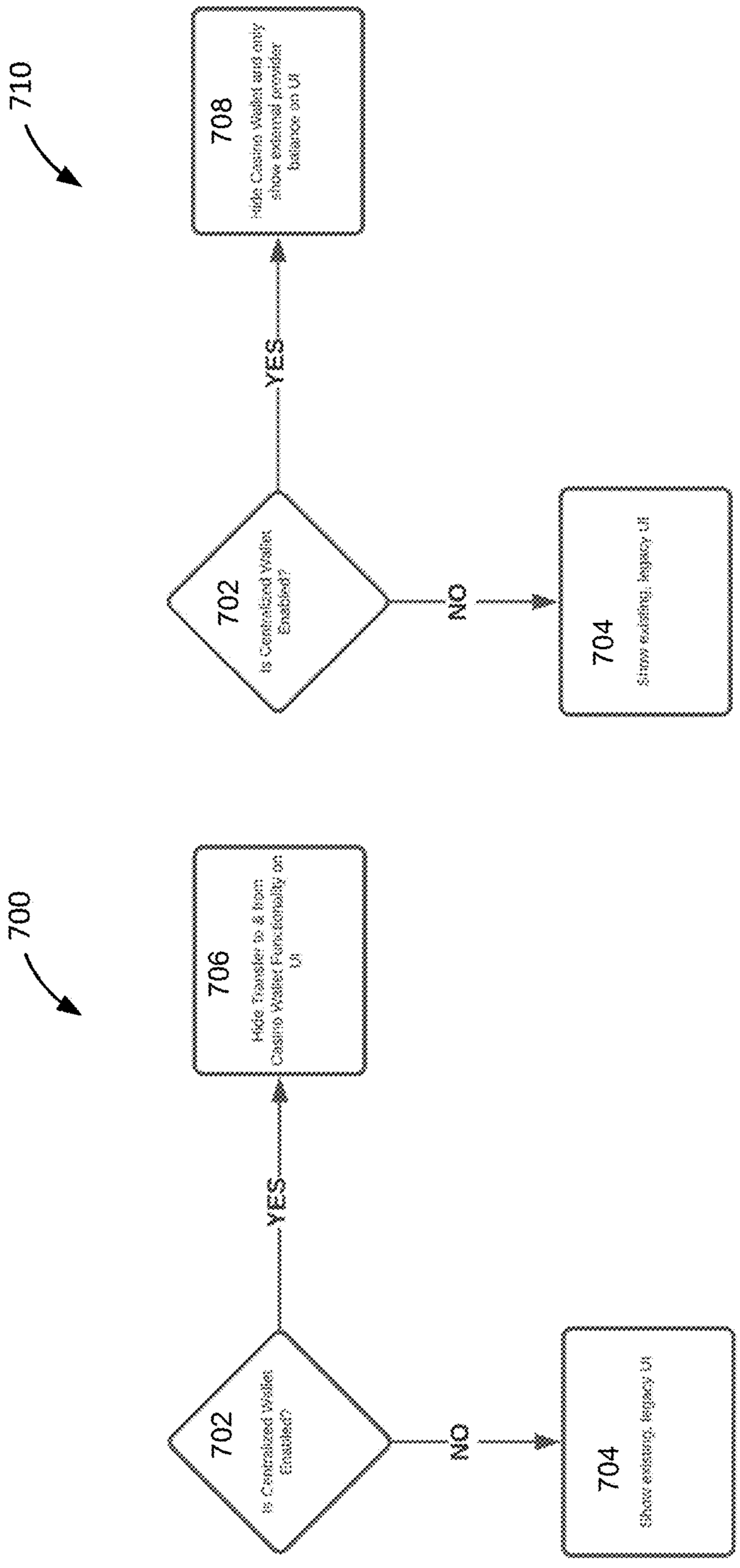

700
706
Hide Transfer to & from Casino Wallet Functionality on UI
YES
702
Is Centralized Wallet Enabled?
NO
704
Show existing, legacy UI
710
708
Hide Casino Wallet and only show external provider balance on UI
YES
702
Is Centralized Wallet Enabled?
NO
704
Show existing, legacy UI

FIG. 7A

FIG. 7B

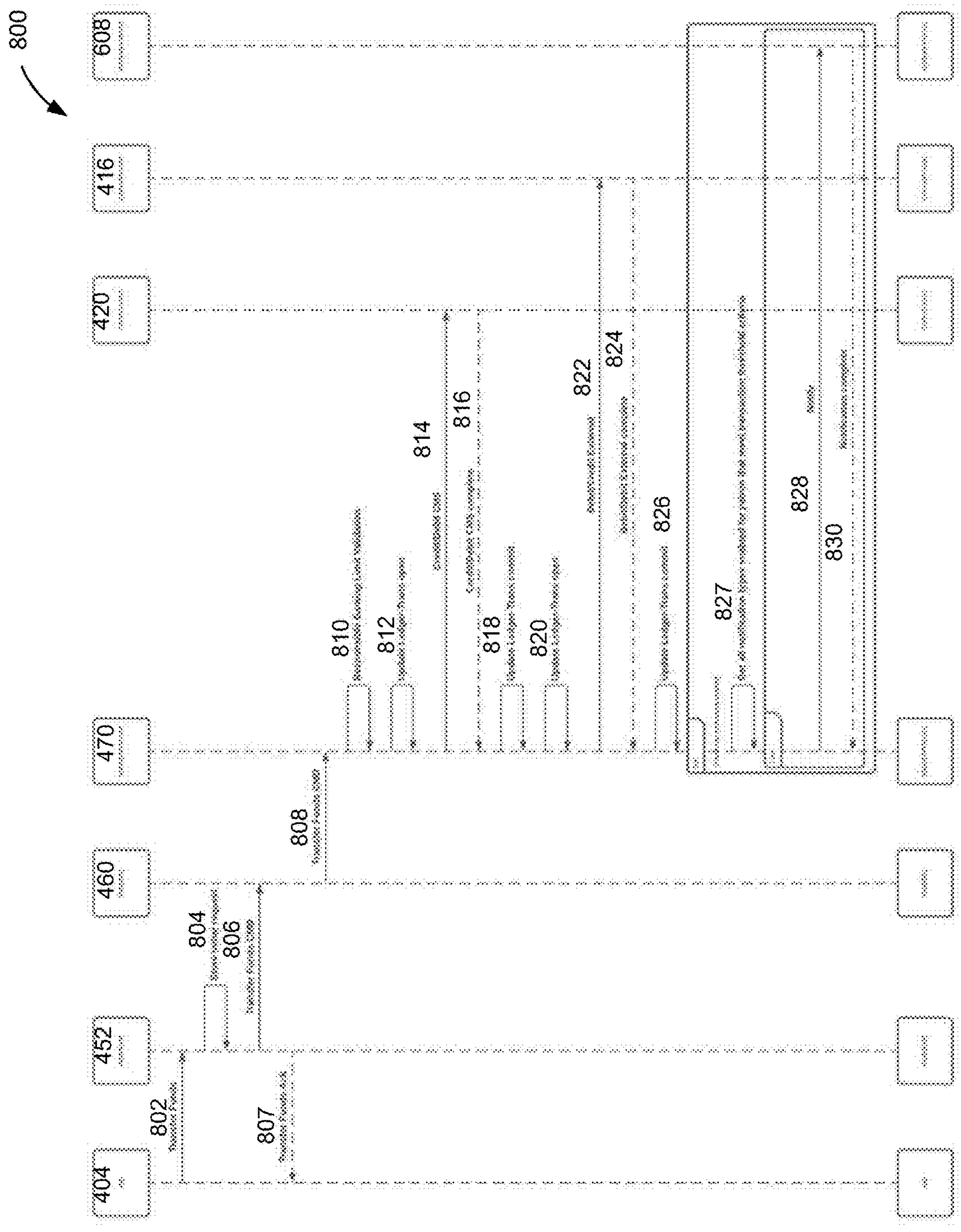

800
608
416
420
470
808
460
804
806
452
802
807
404
810
812
814
816
818
820
822
824
826
827
828
830

FIG. 8

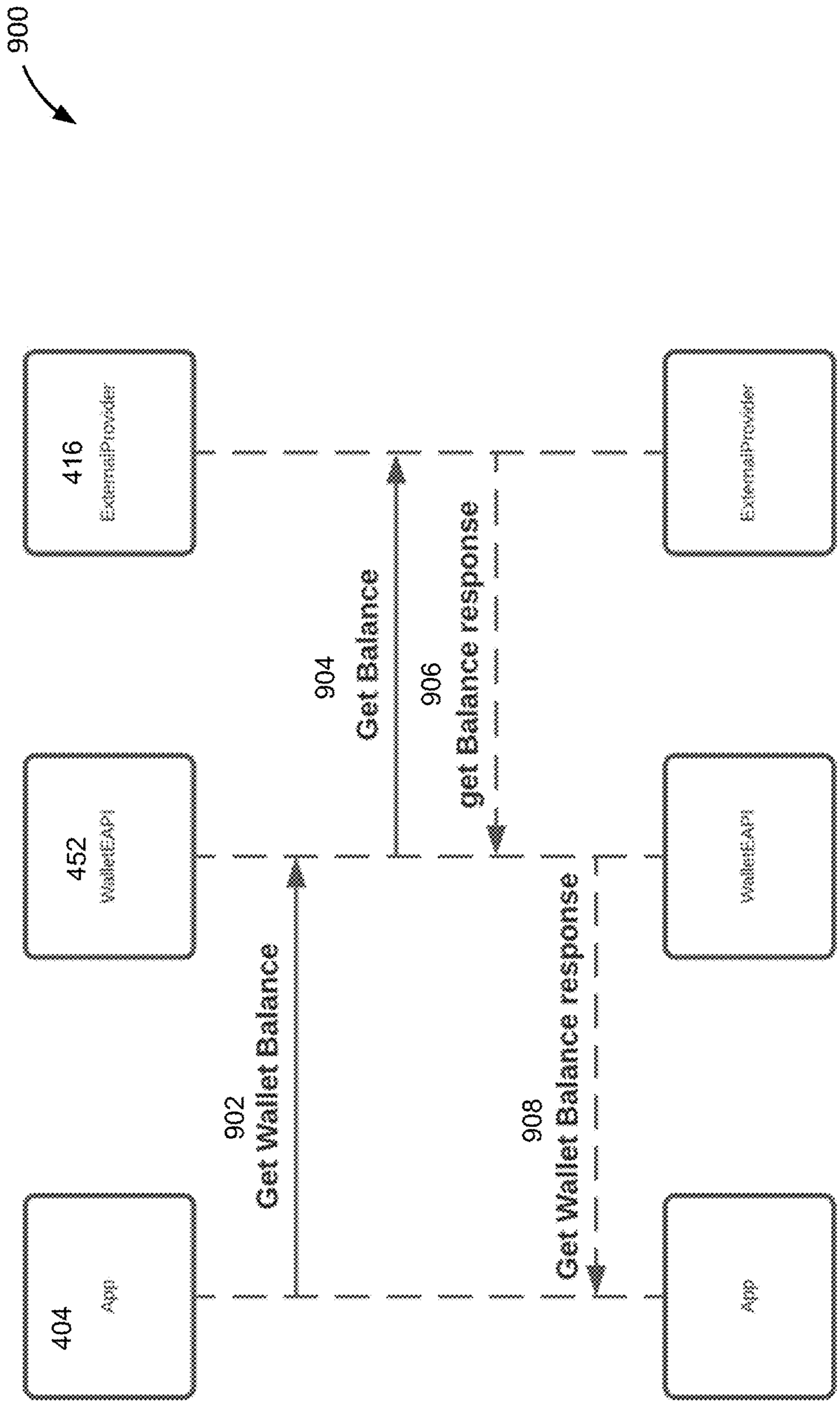

900
404
App
452
WalletSAPI
416
ExternalProvider
902
Get Wallet Balance
904
Get Balance
906
get Balance response
908
Get Wallet Balance response
WalletSAPI
ExternalProvider
App

FIG. 9

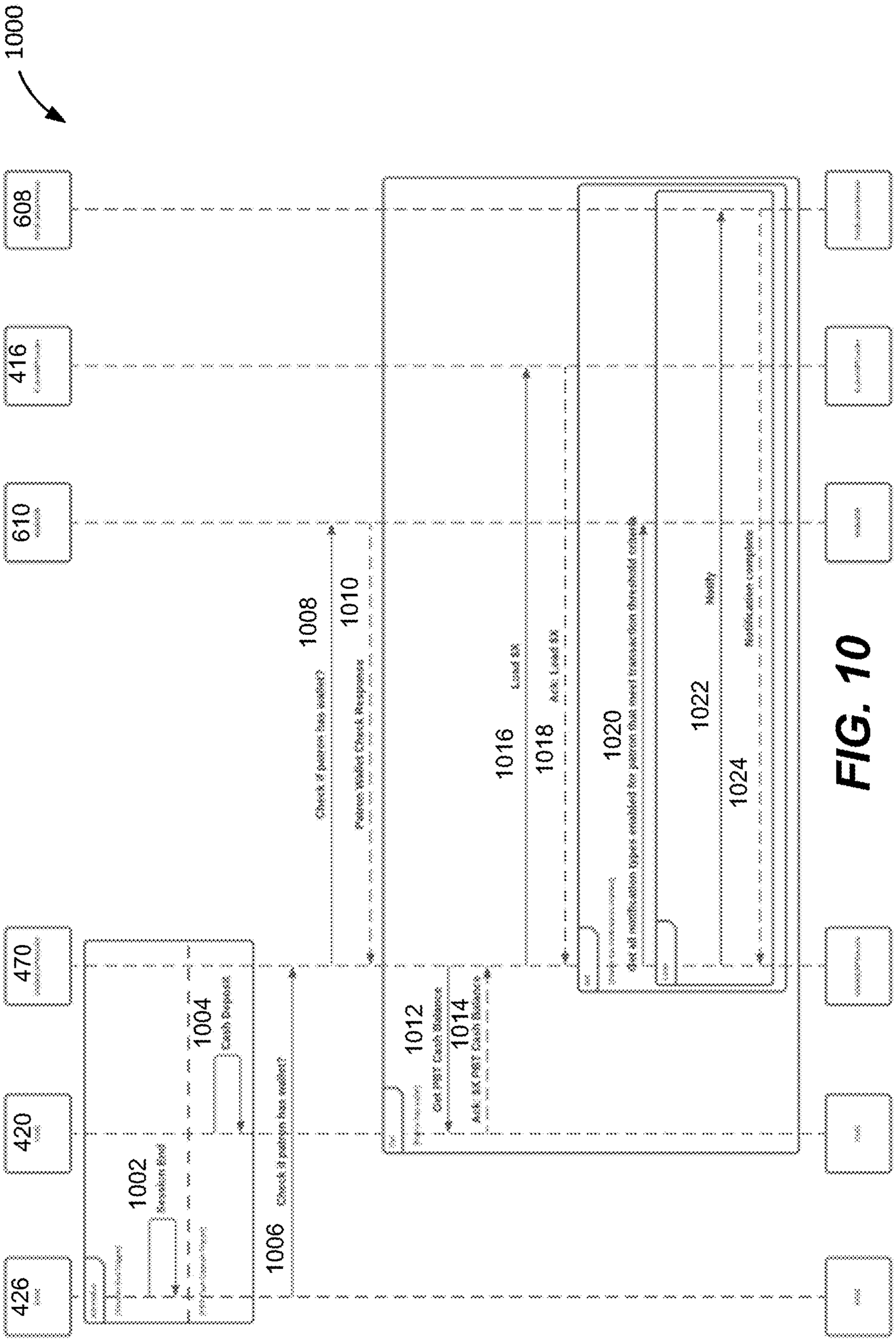

1000
608
416
610
1008
1010
1016
1018
1020
1022
1024
470
420
426
1002
1004
1006
1012
1014

FIG. 10

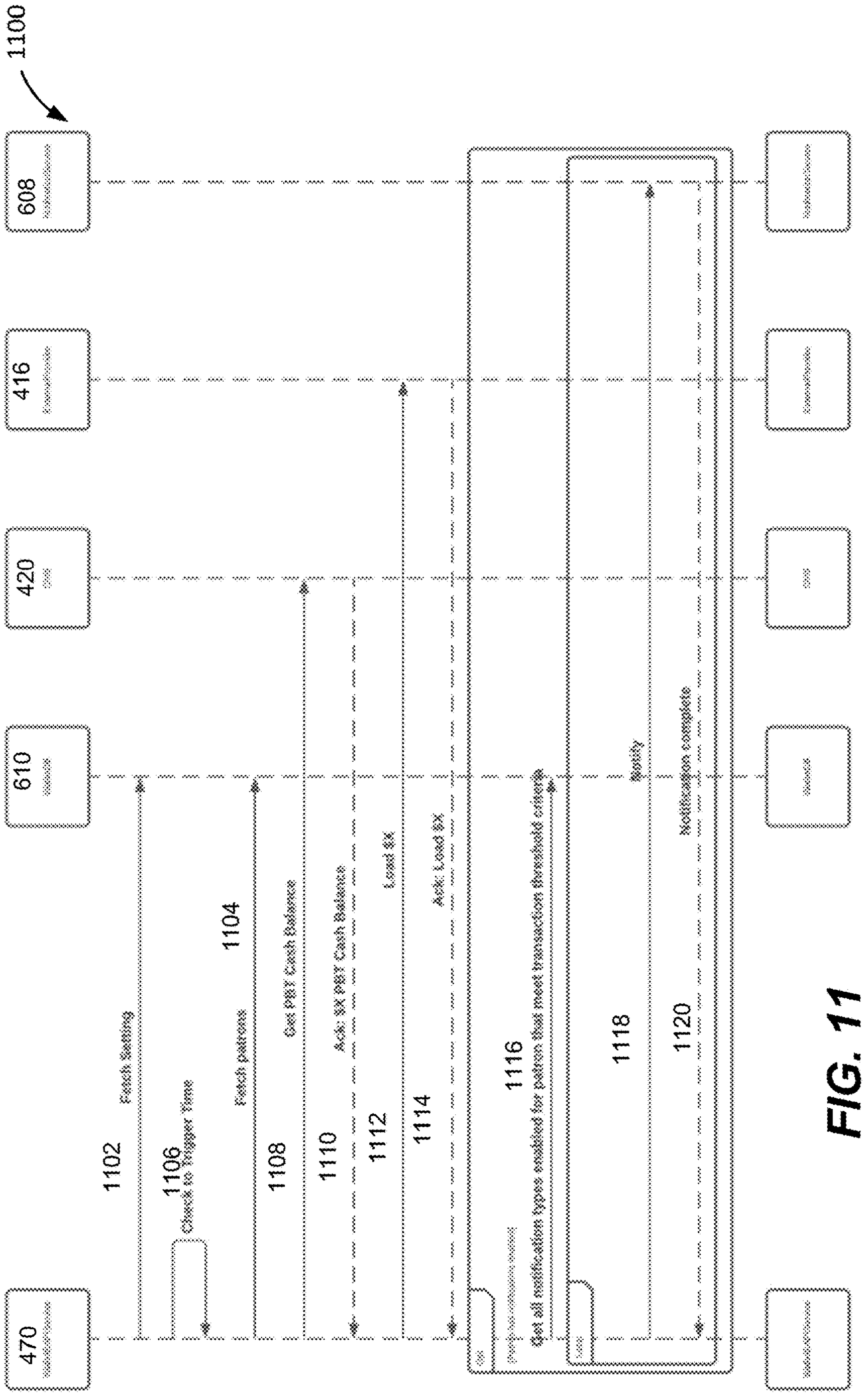
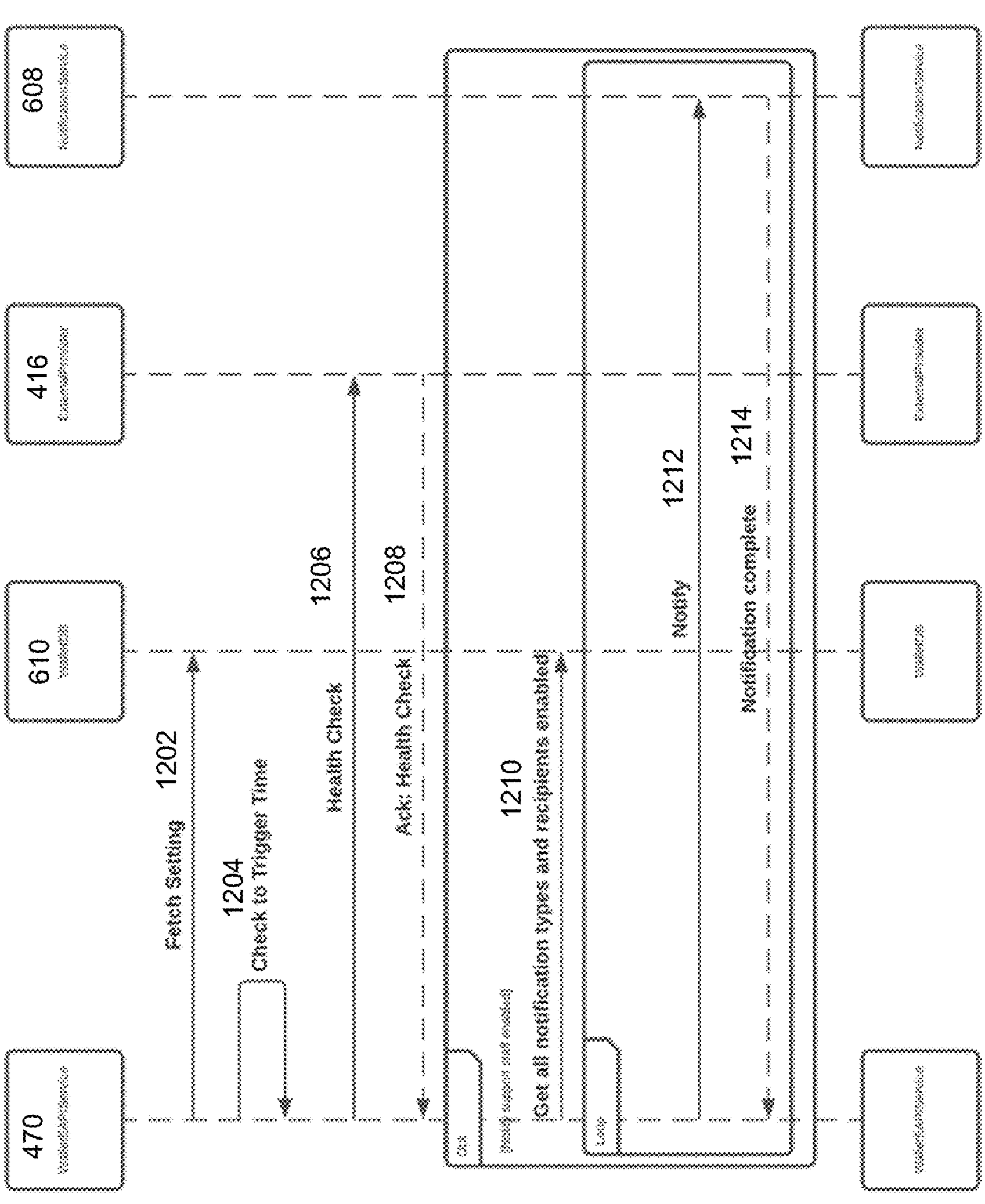

1100
608
416
420
610
1104
1102
1106
1108
1110
1112
1114
1116
1118
1120
470

FIG. 11

1200

FIG. 12


610
416
608
470
1202
Fetch Setting
1204
Check to Trigger Time
1206
Health Check
1208
Ack: Health Check
1210
Get all notification types and recipients enabled
1212
Notify
1214
Notification complete

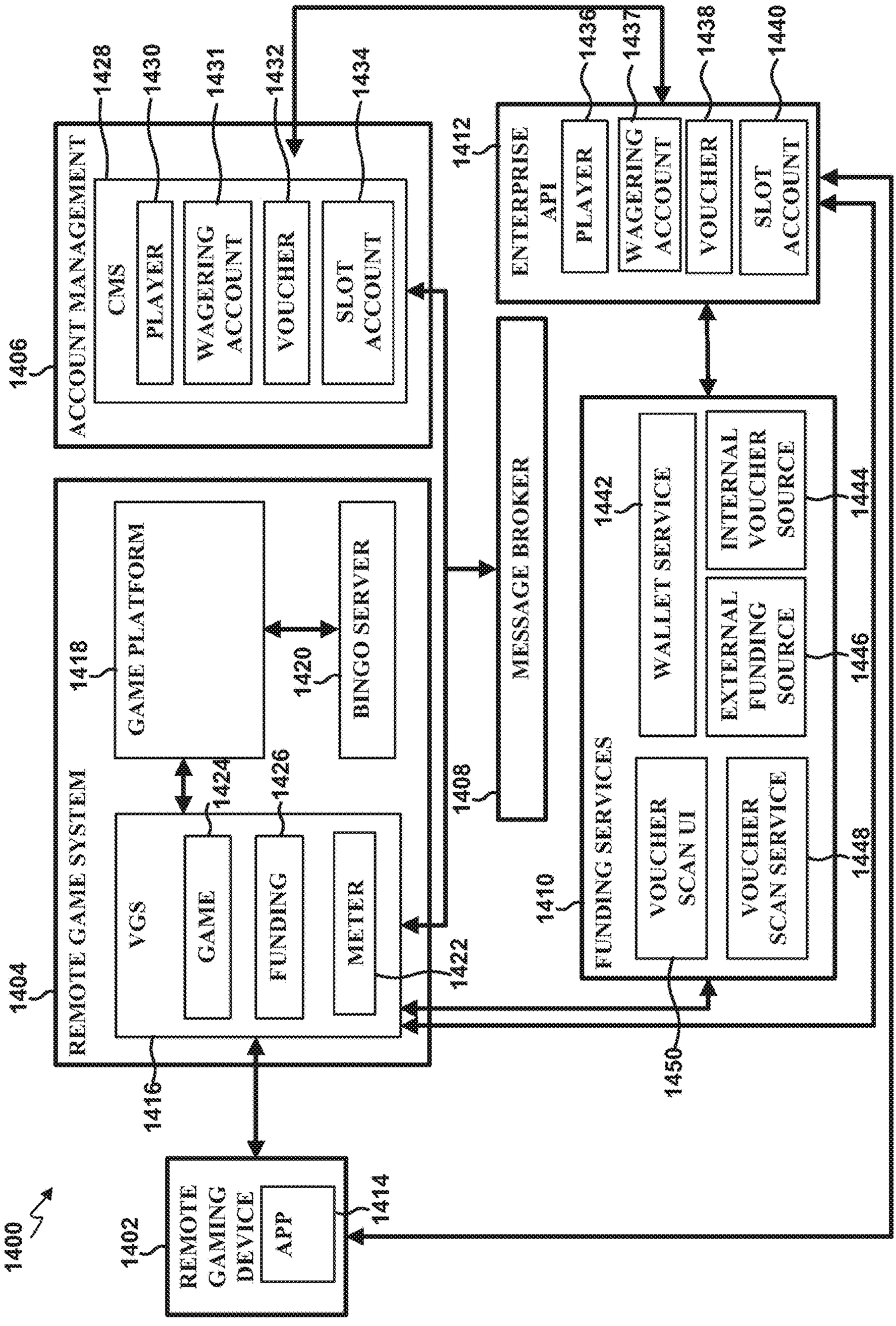

1400
1402
REMOTE GAMING DEVICE
APP
1414
1404
REMOTE GAME SYSTEM
1406
ACCOUNT MANAGEMENT
CMS
PLAYER
WAGERING ACCOUNT
VOUCHER
SLOT ACCOUNT
1428
1430
1431
1432
1434
1412
ENTERPRISE API
PLAYER
WAGERING ACCOUNT
VOUCHER
SLOT ACCOUNT
1436
1437
1438
1440
VGS
GAME
FUNDING
METER
1424
1426
1422
1416
GAME PLATFORM
1418
BINGO SERVER
1420
1408
MESSAGE BROKER
1410
FUNDING SERVICES
1442
WALLET SERVICE
VOUCHER SCAN UI
VOUCHER SCAN SERVICE
EXTERNAL FUNDING SOURCE
INTERNAL VOUCHER SOURCE
1444
1446
1448
1450

FIG. 13

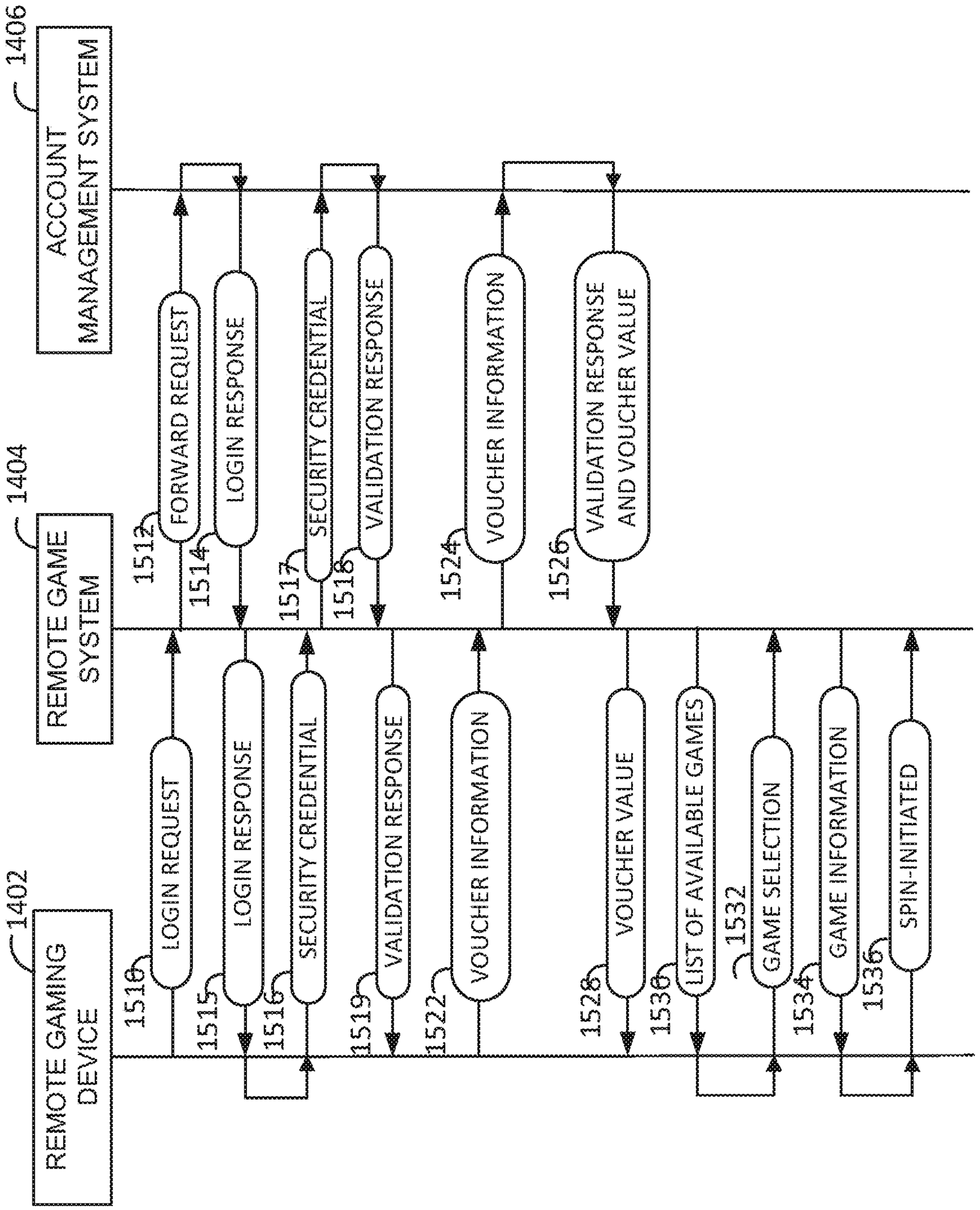

1500
1402
REMOTE GAMING DEVICE
1404
REMOTE GAME SYSTEM
1406
ACCOUNT MANAGEMENT SYSTEM
1510
LOGIN REQUEST
1512
FORWARD REQUEST
1514
LOGIN RESPONSE
1515
LOGIN RESPONSE
1516
SECURITY CREDENTIAL
1517
SECURITY CREDENTIAL
1518
VALIDATION RESPONSE
1519
VALIDATION RESPONSE
1522
VOUCHER INFORMATION
1524
VOUCHER INFORMATION
1526
VALIDATION RESPONSE AND VOUCHER VALUE
1528
VOUCHER VALUE
1530
LIST OF AVAILABLE GAMES
1532
GAME SELECTION
1534
GAME INFORMATION
1536
SPIN-INITIATED

FIG. 14

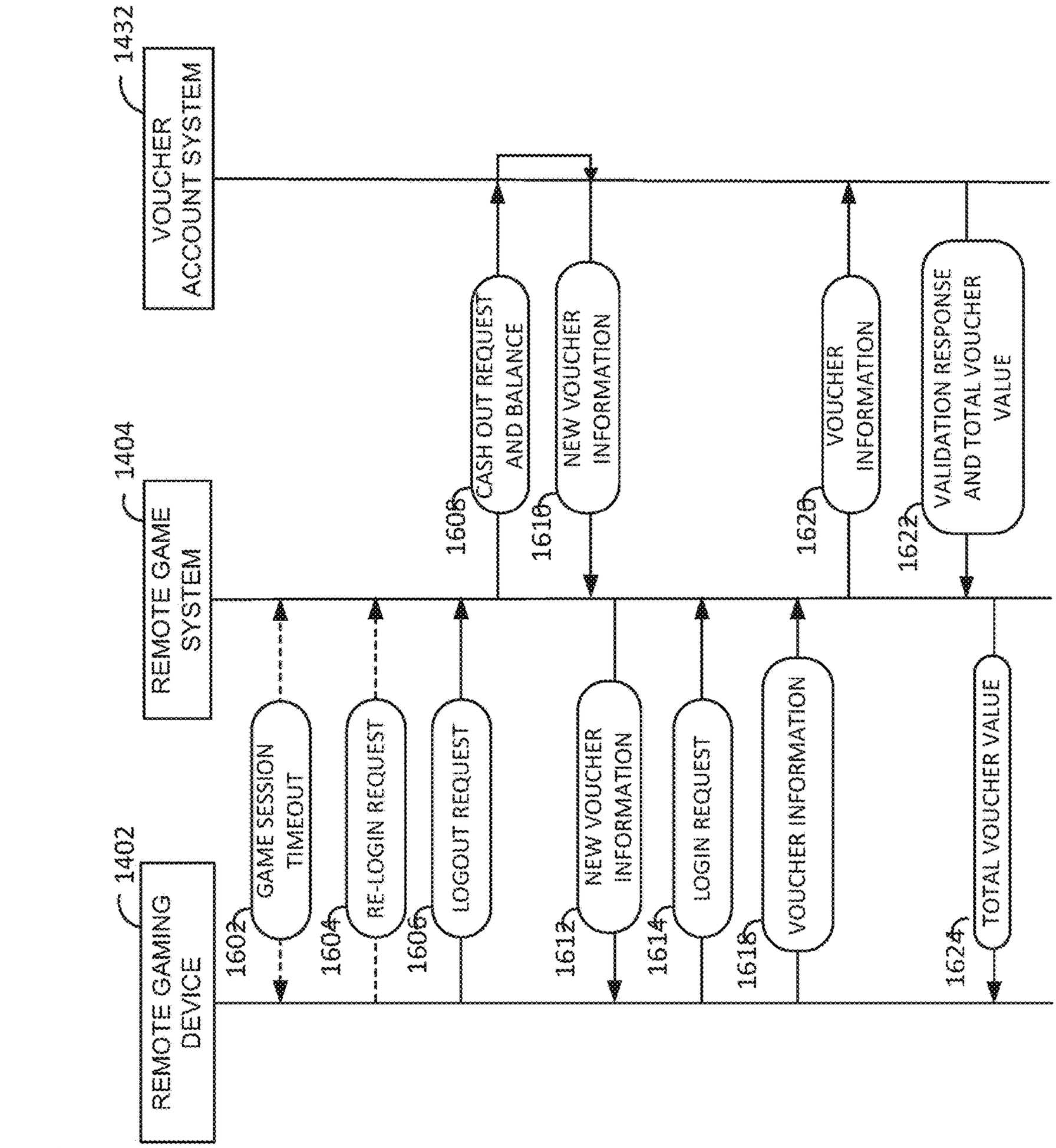

1600
1402
REMOTE GAMING DEVICE
1404
REMOTE GAME SYSTEM
1432
VOUCHER ACCOUNT SYSTEM
1602
GAME SESSION TIMEOUT
1604
RE-LOGIN REQUEST
1606
LOGOUT REQUEST
1608
CASH OUT REQUEST AND BALANCE
1610
NEW VOUCHER INFORMATION
1612
NEW VOUCHER INFORMATION
1614
LOGIN REQUEST
1618
VOUCHER INFORMATION
1620
VOUCHER INFORMATION
1622
VALIDATION RESPONSE AND TOTAL VOUCHER VALUE
1624
TOTAL VOUCHER VALUE

FIG. 15

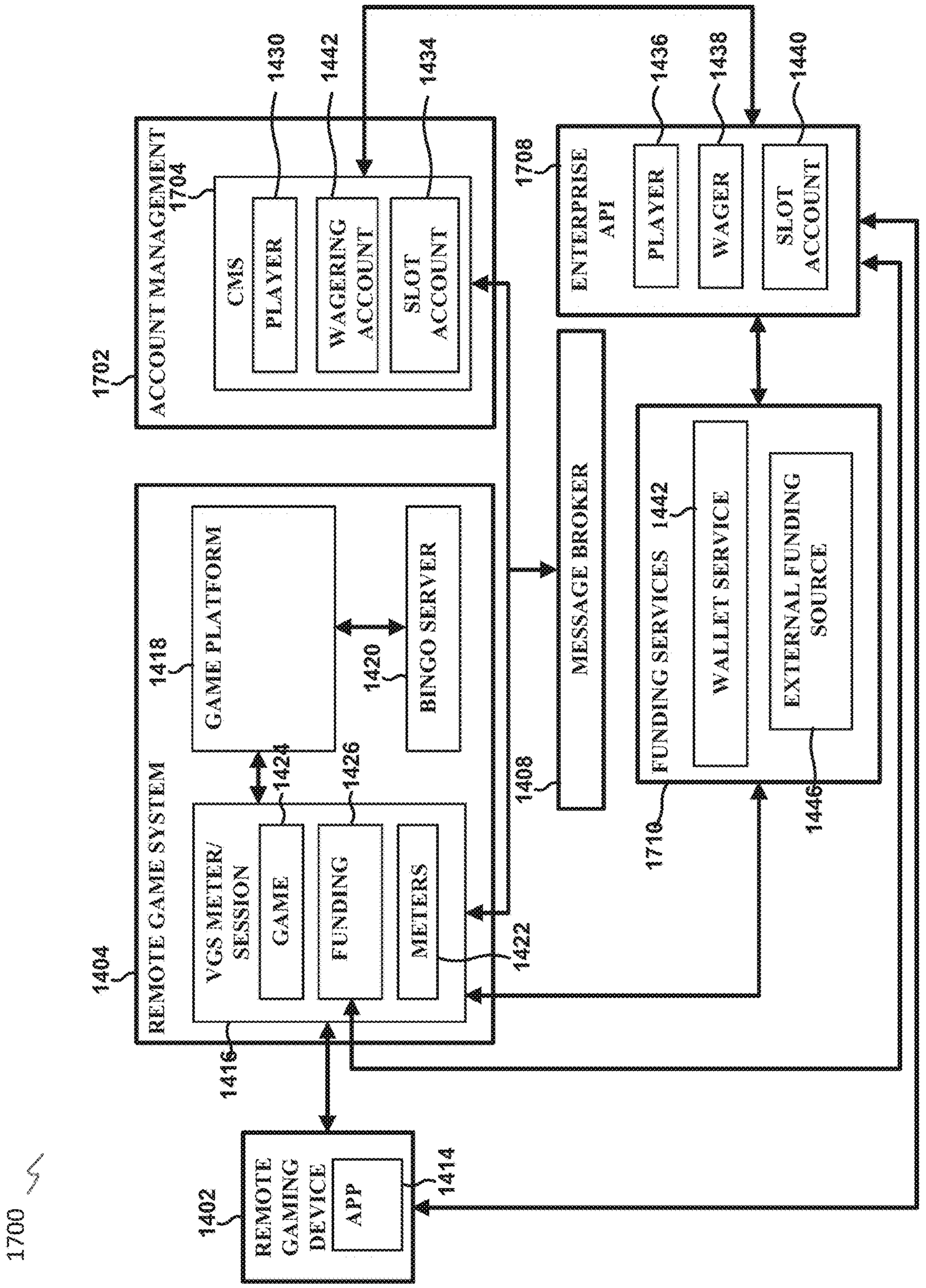

1700
REMOTE GAMING DEVICE
1402
APP
1414
REMOTE GAME SYSTEM
1404
VGS METER/ SESSION
GAME
FUNDING
METERS
1422
1416
GAME PLATFORM
1418
BINGO SERVER
1420
1424
1426
ACCOUNT MANAGEMENT
1702
1704
CMS
PLAYER
WAGERING ACCOUNT
SLOT ACCOUNT
1430
1442
1434
MESSAGE BROKER
1408
ENTERPRISE API
1708
PLAYER
WAGER
SLOT ACCOUNT
1436
1438
1440
FUNDING SERVICES
1710
1442
WALLET SERVICE
EXTERNAL FUNDING SOURCE
1446
1716

FIG. 16

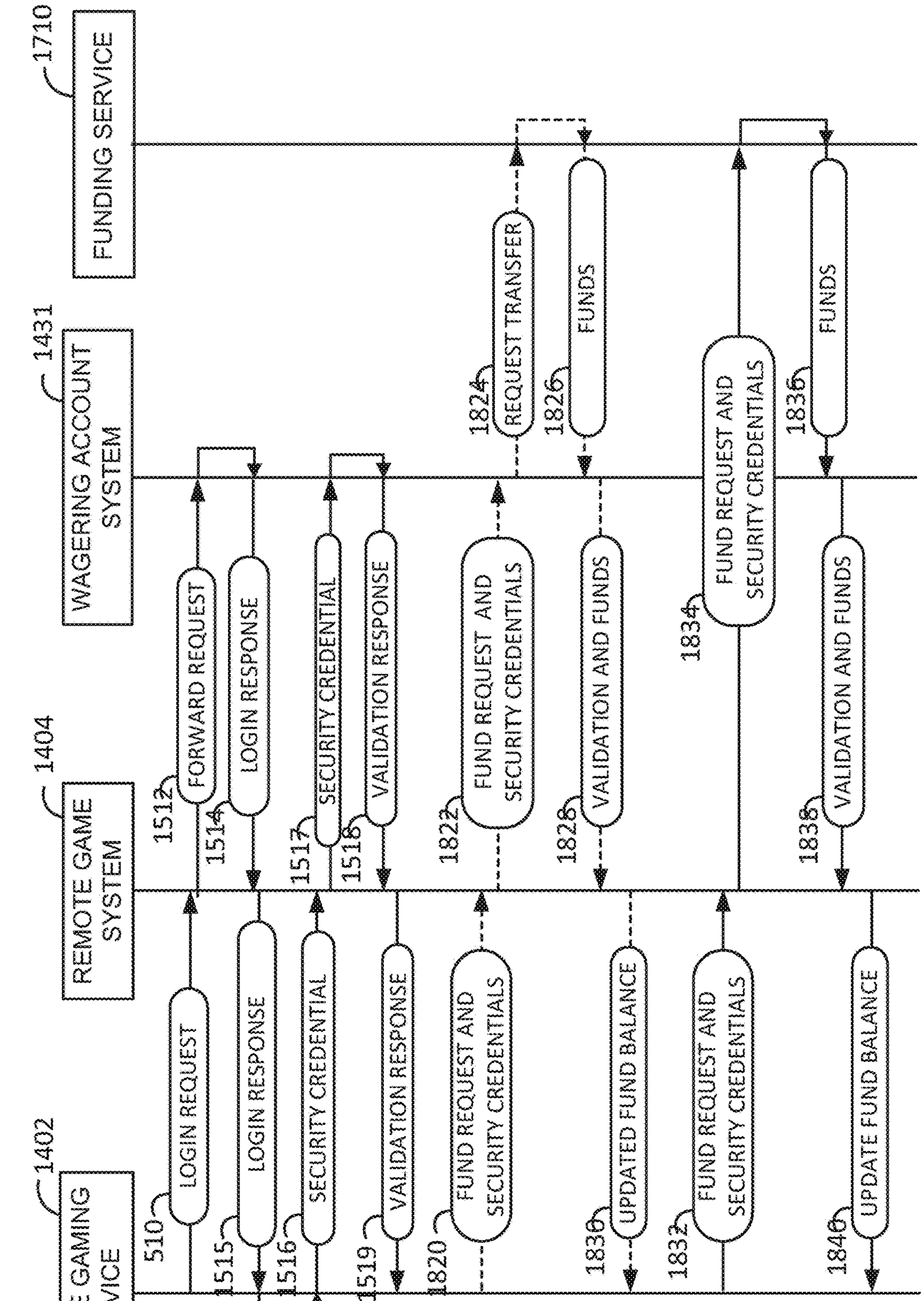

1800
1402
REMOTE GAMING DEVICE
1404
REMOTE GAME SYSTEM
1431
143
WAGERING ACCOUNT SYSTEM
1710
FUNDING SERVICE
510
LOGIN REQUEST
1512
FORWARD REQUEST
1514
LOGIN RESPONSE
1515
LOGIN RESPONSE
1516
SECURITY CREDENTIAL
1517
SECURITY CREDENTIAL
1518
VALIDATION RESPONSE
1519
VALIDATION RESPONSE
1820
FUND REQUEST AND SECURITY CREDENTIALS
1822
FUND REQUEST AND SECURITY CREDENTIALS
1824
REQUEST TRANSFER
1826
FUNDS
1826
VALIDATION AND FUNDS
1828
VALIDATION AND FUNDS
1830
UPDATED FUND BALANCE
1832
FUND REQUEST AND SECURITY CREDENTIALS
1834
FUND REQUEST AND SECURITY CREDENTIALS
1836
FUNDS
1838
VALIDATION AND FUNDS
1840
UPDATE FUND BALANCE

FIG. 17

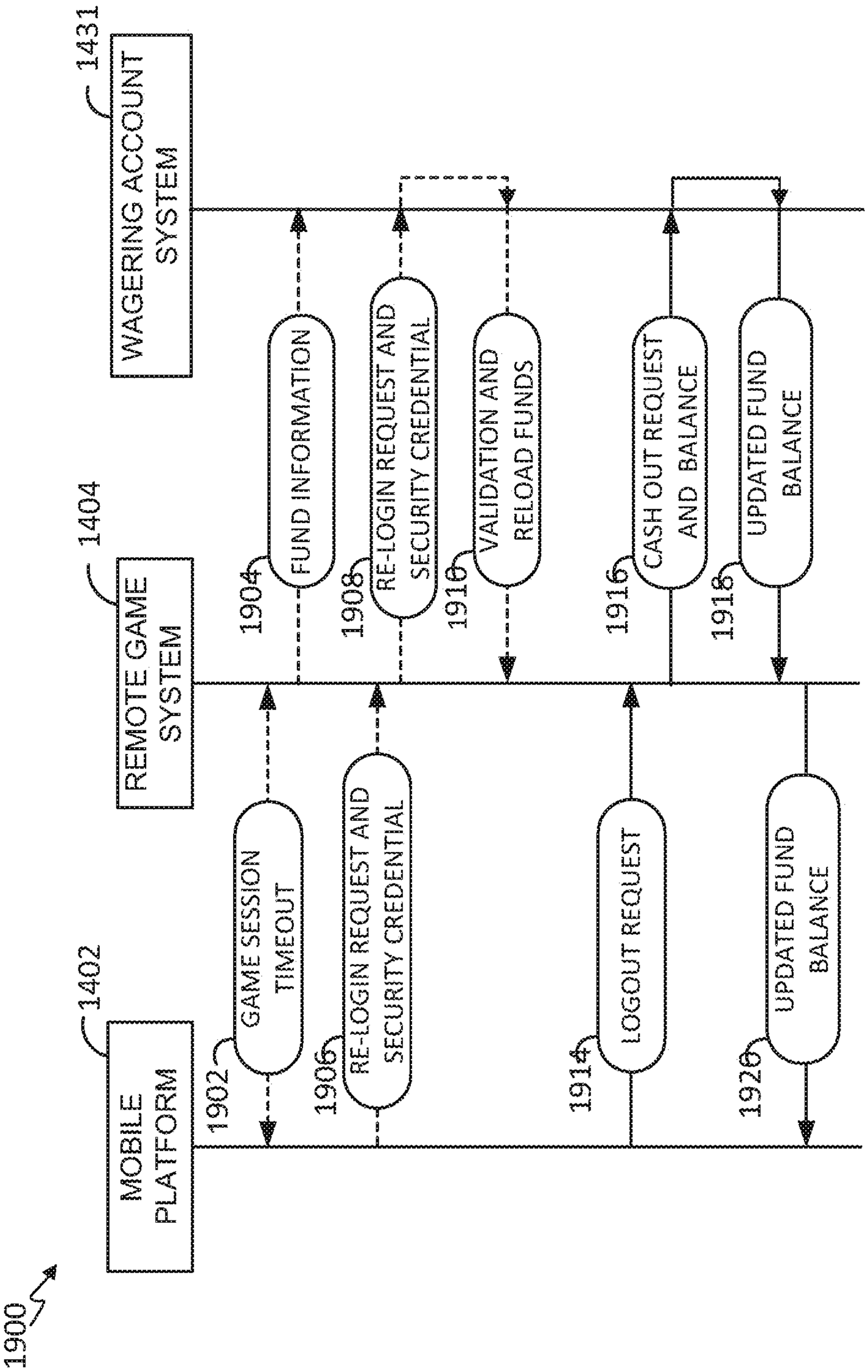

1900
1402
MOBILE PLATFORM
1404
REMOTE GAME SYSTEM
1431
WAGERING ACCOUNT SYSTEM
1902
GAME SESSION TIMEOUT
1904
FUND INFORMATION
1906
RE-LOGIN REQUEST AND SECURITY CREDENTIAL
1908
RE-LOGIN REQUEST AND SECURITY CREDENTIAL
1910
VALIDATION AND RELOAD FUNDS
1914
LOGOUT REQUEST
1916
CASH OUT REQUEST AND BALANCE
1918
UPDATED FUND BALANCE
1920
UPDATED FUND BALANCE

FIG. 18

DIGITAL WALLET SYSTEMS AND METHODS WITH RESPONSIBLE GAMING

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims priority to U.S. Provisional Patent Application No. 63/112,400, filed Nov. 11, 2020, entitled "RANDOM BASED GAME OUTCOMES FOR REMOTE GAME PLAY" and U.S. Provisional Patent Application No. 63/242,990, filed Sep. 10, 2021, and entitled "DIGITAL WALLET SYSTEMS AND METHODS WITH RESPONSIBLE GAMING" which are hereby incorporated by reference in their entireties.

TECHNICAL FIELD

[0002] The field of disclosure relates generally to electronic gaming, and more particularly, to digital wallet systems and methods and responsible gaming with electronic games.

BACKGROUND

[0003] Electronic gaming machines ("EGMs") or gaming devices provide a variety of wagering games such as slot games, video poker games, video blackjack games, roulette games, video bingo games, keno games and other types of games that are frequently offered at casinos and other locations. Play on EGMs typically involves a player establishing a credit balance by inputting money, or another form of monetary credit, and placing a monetary wager (from the credit balance) on one or more outcomes of an instance (or single play) of a primary or base game. In some cases, a player may qualify for a special mode of the base game, a secondary game, or a bonus round of the base game by attaining a certain winning combination or triggering event in, or related to, the base game, or after the player is randomly awarded the special mode, secondary game, or bonus round. In the special mode, secondary game, or bonus round, the player is given an opportunity to win extra game credits, game tokens or other forms of payout. In the case of "game credits" that are awarded during play, the game credits are typically added to a credit meter total on the EGM and can be provided to the player upon completion of a gaming session or when the player wants to "cash out."

[0004] "Slot" type games are often displayed to the player in the form of various symbols arrayed in a row-by-column grid or matrix. Specific matching combinations of symbols along predetermined paths (or paylines) through the matrix indicate the outcome of the game. The display typically highlights winning combinations/outcomes for identification by the player. Matching combinations and their corresponding awards are usually shown in a "pay-table" which is available to the player for reference. Often, the player may vary his/her wager to include differing numbers of paylines and/or the amount bet on each line. By varying the wager, the player may sometimes alter the frequency or number of winning combinations, frequency or number of secondary games, and/or the amount awarded.

[0005] Typical games use a random number generator (RNG) to randomly determine the outcome of each game. The game is designed to return a certain percentage of the amount wagered back to the player over the course of many plays or instances of the game, which is generally referred to as return to player (RTP). The RTP and randomness of the RNG ensure the fairness of the games and are highly regulated. Upon initiation of play, the RNG randomly determines a game outcome and symbols are then selected which correspond to that outcome. Notably, some games may include an element of skill on the part of the player and are therefore not entirely random.

[0006] Certain venues may also include systems that provide additional functionality alongside EGMs. For example, player tracking systems offer a venue to track a player's play and provide additional rewards to players based on factors, such as the amount the player wagers or how frequently they wager. Player tracking systems can also provide support for a user to establish an account and transfer credits to the gaming machine and back to the player account. After a player enters a player tracking card, a player tracking device connected to or embedded within the EGM communicates with the player tracking system to obtain, manage, and/or track player information.

[0007] EGMs often depend on usability and player tracking information to enhance player experiences. Although previous EGMs and player tracking systems include various features that improve usability and enhance player experiences, there is a continuous need for further improvements to electronic gaming devices, gaming systems, and/or the overall gaming environment (e.g., land-based and digital gaming ecosystems) while complying with gaming regulations.

BRIEF DESCRIPTION

[0008] In one aspect, a digital wallet computing system is described. The digital wallet computing system includes at least one processor in communication with a memory device storing instructions. The instructions, when executed, cause the at least one processor to establish wireless connectivity between a mobile device of a player and an electronic gaming device, the electronic gaming device including a device identifier, receive an initiation of a funds transfer request from the mobile device of the player, the funds transfer request identifying a funds transfer amount and an external player account of the player, and identify an operator identity of an operator based on the device identifier of the electronic gaming device. The instructions also cause the at least one processor to identify a player account of the player, the player account associated with the operator, perform a first withdrawal transaction moving the funds transfer amount from the electronic gaming device to the player account associated with the operator, and in response to the first withdrawal transaction, automatically perform a second withdrawal transaction moving the funds transfer amount from the player account associated with the operator to the external player account of the player.

[0009] In another aspect, a computer-implemented method of providing digital wallet transactions implemented by a processor in communication with a memory device is described. The method includes establishing wireless connectivity between a mobile device of a player and an electronic gaming device, the electronic gaming device including a device identifier, receiving an initiation of a funds transfer request from the mobile device of the player, the funds transfer request identifying a funds transfer amount and an external player account of the player, and identifying an operator identity of an operator based on the device identifier of the electronic gaming device. The method also includes identifying a player account of the

player, the player account associated with the operator, performing a first withdrawal transaction moving the funds transfer amount from the electronic gaming device to the player account associated with the operator, and in response to the first withdrawal transaction, automatically performing a second withdrawal transaction moving the funds transfer amount from the player account associated with the operator to the external player account of the player.

[0010] In another aspect, a non-transitory computer-readable medium storing instructions that, when executed by at least one processor, cause the at least one processor to establish wireless connectivity between a mobile device of a player and an electronic gaming device, the electronic gaming device including a device identifier, receive an initiation of a funds transfer request from the mobile device of the player, the funds transfer request identifying a funds transfer amount and an external player account of the player, and identify an operator identity of an operator based on the device identifier of the electronic gaming device. The instructions also cause the at least one processor to identify a player account of the player, the player account associated with the operator, perform a first withdrawal transaction moving the funds transfer amount from the electronic gaming device to the player account associated with the operator, and in response to the first withdrawal transaction, automatically perform a second withdrawal transaction moving the funds transfer amount from the player account associated with the operator to the external player account of the player.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] While certain implementations will be described in connection with the illustrative implementations shown herein, this disclosure is not limited to those implementations. On the contrary, all alternatives, modifications, and equivalents are included within the spirting and scope of the invention as defined by the claims. In the drawings, which are not to scale, the same reference numerals are used throughout the description and in the drawing figures for components and elements having the same structure. If applicable, primed reference numerals are used for components and elements having similar function and construction to those components and elements having the same unprimed reference numerals.

[0012] FIG. **1** is an exemplary diagram showing several EGMs networked with various gaming related servers.

[0013] FIG. **2**A is a block diagram showing various functional elements of an exemplary EGM.

[0014] FIG. **2**B depicts a casino gaming environment according to one example.

[0015] FIG. **2**C is a diagram that shows examples of components of a system for providing online gaming according to some aspects of the present disclosure.

[0016] FIG. **3** illustrates, in block diagram form, an implementation of a game processing architecture algorithm that implements a game processing pipeline for the play of a game in accordance with various implementations described herein.

[0017] FIG. **4**A is an architecture diagram illustrating components of an example digital wallet system.

[0018] FIG. **4**B is an architecture diagram illustrating components of an embodiment of the example digital wallet system shown in FIG. **4**A.

[0019] FIG. **5** is an architecture diagram of components of an example digital wallet system.

[0020] FIG. **6** is an architecture diagram of components of another example digital wallet system.

[0021] FIG. **7**A and FIG. **7**B are example flowcharts illustrating example operations of a digital wallet system such as the digital wallet systems shown in FIGS. **4**A-**6**.

[0022] FIG. **8** illustrates an example process for fund transfers (e.g., credit and debit transactions) that may be performed by the digital wallet systems shown in FIGS. **4**A-**6**.

[0023] FIG. **9** illustrates an example process for getting a balance from an external provider that may be performed by the digital wallet systems shown in FIGS. **4**A-**6**.

[0024] FIG. **10** illustrates an example process for automatic funds transfers that may be performed by the digital wallet systems shown in FIGS. **4**A-**6**. In some embodiments, the process may trigger based on an end of session event (e.g., on an EGM, smart table, via mobile device, or the like) or by a CMS cash deposit.

[0025] FIG. **11** illustrates an example polling process that may be performed by the digital wallet systems shown in FIGS. **4**A-**6**.

[0026] FIG. **12** illustrates an example external provider polling health check process that may be performed by the digital wallet systems shown in FIGS. **4**A-**6**.

[0027] FIG. **13** is a block diagram of an implementation of a remote game play architecture that supports and funds remote game play with a prepaid game voucher.

[0028] FIG. **14** is a protocol diagram that depicts a protocol sequence for logging in, funding a game session with a prepaid game voucher, and selecting a game for remote game play.

[0029] FIG. **15** is a protocol diagram illustrating a protocol sequence for ending and/or logging out of a game session when funding remote game play with a prepaid game voucher.

[0030] FIG. **16** is a block diagram of another implementation of a remote game play architecture that supports and funds remote game play using a digital gaming wallet.

[0031] FIG. **17** is a protocol diagram that depicts a protocol sequence for logging in and funding a game session with a digital gaming wallet.

[0032] FIG. **18** is a protocol diagram illustrating a protocol sequence for ending and/or logging out of a game session when funding remote game play with a digital gaming wallet.

DETAILED DESCRIPTION

[0033] In markets where casino enterprise properties are often within proximity of each other, conventional wallet architecture requires casino player account cash balances to remain at each casino site. If that same player has a balance at one casino location and travels to another casino site, the player will have to first log back into the first casino site to transfer money to an external provider. After that transfer, the player would need to transfer the balance into a player account associated with the new property that the player wants to fund gameplay. This disparate separation of play funds between various casino accounts of the player can cause frustration and confusion on the part of players, as many may not understand where their play funds reside as they move between properties or the necessity to manually initiate wallet transactions to migrate play funds to another casino account before use. Thus, there is a need to allow for

a more seamless user experience where the patron's wallet balance is easily accessible and usable across multiple properties.

[0034] The present disclosure provides an improved digital wallet system and architecture that allows for the capability of automatic transfer of funds between casino player accounts and an external provider. Specifically, the improved digital wallet architecture pertains to utilizing a core enterprise application programming interface (EAPI) and wallet EAPI that allows a centralized wallet to automatically conduct transfers to and from casino accounts and external accounts of a player. The improved digital wallet architecture also includes a responsible gaming feature that allows a player (e.g., and/or game provider, gaming property) to set responsible gaming limits/thresholds and enforce those limits across multiple properties. The responsible gaming limits can be manually setup by the user or automatically created or modified based on historical player data. For example, a transfer limit could be based on historical game play and/or specific dates, days of the week, or the like, based on historical game play data of the player and/or other players.

[0035] Aspects of the present disclosure are technically rooted in game funding technology that allows players to automatically transfer funds between different casino sites (e.g., "gaming properties") while complying with gaming regulations. In prior digital wallet implementations, when a "cash out event" occurs during a carded gaming session, the funds managed or stored on the gaming device (e.g., tracked by the credit meter) may be sent to a casino player account for the known player. The player would then need to manually transfer funds from the casino player account to an external provider account (e.g., Everi/Sightline account). Rather than the player manually transferring funds from the casino player account to the external provider, the centralized digital wallet automatically transfers funds from the casino player account to the external provider without any player input and while satisfying gaming regulations. Similarly, a similar process may occur for a "buy in event" (e.g., card-in process, initial deposit transaction to the gaming device, or the like), automatically initiating a transaction of funds from the player's external provider account to casino player account before transferring those funds from the casino player account to the gaming device (e.g., EGM, table game, kiosk, or the like). In some embodiments, the automatic cash out and/or buy in events may be automatically performed by the digital wallet systems described herein when the player (e.g., a mobile device associated with the player) is detected as entering and/or exiting a gaming property.

[0036] Since the digital wallet system manages transactions involving both the external provider account(s) of the player and the various casino player accounts of various gaming properties for the player, enforcement of responsible gaming limits may be centrally managed and enforced. For example, in conventional systems, if $1,000 is set as a daily limit, then once a player transfers $1,000 to the casino player account, the limit amount is satisfied and no more funds can be manually transferred down to the casino player account by the player. However, in this digital wallet system, transaction limits may be consolidated and managed across all of the player's accounts. As an example, presume a player initially withdraws $500 from the external provider for a gaming session at a first property and finishes that gaming session with a $1,000 balance. After cash out, the digital wallet system automatically transfers the $1,000 balance from the gaming device to the casino player account and out to the external provider account of the player. The player can subsequently withdraw $1,000 from the external account (e.g., for gaming at the first property or a second property) without exceeding the $1,000 limit because the $500 initially transferred down to the game was returned to the external provider. In some embodiments, limits may be configured and implemented per property or across multiple properties, perhaps based on regulatory requirements for particular jurisdictions.

[0037] Other implementations could vary the daily fund transfer limit using AI and/or rule-based decision engine. The decision engine could be based the maximum limit according to historical game play, certain external events (e.g., Player Paycheck Pay Day).

[0038] The disclosure also includes various implementations that present and generate random based game outcomes (e.g., bingo game outcomes, predetermined game outcomes, and/or lottery game outcomes) for remote game play. In one or more implementations, a remote game system can be physically located in a designated gaming zone and/or other zones defined for wagering game play. The remote game system is setup to provide remote game play for one or more remote gaming devices (e.g., a mobile device). The remote game system can generate multiple virtual gaming services, where each virtual gaming service represents a virtual version of a gaming device typically located on a casino floor (e.g., Class II EGM or video lottery terminal). Each virtual gaming service is allocated to support remote game play on a remote gaming device by having a game module to initiate and execute game instances (e.g., rounds of play), a funding module to facilitate and manage fund transactions, and a metering module to track wager and other metering information throughout a gaming session.

[0039] In a Class II implementation, following a remote gaming device establishing a gaming session with the remote game system and initiating a game instance (e.g., pressing a spin button), the allocated virtual gaming service joins a multiplayer game (e.g., an electronic bingo game). The remote game system can include or is coupled to a central determination gaming system (e.g., a bingo server) that initiates one or more sequence listings (e.g., bingo or lottery ball calls). After joining the multiplayer game, the virtual gaming service compares a given sequence listing (e.g., a bingo number listing) with a selected pattern and/or sequence of symbols and/or numbers (e.g., a bingo card) to possibly determine one or more designated game patterns (e.g., bingo patterns). Afterwards, the virtual gaming service evaluates the designated game patterns according to one or more pay tables to determine one or more game outcomes (e.g., payout of 100 game credits). The virtual game service then determines and sends presentation information corresponding to the game outcomes to the remote gaming device. In one example, the virtual gaming services can directly dictate and provide the presentation game outcomes to the remote gaming device. In another example, the virtual gaming services indirectly communicates the presentation game outcomes by providing presentation related information (e.g., one or more RNG seeds or credit values) to the remote gaming device for it to derive the presentation game outcomes.

[0040] The disclosure also includes various implementations to fund real money wagering for remote game play. In one example, remote game play can be funded with a prepaid game voucher (e.g., a TITO ticket), which can also be referenced as a "prepaid game token," "pre-purchased remote game play token" or more generally as a "token" throughout this disclosure. The prepaid game voucher can be a physical and/or digital voucher that a player purchases within a designated gaming zone and/or other wager-enabled zones prior to remote game play. For a physical, prepaid game voucher, a remote gaming device scans the prepaid game voucher and stores information related to and/or a scanned digital image of the prepaid game voucher. The remote gaming device forwards related information and/or the scanned prepaid game voucher to a voucher system for funding verification. After verifying the prepaid game voucher, the voucher system sends a verified voucher value to the virtual gaming services to use for game play. The remote gaming device presents via a user interface (UI) on a mobile application the credit balance loaded onto one or more credit meters and other funding information. In another example, rather than utilizing a prepaid game voucher, the remote gaming device may initiate the transfer of funds to and from a player's wagering account that includes one or more digital wallets. As an example, a digital gaming wallet linked to a player's wagering account may be customized to facilitate and manage gaming related transactions, such as transferring funds to the virtual gaming service to load onto credit meters.

[0041] In terms of technical effects, the one or more remote game play implementations described throughout the disclosure deliver improvements to gaming systems and/or overall gaming environment by providing new and/or improved gaming device and/or system operations that comply with gaming regulations. Specifically, a remote gaming device is specially programmed to present game outcomes inside and/or outside typical gaming zones by decoupling the presentation of game outcomes with the generation of random-based game outcomes. The remote gaming device offloads the generation and/or evaluation of random based game outcomes to a remote game play system to avoid being classified as a wagering game device restricted to a designated gaming zone. The remote game play system, which could be located within a designated gaming zone, includes virtual gaming services that perform functionality associated with wagering gaming devices. To simplify integration within existing game system components, the remote game play system can act as middleware system that interfaces and communicates with an central determination game system (e.g., bingo server), a casino management system, and/or other existing gaming and casino systems. The remote game play system also supports multiple funding options for remote gameplay that comply with one or more jurisdictional regulations. These and other technical features are described in greater detail later in the disclosure.

[0042] FIG. **1** illustrates several different models of EGMs which may be networked to various gaming related servers. Shown is a system **100** in a gaming environment including one or more server computers **102** (e.g., slot servers of a casino) that are in communication, via a communications network, with one or more gaming devices **104**A-**104**X (EGMs, slots, video poker, bingo machines, etc.) that can implement one or more aspects of the present disclosure. The gaming devices **104**A-**104**X may alternatively be portable and/or remote gaming devices such as, but not limited to, a smart phone, a tablet, a laptop, or a game console. Gaming devices **104**A-**104**X utilize specialized software and/or hardware to form non-generic, particular machines or apparatuses that comply with regulatory requirements regarding devices used for wagering or games of chance that provide monetary awards. Additionally, or alternatively, one or more of gaming devices **104**A-**104**X may be configured as a tabletop game, as shown below in FIG. **4**A.

[0043] Communication between the gaming devices **104**A-**104**X and the server computers **102**, and among the gaming devices **104**A-**104**X, may be direct or indirect using one or more communication protocols. As an example, gaming devices **104**A-**104**X and the server computers **102** can communicate over one or more communication networks, such as over the Internet through a website maintained by a computer on a remote server or over an online data network including commercial online service providers, Internet service providers, private networks (e.g., local area networks and enterprise networks), and the like (e.g., wide area networks). The communication networks could allow gaming devices **104**A-**104**X to communicate with one another and/or the server computers **102** using a variety of communication-based technologies, such as radio frequency (RF) (e.g., wireless fidelity (WiFi®) and Bluetooth®), cable TV, satellite links and the like.

[0044] In some implementation, server computers **102** may not be necessary and/or preferred. For example, in one or more implementations, a stand-alone gaming device such as gaming device **104**A, gaming device **104**B or any of the other gaming devices **104**C-**104**X can implement one or more aspects of the present disclosure. However, it is typical to find multiple EGMs connected to networks implemented with one or more of the different server computers **102** described herein.

[0045] The server computers **102** may include a central determination gaming system server **106**, a ticket-in-ticket-out (TITO) system server **108**, a player tracking system server **110**, a progressive system server **112**, and/or a casino management system server **114**. Gaming devices **104**A-**104**X may include features to enable operation of any or all servers for use by the player and/or operator (e.g., the casino, resort, gaming establishment, tavern, pub, etc.). For example, game outcomes may be generated on a central determination gaming system server **106** and then transmitted over the network to any of a group of remote terminals or remote gaming devices **104**A-**104**X that utilize the game outcomes and display the results to the players.

[0046] Gaming device **104**A is often of a cabinet construction which may be aligned in rows or banks of similar devices for placement and operation on a casino floor. The gaming device **104**A often includes a main door which provides access to the interior of the cabinet. Gaming device **104**A typically includes a button area or button deck **120** accessible by a player that is configured with input switches or buttons **122**, an access channel for a bill validator **124**, and/or an access channel for a ticket-out printer **126**.

[0047] In FIG. **1**, gaming device **104**A is shown as a Relm XL™ model gaming device manufactured by Aristocrat® Technologies, Inc. As shown, gaming device **104**A is a reel machine having a gaming display area **118** comprising a number (typically 3 or 5) of mechanical reels **130** with various symbols displayed on them. The mechanical reels

130 are independently spun and stopped to show a set of symbols within the gaming display area **118** which may be used to determine an outcome to the game.

[0048] In many configurations, the gaming device **104**A may have a main display **128** (e.g., video display monitor) mounted to, or above, the gaming display area **118**. The main display **128** can be a high-resolution liquid crystal display (LCD), plasma, light emitting diode (LED), or organic light emitting diode (OLED) panel which may be flat or curved as shown, a cathode ray tube, or other conventional electronically controlled video monitor.

[0049] In some implementations, the bill validator **124** may also function as a "ticket-in" reader that allows the player to use a casino issued credit ticket to load credits onto the gaming device **104**A (e.g., in a cashless ticket ("TITO") system). In such cashless implementations, the gaming device **104**A may also include a "ticket-out" printer **126** for outputting a credit ticket when a "cash out" button is pressed. Cashless TITO systems are used to generate and track unique bar-codes or other indicators printed on tickets to allow players to avoid the use of bills and coins by loading credits using a ticket reader and cashing out credits using a ticket-out printer **126** on the gaming device **104**A. The gaming device **104**A can have hardware meters for purposes including ensuring regulatory compliance and monitoring the player credit balance. In addition, there can be additional meters that record the total amount of money wagered on the gaming device, total amount of money deposited, total amount of money withdrawn, total amount of winnings on gaming device **104**A.

[0050] In some implementations, a player tracking card reader **144**, a transceiver for wireless communication with a mobile device (e.g., a player's smartphone), a keypad **146**, and/or an illuminated display **148** for reading, receiving, entering, and/or displaying player tracking information is provided in gaming device **104**A. In such implementations, a game controller within the gaming device **104**A can communicate with the player tracking system server **110** to send and receive player tracking information.

[0051] Gaming device **104**A may also include a bonus topper wheel **134**. When bonus play is triggered (e.g., by a player achieving a particular outcome or set of outcomes in the primary game), bonus topper wheel **134** is operative to spin and stop with indicator arrow **136** indicating the outcome of the bonus game. Bonus topper wheel **134** is typically used to play a bonus game, but it could also be incorporated into play of the base or primary game.

[0052] A candle **138** may be mounted on the top of gaming device **104**A and may be activated by a player (e.g., using a switch or one of buttons **122**) to indicate to operations staff that gaming device **104**A has experienced a malfunction or the player requires service. The candle **138** is also often used to indicate a jackpot has been won and to alert staff that a hand payout of an award may be needed.

[0053] There may also be one or more information panels **152** which may be a back-lit, silkscreened glass panel with lettering to indicate general game information including, for example, a game denomination (e.g., $0.25 or $1), pay lines, pay tables, and/or various game related graphics. In some implementations, the information panel(s) **152** may be implemented as an additional video display.

[0054] Gaming devices **104**A have traditionally also included a handle **132** typically mounted to the side of main cabinet **116** which may be used to initiate game play.

[0055] Many or all the above described components can be controlled by circuitry (e.g., a game controller) housed inside the main cabinet **116** of the gaming device **104**A, the details of which are shown in FIG. **2**A.

[0056] An alternative example gaming device **104**B illustrated in FIG. **1** is the Arc model gaming device manufactured by Aristocrat® Technologies, Inc. Note that where possible, reference numerals identifying similar features of the gaming device **104**A implementation are also identified in the gaming device **104**B implementation using the same reference numbers. Gaming device **104**B does not include physical reels and instead shows game play functions on main display **128**. An optional topper screen **140** may be used as a secondary game display for bonus play, to show game features or attraction activities while a game is not in play, or any other information or media desired by the game designer or operator. In some implementations, the optional topper screen **140** may also or alternatively be used to display progressive jackpot prizes available to a player during play of gaming device **104**B.

[0057] Example gaming device **104**B includes a main cabinet **116** including a main door which opens to provide access to the interior of the gaming device **104**B. The main or service door is typically used by service personnel to refill the ticket-out printer **126** and collect bills and tickets inserted into the bill validator **124**. The main or service door may also be accessed to reset the machine, verify and/or upgrade the software, and for general maintenance operations.

[0058] Another example gaming device **104**C shown is the Helix™ model gaming device manufactured by Aristocrat® Technologies, Inc. Gaming device **104**C includes a main display **128**A that is in a landscape orientation. Although not illustrated by the front view provided, the main display **128**A may have a curvature radius from top to bottom, or alternatively from side to side. In some implementations, main display **128**A is a flat panel display. Main display **128**A is typically used for primary game play while secondary display **128**B is typically used for bonus game play, to show game features or attraction activities while the game is not in play or any other information or media desired by the game designer or operator. In some implementations, example gaming device **104**C may also include speakers **142** to output various audio such as game sound, background music, etc.

[0059] Although gaming devices **104**A-**104**X are shown in FIG. **1** as upright EGMs, the systems and methods described herein can be used on upright EGMs or table type EGMs as shown in FIG. **4**A.

[0060] Many different types of games, including mechanical slot games, video slot games, video poker, video black jack, video pachinko, keno, bingo, and lottery, may be provided with or implemented within the depicted gaming devices **104**A-**104**C and other similar gaming devices. Each gaming device may also be operable to provide many different games. Games may be differentiated according to themes, sounds, graphics, type of game (e.g., slot game vs. card game vs. game with aspects of skill), denomination, number of paylines, maximum jackpot, progressive or non-progressive, bonus games, and may be deployed for operation in Class 2 or Class 3, etc.

[0061] FIG. **2**A is a block diagram depicting exemplary internal electronic components of a gaming device **200** connected to various external systems. All or parts of the

gaming device **200** shown could be used to implement any one of the example gaming devices **104**A-X depicted in FIG. **1**. As shown in FIG. **2**A, gaming device **200** includes a topper display **216** or another form of a top box (e.g., a topper wheel, a topper screen, etc.) that sits above cabinet **218**. Cabinet **218** or topper display **216** may also house a number of other components which may be used to add features to a game being played on gaming device **200**, including speakers **220**, a ticket printer **222** which prints bar-coded tickets or other media or mechanisms for storing or indicating a player's credit value, a ticket reader **224** which reads bar-coded tickets or other media or mechanisms for storing or indicating a player's credit value, and a player tracking interface **232**. Player tracking interface **232** may include a keypad **226** for entering information, a player tracking display **228** for displaying information (e.g., an illuminated or video display), a card reader **230** for receiving data and/or communicating information to and from media or a device such as a smart phone enabling player tracking. FIG. **2** also depicts utilizing a ticket printer **222** to print tickets for a TITO system server **108**. Gaming device **200** may further include a bill validator **234**, player-input buttons **236** for player input, cabinet security sensors **238** to detect unauthorized opening of the cabinet **218**, a primary game display **240**, and a secondary game display **242**, each coupled to and operable under the control of game controller **202**.

[0062] The games available for play on the gaming device **200** are controlled by a game controller **202** that includes one or more processors **204**. Processor **204** represents a general-purpose processor, a specialized processor intended to perform certain functional tasks, or a combination thereof. As an example, processor **204** can be a central processing unit (CPU) that has one or more multi-core processing units and memory mediums (e.g., cache memory) that function as buffers and/or temporary storage for data. Alternatively, processor **204** can be a specialized processor, such as an application specific integrated circuit (ASIC), graphics processing unit (GPU), field-programmable gate array (FPGA), digital signal processor (DSP), or another type of hardware accelerator. In another example, processor **204** is a system on chip (SoC) that combines and integrates one or more general-purpose processors and/or one or more specialized processors. Although FIG. **2**A illustrates that game controller **202** includes a single processor **204**, game controller **202** is not limited to this representation and instead can include multiple processors **204** (e.g., two or more processors).

[0063] FIG. **2**A illustrates that processor **204** is operatively coupled to memory **208**. Memory **208** is defined herein as including volatile and nonvolatile memory and other types of non-transitory data storage components. Volatile memory is memory that do not retain data values upon loss of power. Nonvolatile memory is memory that do retain data upon a loss of power. Examples of memory **208** include random access memory (RAM), read-only memory (ROM), hard disk drives, solid-state drives, universal serial bus (USB) flash drives, memory cards accessed via a memory card reader, floppy disks accessed via an associated floppy disk drive, optical discs accessed via an optical disc drive, magnetic tapes accessed via an appropriate tape drive, and/or other memory components, or a combination of any two or more of these memory components. In addition, examples of RAM include static random access memory (SRAM), dynamic random access memory (DRAM), magnetic random access memory (MRAM), and other such devices. Examples of ROM include a programmable read-only memory (PROM), an erasable programmable read-only memory (EPROM), an electrically erasable programmable read-only memory (EEPROM), or other like memory device. Even though FIG. **2**A illustrates that game controller **202** includes a single memory **208**, game controller **202** could include multiple memories **208** for storing program instructions and/or data.

[0064] Memory **208** can store one or more game programs **206** that provide program instructions and/or data for carrying out various implementations (e.g., game mechanics) described herein. Stated another way, game program **206** represents an executable program stored in any portion or component of memory **208**. In one or more implementations, game program **206** is embodied in the form of source code that includes human-readable statements written in a programming language or machine code that contains numerical instructions recognizable by a suitable execution system, such as a processor **204** in a game controller or other system. Examples of executable programs include: (1) a compiled program that can be translated into machine code in a format that can be loaded into a random access portion of memory **208** and run by processor **204**; (2) source code that may be expressed in proper format such as object code that is capable of being loaded into a random access portion of memory **208** and executed by processor **204**; and (3) source code that may be interpreted by another executable program to generate instructions in a random access portion of memory **208** to be executed by processor **204**.

[0065] Alternatively, game programs **206** can be set up to generate one or more game instances based on instructions and/or data that gaming device **200** exchanges with one or more remote gaming devices, such as a central determination gaming system server **106** (not shown in FIG. **2**A but shown in FIG. **1**). For purpose of this disclosure, the term "game instance" refers to a play or a round of a game that gaming device **200** presents (e.g., via a user interface (UI)) to a player. The game instance is communicated to gaming device **200** via the network **214** and then displayed on gaming device **200**. For example, gaming device **200** may execute game program **206** as video streaming software that allows the game to be displayed on gaming device **200**. When a game is stored on gaming device **200**, it may be loaded from memory **208** (e.g., from a read only memory (ROM)) or from the central determination gaming system server **106** to memory **208**.

[0066] Gaming devices, such as gaming device **200**, are highly regulated to ensure fairness and, in many cases, gaming device **200** is operable to award monetary awards (e.g., typically dispensed in the form of a redeemable voucher). Therefore, to satisfy security and regulatory requirements in a gaming environment, hardware and software architectures are implemented in gaming devices **200** that differ significantly from those of general-purpose computers. Adapting general purpose computers to function as gaming devices **200** is not simple or straightforward because of: (1) the regulatory requirements for gaming devices **200**, (2) the harsh environment in which gaming devices **200** operate, (3) security requirements, (4) fault tolerance requirements, and (5) the requirement for additional special purpose componentry enabling functionality of an EGM. These differences require substantial engineering effort with

respect to game design implementation, game mechanics, hardware components, and software.

[0067] One regulatory requirement for games running on gaming device **200** generally involves complying with a certain level of randomness. Typically, gaming jurisdictions mandate that gaming devices **200** satisfy a minimum level of randomness without specifying how a gaming device **200** should achieve this level of randomness. To comply, FIG. **2**A illustrates that gaming device **200** could include an RNG **212** that utilizes hardware and/or software to generate RNG outcomes that lack any pattern. The RNG operations are often specialized and non-generic in order to comply with regulatory and gaming requirements. For example, in a slot game, game program **206** can initiate multiple RNG calls to RNG **212** to generate RNG outcomes, where each RNG call and RNG outcome corresponds to an outcome for a reel. In another example, gaming device **200** can be a Class II gaming device where RNG **212** generates RNG outcomes for creating Bingo cards. In one or more implementations, RNG **212** could be one of a set of RNGs operating on gaming device **200**. More generally, an output of the RNG **212** can be the basis on which game outcomes are determined by the game controller **202**. Game developers could vary the degree of true randomness for each RNG (e.g., pseudorandom) and utilize specific RNGs depending on game requirements. The output of the RNG **212** can include a random number or pseudorandom number (either is generally referred to as a "random number").

[0068] In FIG. **2**A, RNG **212** and hardware RNG **244** are shown in dashed lines to illustrate that RNG **212**, hardware RNG **244**, or both can be included in gaming device **200**. In one implementation, instead of including RNG **212**, gaming device **200** could include a hardware RNG **244** that generates RNG outcomes. Analogous to RNG **212**, hardware RNG **244** performs specialized and non-generic operations in order to comply with regulatory and gaming requirements. For example, because of regulation requirements, hardware RNG **244** could be a random number generator that securely produces random numbers for cryptography use. The gaming device **200** then uses the secure random numbers to generate game outcomes for one or more game features. In another implementation, the gaming device **200** could include both hardware RNG **244** and RNG **212**. RNG **212** may utilize the RNG outcomes from hardware RNG **244** as one of many sources of entropy for generating secure random numbers for the game features.

[0069] Another regulatory requirement for running games on gaming device **200** includes ensuring a certain level of RTP. Similar to the randomness requirement discussed above, numerous gaming jurisdictions also mandate that gaming device **200** provides a minimum level of RTP (e.g., RTP of at least 75%). A game can use one or more lookup tables (also called weighted tables) as part of a technical solution that satisfies regulatory requirements for randomness and RTP. In particular, a lookup table can integrate game features (e.g., trigger events for special modes or bonus games; newly introduced game elements such as extra reels, new symbols, or new cards; stop positions for dynamic game elements such as spinning reels, spinning wheels, or shifting reels; or card selections from a deck) with random numbers generated by one or more RNGs, so as to achieve a given level of volatility for a target level of RTP. (In general, volatility refers to the frequency or probability of an event such as a special mode, payout, etc. For example, for a target level of RTP, a higher-volatility game may have a lower payout most of the time with an occasional bonus having a very high payout, while a lower-volatility game has a steadier payout with more frequent bonuses of smaller amounts.) Configuring a lookup table can involve engineering decisions with respect to how RNG outcomes are mapped to game outcomes for a given game feature, while still satisfying regulatory requirements for RTP. Configuring a lookup table can also involve engineering decisions about whether different game features are combined in a given entry of the lookup table or split between different entries (for the respective game features), while still satisfying regulatory requirements for RTP and allowing for varying levels of game volatility.

[0070] FIG. **2**A illustrates that gaming device **200** includes an RNG conversion engine **210** that translates the RNG outcome from RNG **212** to a game outcome presented to a player. To meet a designated RTP, a game developer can set up the RNG conversion engine **210** to utilize one or more lookup tables to translate the RNG outcome to a symbol element, stop position on a reel strip layout, and/or randomly chosen aspect of a game feature. As an example, the lookup tables can regulate a prize payout amount for each RNG outcome and how often the gaming device **200** pays out the prize payout amounts. The RNG conversion engine **210** could utilize one lookup table to map the RNG outcome to a game outcome displayed to a player and a second lookup table as a pay table for determining the prize payout amount for each game outcome. The mapping between the RNG outcome to the game outcome controls the frequency in hitting certain prize payout amounts.

[0071] FIG. **2**A also depicts that gaming device **200** is connected over network **214** to player tracking system server **110**. Player tracking system server **110** may be, for example, an OASIS® system manufactured by Aristocrat® Technologies, Inc. Player tracking system server **110** is used to track play (e.g. amount wagered, games played, time of play and/or other quantitative or qualitative measures) for individual players so that an operator may reward players in a loyalty program. The player may use the player tracking interface **232** to access his/her account information, activate free play, and/or request various information. Player tracking or loyalty programs seek to reward players for their play and help build brand loyalty to the gaming establishment. The rewards typically correspond to the player's level of patronage (e.g., to the player's playing frequency and/or total amount of game plays at a given casino). Player tracking rewards may be complimentary and/or discounted meals, lodging, entertainment and/or additional play. Player tracking information may be combined with other information that is now readily obtainable by a casino management system.

[0072] When a player wishes to play the gaming device **200**, he/she can insert cash or a ticket voucher through a coin acceptor (not shown) or bill validator **234** to establish a credit balance on the gaming device. The credit balance is used by the player to place wagers on instances of the game and to receive credit awards based on the outcome of winning instances. The credit balance is decreased by the amount of each wager and increased upon a win. The player can add additional credits to the balance at any time. The player may also optionally insert a loyalty club card into the card reader **230**. During the game, the player views with one or more UIs, the game outcome on one or more of the

primary game display **240** and secondary game display **242**. Other game and prize information may also be displayed.

[0073] For each game instance, a player may make selections, which may affect play of the game. For example, the player may vary the total amount wagered by selecting the amount bet per line and the number of lines played. In many games, the player is asked to initiate or select options during course of game play (such as spinning a wheel to begin a bonus round or select various items during a feature game). The player may make these selections using the player-input buttons **236**, the primary game display **240** which may be a touch screen, or using some other device which enables a player to input information into the gaming device **200**.

[0074] During certain game events, the gaming device **200** may display visual and auditory effects that can be perceived by the player. These effects add to the excitement of a game, which makes a player more likely to enjoy the playing experience. Auditory effects include various sounds that are projected by the speakers **220**. Visual effects include flashing lights, strobing lights or other patterns displayed from lights on the gaming device **200** or from lights behind the information panel **152** (FIG. **1**).

[0075] When the player is done, he/she cashes out the credit balance (typically by pressing a cash out button to receive a ticket from the ticket printer **222**). The ticket may be "cashed-in" for money or inserted into another machine to establish a credit balance for play.

[0076] Additionally, or alternatively, gaming devices **104**A-**104**X and **200** can include or be coupled to one or more wireless transmitters, receivers, and/or transceivers (not shown in FIGS. **1** and **2**A) that communicate (e.g., Bluetooth® or other near-field communication technology) with one or more mobile devices to perform a variety of wireless operations in a casino environment. Examples of wireless operations in a casino environment include detecting the presence of mobile devices, performing credit, points, comps, or other marketing or hard currency transfers, establishing wagering sessions, and/or providing a personalized casino-based experience using a mobile application. In one implementation, to perform these wireless operations, a wireless transmitter or transceiver initiates a secure wireless connection between a gaming device **104**A-**104**X and **200** and a mobile device. After establishing a secure wireless connection between the gaming device **104**A-**104**X and **200** and the mobile device, the wireless transmitter or transceiver does not send and/or receive application data to and/or from the mobile device. Rather, the mobile device communicates with gaming devices **104**A-**104**X and **200** using another wireless connection (e.g., WiFi® or cellular network). In another implementation, a wireless transceiver establishes a secure connection to directly communicate with the mobile device. The mobile device and gaming device **104**A-**104**X and **200** sends and receives data utilizing the wireless transceiver instead of utilizing an external network. For example, the mobile device would perform digital wallet transactions by directly communicating with the wireless transceiver. In one or more implementations, a wireless transmitter could broadcast data received by one or more mobile devices without establishing a pairing connection with the mobile devices.

[0077] Although FIGS. **1** and **2**A illustrate specific implementations of a gaming device (e.g., gaming devices **104**A-**104**X and **200**), the disclosure is not limited to those implementations shown in FIGS. **1** and **2**. For example, not all gaming devices suitable for implementing implementations of the present disclosure necessarily include top wheels, top boxes, information panels, cashless ticket systems, and/or player tracking systems. Further, some suitable gaming devices have only a single game display that includes only a mechanical set of reels and/or a video display, while others are designed for bar counters or tabletops and have displays that face upwards. Gaming devices **104**A-**104**X and **200** may also include other processors that are not separately shown. Using FIG. **2**A as an example, gaming device **200** could include display controllers (not shown in FIG. **2**A) configured to receive video input signals or instructions to display images on game displays **240** and **242**. Alternatively, such display controllers may be integrated into the game controller **202**. The use and discussion of FIGS. **1** and **2** are examples to facilitate ease of description and explanation.

[0078] FIG. **2**B depicts a casino gaming environment according to one example. In this example, the casino **251** includes banks **252** of EGMs **104**. In this example, each bank **252** of EGMs **104** includes a corresponding gaming signage system **254** (also shown in FIG. **2**A). According to this implementation, the casino **251** also includes mobile gaming devices **256**, which are also configured to present wagering games in this example. The mobile gaming devices **256** may, for example, include tablet devices, cellular phones, smart phones and/or other handheld devices. In this example, the mobile gaming devices **256** are configured for communication with one or more other devices in the casino **251**, including but not limited to one or more of the server computers **102**, via wireless access points **258**.

[0079] According to some examples, the mobile gaming devices **256** may be configured for stand-alone determination of game outcomes. However, in some alternative implementations the mobile gaming devices **256** may be configured to receive game outcomes from another device, such as the central determination gaming system server **106**, one of the EGMs **104**, etc.

[0080] Some mobile gaming devices **256** may be configured to accept monetary credits from a credit or debit card, via a wireless interface (e.g., via a wireless payment app), via tickets, via a patron casino account, etc. However, some mobile gaming devices **256** may not be configured to accept monetary credits via a credit or debit card. Some mobile gaming devices **256** may include a ticket reader and/or a ticket printer whereas some mobile gaming devices **256** may not, depending on the particular implementation.

[0081] In some implementations, the casino **251** may include one or more kiosks **260** that are configured to facilitate monetary transactions involving the mobile gaming devices **256**, which may include cash out and/or cash in transactions. The kiosks **260** may be configured for wired and/or wireless communication with the mobile gaming devices **256**. The kiosks **260** may be configured to accept monetary credits from casino patrons **262** and/or to dispense monetary credits to casino patrons **262** via cash, a credit or debit card, via a wireless interface (e.g., via a wireless payment app), via tickets, etc. According to some examples, the kiosks **260** may be configured to accept monetary credits from a casino patron and to provide a corresponding amount of monetary credits to a mobile gaming device **256** for wagering purposes, e.g., via a wireless link such as a near-field communications link. In some such examples, when a casino patron **262** is ready to cash out, the casino

patron **262** may select a cash out option provided by a mobile gaming device **256**, which may include a real button or a virtual button (e.g., a button provided via a graphical user interface) in some instances. In some such examples, the mobile gaming device **256** may send a "cash out" signal to a kiosk **260** via a wireless link in response to receiving a "cash out" indication from a casino patron. The kiosk **260** may provide monetary credits to the casino patron **262** corresponding to the "cash out" signal, which may be in the form of cash, a credit ticket, a credit transmitted to a financial account corresponding to the casino patron, etc.

[0082] In some implementations, a cash-in process and/or a cash-out process may be facilitated by the TITO system server **108**. For example, the TITO system server **108** may control, or at least authorize, ticket-in and ticket-out transactions that involve a mobile gaming device **256** and/or a kiosk **260**.

[0083] Some mobile gaming devices **256** may be configured for receiving and/or transmitting player loyalty information. For example, some mobile gaming devices **256** may be configured for wireless communication with the player tracking system server **110**. Some mobile gaming devices **256** may be configured for receiving and/or transmitting player loyalty information via wireless communication with a patron's player loyalty card, a patron's smartphone, etc.

[0084] According to some implementations, a mobile gaming device **256** may be configured to provide safeguards that prevent the mobile gaming device **256** from being used by an unauthorized person. For example, some mobile gaming devices **256** may include one or more biometric sensors and may be configured to receive input via the biometric sensor(s) to verify the identity of an authorized patron. Some mobile gaming devices **256** may be configured to function only within a predetermined or configurable area, such as a casino gaming area.

[0085] FIG. **2**C is a diagram that shows examples of components of a system for providing online gaming according to some aspects of the present disclosure. As with other figures presented in this disclosure, the numbers, types and arrangements of gaming devices shown in FIG. **2**C are merely shown by way of example. In this example, various gaming devices, including but not limited to end user devices (EUDs) **264***a,* **264***b* and **264***c* are capable of communication via one or more networks **417**. The networks **417** may, for example, include one or more cellular telephone networks, the Internet, etc. In this example, the EUDs **264***a* and **264***b* are mobile devices: according to this example the EUD **264***a* is a tablet device and the EUD **264***b* is a smart phone. In this implementation, the EUD **264***c* is a laptop computer that is located within a residence **266** at the time depicted in FIG. **2**C. Accordingly, in this example the hardware of EUDs is not specifically configured for online gaming, although each EUD is configured with software for online gaming. For example, each EUD may be configured with a web browser. Other implementations may include other types of EUD, some of which may be specifically configured for online gaming.

[0086] In this example, a gaming data center **276** includes various devices that are configured to provide online wagering games via the networks **417**. The gaming data center **276** is capable of communication with the networks **417** via the gateway **272**. In this example, switches **278** and routers **280** are configured to provide network connectivity for devices of the gaming data center **276**, including storage devices **282***a,* servers **284***a* and one or more workstations **570***a*. The servers **284***a* may, for example, be configured to provide access to a library of games for online game play. In some examples, code for executing at least some of the games may initially be stored on one or more of the storage devices **282***a*. The code may be subsequently loaded onto a server **284***a* after selection by a player via an EUD and communication of that selection from the EUD via the networks **417**. The server **284***a* onto which code for the selected game has been loaded may provide the game according to selections made by a player and indicated via the player's EUD. In other examples, code for executing at least some of the games may initially be stored on one or more of the servers **284***a*. Although only one gaming data center **276** is shown in FIG. **2**C, some implementations may include multiple gaming data centers **276**.

[0087] In this example, a financial institution data center **270** is also configured for communication via the networks **417**. Here, the financial institution data center **270** includes servers **284***b,* storage devices **282***b,* and one or more workstations **286***b*. According to this example, the financial institution data center **270** is configured to maintain financial accounts, such as checking accounts, savings accounts, loan accounts, etc. In some implementations one or more of the authorized users **274***a*-**274***c* may maintain at least one financial account with the financial institution that is serviced via the financial institution data center **270**.

[0088] According to some implementations, the gaming data center **276** may be configured to provide online wagering games in which money may be won or lost. According to some such implementations, one or more of the servers **284***a* may be configured to monitor player credit balances, which may be expressed in game credits, in currency units, or in any other appropriate manner. In some implementations, the server(s) **284***a* may be configured to obtain financial credits from and/or provide financial credits to one or more financial institutions, according to a player's "cash in" selections, wagering game results and a player's "cash out" instructions. According to some such implementations, the server(s) **284***a* may be configured to electronically credit or debit the account of a player that is maintained by a financial institution, e.g., an account that is maintained via the financial institution data center **270**. The server(s) **284***a* may, in some examples, be configured to maintain an audit record of such transactions.

[0089] In some alternative implementations, the gaming data center **276** may be configured to provide online wagering games for which credits may not be exchanged for cash or the equivalent. In some such examples, players may purchase game credits for online game play, but may not "cash out" for monetary credit after a gaming session. Moreover, although the financial institution data center **270** and the gaming data center **276** include their own servers and storage devices in this example, in some examples the financial institution data center **270** and/or the gaming data center **276** may use offsite "cloud-based" servers and/or storage devices. In some alternative examples, the financial institution data center **270** and/or the gaming data center **276** may rely entirely on cloud-based servers.

[0090] One or more types of devices in the gaming data center **276** (or elsewhere) may be capable of executing middleware, e.g., for data management and/or device communication. Authentication information, player tracking information, etc., including but not limited to information

obtained by EUDs **264** and/or other information regarding authorized users of EUDs **264** (including but not limited to the authorized users **274***a*-**274***c*), may be stored on storage devices **282** and/or servers **284**. Other game-related information and/or software, such as information and/or software relating to leaderboards, players currently playing a game, game themes, game-related promotions, game competitions, etc., also may be stored on storage devices **282** and/or servers **284**. In some implementations, some such game-related software may be available as "apps" and may be downloadable (e.g., from the gaming data center **276**) by authorized users.

[0091] In some examples, authorized users and/or entities (such as representatives of gaming regulatory authorities) may obtain gaming-related information via the gaming data center **276**. One or more other devices (such EUDs **264** or devices of the gaming data center **276**) may act as intermediaries for such data feeds. Such devices may, for example, be capable of applying data filtering algorithms, executing data summary and/or analysis software, etc. In some implementations, data filtering, summary and/or analysis software may be available as "apps" and downloadable by authorized users.

[0092] FIG. **3** illustrates, in block diagram form, an implementation of a game processing architecture **300** that implements a game processing pipeline for the play of a game in accordance with various implementations described herein. As shown in FIG. **3**, the gaming processing pipeline starts with having a UI system **302** receive one or more player inputs for the game instance. Based on the player input(s), the UI system **302** generates and sends one or more RNG calls to a game processing backend system **314**. Game processing backend system **314** then processes the RNG calls with RNG engine **316** to generate one or more RNG outcomes. The RNG outcomes are then sent to the RNG conversion engine **320** to generate one or more game outcomes for the UI system **302** to display to a player. The game processing architecture **300** can implement the game processing pipeline using a gaming device, such as gaming devices **104**A-**104**X and **200** shown in FIGS. **1** and **2**, respectively. Alternatively, portions of the gaming processing architecture **300** can implement the game processing pipeline using a gaming device and one or more remote gaming devices, such as central determination gaming system server **106** shown in FIG. **1**.

[0093] The UI system **302** includes one or more UIs that a player can interact with. The UI system **302** could include one or more game play UIs **304**, one or more bonus game play UIs **308**, and one or more multiplayer UIs **312**, where each UI type includes one or more mechanical UIs and/or graphical UIs (GUIs). In other words, game play UI **304**, bonus game play UI **308**, and the multiplayer UI **312** may utilize a variety of UI elements, such as mechanical UI elements (e.g., physical "spin" button or mechanical reels) and/or GUI elements (e.g., virtual reels shown on a video display or a virtual button deck) to receive player inputs and/or present game play to a player. Using FIG. **3** as an example, the different UI elements are shown as game play UI elements **306**A-**306**N and bonus game play UI elements **310**A-**310**N.

[0094] The game play UI **304** represents a UI that a player typically interfaces with for a base game. During a game instance of a base game, the game play UI elements **306**A-**306**N (e.g., GUI elements depicting one or more virtual reels) are shown and/or made available to a user. In a subsequent game instance, the UI system **302** could transition out of the base game to one or more bonus games. The bonus game play UI **308** represents a UI that utilizes bonus game play UI elements **310**A-**310**N for a player to interact with and/or view during a bonus game. In one or more implementations, at least some of the game play UI element **306**A-**306**N are similar to the bonus game play UI elements **310**A-**310**N. In other implementations, the game play UI element **306**A-**306**N can differ from the bonus game play UI elements **310**A-**310**N.

[0095] FIG. **3** also illustrates that UI system **302** could include a multiplayer UI **312** purposed for game play that differs or is separate from the typical base game. For example, multiplayer UI **312** could be set up to receive player inputs and/or presents game play information relating to a tournament mode. When a gaming device transitions from a primary game mode that presents the base game to a tournament mode, a single gaming device is linked and synchronized to other gaming devices to generate a tournament outcome. For example, multiple RNG engines **316** corresponding to each gaming device could be collectively linked to determine a tournament outcome. To enhance a player's gaming experience, tournament mode can modify and synchronize sound, music, reel spin speed, and/or other operations of the gaming devices according to the tournament game play. After tournament game play ends, operators can switch back the gaming device from tournament mode to a primary game mode to present the base game. Although FIG. **3** does not explicitly depict that multiplayer UI **312** includes UI elements, multiplayer UI **312** could also include one or more multiplayer UI elements.

[0096] Based on the player inputs, the UI system **302** could generate RNG calls to a game processing backend system **314**. As an example, the UI system **302** could use one or more application programming interfaces (APIs) to generate the RNG calls. To process the RNG calls, the RNG engine **316** could utilize gaming RNG **318** and/or non-gaming RNGs **319**A-**319**N. Gaming RNG **318** could corresponds to RNG **212** or hardware RNG **244** shown in FIG. **2**A. As previously discussed with reference to FIG. **2**A, gaming RNG **318** often performs specialized and non-generic operations that comply with regulatory and/or game requirements. For example, because of regulation requirements, gaming RNG **318** could correspond to RNG **212** by being a cryptographic RNG or pseudorandom number generator (PRNG) (e.g., Fortuna PRNG) that securely produces random numbers for one or more game features. To securely generate random numbers, gaming RNG **318** could collect random data from various sources of entropy, such as from an operating system (OS) and/or a hardware RNG (e.g., hardware RNG **244** shown in FIG. **2**A). Alternatively, non-gaming RNGs **319**A-**319**N may not be cryptographically secure and/or be computationally less expensive. Non-gaming RNGs **319**A-**319**N can, thus, be used to generate outcomes for non-gaming purposes. As an example, non-gaming RNGs **319**A-**319**N can generate random numbers for generating random messages that appear on the gaming device.

[0097] The RNG conversion engine **320** processes each RNG outcome from RNG engine **316** and converts the RNG outcome to a UI outcome that is feedback to the UI system **302**. With reference to FIG. **2**A, RNG conversion engine **320** corresponds to RNG conversion engine **210** used for game

play. As previously described, RNG conversion engine **320** translates the RNG outcome from the RNG **212** to a game outcome presented to a player. RNG conversion engine **320** utilizes one or more lookup tables **322**A-**322**N to regulate a prize payout amount for each RNG outcome and how often the gaming device pays out the derived prize payout amounts. In one example, the RNG conversion engine **320** could utilize one lookup table to map the RNG outcome to a game outcome displayed to a player and a second lookup table as a pay table for determining the prize payout amount for each game outcome. In this example, the mapping between the RNG outcome and the game outcome controls the frequency in hitting certain prize payout amounts. Different lookup tables could be utilized depending on the different game modes, for example, a base game versus a bonus game.

[0098] After generating the UI outcome, the game processing backend system **314** sends the UI outcome to the UI system **302**. Examples of UI outcomes are symbols to display on a video reel or reel stops for a mechanical reel. In one example, if the UI outcome is for a base game, the UI system **302** updates one or more game play UI elements **306**A-**306**N, such as symbols, for the game play UI **304**. In another example, if the UI outcome is for a bonus game, the UI system could update one or more bonus game play UI elements **310**A-**310**N (e.g., symbols) for the bonus game play UI **308**. In response to updating the appropriate UI, the player may subsequently provide additional player inputs to initiate a subsequent game instance that progresses through the game processing pipeline.

[0099] FIG. **4**A is an architecture diagram illustrating components of an example digital wallet system **400**. In the example embodiment, the digital wallet system **400** facilitates digital wallet transactions for wager gaming sessions of a player **402** using their mobile device **404** in conjunction with a digital wallet system server **414** and other components as shown herein. The digital wallet system server **414** performs withdrawal and deposit type transactions on behalf of the player **402** with an external provider server **416** (e.g., a third party digital wallet service) and one or more casino management systems **420** (e.g., casino operators, properties, or the like), who operate gaming devices **426** (e.g., EGMs **104**, wagering table games **422**, kiosks, or the like).

[0100] The digital wallet system **400** establishes or otherwise utilizes various funds accounts of the player **402**. In this example embodiment, the player **402** has an external player account **410** established with the external provider server **416** that is used to store funds that may be used for wager gaming. The external provider server **416** may facilitate digital wallet transactions or other transactions to move funds between the external player account **410** and various financial institutions **418** or other funds sources of the player **402** (e.g., bank accounts, debit cards, credit cards, or other payment cards). For example, such transactions may include deposit or withdrawal transactions between the external player account **410** and accounts of the player **402** at the financial institutions, in some cases establishing an outstanding balance within the external player account **410** of the player that is made accessible for digital wallet-based transactions performed by the system **400** described herein.

[0101] The player also has a casino player account **408** established with a gaming operator (e.g., a casino or other wagering venue). The gaming operator utilizes a casino management system (or just "CMS") **420**, such as the Oasis® system (made commercially available by Aristocrat® Technologies, Inc.). The CMS **420**, amongst many other functionalities, manages certain aspects of gaming devices **426** at one or more properties of the operator. The casino management system **420** may also provide a player loyalty system through which players **402** register and participate in rated game play and receive loyalty benefits. In the example embodiment, the CMS **420** also establishes and maintains the casino player account **408** for the player **402**. The casino player account **408** provides a wagering account through which the player **402** can easily establish wagering funds at the gaming devices **426** (e.g., via credit transfers between the casino player account **408** and the gaming devices **426** in cash-in and cash-out transactions).

[0102] Further, in the example embodiment, the player **402** has a digital wallet application **406** and a player application (or "player app") **412** installed on their mobile device **404**. While these apps are shown separately for purposes of illustration, it should be understood that the player app **412** may contain the digital wallet (e.g., as an embedded functionality). The apps **406**, **412** may be provided by the casino operator, the casino management system **420**, the digital wallet system server **414**, or a third party service provider. The player app **412** may allow the player **402** to wirelessly connect with gaming devices **426** at various gaming properties, establish rated gaming sessions (e.g., wirelessly card into gaming devices **426**), interact with aspects of their loyalty account, or various other functionalities. In the example embodiment, the player app **412** allows the player **402** to perform digital wallet transactions via the digital wallet app **406**. The digital wallet app **406** allows the player **402** to establish protected access to and perform privileged transactions with their external player account **410** and one or more casino player accounts **408**. Each individual casino player account **408** may be associated with an individual gaming property (e.g., a single casino), a group of gaming properties (e.g., co-owned by the same gaming operator), or a particular gaming operator.

[0103] During a gaming session, the player **402** wishes to participate in wager gaming at a particular casino. For example, the player **402** may wish to begin a gaming session with $200 at a particular EGM **104** at this casino, shown here as local gaming device **424**. Presume, for example, that the player **402** has previously established a $1,000 balance in their external player account **410** (e.g., via a withdrawal from a bank account), but currently has a $0 balance within their casino player account **408** at this property.

[0104] In conventional systems, the CMS **420** may allow the player **402** access to transfer funds between their casino player account **408** and the local gaming device **424**, but in this situation, there is no balance. As such, under this conventional system, the player **402** may have to separately execute a transaction from the external player account **410** to the casino player account **408**, and then initiate another transaction (e.g., a cash in transaction) from the casino player account **408** to the local gaming device **424** to establish play credit at the device **424** (e.g., in meter credit, chips, or the like). Further, when the player **402** concludes their gaming session at the local gaming device **424**, the player **402** may initiate a cash-out transaction (e.g., to move any remaining balance from the local gaming device **424** to the casino player account **408**), but this transaction leaves the balance of funds in the casino player account **408**. If the player wishes to move to a different gaming property, this

example casino player account **408** may not be directly accessible at the other gaming property. As such, the player **402** may be confused as to where their funds reside, and may be forced to initiate a transaction to move that balance from the casino player account **408** out to the external player account **410** before then moving the funds from the external player account **410** down into another casino player account **408** at the second gaming property.

[0105] In the example embodiment, the digital wallet system **400** automatically facilitates some of these transactions when the player **402** takes certain actions. In one example, when the player **402** begins the gaming session at the local gaming device **424**, the player app **412** may allow the player **402** to open a gaming session at the local gaming device (e.g., via wireless connectivity between the local gaming device **424** and the mobile device **404** of the player). Once the player **402** has established authenticated connectivity to a particular gaming device **426** (e.g., to the local gaming device **424**), the system **400** may allow the player **402** to initiate a withdrawal of $200 for this gaming session. Upon receipt of this request, in this example, the system **400** executes a withdrawal transaction to move $200 from the external player account **410** of the player to the casino player account **408** and also automatically executes a second transaction to move the $200 from the casino player account **408** to the local gaming device **424**. After successfully executing both transactions, the local gaming device **424** receives the $200 gaming funds (e.g., as additional credit on the credit meter of an EGM **104**, as approval to hand out $200 chips at a gaming table **422**, or the like).

[0106] When the player **402** concludes their gaming session, the player **402** may conclude their gaming session in one of many ways, each of which may cause the system **400** to perform a cash-out process and associated transactions. In some embodiments, the player **402** may press a "cash-out" button on an EGM **104**. In some embodiments, the player **402** may disconnect their mobile device **404** from the local gaming device **424** (e.g., via loss of power, moving the mobile device **404** too far away from the local gaming device **424**, initiate a disconnect feature within the player app **412**, or the like). In some embodiments, the player **402** may ask a dealer to cash out at a table game **426** (e.g., handing the balance of their chips to the dealer) and the dealer may initiate the cash-out process (e.g., via a table management device, not separately shown).

[0107] When the cash-out process has been initiated, the system **400** may perform a cash-out transaction to move the balance credit amount into the casino player account **408**. For example, in scenarios involving an EGM **104**, the EGM **104** may deduct the balance credit amount from the credit meter on the local gaming device **424** and the system **400** may perform a deposit transaction for the balance credit amount into the casino player account **408**. In scenarios involving table games **422**, the dealer may collect chips from the player **402** and manually enter or automatically count chips to determine the balance credit amount. Upon receipt and accounting of the chips, the dealer may place the chips into the chip tray at the table **422** and confirm collection of the balance amount via the table management device, thereby beginning the cash-out process performed by the system **400**. Further, the system **400** may also automatically initiate a second transaction, a deposit transaction, to move the balance credit amount from the casino player account **408** out to the external player account **410** of the player **402**. The automatic performance of multiple transactions during both the cash-in and cash-out processes when establishing and concluding gaming sessions allows these funds to be moved to and from a more accessible account (e.g., the external player account) rather than leaving the funds in the casino player account **408**. In some sense, the system **400** masks the casino player account(s) **408** from the player by automatically moving the funds through these accounts without leaving funds in those casino player accounts. As such, if the player **402** moves to a different casino property, the funds balance can be easily viewed via the external player account **410** and another pair of transactions can be executed to move play funds from the external player account **410** into another local gaming device **424** at this or another gaming property (e.g., regardless of whether the properties use the same casino player account **408** or different player accounts **408**). In some embodiments, cash-outs (e.g., and or cash-ins such as moving funds from an external player account **410** to a casino player account **408**) may automatically be performed upon detection of a player leaving and/or entering a gaming property.

[0108] The centralization of wagering funds from and to the external player account **410** also allows the system **400** to more accurately enforce responsible gaming limits. The system **400** may, for example, allow the player **402** to configure gaming limits for their own game play. In some embodiments, the player **402** may, for example, establish a daily loss limit or daily withdrawal limit, or other time-based limit, such as $500 per day loss limit. In conventional systems, these limits may not be enforced across multiple operators or multiple properties, as the transactions performed at one property may not be visible to the other operations.

[0109] In the example embodiment, the system **400** provides a centralized responsible gaming component that can view transactions across multiple properties and multiple operators. More specifically, the system **400** tracks withdrawal and deposit transactions for the player **402**, both at the casino account level as well as the external player account level. When the player **402** conducts the $200 withdrawal, the system **400** debits the withdrawal amount from the daily limit of the player and allows the transactions to occur because the daily limit has not been exceeded. If the player **402** performs the cash-out process through the system **400** (e.g., as described above), the system **400** can credit the daily limit based on the balance amount deposited back up to the external player account **410**. Since the system **400** sees transactions performed across multiple operators or properties, the scope of the responsible gaming limits are allowed to be enforced more broadly than any single operator or single property.

[0110] FIG. **4**B illustrates an architecture diagram illustrating components of an embodiment of the example digital wallet system **400**. In the example embodiment, the digital wallet system **400** supports transfers of funds/credits across a pool of managed devices **490**, the digital wallet server **414**, and an external provider (e.g., such as a financial institution at external provider server **416**). The direct-managed devices **490** may be similar to the devices **104**, **422**, **426** as shown and described in relation to FIG. **4**A, and such direct-managed devices **490** (e.g., client device **404**) may, in some embodiments, directly communicate with the digital wallet system server **414**). Messages may be transmitted from the digital wallet system server **414** through adapters

470 and out through a third-party adapter **456** that is configured to communicate with an API **442** of the third-party server **440**. Device **404** and/or devices **490** may be in communication with an identity server **516** (e.g., an authentication server configured to authenticate requests).

[0111] In the example embodiment, the messaging network **450** is configured to communicate with an external provider server **416** to facilitate funds transfers controlled by the digital wallet system server **414** for an external player account **410** associated with external provider server **416**.

[0112] In some embodiments, the digital wallet system server **414** may receive device registration event messages from the managed devices **490**. These device registration event messages provide device details for each of the devices **490**. Device registration is provided to allow the digital wallet system server **414** to establish certain details about devices **490**, such as unique device IDs, device types, game types provided, seat positions or unique position IDs (e.g., for table game), login IDs or loyalty IDs or mobile device IDs (e.g., for mobile device players **402**, for players **402** establishing carded gaming sessions, for players **402** wirelessly connecting with their mobile devices **404**). The digital wallet system server **414** may thus recognize, register, and consider eligibility of the various devices **490** for the various funds transfers controlled by the digital wallet system **400**.

[0113] In the example embodiment, the messaging network **450** provides a message queue **460** and a set of adapters **470** that are configured to receive and manage a queue of event messages and convert those event messages into a format and protocol understood by the digital wallet system server **414** and/or external provider server **416**. For example, in one embodiment, the messaging API **452** may act as a RESTful API ("representational state transfer"), receiving event messages in XML, HTML, or JSON format and may provide event messages in Advanced Message Queuing Protocol (AMQP) to the message queue **460**. In the example embodiment, the message queue **460** is provided by RabbitMQ, an open source message broker (made available under Mozilla Public License) that provides various services **462** and a set of adapters **470** that may be configured to convert AMQP messages into streaming text oriented messaging protocol (STOMP), and vice versa. For example, incoming session start event messages, wager event messages, and session termination event messages may be received at the messaging API **452**, provided onto the message queue **460** and adapters via AMQP, and converted into STOMP, or another suitable format, when forwarded to the digital wallet system server **414**.

[0114] Further, the digital wallet system **400** also facilitates certain communications to the devices **490** and the external provider server **416**. For example, when a device is registered (e.g., after processing of a device registration event message), the digital wallet system server **414** may transmit a registration confirmation message back to the devices **490**. When a session termination event message is received by the digital wallet system server **414** (e.g., from one of devices **490**), the digital wallet system server **414** may transmit a session termination confirmation message back to the devices **490**. Such messages may be transmitted from the digital wallet system server **414** through adapters **470** configured to communicate with external provider server **416** and/or devices **490**, where each stage of communication may include a message protocol conversion in reverse of the inbound communications described above.

[0115] While only one external provider server **416** is illustrated in FIG. **4**B, it should be understood that the architecture provided by the messaging network **450** of the example digital wallet system **400** may be configured to support many third parties and various types of gaming devices. For example, the digital wallet system **400** may support table games **426**, several servers that each individually support EMGs **104**, table games **426**, and/or mobile gaming devices **404** at various particular gaming properties, several servers that provide mobile gaming platforms for mobile gaming devices **404** (e.g., mobile class-2 gaming, virtual gaming, or the like), and may also support various devices **490** at one or more gaming properties.

[0116] FIG. **5** is an architecture diagram of components of an example digital wallet system **500**. The digital wallet system **500** may be similar to the digital wallet system **400** shown in FIGS. **4**A and **4**B. In an example embodiment, the digital wallet system **500** performs digital wallet functionality associated with electronic gaming. For example, the digital wallet system **500** may perform transactions supporting wagering activity of a player at a wagering venue (e.g., at a casino property, via online gaming, or the like). The digital wallet system **500** may provide one or more nodes **502** of a cluster **504** (e.g., Kubernetes Cluster) that act as processing engines for computational activities performed by the digital wallet system **500** (e.g., across multiple machines and/or environments).

[0117] Nodes **502** may include a master node **506** and one or more worker nodes **508** (e.g., physical computers and/or virtual machines). The master node **506** may be configured to control the worker nodes **508** (e.g., scheduling and scaling applications, maintaining a state of the cluster **504**, and/or implementing updates). The worker nodes **508** may be configured to run applications to perform tasks assigned by the master node **506**.

[0118] In some embodiments, node **510** includes an API (e.g., API **452**) exposing a REST (representational state transfer) interface to nodes **502** and serving as a front end control plane. In some embodiments, worker nodes **508** are configured to control wallet transfer messages (e.g., withdrawals, deposits) and wallet transfer state messages (e.g., status of wallet transfers). In some embodiments, nodes **502** may be in communication with a message queue **512** (e.g., RabbitMQ), an SQL server/database **514**, and/or an identity server **516** (e.g., an authentication server configured to authenticate requests to nodes **502**).

[0119] Client devices **518** (e.g., mobile devices and/or other computer devices) may communicate (e.g., via domain name system (DNS) **520** and/or hypertext transfer protocol secure (HTTPS)) with the cluster during gaming sessions. In some embodiments, the digital wallet system **500** may perform digital wallet transactions on behalf of players when players begin or end play sessions, performing transactions that, for example, establish a credit balance on a given gaming machine (e.g., to EGM **104**) or transfer credit off of the gaming machine at the end of the player's play session (e.g., from EGM **104** on cash out). In some embodiments, an initial cash-out transaction may target a player account for a particular property, thereby crediting that player account with any additional credit value from the EGM **104**. In some embodiments, the digital wallet system **500** may automatically perform an additional transaction to move that credit

value out to an external player account at an external provider. This additional transaction allows that credit value to be usable at other wagering venues, thereby allowing the player to more freely and easily start gaming sessions at those other venues. In some embodiments, the digital wallet system **500** may provide responsible gaming functionality that allows players or operators to, for example, configure limits on their wagering activities. Use of the external player account and automatic balance transfers allows the digital wallet system **500** to more effectively track player activity, and thus more reliably and accurately enforce limits.

[0120] In some embodiments, nodes **502** are in communication with an automation system **522** (e.g., via hypertext transfer protocol secure (HTTPS)) configured to handle, as examples, configuration management, application deployment, and software provisioning of nodes **502**. In some embodiments, nodes may include a configuration API node **524**, a configuration management user interface (UI) node **526**, a configuration management backend node **528**. In some embodiments, nodes **502** include a logs agent **530** in communication with a system **532** configured to receive and store data associated with nodes **502**.

[0121] FIG. **6** is an architecture diagram of components of another example digital wallet system **600**. The digital wallet system **600** may be similar to the digital wallet system **400** shown in FIGS. **4**A and **4**B. In this example, mobile wallets **602** (e.g., from mobile devices **404**) and/or mobile nCompass units **604** (e.g., from EGMs **104** or table games) communicate with back end processing components of the digital wallet system **600** via a wallet API ("WalletEAPI") **606** (e.g., including nodes **502**) and an EAPI notification service **608**. In some embodiments, API **606** and service **608** are included in cluster **504**. In some embodiments, the wallet API **606** and the notification service **608** may be in communication with a wallet API database **610**, the message queue **512**, the identity server **516**, and/or a notification hub **612** configured to push notifications associated with system **600** to electronic devices (e.g., mobile devices **404**).

[0122] FIG. **7**A and FIG. **7**B are example flowcharts **700**, **710** illustrating example operations of a digital wallet system such as the digital wallet systems **400**, **500**, **600** shown in FIGS. **4**A-**6**. At least one of systems **400**, **500**, **600** determines **702** whether a centralized wallet (e.g., digital wallet) is enabled (e.g., on the mobile device **404** of a player). When a centralized wallet functionality is disabled, the player is presented **704** with a legacy user interface (e.g., via their digital wallet app, player app, or the like, on their mobile device **404**). When a centralized wallet functionality is enabled, the digital wallet system may automatically perform transfers to and from casino wallets (e.g., hiding **706** the transfer to and from casino wallet functionality on the mobile device **404**) and may hide **708** casino wallets from the player (e.g., via the UI) and instead only show their balance on their external player account **410**.

[0123] FIG. **8** illustrates an example process **800** for fund transfers (e.g., credit and debit transactions) that may be performed by the digital wallet systems **400**, **500**, **600** shown in FIGS. **4**A-**6**. Process **800** is performed via a plurality of devices, services, providers, etc. such as a mobile app on a mobile device **404** (e.g., a direct managed device **490**), API **452**, message queue **460**, adapters **470**, CMS **420**, external provider server **416**, and notification service **608**. In some embodiments, API **452**, queue **460**, and adapters **470**, as examples, FIGS. **8-12** may include any components in network **450** and/or other components and actions described as being performed by components of network **450** may be controlled by any of the servers described herein (e.g., digital wallet system server **414**).

[0124] In the example shown in FIG. **8**, a player at device **404** may initiate a transfer funds request that is transmitted **802** to API **452**. The request is then stored **804** by API **452**. A transfer funds command is then generated by API **452** and transmitted **806** to queue **460**. The transfer funds command may then be acknowledged in a message transmitted **807** from API **452** to device **404**. Queue **460** then transmits **808** the transfer funds command to adapters **470**. Adapters **470** may then check **810** for a responsible gaming limit validation (e.g., as described elsewhere herein). Adapters **470** then update **812** a ledger to indicate a transaction message will be sent to CMS **420** and then generates and transmits **814** a credit/debit message (e.g., including the transfer funds request/command) to CMS **420**. CMS **420** then generates and transmits **816** a CMS complete message to adapters **470** indicating that, for example, CMS **420** has stored a record of the credit/debit message and approved the credit/debit message. Adapters **470** then update **818** the ledger according to CMS complete message and again updates **820** the ledger to indicate a transaction message will be sent to external provider server **416**. Adapters **470** then generate and transmit **822** an external debit/credit message to server **416**. Server **416** then facilitates completion of the requested external transaction and generates and transmits **824** a debit/credit completion message to adapters **470**. Adapters **470** then update **826** ledger to indicate receipt of the debit/credit completion message. Adapters **470** may then, when the player associated with device **404** has notifications enabled, determine **827** which notifications meet a transaction threshold criteria, and generate and transmit **828** one or more messages to notification service **608** (e.g., to facilitate/control notifications sent to device **404**). Service **608** then generates and transmits **830** one or more notification complete messages to adapters **470** when the notifications have been sent to the player (e.g., via device **404**).

[0125] FIG. **9** illustrates an example process **900** for getting a balance from an external provider that may be performed by the digital wallet systems **400**, **500**, **600** shown in FIGS. **4**A-**6**. Process **900** is performed via a plurality of devices, services, providers, etc. such as a mobile app on a mobile device **404** (e.g., a direct managed device **490**), API **452**, and external provider server **416**.

[0126] In the example shown in FIG. **9**, a player at device **404** may initiate a get wallet balance request (e.g., requesting to view their digital wallet balance) causing device **404** to transmit **902** a get wallet balance message to API **452**. API **452** may then generate and transmit **904** a get balance message to server **416** (e.g., requesting the digital wallet balance). Server **416** then generates and transmits **906** a balance response message (e.g., including the digital wallet balance) to API **452**. API **452** then generates and transmits **908** a wallet balance response message (e.g., including the digital wallet balance) to device **404**. Upon receipt of the wallet balance response message, device **404** causes display of the digital wallet balance.

[0127] FIG. **10** illustrates an example process **1000** for automatic funds transfer that may be performed by the digital wallet systems **400**, **500**, **600** shown in FIGS. **4**A-**6**. In some embodiments, the process **1000** may trigger based on an end of session event (e.g., on an EGM **104**, smart

table, via mobile device, or the like) or by a CMS cash deposit. Process **1000** is performed via a plurality of devices, services, providers, etc. such as a gaming device **426**, CMS **420**, adapters **470**, wallet database **610**, external provider server **416**, and notification service **608**.

[0128] In the example shown in FIG. **10**, a session end/cash out event is detected **1002** at device **426** and/or a cash deposit event is detected **1004** at CMS **420**. Device **426** then transmits **1006** a message to adapters **470** querying to see if the player at device **426** has a digital wallet. Adapters **470** then transmit **1008** a message to database **610** to determine whether the player has a digital wallet, and database **610** responds by transmitting **1010** a message indicating whether the player has a digital wallet. If the player has a digital wallet, process **1000** proceeds.

[0129] When the player has a digital wallet, as indicated by database **610**, adapters **470** transmit **1012** a message to CMS **420** requesting a balance of the player at CMS **420** (e.g., and/or device **426**). CMS **420** responds by transmitting **1014** a message to adapters **470** indicating the balance of the player at CMS **420** (e.g., and/or device **426**). Adapters **470** then automatically load **1016** the balance of the player to the external provider account of the player at server **416**. Server **416** then acknowledges **1018** loading/depositing the balance of the player to the external provider account of the player. Accordingly, when adapters **470** determine the player associated with device **404** has notifications enabled, adapters **470** determine which notifications meet a transaction threshold criteria (e.g., by querying **1020** database **610**), and generates and transmit **1022** one or more messages to notification service **608** (e.g., to facilitate/control notifications sent to device **404**). Service **608** then generates and transmits **1024** one or more notification complete messages to adapters **470** when the notifications have been sent to the player (e.g., via device **404**).

[0130] FIG. **11** illustrates an example automatic fund transfer polling process **1100** that may be performed by the digital wallet systems **400**, **500**, **600** shown in FIGS. **4A-6**. Process **1100** is performed via a plurality of devices, services, providers, etc. such as adapters **470**, wallet database **610**, CMS **420**, external provider server **416**, and notification service **608**.

[0131] In the example embodiment, adapters **470** request and receive **1102** polling settings from database **610** and requests and receives **1104** a list of patrons/players who have a digital wallet from database **610**. Adapters **470** may also check **1106** for a trigger time (e.g., in the polling settings received from database **610**). Adapters **470** then transmit **1108** a message to CMS **420** requesting a balance of at least a portion of the players who have a digital wallet (e.g., as indicated by database **610**). CMS **420** responds by transmitting **1110** a message to adapters **470** indicating the balances of the players requested by adapters **470**. Adapters **470** then automatically load **1112** the balances of the players to the external provider account of the players at server **416**. Server **416** then acknowledges **1114** loading/depositing the balances of the players to the external provider account of the player. Accordingly, when adapters **470** determine the player associated with device **404** has notifications enabled, adapters **470** determine which notifications meet a transaction threshold criteria (e.g., by querying **1116** database **610**), and generates and transmit **1118** one or more messages to notification service **608** (e.g., to facilitate/control notifications sent to devices **404** of the players). Service **608** then generates and transmits **1120** one or more notification complete messages to adapters **470** when the notifications have been sent to the players (e.g., via devices **404**).

[0132] FIG. **12** illustrates an example external provider polling health check process **1200** that may be performed by the digital wallet systems **400**, **500**, **600** shown in FIGS. **4A-6**. Process **1200** is performed via a plurality of devices, services, providers, etc. such as adapters **470**, wallet database **610**, external provider server **416**, and notification service **608**.

[0133] Adapters **470** may request **1202** settings from database **610** and check **1204** a trigger time for the health check (e.g., included in settings received from database **610**). Adapters **470** may the cause a health check to be performed by transmitting **1206** a health check message to server **416** (e.g., to ensure that the external provider server **416** is performing/operating properly). Server **416** then acknowledges the health check and transmits **1208** health check results to adapters **470** (e.g., indicating positive or negative results of the health check). Accordingly, when adapters **470** determine support staff, as an example, associated with mobile devices who have notifications regarding health checks enabled, adapters **470** determine which notification types should be transmitted to the support staff (e.g., by querying **1210** database **610**), and generates and transmits **1212** one or more messages to notification service **608** (e.g., to facilitate/control notifications sent to the mobile devices of the staff indicating the results of the health check). Service **608** then generates and transmits **1214** one or more notification complete messages to adapters **470** when the notifications have been sent to the staff (e.g., via mobile devices).

[0134] Certain aspects and embodiments/processes implemented by at least one of the architectures described above are provided below.

[0135] In one aspect, a digital wallet computing system is described. The digital wallet computing system includes at least one processor in communication with a memory device storing instructions. The instructions, when executed, cause the at least one processor to establish wireless connectivity between a mobile device of a player and an electronic gaming device, the electronic gaming device including a device identifier, receive an initiation of a funds transfer request from the mobile device of the player, the funds transfer request identifying a funds transfer amount and an external player account of the player, and identify an operator identity of an operator based on the device identifier of the electronic gaming device. The instructions also cause the at least one processor to identify a player account of the player, the player account associated with the operator, perform a first withdrawal transaction moving the funds transfer amount from the electronic gaming device to the player account associated with the operator, and in response to the first withdrawal transaction, automatically perform a second withdrawal transaction moving the funds transfer amount from the player account associated with the operator to the external player account of the player.

[0136] In some embodiments, the instructions also cause the at least one processor to determine, in response to the initiation of a funds transfer request, that the player has stopped playing at the electronic gaming device, determine a remaining credit balance including an amount of credits

remaining at the electronic gaming device, and cause the remaining credit balance to be deposited as funds into the external player account.

[0137] In some embodiments, the instructions also cause the at least one processor to establish wireless connectivity between the mobile device of the player and a second electronic gaming device, the second electronic gaming device including a second device identifier, receive an initiation of a second funds transfer request from the mobile device of the player, the funds transfer request identifying a second funds transfer amount and the external player account of the player, and perform a third withdrawal transaction moving the second funds transfer amount from the external player account and causing a credit balance associated with the second funds transfer amount to be established at the second electronic gaming device identified by the second device identifier.

[0138] In some embodiments, the instructions also cause the at least one processor to determine a responsible gaming limit including a threshold amount of funds. In some embodiments, the instructions also cause the at least one processor to compare the second funds transfer amount to the threshold amount of funds. In some embodiments, the instructions also cause the at least one processor to, in response to determining that the funds transfer amount is less than the threshold amount of funds, perform the third withdrawal transaction. In some embodiments, the instructions also cause the at least one processor to determine a difference between an amount of funds withdrawn from the external player account, the amount of funds withdrawn including the second funds transfer amount, and an amount of funds deposited into the external player account over a predetermined period of time, and in response to determining that the difference satisfies the threshold amount of funds by not exceeding the responsible gaming limit, perform the third withdrawal transaction.

[0139] In another aspect, a computer-implemented method of providing digital wallet transactions implemented by a processor in communication with a memory device is described. The method includes establishing wireless connectivity between a mobile device of a player and an electronic gaming device, the electronic gaming device including a device identifier, receiving an initiation of a funds transfer request from the mobile device of the player, the funds transfer request identifying a funds transfer amount and an external player account of the player, and identifying an operator identity of an operator based on the device identifier of the electronic gaming device. The method also includes identifying a player account of the player, the player account associated with the operator, performing a first withdrawal transaction moving the funds transfer amount from the electronic gaming device to the player account associated with the operator, and in response to the first withdrawal transaction, automatically performing a second withdrawal transaction moving the funds transfer amount from the player account associated with the operator to the external player account of the player.

[0140] In some embodiments, the method also includes determining, in response to the initiation of a funds transfer request, that the player has stopped playing at the electronic gaming device, determining a remaining credit balance including an amount of credits remaining at the electronic gaming device, and causing the remaining credit balance to be deposited as funds into the external player account.

[0141] In some embodiments, the method also includes establishing wireless connectivity between the mobile device of the player and a second electronic gaming device, the second electronic gaming device including a second device identifier, receiving an initiation of a second funds transfer request from the mobile device of the player, the funds transfer request identifying a second funds transfer amount and the external player account of the player, and performing a third withdrawal transaction moving the second funds transfer amount from the external player account and causing a credit balance associated with the second funds transfer amount to be established at the second electronic gaming device identified by the second device identifier.

[0142] In some embodiments, the method also includes determining a responsible gaming limit including a threshold amount of funds. In some embodiments, the method also includes comparing the second funds transfer amount to the threshold amount of funds and, in response to determining that the funds transfer amount is less than the threshold amount of funds, performing the third withdrawal transaction. In some embodiments, the method also includes determining a difference between an amount of funds withdrawn from the external player account, the amount of funds withdrawn including the second funds transfer amount, and an amount of funds deposited into the external player account over a predetermined period of time and in response to determining that the difference satisfies the threshold amount of funds by not exceeding the responsible gaming limit, performing the third withdrawal transaction.

[0143] In another aspect, a non-transitory computer-readable medium storing instructions that, when executed by at least one processor, cause the at least one processor to establish wireless connectivity between a mobile device of a player and an electronic gaming device, the electronic gaming device including a device identifier, receive an initiation of a funds transfer request from the mobile device of the player, the funds transfer request identifying a funds transfer amount and an external player account of the player, and identify an operator identity of an operator based on the device identifier of the electronic gaming device. The instructions also cause the at least one processor to identify a player account of the player, the player account associated with the operator, perform a first withdrawal transaction moving the funds transfer amount from the electronic gaming device to the player account associated with the operator, and in response to the first withdrawal transaction, automatically perform a second withdrawal transaction moving the funds transfer amount from the player account associated with the operator to the external player account of the player.

[0144] In some embodiments, the instructions also cause the at least one processor to determine, in response to the initiation of a funds transfer request, that the player has stopped playing at the electronic gaming device, determine a remaining credit balance including an amount of credits remaining at the electronic gaming device, and cause the remaining credit balance to be deposited as funds into the external player account.

[0145] In some embodiments, the instructions also cause the at least one processor to establish wireless connectivity between the mobile device of the player and a second electronic gaming device, the second electronic gaming device including a second device identifier, receive an initiation of a second funds transfer request from the mobile

device of the player, the funds transfer request identifying a second funds transfer amount and the external player account of the player, and perform a third withdrawal transaction moving the second funds transfer amount from the external player account and causing a credit balance associated with the second funds transfer amount to be established at the second electronic gaming device identified by the second device identifier.

[0146] In some embodiments, the instructions also cause the at least one processor to determine a responsible gaming limit including a threshold amount of funds. In some embodiments, the instructions also cause the at least one processor to compare the second funds transfer amount to the threshold amount of funds and in response to determining that the funds transfer amount is less than the threshold amount of funds, perform the third withdrawal transaction. In some embodiments, the instructions also cause the at least one processor to determine a difference between an amount of funds withdrawn from the external player account, the amount of funds withdrawn including the second funds transfer amount, and an amount of funds deposited into the external player account over a predetermined period of time and in response to determining that the difference satisfies the threshold amount of funds by not exceeding the responsible gaming limit, perform the third withdrawal transaction.

[0147] In another aspect a digital wallet computer system for gaming devices is described. The digital wallet computer system includes a messaging application programming interface (API) configured to receive funds transfer messages in a first message format, a message queue configured to receive funds transfer messages from the messaging API in a second message format, and at least one processor storing instructions. The instructions, when executed, cause the at least one processor to receive, by the messaging API from a server that manages electronic gaming sessions at a plurality of electronic gaming devices, a first funds transfer message in response to a player initiating a funds transfer request an electronic gaming device of the plurality of electronic gaming devices and convert, by the messaging API, the first funds transfer message from the first message format to the second message format. The instructions also cause the at least one processor to transmit the first funds transfer message to a digital wallet server and in response to the first funds transfer message being transmitted to the digital wallet server, automatically cause a funds amount associated with the first funds transfer message to be deposited in an external player account of the player at an external provider server.

[0148] In some embodiments, the digital wallet computer system further includes an adapter configured to receive the first funds transfer message in the second message format and convert the first funds transfer message into a third message format, wherein the first funds transfer message is received by the digital wallet server in the third message format.

[0149] In some embodiments, the instructions further cause the at least one processor to determine, in response to the first funds transfer message being transmitted to the digital wallet server, that the player has stopped playing at the electronic gaming device, determine a remaining credit balance including an amount of credits remaining at the electronic gaming device, the remaining credit balance including the funds amount, cause the funds to be deposited into a player account of the player associated with an operator of the electronic gaming device, and in response to the funds amount being deposited into the player account of the player, automatically withdraw the funds amount from the player account and cause the funds amount to be deposited in the external player account of the player.

[0150] In some embodiments, the instructions further cause the at least one processor to determine that the player has left a gaming property associated with the plurality of electronic gaming devices and in response to determining that the player has left the gaming property associated with the plurality of electronic gaming devices, transmit, to the server, a request for the first funds transfer message.

[0151] In some embodiments, the instructions further cause the at least one processor to receive, by the messaging API from a second server that manages electronic gaming sessions at a second plurality of electronic gaming devices, a second funds transfer message in response to a player initiating a second funds transfer request a second electronic gaming device of the second plurality of electronic gaming devices, the second funds transfer request identifying a second funds amount and the external player account of the player and cause the second funds amount to be transferred from the external player account and deposited at the second electronic gaming device, causing a credit balance associated with the second funds amount to be established at the second electronic gaming device.

[0152] In some embodiments, the instructions further cause the at least one processor to determine a responsible gaming limit including a threshold amount of funds, compare the second funds amount to the threshold amount of funds, and in response to determining that the funds amount is less than the threshold amount of funds, cause the second funds amount to be transferred from the external player account and deposited at the second electronic gaming device.

[0153] In another aspect, a computer-implemented method for managing a digital wallet computer system is described. The method includes receiving, by a messaging application programming interface (API) configured to receive funds transfer messages in a first message format and from a server that manages electronic gaming sessions at a plurality of electronic gaming devices, a first funds transfer message in response to a player initiating a funds transfer request an electronic gaming device of the plurality of electronic gaming devices and converting, by the messaging API, the first funds transfer message from the first message format to a second message format. The method also includes transmitting the first funds transfer message to a digital wallet server configured to manage funds transfers and in response to the first funds transfer message being transmitted to the digital wallet server, automatically causing a funds amount associated with the first funds transfer message to be deposited in an external player account of the player at an external provider server.

[0154] In some embodiments of the method, an adapter is configured to receive the first funds transfer message in the second message format and convert the first funds transfer message into a third message format, wherein the first funds transfer message is received by the digital wallet server in the third message format.

[0155] In some embodiments, the method also includes determining, in response to the first funds transfer message being transmitted to the digital wallet server, that the player has stopped playing at the electronic gaming device, deter-

mining a remaining credit balance including an amount of credits remaining at the electronic gaming device, the remaining credit balance including the funds amount, causing the funds to be deposited into a player account of the player associated with an operator of the electronic gaming device, and in response to the funds amount being deposited into the player account of the player, automatically withdrawing the funds amount from the player account and cause the funds amount to be deposited in the external player account of the player.

[0156] In some embodiments, the method also includes determining that the player has left a gaming property associated with the plurality of electronic gaming devices and in response to determining that the player has left the gaming property associated with the plurality of electronic gaming devices, transmitting, to the server, a request for the first funds transfer message.

[0157] In some embodiments, the method also includes receiving, by the messaging API from a second server that manages electronic gaming sessions at a second plurality of electronic gaming devices, a second funds transfer message in response to a player initiating a second funds transfer request a second electronic gaming device of the second plurality of electronic gaming devices, the second funds transfer request identifying a second funds amount and the external player account of the player and causing the second funds amount to be transferred from the external player account and deposited at the second electronic gaming device, causing a credit balance associated with the second funds amount to be established at the second electronic gaming device.

[0158] In some embodiments, the method also includes determining a responsible gaming limit including a threshold amount of funds, comparing the second funds amount to the threshold amount of funds, and in response to determining that the funds amount is less than the threshold amount of funds, causing the second funds amount to be transferred from the external player account and deposited at the second electronic gaming device.

[0159] In another aspect, a non-transitory computer-readable medium including instructions stored thereon is described. The instructions, in response to execution by a processor, cause the processor to receive, by a messaging application programming interface (API) configured to receive funds transfer messages in a first message format and from a server that manages electronic gaming sessions at a plurality of electronic gaming devices, a first funds transfer message in response to a player initiating a funds transfer request an electronic gaming device of the plurality of electronic gaming devices and convert, by the messaging API, the first funds transfer message from the first message format to a second message format. The instructions also cause the processor to transmit the first funds transfer message to a digital wallet server configured to manage funds transfers and in response to the first funds transfer message being transmitted to the digital wallet server, automatically cause a funds amount associated with the first funds transfer message to be deposited in an external player account of the player at an external provider server.

[0160] In some embodiments, the instructions further cause the processor to determine, in response to the first funds transfer message being transmitted to the digital wallet server, that the player has stopped playing at the electronic gaming device, determine a remaining credit balance including an amount of credits remaining at the electronic gaming device, the remaining credit balance including the funds amount, cause the funds to be deposited into a player account of the player associated with an operator of the electronic gaming device, and in response to the funds amount being deposited into the player account of the player, automatically withdraw the funds amount from the player account and cause the funds amount to be deposited in the external player account of the player.

[0161] In some embodiments, the instructions further cause the processor to determine that the player has left a gaming property associated with the plurality of electronic gaming devices and in response to determining that the player has left the gaming property associated with the plurality of electronic gaming devices, transmit, to the server, a request for the first funds transfer message.

[0162] In some embodiments, the instructions further cause the processor to receive, by the messaging API from a second server that manages electronic gaming sessions at a second plurality of electronic gaming devices, a second funds transfer message in response to a player initiating a second funds transfer request a second electronic gaming device of the second plurality of electronic gaming devices, the second funds transfer request identifying a second funds amount and the external player account of the player and cause the second funds amount to be transferred from the external player account and deposited at the second electronic gaming device, causing a credit balance associated with the second funds amount to be established at the second electronic gaming device.

[0163] In some embodiments, the instructions further cause the processor to determine a responsible gaming limit including a threshold amount of funds, compare the second funds amount to the threshold amount of funds, and in response to determining that the funds amount is less than the threshold amount of funds, cause the second funds amount to be transferred from the external player account and deposited at the second electronic gaming device.

[0164] FIG. **13** is a block diagram of an implementation of a remote game play architecture **1400** that supports and funds remote game play with a prepaid game voucher. The use and discussion of FIG. **13** is for exemplary purposes and is not intended to limit the disclosure to the specific remote game play architecture **1400** implementation. As an example, the remote game play architecture **1400** supports remote game play in a Class II wagering environment. The remote game play architecture **1400** could also be a framework that supports other game types, such as scratch tickets and iLottery. Specifically, although FIG. **13** illustrates that the remote game system **1404** includes a bingo server **1420**, the remote game system **1404** could more generally utilize a central determination gaming system to support not only Class II bingo, but other game types such as scratch tickets and iLottery. In another example, rather than having the bingo server **1420** be part of the remote game system **1404**, the bingo server **1420** could be external to the remote game system **1404**. In particular, the bingo server **1420** could be part of a central determination gaming system server **106** shown in FIGS. **1** and **2**. With reference to FIG. **3**, the remote gaming device **1402** shown in FIG. **13** could correspond to UI system **302**, and remote game system **1404** corresponds to game processing backend system **314**. In other words, the remote game system **1404** can include and/or implement

functionality relating to one or more components shown in FIG. **2**'s gaming device **200**, such as RNG **212**.

[0165] In FIG. **13**, the remote game play architecture **1400** includes a remote gaming device **1402** with an app **1414**. The remote gaming device **1402** shown in FIG. **13** can be a mobile gaming device **256** shown in FIG. **2**B and/or an EUD **264** shown in FIG. **2**C. For example, the remote gaming device **1402** could be a smart phone, a tablet, a laptop computer, a personal computer, and/or a special purpose device configured for remote game play. The app **1414** is executable software and/or code made available by downloading the software from a remote host, such as an online app store, website, shared folder, or other remote data site (e.g., from a gaming data center **276**). App **1414** may be a custom app specifically designed for remote game play or part of a more generalized app that includes functionality for remote game play with real money wagering. As an example, app **1414** could be a loyalty app that includes not only remote game play with real money wagering, but other casino-related features and functions, such as tracking loyalty points, comps, and digital gaming wallet balances. In another example, app **1414** is a gaming app customized for remote game play and does not provide other casino-related functionality.

[0166] In one or more implementations, to comply with regulations and/or other third-party policies, the remote host (not shown in FIG. **13**) restricts when the remote gaming device **1402** can download the app **1414** according to the location of the remote gaming device. For example, before a remote host authorizes a remote gaming device **1402** to download app **1414**, the remote host receives location information of the remote gaming device **1402** and checks whether the remote gaming device **1402** is located in one or more designated geographical zones (e.g., within a wager-enabled zone or jurisdiction). If the remote host determines that the device is located within an appropriate geographical zone, the remote host permits downloading app **1414** to remote gaming device **1402**. After installing app **1414**, for remote gaming device **1402** to run app **1414** or enable remote game play functionality within app **1414**, the remote gaming device **1402** checks and verifies that the remote gaming device **1402** is within one or more designated remote gaming zones. If the app **1414** determines that the remote gaming device **1402** is not within the designated remote gaming zone, the app **1414** fails to run and/or disables the remote gaming functionality. The remote gaming zones could include designated gaming zones the permits wagering activity and playing wagering games and other venue or jurisdictional zones outside the designated gaming zones. The other venue or jurisdictional zones could correspond to zones that typically do not permit in-person wagering activities and/or playing wagering games. Examples of these venue or jurisdictional zones include casino hotel rooms, dining areas, retail, recreational facilities (e.g., swimming pool) and other on-site casino locations. The designated geographical zones to download app **1414** can include the remote gaming zones and/or other areas outside the remote gaming zones.

[0167] With reference to FIG. **3**, the remote gaming device **1402** shown in FIG. **14** corresponds to UI system **302**. As such, when app **1414** loads and runs on remote gaming device **1402**, the remote gaming device **1402** is unable to generate random based game outcomes for a wagering game. Using FIG. **3** as an example, remote gaming device **1402** may not include a gaming RNG **318** that securely produces random numbers for determining random based game outcomes. Instead, the app **1414** may store and/or load UI elements and other visual assets to present the results (e.g., payout amount) after the remote game system **1404** determines the random based game outcome. The remote gaming device **1402** may receive the presentation information directly from remote game system **1404** or relevant presentation information (e.g., RNG seeds and/or credit values) to derive how to present the results to a player. In one or more implementations, to derive how to present game outcomes received from the remote game system **1404**, the app **1414** could include a non-gaming RNG that performs similar functionality as non-gaming RNG **319**A shown in FIG. **3**. For example, remote game system **1404** may provide credit values determined from the games outcomes to the remote game device **1402**. Based on the credit values, the remote game device **1402** may utilize the non-gaming RNG to randomly determine how to present the credit values.

[0168] Referring to FIG. **3** again, remote game system **1404** could correspond to game processing backend system **314**. In one or more implementations, remote game system **1404** can be physically located in a designated gaming zone and/or other zones defined for wagering game play. Alternatively, remote game system **1404** can be physically located outside the designated gaming zone depending on regulations. To perform operations associated with the game processing backend system **314**, the remote game system **1404** includes and/or provides a virtual gaming service **1416** that manages the game session for the remote gaming device. In one or more implementations, the virtual gaming service **1416** could be or is part of a virtual machine, virtual container, or other virtual computing resource allocated within remote game system **1404**. Additionally, or alternatively, virtual gaming service **1416** could be or is part of a workstation, server, and/or other physical computing resource. In FIG. **13**, the virtual gaming service includes a game module **1424** that performs, facilitates, and manages game processing operations to generate the random based game outcomes. For example, when the remote gaming device **1402** receives one or more player inputs, the remote gaming device **1402** generates and sends over one or more RNG and/or game initiation calls to remote game system **1404**. Virtual gaming service **1416** processes the RNG and/or game initiation calls by communicating with game platform **1418**, generating random numbers used to generate one or more random based game outcomes (e.g., generating bingo cards), and evaluating relevant game patterns (e.g., bingo patterns with a ball call) to determine payout amounts.

[0169] FIG. **13** also illustrates that the virtual gaming service **1416** includes a funding module **1426** and a meter module **1422**. The funding module **1426** supports and/or facilitates fund transactions, such as transactions relating to the prepaid game voucher and/or transactions associated with a digital wallet. Regarding utilizing prepaid game vouchers, funding module **1426** stores relevant prepaid game voucher information (e.g., voucher value and identification information) for a game session and/or communicates prepaid game voucher information with other systems. In one or more implementations, the funding module **1426** is also setup to store and associate player identifying information, remote gaming device information, geolocation information, and/or date and time information along with the prepaid game voucher information. Meter module **1422**

tracks wager and other credit metering information throughout the gaming session. Specifically, the meter module **1422** performs functions that typical hardware meters or other meters within an EGM perform to ensure regulatory compliance and monitor player credit balance. As an example, meter module **1422** can record the total amount of money wagered on the gaming device, total amount of money deposited, total amount of money withdrawn, total amount of winnings on the EGM. In FIG. **13**, meter information is shared between the virtual gaming service **1416** and account management system **1406** using a message broker **1408**. The message broker **1408** is a system that manages a variety of events, such as card-in events and/or fund transfer events.

[0170] As shown in FIG. **13**, the virtual gaming service **1416** also includes a game platform **1418** and bingo server **1420**. In a Class II environment, the game platform **1418** is setup to initiate and manage virtual gaming services entering and leaving one or more bingo game sessions. Over a period of game play, a virtual gaming service **1416** could enter numerous bingo game sessions. For each bingo game session, the game platform **1418** communicates with bingo server **1420** to obtain a ball call and passes the information to the appropriate virtual gaming services **1416**. After receiving the ball call information, virtual gaming services **1416** compares and evaluates the ball call to one or more bingo cards. The virtual gaming service **1416** and/or the bingo server **1420** could generate, provide, and/or select the bingo cards.

[0171] The funding module **1426** in virtual gaming service **1416** communicates with funding services **1410** to initiate the transfer of funds for use in a game session with the remote gaming device **1402**. In FIG. **13**, the funding services **1410** represents one or more systems (e.g., financial provider and/or broker systems) used to verify, authenticate, and transfer funds to and/or from external funding source **1446** and internal voucher source **1444**. The funding services **1410** includes a voucher scan UI **1450** and a voucher scan service **1448** to view, scan, digitize and store prepaid game voucher information and/or other relevant information. Voucher scan service **1448** also provides voucher information to a wallet service **1442**, which acts as a financial transaction broker. The wallet service **1442** can broker funding transactions amongst the internal voucher source **1444**, external funding source **1446**, and/or other funding accounts. Internal voucher source **1444** represents an internally managed system that store, tracks, and manage funds for voucher account system **1432**. The internal voucher source **1444** receives prepaid game voucher information from wallet service **1442** and sends relevant prepaid game voucher information and associated funds via enterprise API **1412** to account management system **1406**. The external funding source **1446** could include third-party financial provider and/or institution systems (e.g., banks) and/or other gaming systems (e.g., other casino venues managed by a specific casino company or amongst different casino companies) that manage other accounts for a player external to the remote game play architecture **1400**. For fund transfers relating to a digital wallet, the wallet service **1442** could initiate and/or verify a fund transfer from the external funding source **1446** to a player's wagering account. Specifically, the wallet service **1442** sends fund information via enterprise API **1412** to wagering account system **1431** within account management system **1406**.

[0172] Although FIG. **13** illustrates that voucher scan UI **1450** and voucher scan service **1448** are part of funding services **1410**, one or more operations of the voucher scan UI **1450** and a voucher scan service **1448** could be offloaded to other systems and/or other devices. For example, the voucher scan UI **1450** can be loaded as part of app **1414** to utilize remote gaming device **1402** to scan or capture an image of physical prepaid game vouchers. In another example, a kiosk that includes a voucher reader or optical scanner is loaded with the voucher scan UI **1450**. The fund services **1410** and/or account management system **1406** could be setup to restrict the sale of physical prepaid game voucher to be within designated gaming zones and/or other wager-enabled zones prior to remote game play. Examples of other wager-enabled zones include restaurants, nightclubs, retail outlets, and other areas and/or businesses within casino venues. The wager-enabled zones, remote gaming zones, and designated gaming zones previously described could overlap in at least some of geographical areas. In other examples, the wager-enabled zones, remote gaming zones, and designated gaming zones could be completely separate with no overlapping geographical areas.

[0173] The enterprise API **1412** is an interface that communicates fund transaction information, gaming device information, and/or player account information amongst the remote gaming device **1402**, the account management system **1406**, the funding services **1410**, and the remote game system **1404**. The enterprise API **1412** facilitates communication between the different systems for a variety of different accounts and/or systems. FIG. **13** illustrates that enterprise API **1412** includes a player module **1436**, wagering account module **1437**, voucher module **1438**, and slot account module **1440**. The player module **1436**, wagering account module **1437**, voucher module **1438**, and slot account module **1440** provide interfaces with the player tracking system **1430**, wagering account system **1431**, voucher account system **1432**, and slot account system **1434** stored and managed by the central management system **1428**. Player tracking system **1430** manages and tracks player and/or loyalty data at one or more casino venues venue. Wagering account system **1431** manages and tracks player funds accounts (e.g., digital gaming wallet) managed by the one or more casino venues, and voucher account system **1432** manages, issues, and tracks vouchers, such as authenticating existing prepaid game vouchers and issuing new prepaid game vouchers. Slot account system **1434** manages metering reporting, event logging, and bonusing and progressive jackpot features, resulting from game play for one or more virtual game services. To communicate relevant data, enterprise API **1412** may utilize a protocol, such as the Slot Accounting System (SAS) protocol or Game to System (G2S) protocol.

[0174] FIG. **14** is a protocol diagram that depicts a protocol sequence **1500** for logging in, funding a game session with a prepaid game voucher, and selecting a game for remote game play. Specifically, messages **1510-1519** correspond to exchanging data for login operations, messages **1522-1528** correspond to exchanging data for funding operations, and messages **1530-1536** corresponds to exchanging data for selecting a game for remote game play. With reference to FIG. **13**, protocol sequence **1500** can be implemented using the remote game play architecture **1400**. The use and discussion of FIG. **14** is only an example to facilitate explanation and is not intended to limit the disclo-

sure to this specific example. Specifically, messages **1510-1536** do not necessarily need to perform in the order as depicted in FIG. **14**. As an example, protocol sequence **1500** may communicate messages **1522-1528** after communicating messages **1530-1536**. Additionally, or alternatively, for ease of explanation, protocol sequence **1500** does not include messages communicated with other systems, such as funding services **1410**.

[0175] To start login process to an app and/or functionality within app, protocol sequence **1500** starts with transmitting a login request **1510** from remote gaming device **1402**. In one or more implementations, the login request **1510** includes player information, such as loyalty card information, entered and/or stored in the remote gaming device **1402**. In FIG. **14**, the remote game system **1404** forwards the player information within the forward request **1512** to the account management system **1406**. When the account management system **1406** receives the forward request **1512**, the account management system **1406** processes the player information. Using FIG. **13** as an example, the account management system **1406** processes the player information with player tracking system **1430** and subsequently transmits a login response based on processing the player information. In one or more implementations, the login response includes a challenge or some other type of security credential request to verify and authenticate the remote gaming device's **1402** login request. The remote game system **1404** receives the login response **1514** and forwards the login response **1515** to remote gaming device **1402**. Based on the login response **1515**, the remote gaming device **1402** obtains and sends security credential **1516** to remote game system **1404**, which then forwards security credential **1517** to account management system **1406**. The account management system **1406** evaluates security credential **1517** to verify and authenticate the remote gaming device **1402**. The account management system **1406** then sends a validation response **1518** that can either approve or deny the login request **1510**. The remote game system **1404** receives the validation response **1518** and forwards the validation response **1519** to remote gaming device **1402**.

[0176] After remote gaming device **1402** logins into the app, the remote gaming device may scan or capture an image of the prepaid gaming voucher. After remote gaming device **1402** scans or captures an image of the prepaid gaming voucher, the remote gaming device **1402** sends the voucher information **1522** (e.g., image of the prepaid gaming voucher) to the remote game system **1404**. The remote game system **1404** stores the voucher information **1522** received from the remote game system **1404** and forwards voucher information **1524** to the account management system **1406**. The account management system **1406** receives the voucher information **1524** and authenticates the prepaid gaming voucher and determines a voucher value. Recall that the account management system **1406** and/or funding services **1410** could have previously issued a corresponding prepaid gaming voucher within a wager-enabled zone. During the authentication process, account management system **1406** verifies and authenticates the issued prepaid gaming voucher with the received voucher information **1524**. Voucher information **1524** could include the prepaid game voucher identifier information, remote gaming device information, geolocation information, and/or date and time information. Once account management system **1406** completes the authentication operation, the account management system **1406** sends a validation response and voucher value **1526** to the remote game system **1404**. The remote game system **1404** receives the message from the account management system **1406** and in response provides the voucher value **1528** to the remote gaming device.

[0177] FIG. **14** also illustrates that after remote gaming device **1402** logins into the app, the remote game system **1404** provides a list of available games to the remote gaming device **1402**. When the remote gaming device **1402** receives the list of available games, the remote gaming device **1402** may present the list of available games in a UI (e.g., a UI presented in app **1414** shown in FIG. **13**) to a player. In one or more implementations, the UI could present a virtual lobby similar to a casino floor that a player could navigate through to find an appropriate game. Within the virtual lobby, the remote gaming device **1402** receives one or more player inputs to select a game from the available games. Based on the selected game, the remote game system **1404** sends game selection message **1532** to the remote game system **1404**. The remote game system **1404** then sends game related information **1534** back to remote gaming device **1402**. Based on the game related information **1534**, the remote gaming device **1402** can build out and load the remote game to present in a UI. The remote gaming device **1402** may then receive one or more player inputs to initiate a spin for the remote game. Remote gaming device **1402** sends spin-initiated message **1536** to remote game system **1404** for processing. As previously discussed, remote game system **1404** performs one or more RNG calls and/or communicates with another system (e.g., a bingo server) to determine random based game outcomes for the spin-initiated message **1536**.

[0178] FIG. **15** is a protocol diagram illustrating a protocol sequence **1600** for ending and/or logging out of a game session when funding remote game play with a prepaid game voucher. In particular, the protocol sequence **1600** illustrates how remote game play architecture **1400** shown in FIG. **13** manages fund transactions for unexpected terminations and explicit logouts of a game session. Using FIG. **13** as an example, during remote game play, the established game session between the remote gaming device **1402** and the remote game system **1404** may terminate without the remote gaming device **1402** providing explicit instructions to end the game session with the remote game system **1404**. These unexpected terminations of the game session could occur from a variety reasons, such as execution errors that causes app **1414** to crash, loss of network connection, loss of power for the remote gaming device **1402**, and/or the remote gaming device **1402** moves outside the remote gaming zones. Similar to EGMs located on a casino floor, the virtual gaming service **1416** acts as a state machine and saves the current state of the gaming session. By saving the current state of the gaming session, the virtual gaming service **1416** can return to the last saved state prior to the unexpected termination of the game session.

[0179] The protocol sequence **1600** shown in FIG. **15** starts with an unexpected termination of a game session. When a game session unexpectedly terminates, a game session timeout **1602** occurs between remote gaming device **1402** and remote game system **1404**. During the game session timeout **1602**, remote gaming device **1402** and/or remote game system **1404** may attempt to exchange data or verify the network connection between each other. When the remote game system **1404** determines that an unexpected

session terminates, rather than notifying voucher account system **1432** to issue a new voucher, the remote game system **1404** temporarily holds the fund within the gaming environment. In one or more implementations, to hold the funds within the gaming environment, remote game system **1404** holds off on notifying the voucher account system **1432** for a designated period. Using FIG. **13** as an example, the remote game system **1404** may send fund information only to the wagering account system **1431** or avoid sending fund information to the central management system **1428** altogether. If the remote game system **1404** is unable to re-establish the game session with remote gaming device **1402** within the designated period, the remote game system **1404** notifies the voucher account system **1432** to issue a new voucher. In one or more implementations, to notify the voucher account system **1432**, the remote game system **1404** notifies the central management system **1428**, which routes the notification to the voucher account system **1432**.

[0180] In FIG. **15**, the remote game system **1404** sends re-login request **1604** prior to the designated period expiring. Although not explicitly shown in FIG. **15**, the protocol sequence **1600** could exchange messages between the remote gaming device **1402**, remote game system **1404** and account management system **1406** (e.g., messages **1510-1519** in FIG. **14**) to authenticate the re-login request **1604**. Based on the re-login request **1604** and after authenticating the re-login request **1604**, the remote game system **1404** reloads the funds that were available prior to the unexpected termination of the game session onto the meter. In one or more implementations, the remote game system **1404** could reload the funds based on the fund information temporarily stored on the remote game system **1404** (e.g., virtual gaming service **1416** in FIG. **13**). In other implementations, the remote game system **1404** could receive the available funds from another system that previously saved and stored on the fund information (e.g., wagering account system **1431** shown in FIG. **13**).

[0181] During an active game session, when the remote gaming device **1402** receives instructions from one or more player inputs to end a game session for remote game play, the remote gaming device **1402** sends a logout request **1606** to remote game system **1404**. Remote game system **1404** receives logout request **1606** and generates and sends a cash out request and balance **1608** to the voucher account system **1432**. The cash out request and balance **1608** includes the remaining game credits and/or monetary balance left on the meter when receiving the logout request **1606** from remote gaming device **1402**. When voucher account system **1432** receives the cash out request and balance **1608**, voucher account system **1432** generates and issues a new voucher based on the balance information. Voucher account system **1432** sends the new voucher information to remote game system **1404** and remote game system **1404** stores the monetary value. Afterwards, remote game system **1404** sends voucher information **1612** to remote gaming device **1402**. When remote gaming device **1402** receives the voucher information **1612**, the remote gaming device **1402** could present a digital voucher within app **1414**.

[0182] After ending a game session by logging out, the remote gaming device **1402** may subsequently establish a new game session for remote game play. Although not shown in FIG. **15**, the protocol sequence **1600** could exchange messages **1510-1519** to perform login operations. In FIG. **15**, when remote gaming device **1402** establishes the new game session based on login request **1614**, any additional prepaid gaming vouchers captured and stored into the remote gaming device **1402** is sent to remote game system **1404** via voucher information **1618**. The voucher information **1618** may not include the digital voucher associated with voucher information **1612** since remote game system **1404** may have previously stored the voucher information during the cash out operation. The remote game system **1404** sends voucher information **1620**, which includes the voucher information **1618** and the digital voucher associated with voucher information **1612**, to voucher account system **1432**. After voucher account system **1432** processes voucher information **1620**, voucher account system **1432** sends a validation response and the total voucher value **1622** to the remote game system **1404**. The remote game system **1404** loads game credits onto the meter based on the total voucher value **1622**. The remote game system **1404** also sends the total voucher value **1624** to remote gaming device **1402**.

[0183] FIG. **16** is a block diagram of another implementation of a remote game play architecture **1700** that supports and funds remote game play using a digital gaming wallet. Remote game play architecture **1700** is substantially similar to remote game play architecture **1400** implementation except that the funding services **1710**, enterprise **1708**, and account management system **1702** do not support the use of prepaid game vouchers purchased outside a designated gaming zone. Similar to the remote game play architecture **1400**, remote game play architecture **1700** can support remote game play in Class II wagering games and other game types, such as scratch tickets and iLottery. Stated another way, remote game play architectures **1400** and **1700** support not only real-time remote game play, but also predetermined or future game outcomes.

[0184] FIG. **17** is a protocol diagram that depicts a protocol sequence **1800** for logging in and funding a game session with a digital gaming wallet. Remote game play architectures **1400** or **1700** can implement protocol sequence **1800** to fund a digital gaming wallet managed by the wagering account system **1431**. Protocol sequence **1800** includes two different funding operations that could be implemented within wagering account system **1431**. One funding operation includes exchanging messages **1820-1830** and another funding operation includes exchanging messages **1832-1840**. The use and discussion of FIG. **17** is only an example to facilitate explanation and is not intended to limit the disclosure to this specific example. As an example, remote game play architectures **1400** and **1700** could implement one of the funding operations while in another example, remote game play architectures **1400** and **1700** could implement both funding operations. Additionally, or alternatively, for ease of explanation, protocol sequence **1500** does not include messages communicated with other systems, such as funding services **1410**.

[0185] FIG. **17** performs a login process that is substantially similar to the login process shown in FIG. **14**. After remote gaming device **1402** logins into the app, the remote gaming device **1402** sends a fund request and security credentials to remote game system **1404**. The fund request provides instructions to transfer funds from an external funding source to a digital gaming wallet account managed by the wagering account system **1431**. When the remote game system **1404** receives the fund request and security credentials **1820**, the remote game system **1404** processes the message and forwards the relevant information into fund

request and security credentials **1822** to wagering account system **1431**. In one or more implementations, the remote game system **1404** stores the fund information sent in the fund request and security credentials **1820**. When the wagering account system **1431** receives fund request and security credentials **1822**, the wagering account system **1431** authenticates the fund request and sends a fund request transfer **1824** to funding service **1710**. The funding service **1710** verifies the fund request transfer **1824** and provides funds **1826** to wagering account system **1431** (e.g., a digital gaming wallet). The wagering account system **1431** can send a validation response and funds **1828** to remote game system **1404** for remote game play. The remote game system **1404** may then send an updated fund balance **1830** to remote gaming device **1402**.

[0186] FIG. **17** also illustrates another funding operation that starts with the remote gaming device **1402** sending a fund request and security credentials to remote game system **1404**. Rather than having remote game system **1404** send the fund request and security credentials **1834** to the wagering account system **1431**, the remote game system **1404** sends the fund request and security credentials **1834** directly to the funding service **1710**. The funding service **1710** verifies the fund request and security credentials **1834** and provides funds **1836** to wagering account system **1431** (e.g., a digital gaming wallet). The wagering account system **1431** can send a validation response and funds **1838** to remote game system **1404** for remote game play. The remote game system **1404** may then send an updated fund balance **1840** to remote gaming device **1402**.

[0187] FIG. **18** is a protocol diagram illustrating a protocol sequence **1900** for ending and/or logging out of a game session when funding remote game play with a digital gaming wallet. In particular, the protocol sequence **1900** illustrates how remote game play architectures **1400** and **1700** shown in FIGS. **13** and **16** manage funding transactions for unexpected terminations and explicit logouts of a game session. Similar to FIG. **15**, FIG. **18** illustrates an established game session between the remote gaming device **1402** and the remote game system **1404** that terminates without the remote gaming device **1402** providing explicit instructions to end the game session to the remote game system **1404**. The protocol sequence **1900** shown in FIG. **18** starts with a game session timeout **1902** that is substantially similar to game session timeout **1602** shown in FIG. **15**. When the remote game system **1404** determines that an unexpected session terminates, the remote game system **1404** temporarily holds the fund within the gaming environment. In one or more implementations, to maintain funds within the gaming environment, remote game system **1404** holds off on notifying the central management system **1428** for a designated period and stores fund information in the remote game system **1404**. Additionally, or alternatively, as shown in FIG. **18**, remote game system **1404** sends fund information to the wagering account system **1431** to temporarily store the balance in the digital gaming wallet and/or some other wallet. The wagering account system **1431** may indicate that the associated funds are pending or temporarily on hold, and thus may not be available for immediate use. If the remote game system **1404** is unable to re-establish the game session with remote gaming device **1402** within the designated period, the remote game system **1404** sends a cash out operation to the central management system **1428**. After the cash out operation, the funds previously temporarily on hold are transferred to the digital gaming wallet for immediate use.

[0188] In FIG. **18**, the remote game system **1404** sends re-login request **1904** prior to the designated period expiring. Although not explicitly shown in FIG. **18**, the protocol sequence **1900** could exchange login messages between the remote gaming device **1402**, remote game system **1404** and account management system **1406** (e.g., messages **1510**-**1519** in FIG. **17**) to authenticate the re-login request **1904**. Based on the re-login request **1604** and after authenticating and validating the re-login request **1904**, the remote game system **1404** reloads the funds that were available prior to the unexpected termination of the game session onto the meter. In one or more implementations, the remote game system **1404** could reload the funds based on the fund information temporarily stored on the remote game system **1404** (e.g., virtual gaming service **1416** in FIG. **13**). In other implementations and as shown in FIG. **18**, the remote game system **1404** sends a re-login request and security credential **1908** to wagering account system **1431**. When wagering account system **1431** receives the re-login request and security credential **1908**, wagering account system **1431** processes the message and sends a validation and reload funds message **1910** back to the remote game system. Based on the validation and reload funds message **1910**, the remote game system **1404** reloads the temporarily held funds onto the credit meter.

[0189] During an active game session, when the remote gaming device **1402** receives instructions from one or more player inputs to end a game session for remote game play, the remote gaming device **1402** sends a logout request **1914** to remote game system **1404**. Remote game system **1404** receives logout request **1914** and generates and sends a cash out request and balance **1916** to the wagering account system **1431**. The cash out request and balance **1916** includes the remaining game credits and/or monetary balance left on the meter when receiving the logout request **1914** from remote gaming device **1402**. When wagering account system **1431**receives the cash out request and balance **1916**, wagering account system **1431** stores and update the funds in a digital gaming wallet. Voucher account system **1432** sends the updated fund balance **1918** for the digital gaming wallet to remote game system **1404** and remote game system **1404** stores the fund information. Afterwards, remote game system **1404** sends updated fund balance **1920** for the digital gaming wallet to remote gaming device **1402**. When remote gaming device **1402** receives the updated fund balance **1920**, the remote gaming device **1402** could present the updated fund balance in the digital gaming wallet within app **1414**.

[0190] The present disclosure is widely applicable to numerous implementations, as is readily apparent from the disclosure. One of ordinary skill in the art will recognize that the innovations described herein may be practiced with various modifications and alterations, such as structural, logical, software, and electrical modifications. Although particular features of the innovations described herein may be described with reference to one or more particular implementations and/or drawings, it should be understood that such features are not limited to usage in the one or more particular implementations or drawings with reference to which they are described, unless expressly specified otherwise.

[0191] The present disclosure is neither a literal description of all implementations nor a listing of features of the innovations described herein that must be present in all implementations.

[0192] The Title (set forth at the beginning of the first page of this disclosure) is not to be taken as limiting in any way as the scope of the disclosed implementations. Headings of sections provided in this disclosure are for convenience only and are not to be taken as limiting the disclosure in any way.

[0193] When an ordinal number (such as "first," "second," "third" and so on) is used as an adjective before a term, that ordinal number is used (unless expressly specified otherwise) merely to indicate a particular feature, such as to distinguish that particular feature from another feature that is described by the same term or by a similar term. For example, a "first widget" may be so named merely to distinguish it from, e.g., a "second widget." Thus, the mere usage of the ordinal numbers "first" and "second" before the term "widget" does not indicate any other relationship between the two widgets, and likewise does not indicate any other characteristics of either or both widgets. For example, the mere usage of the ordinal numbers "first" and "second" before the term "widget" (1) does not indicate that either widget comes before or after any other in order or location; (2) does not indicate that either widget occurs or acts before or after any other in time; and (3) does not indicate that either widget ranks above or below any other, as in importance or quality. In addition, the mere usage of ordinal numbers does not define a numerical limit to the features identified with the ordinal numbers. For example, the mere usage of the ordinal numbers "first" and "second" before the term "widget" does not indicate that there must be no more than two widgets.

[0194] When introducing elements of aspects of the present disclosure or implementations thereof, the articles "a," "an," "the," and "said" are intended to mean that there are one or more of the elements. The terms "comprising," including," and "having" are intended to be inclusive and mean that there may be additional elements other than the listed elements.

[0195] When a single device, component, structure, or article is described herein, more than one device, component, structure or article (whether or not they cooperate) may alternatively be used in place of the single device, component or article that is described. Accordingly, the functionality that is described as being possessed by a device may alternatively be possessed by more than one device, component or article (whether or not they cooperate).

[0196] Similarly, where more than one device, component, structure, or article is described herein (whether or not they cooperate), a single device, component, structure, or article may alternatively be used in place of the more than one device, component, structure, or article that is described. For example, a plurality of computer-based devices may be substituted with a single computer-based device. Accordingly, the various functionality that is described as being possessed by more than one device, component, structure, or article may alternatively be possessed by a single device, component, structure, or article.

[0197] The functionality and/or the features of a single device that is described may be alternatively embodied by one or more other devices that are described but are not explicitly described as having such functionality and/or features. Thus, other implementations need not include the described device itself, but rather can include the one or more other devices which would, in those other implementations, have such functionality/features.

[0198] Further, the systems and methods described herein are not limited to the specific implementations described herein but, rather, operations of the methods and/or components of the system and/or apparatus may be utilized independently and separately from other operations and/or components described herein. Further, the described operations and/or components may also be defined in, or used in combination with, other systems, methods, and/or apparatus, and are not limited to practice with only the systems, methods, and storage media as described herein.

[0199] Devices that are in communication with each other need not be in continuous communication with each other, unless expressly specified otherwise. On the contrary, such devices need only transmit to each other as necessary or desirable and may actually refrain from exchanging data most of the time. For example, a machine in communication with another machine via the Internet may not transmit data to the other machine for weeks at a time. In addition, devices that are in communication with each other may communicate directly or indirectly through one or more intermediaries.

[0200] A description of an implementation with several components or features does not imply that all or even any of such components and/or features are required. On the contrary, a variety of optional components are described to illustrate the wide variety of possible implementations of the innovations described herein. Unless otherwise specified explicitly, no component and/or feature is essential or required.

[0201] Further, although process steps, algorithms or the like may be described in a sequential order, such processes may be configured to work in different orders. In other words, any sequence or order of steps that may be explicitly described does not necessarily indicate a requirement that the steps be performed in that order. The steps of processes described herein may be performed in any order practical. Further, some steps may be performed simultaneously despite being described or implied as occurring non-simultaneously (e.g., because one step is described after the other step). Moreover, the illustration of a process by its depiction in a drawing does not imply that the illustrated process is exclusive of other variations and modifications thereto, does not imply that the illustrated process or any of its steps are necessary to the innovations described herein, and does not imply that the illustrated process is preferred.

[0202] Although a process may be described as including a plurality of steps, that does not indicate that all or even any of the steps are essential or required. Various other implementations within the scope of the present disclosure include other processes that omit some or all of the described steps. Unless otherwise specified explicitly, no step is essential or required.

[0203] Although a product may be described as including a plurality of components, aspects, qualities, characteristics and/or features, that does not indicate that all of the plurality are essential or required. Various other implementations within the scope of the present disclosure include other products that omit some or all of the described plurality. An enumerated list of items (which may or may not be numbered) does not imply that any or all of the items are mutually exclusive, unless expressly specified otherwise.

Likewise, an enumerated list of items (which may or may not be numbered) does not imply that any or all of the items are comprehensive of any category, unless expressly specified otherwise.

[0204] For the sake of presentation, the detailed description uses terms like "determine" and "select" to describe computer operations in a computer system. These terms denote operations performed by a computer and should not be confused with acts performed by a human being. The actual computer operations corresponding to these terms vary depending on implementation. For example, "determining" something can be performed in a variety of manners, and therefore the term "determining" (and like terms) can indicate calculating, computing, deriving, looking up (e.g., in a table, database or data structure), ascertaining, recognizing, and the like.

[0205] As used herein, the term "send" denotes any way of conveying information from one component to another component, and the term "receive" denotes any way of getting information at one component from another component. The two components can be part of the same computer system or different computer systems. The information can be passed by value (e.g., as a parameter of a message or function call) or passed by reference (e.g., in a buffer). Depending on context, the information can be communicated directly between the two components or be conveyed through one or more intermediate components. As used herein, the term "connected" denotes an operable communication link between two components, which can be part of the same computer system or different computer systems. The operable communication link can be a wired or wireless network connection, which can be direct or pass through one or more intermediate components (e.g., of a network). Communication among computers and devices may be encrypted to ensure privacy and prevent fraud in any of a variety of ways well known in the art.

[0206] It will be readily apparent that the various methods and algorithms described herein may be implemented by, e.g., appropriately programmed general-purpose computers and computing devices. Typically, a processor (e.g., one or more microprocessors) will receive instructions from a memory or like device, and execute those instructions, thereby performing one or more processes defined by those instructions. Further, programs that implement such methods and algorithms may be stored and transmitted using a variety of media (e.g., computer readable media) in a number of manners. In some implementations, hard-wired circuitry or custom hardware may be used in place of, or in combination with, software instructions for implementation of the processes of various implementations. Thus, implementations are not limited to any specific combination of hardware and software. Accordingly, a description of a process likewise describes at least one apparatus for performing the process, and likewise describes at least one computer-readable medium for performing the process. The apparatus that performs the process can include components and devices (e.g., a processor, input and output devices) appropriate to perform the process.

[0207] A computer-readable medium can store program elements appropriate to perform the method.

[0208] The term "computer-readable medium" refers to any non-transitory storage or memory that may store computer-executable instructions or other data in a computer system and be read by a processor in the computer system. A computer-readable medium may take many forms, including but not limited to non-volatile storage or memory (such as optical or magnetic disk media, a solid-state drive, a flash drive, PROM, EPROM, and other persistent memory) and volatile memory (such as DRAM). The term "computer-readable media" excludes signals, waves, and wave forms or other intangible or transitory media that may nevertheless be readable by a computer.

[0209] The present disclosure provides, to one of ordinary skill in the art, an enabling description of several implementations and/or innovations. Some of these implementations and/or innovations may not be claimed in the present application but may nevertheless be claimed in one or more continuing applications that claim the benefit of priority of the present application. Applicants may file additional applications to pursue patents for subject matter that has been disclosed and enabled but not claimed in the present application.

[0210] The foregoing description discloses only exemplary implementations of the present disclosure. Modifications of the above disclosed apparatus and methods which fall within the scope of the present disclosure will be readily apparent to those of ordinary skill in the art. For example, although the examples discussed above are illustrated for a gaming market, implementations of the present disclosure can be implemented for other markets. The gaming system environment of the examples is not intended to suggest any limitation as to the scope of use or functionality of any aspect of the disclosure.

[0211] While the invention has been described with respect to the figures, it will be appreciated that many modifications and changes may be made by those skilled in the art without departing from the spirit of the invention. Any variation and derivation from the above description and figures are included in the scope of the present invention as defined by the claims. In view of the many possible implementations to which the principles of the disclosed invention may be applied, it should be recognized that the illustrated implementations are only preferred examples of the invention and should not be taken as limiting the scope of the invention. Rather, the scope of the invention is defined by the following claims. We therefore claim as our invention all that comes within the scope and spirit of these claims.

What is claimed is:

1. A digital wallet computing system comprising:

at least one processor in communication with a memory device storing instructions that, when executed, cause the at least one processor to:

establish wireless connectivity between a mobile device of a player and an electronic gaming device, the electronic gaming device including a device identifier;

receive an initiation of a funds transfer request from the mobile device of the player, the funds transfer request identifying a funds transfer amount and an external player account of the player;

identify an operator identity of an operator based on the device identifier of the electronic gaming device;

identify a player account of the player, the player account associated with the operator;

perform a first withdrawal transaction moving the funds transfer amount from the electronic gaming device to the player account associated with the operator; and

in response to the first withdrawal transaction, automatically perform a second withdrawal transaction moving the funds transfer amount from the player account associated with the operator to the external player account of the player.

2. The digital wallet computing system of claim **1**, wherein the instructions further cause the at least one processor to:

determine, in response to the initiation of a funds transfer request, that the player has stopped playing at the electronic gaming device;

determine a remaining credit balance comprising an amount of credits remaining at the electronic gaming device; and

cause the remaining credit balance to be deposited as funds into the external player account.

3. The digital wallet computing system of claim **1**, wherein the instructions further cause the at least one processor to:

establish wireless connectivity between the mobile device of the player and a second electronic gaming device, the second electronic gaming device including a second device identifier;

receive an initiation of a second funds transfer request from the mobile device of the player, the funds transfer request identifying a second funds transfer amount and the external player account of the player; and

perform a third withdrawal transaction moving the second funds transfer amount from the external player account and causing a credit balance associated with the second funds transfer amount to be established at the second electronic gaming device identified by the second device identifier.

4. The digital wallet computing system of claim **3**, wherein the instructions further cause the at least one processor to determine a responsible gaming limit comprising a threshold amount of funds.

5. The digital wallet computing system of claim **4**, wherein the instructions further cause the at least one processor to compare the second funds transfer amount to the threshold amount of funds.

6. The digital wallet computing system of claim **5**, wherein the instructions further cause the at least one processor to, in response to determining that the funds transfer amount is less than the threshold amount of funds, perform the third withdrawal transaction.

7. The digital wallet computing system of claim **4**, wherein the instructions further cause the at least one processor to:

determine a difference between an amount of funds withdrawn from the external player account, the amount of funds withdrawn including the second funds transfer amount, and an amount of funds deposited into the external player account over a predetermined period of time; and

in response to determining that the difference satisfies the threshold amount of funds by not exceeding the responsible gaming limit, perform the third withdrawal transaction.

8. A computer-implemented method of providing digital wallet transactions implemented by a processor in communication with a memory device, the method comprising:

establishing wireless connectivity between a mobile device of a player and an electronic gaming device, the electronic gaming device including a device identifier;

receiving an initiation of a funds transfer request from the mobile device of the player, the funds transfer request identifying a funds transfer amount and an external player account of the player;

identifying an operator identity of an operator based on the device identifier of the electronic gaming device;

identifying a player account of the player, the player account associated with the operator;

performing a first withdrawal transaction moving the funds transfer amount from the electronic gaming device to the player account associated with the operator; and

in response to the first withdrawal transaction, automatically performing a second withdrawal transaction moving the funds transfer amount from the player account associated with the operator to the external player account of the player.

9. The method of claim **8**, further comprising:

determining, in response to the initiation of a funds transfer request, that the player has stopped playing at the electronic gaming device;

determining a remaining credit balance comprising an amount of credits remaining at the electronic gaming device; and

causing the remaining credit balance to be deposited as funds into the external player account.

10. The method of claim **8**, further comprising:

establishing wireless connectivity between the mobile device of the player and a second electronic gaming device, the second electronic gaming device including a second device identifier;

receiving an initiation of a second funds transfer request from the mobile device of the player, the funds transfer request identifying a second funds transfer amount and the external player account of the player; and

performing a third withdrawal transaction moving the second funds transfer amount from the external player account and causing a credit balance associated with the second funds transfer amount to be established at the second electronic gaming device identified by the second device identifier.

11. The method of claim **10**, further comprising determining a responsible gaming limit comprising a threshold amount of funds.

12. The method of claim **11**, further comprising comparing the second funds transfer amount to the threshold amount of funds.

13. The method of claim **12**, further comprising, in response to determining that the funds transfer amount is less than the threshold amount of funds, performing the third withdrawal transaction.

14. The method of claim **11**, further comprising:

determining a difference between an amount of funds withdrawn from the external player account, the amount of funds withdrawn including the second funds transfer amount, and an amount of funds deposited into the external player account over a predetermined period of time; and

in response to determining that the difference satisfies the threshold amount of funds by not exceeding the responsible gaming limit, performing the third withdrawal transaction.

15. A non-transitory computer-readable medium storing instructions that, when executed by at least one processor, cause the at least one processor to:

establish wireless connectivity between a mobile device of a player and an electronic gaming device, the electronic gaming device including a device identifier;

receive an initiation of a funds transfer request from the mobile device of the player, the funds transfer request identifying a funds transfer amount and an external player account of the player;

identify an operator identity of an operator based on the device identifier of the electronic gaming device;

identify a player account of the player, the player account associated with the operator;

perform a first withdrawal transaction moving the funds transfer amount from the electronic gaming device to the player account associated with the operator; and

in response to the first withdrawal transaction, automatically perform a second withdrawal transaction moving the funds transfer amount from the player account associated with the operator to the external player account of the player.

16. The non-transitory computer-readable medium of claim **15**, wherein the instructions further cause the at least one processor to:

determine, in response to the initiation of a funds transfer request, that the player has stopped playing at the electronic gaming device;

determine a remaining credit balance comprising an amount of credits remaining at the electronic gaming device; and

cause the remaining credit balance to be deposited as funds into the external player account.

17. The non-transitory computer-readable medium of claim **15**, wherein the instructions further cause the at least one processor to:

establish wireless connectivity between the mobile device of the player and a second electronic gaming device, the second electronic gaming device including a second device identifier;

receive an initiation of a second funds transfer request from the mobile device of the player, the funds transfer request identifying a second funds transfer amount and the external player account of the player; and

perform a third withdrawal transaction moving the second funds transfer amount from the external player account and causing a credit balance associated with the second funds transfer amount to be established at the second electronic gaming device identified by the second device identifier.

18. The non-transitory computer-readable medium of claim **17**, wherein the instructions further cause the at least one processor to determine a responsible gaming limit comprising a threshold amount of funds.

19. The non-transitory computer-readable medium of claim **18**, wherein the instructions further cause the at least one processor to:

compare the second funds transfer amount to the threshold amount of funds; and

in response to determining that the funds transfer amount is less than the threshold amount of funds, perform the third withdrawal transaction.

20. The non-transitory computer-readable medium of claim **18**, wherein the instructions further cause the at least one processor to:

determine a difference between an amount of funds withdrawn from the external player account, the amount of funds withdrawn including the second funds transfer amount, and an amount of funds deposited into the external player account over a predetermined period of time; and

in response to determining that the difference satisfies the threshold amount of funds by not exceeding the responsible gaming limit, perform the third withdrawal transaction.

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