US 20250267142A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2025/0267142 A1

PETERSEN et al. (43) Pub. Date: Aug. 21, 2025

(54) **CENTRALIZED CLIENT INTERFACE FOR FACILITATING CREDENTIAL-LESS NETWORK-BASED COMMUNICATION EXCHANGES BETWEEN PARTICIPATING MEMBER PLATFORMS**

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(21) Appl. No.: **19/070,103**

(22) Filed: **Mar. 4, 2025**

Related U.S. Application Data

(63) Continuation-in-part of application No. 19/057,119, filed on Feb. 19, 2025, which is a continuation of application No. 18/329,107, filed on Jun. 5, 2023.

(60) Provisional application No. 63/561,062, filed on Mar. 4, 2024, provisional application No. 63/370,280, filed on Aug. 3, 2022, provisional application No. 63/370,279, filed on Aug. 3, 2022.

Publication Classification

(51) **Int. Cl.**

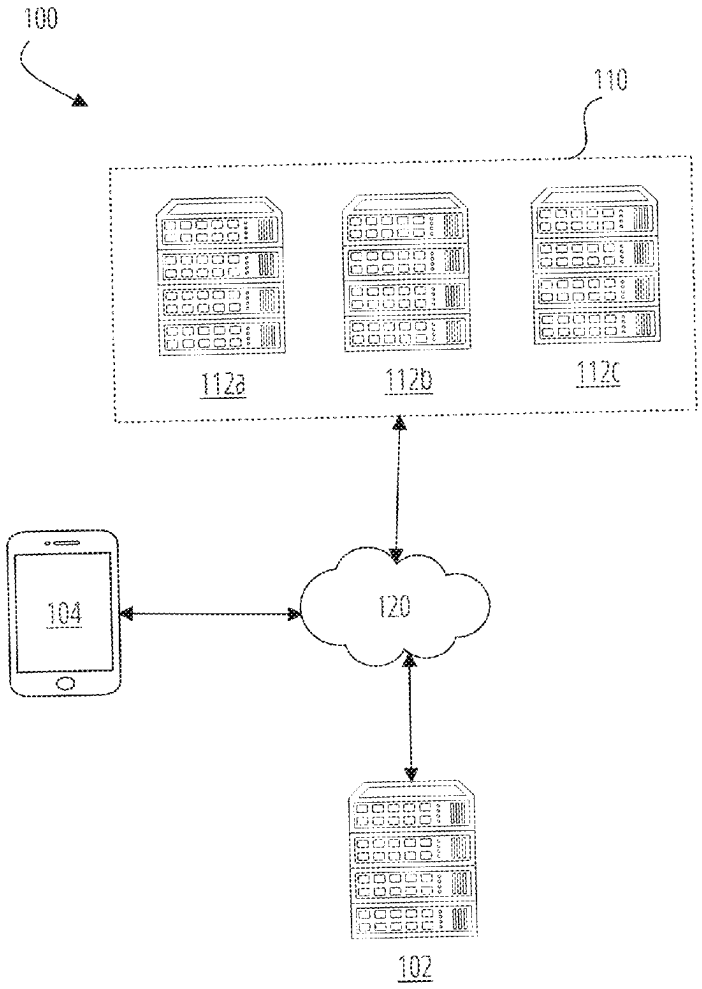
H04L 9/40	(2022.01)
H04L 9/08	(2006.01)
H04L 9/32	(2006.01)

(52) **U.S. Cl.**

CPC ***H04L 63/083*** (2013.01); ***H04L 9/0819*** (2013.01); ***H04L 9/321*** (2013.01)

(57) **ABSTRACT**

Various embodiments of the present disclosure provide techniques for facilitating a credential-less exchange over a network using a plurality of identifier mapping and member interfaces. The techniques may include receiving, by a client device, user input to an icon corresponding to a software container within a central interface repository. The techniques include providing, using a member-client interface, a container activation request based on the user input. The techniques include receiving, using the member-client interface, a universally unique ephemeral key (UUEK) for the software container, storing the UUEK within the software container for a temporary time period, and providing a message transmission that identifies the UUEK and initiates an exchange request.



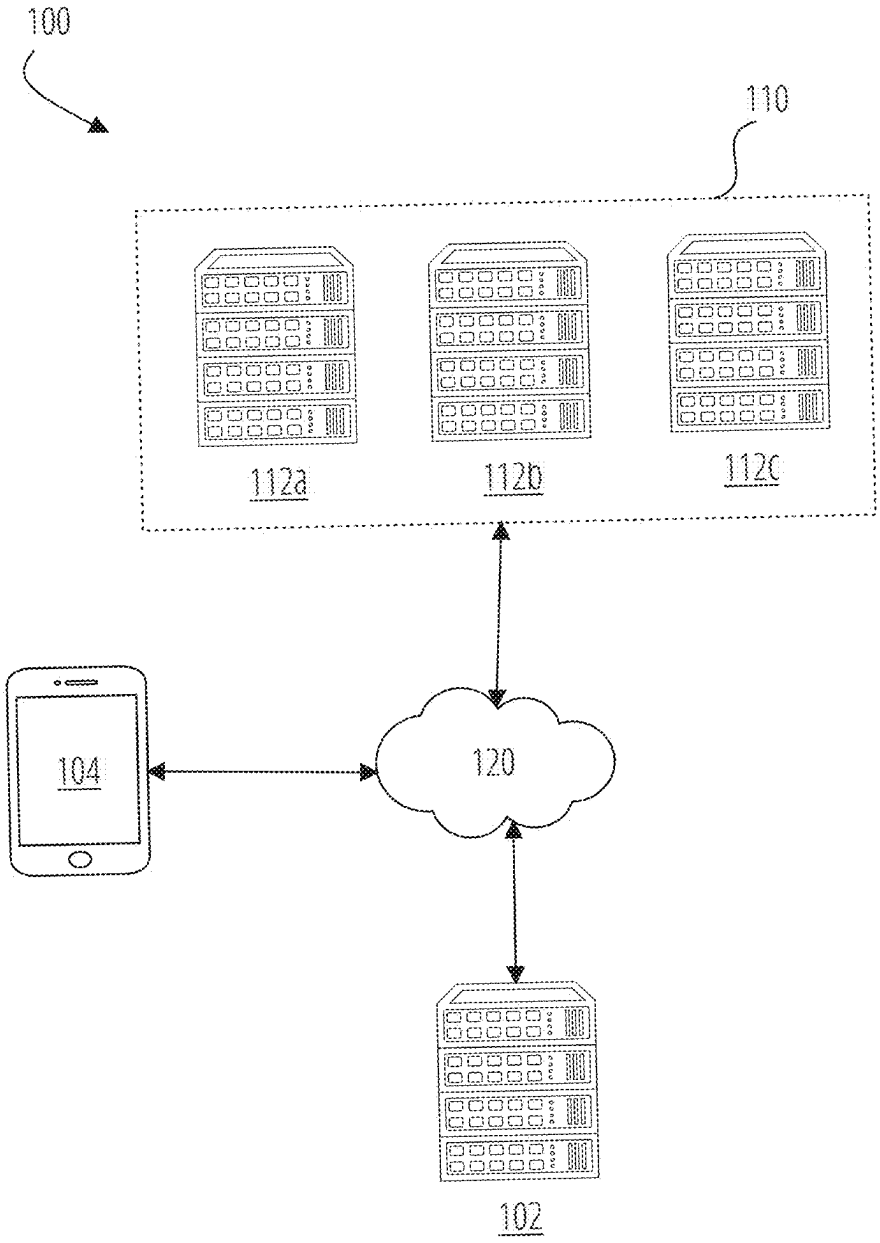


FIG. 1

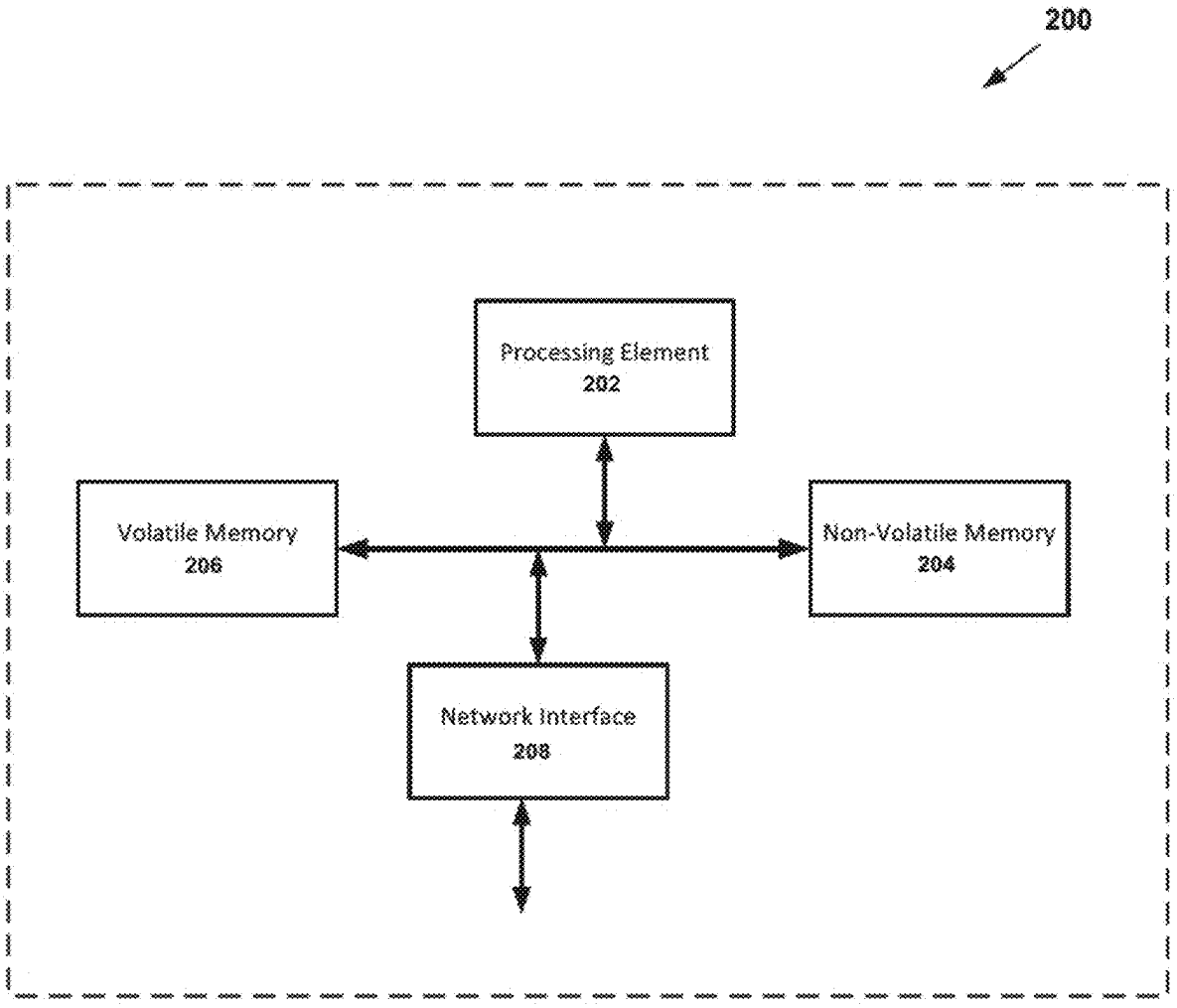

200
Processing Element
202
Volatile Memory
206
Non-Volatile Memory
204
Network Interface
208

FIG. 2

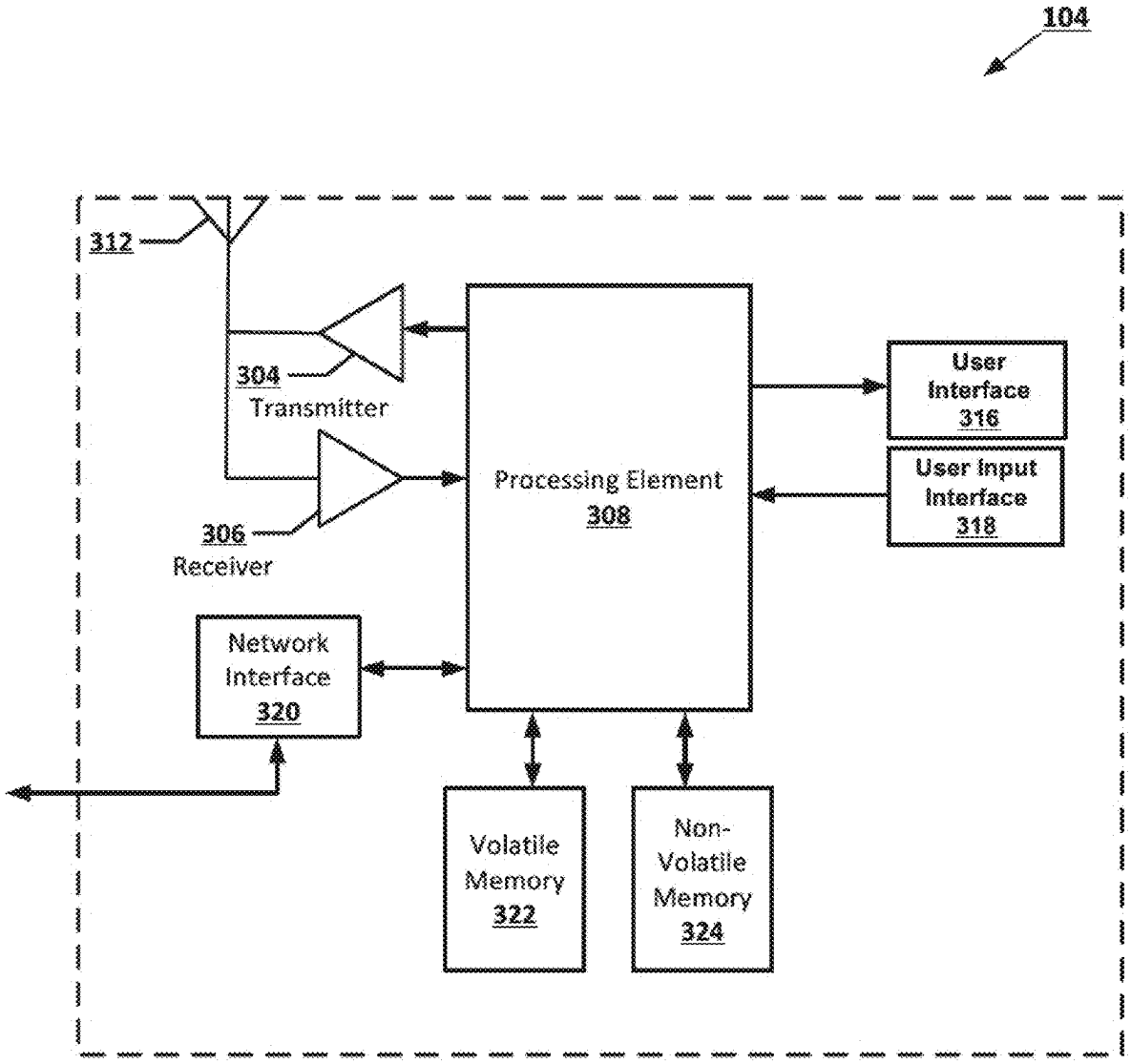

104
312
304
Transmitter
306
Receiver
Processing Element
308
User
Interface
316
User Input
Interface
318
Network
Interface
320
Volatile
Memory
322
Non-
Volatile
Memory
324

FIG. 3

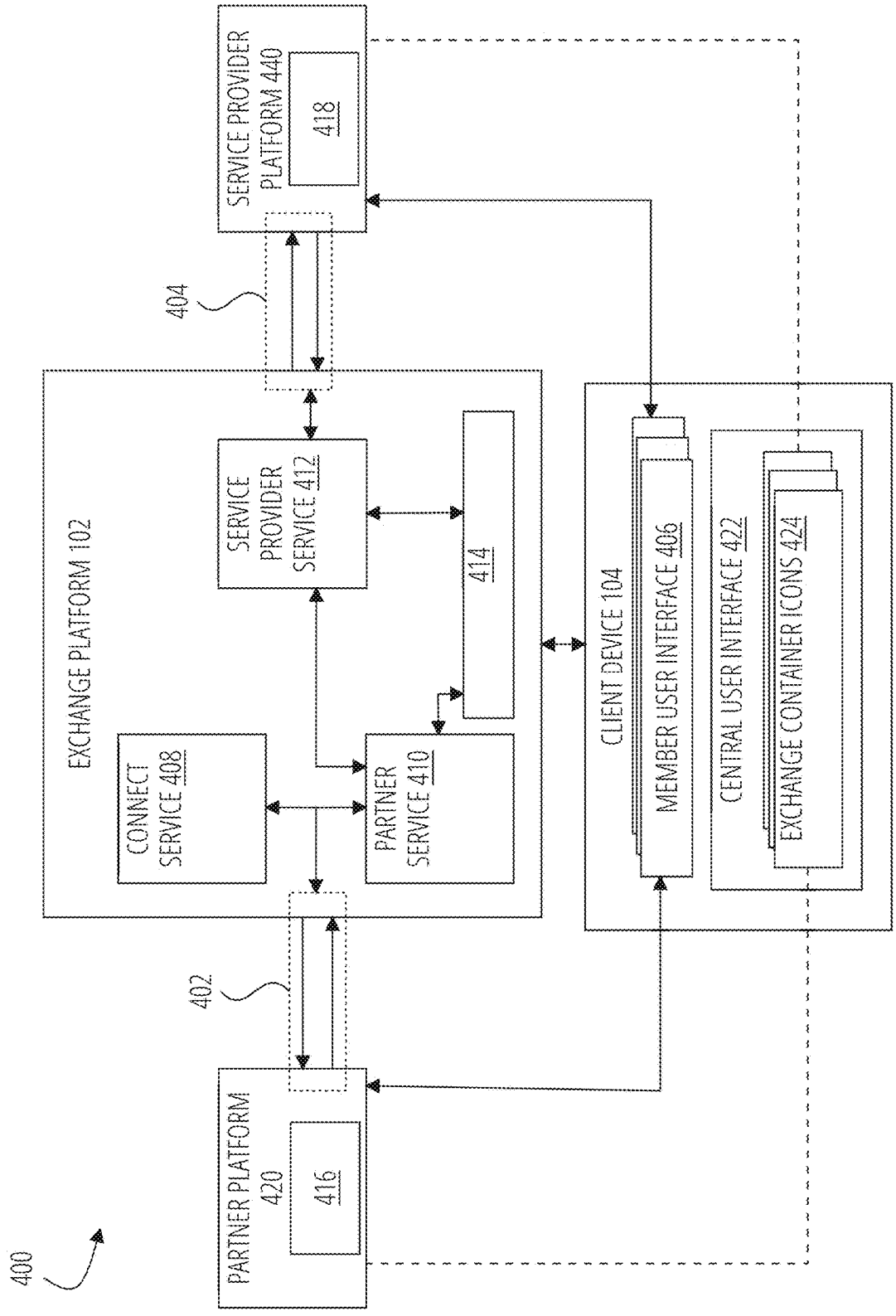

400
PARTNER PLATFORM 420
416
402
EXCHANGE PLATFORM 102
CONNECT SERVICE 408
PARTNER SERVICE 410
SERVICE PROVIDER SERVICE 412
414
404
SERVICE PROVIDER PLATFORM 440
418
CLIENT DEVICE 104
MEMBER USER INTERFACE 406
CENTRAL USER INTERFACE 422
EXCHANGE CONTAINER ICONS 424

FIG. 4

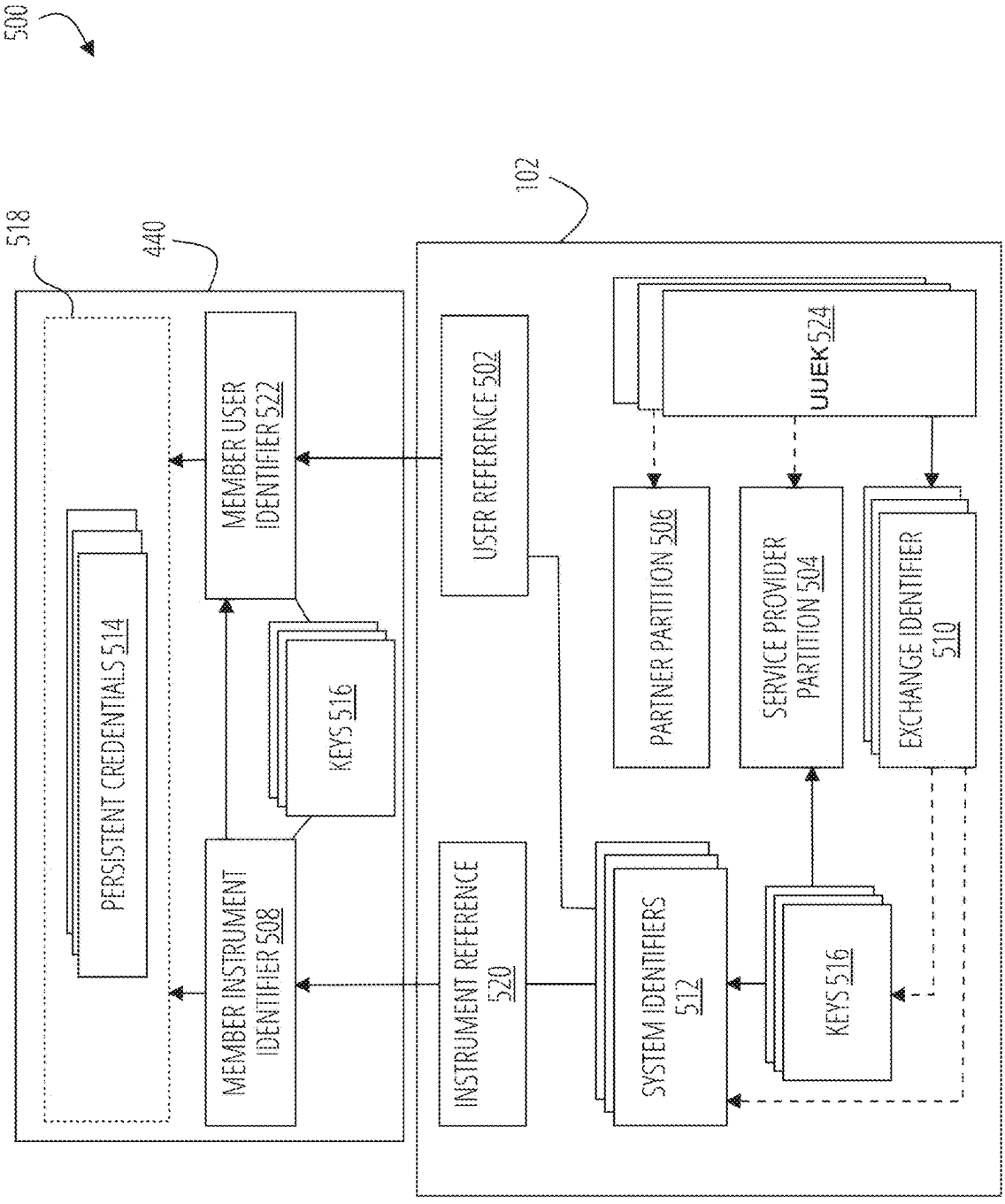

500
518
440
102
PERSISTENT CREDENTIALS 514
MEMBER USER IDENTIFIER 522
KEYS 516
MEMBER INSTRUMENT IDENTIFIER 508
USER REFERENCE 502
INSTRUMENT REFERENCE 520
UUEK 524
PARTNER PARTITION 506
SERVICE PROVIDER PARTITION 504
EXCHANGE IDENTIFIER 510
SYSTEM IDENTIFIERS 512
KEYS 516

FIG. 5

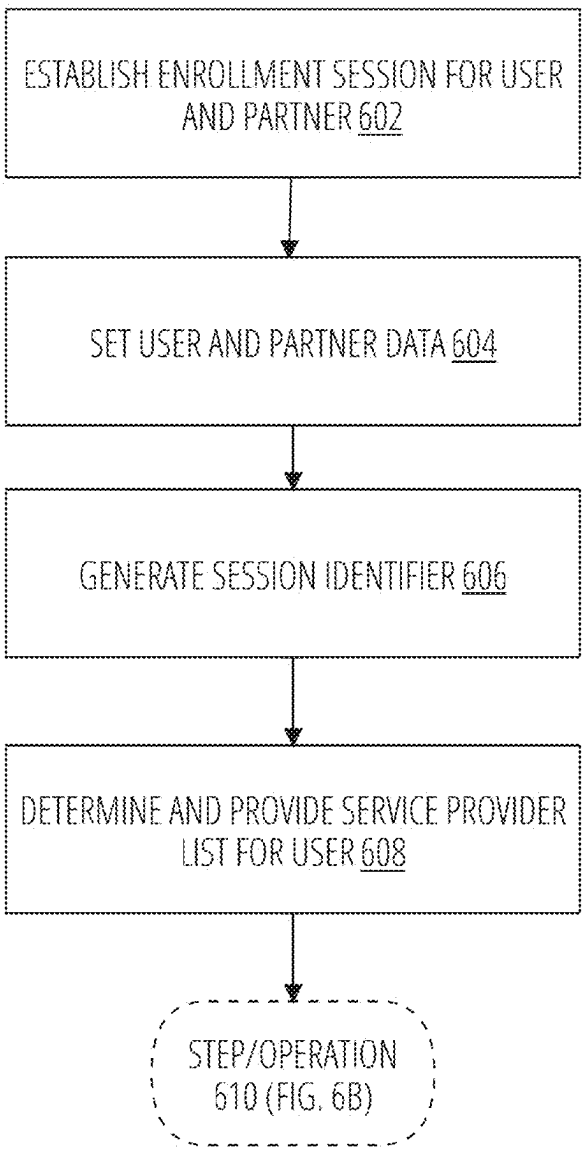

ESTABLISH ENROLLMENT SESSION FOR USER AND PARTNER 602
SET USER AND PARTNER DATA 604
GENERATE SESSION IDENTIFIER 606
DETERMINE AND PROVIDE SERVICE PROVIDER LIST FOR USER 608
STEP/OPERATION 610 (FIG. 6B)

FIG. 6A

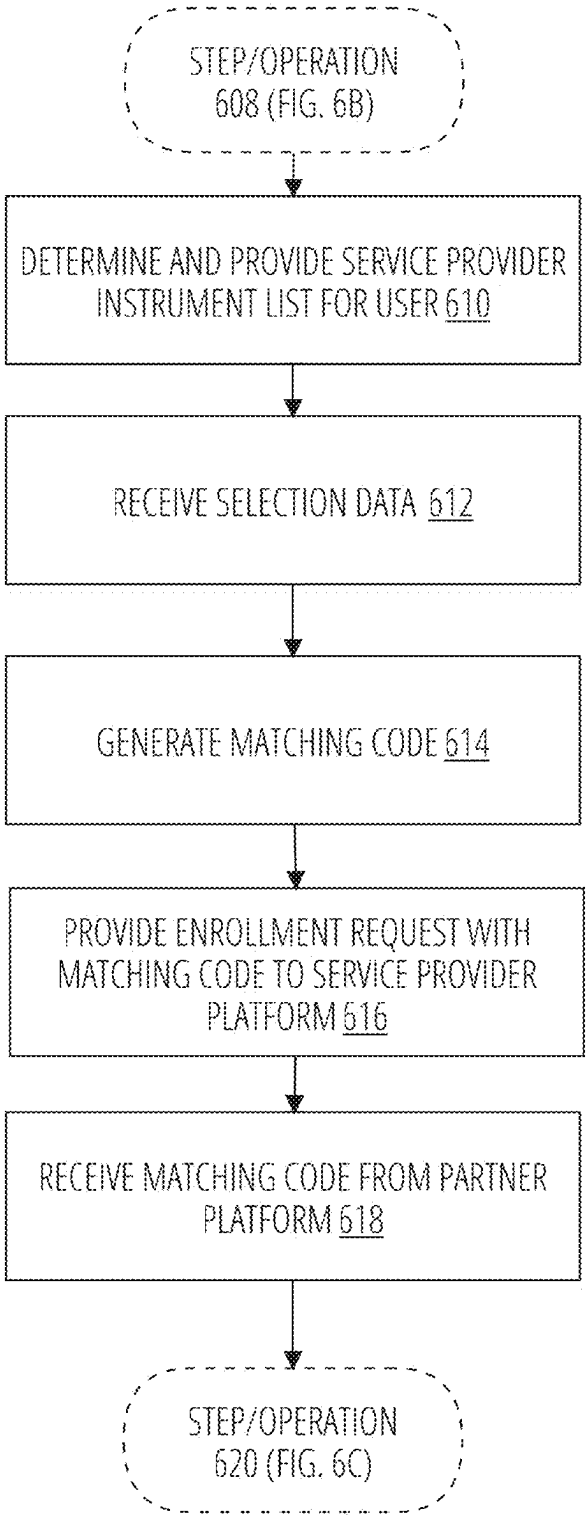

STEP/OPERATION 608 (FIG. 6B)
DETERMINE AND PROVIDE SERVICE PROVIDER INSTRUMENT LIST FOR USER 610
RECEIVE SELECTION DATA 612
GENERATE MATCHING CODE 614
PROVIDE ENROLLMENT REQUEST WITH MATCHING CODE TO SERVICE PROVIDER PLATFORM 616
RECEIVE MATCHING CODE FROM PARTNER PLATFORM 618
STEP/OPERATION 620 (FIG. 6C)

FIG. 6B

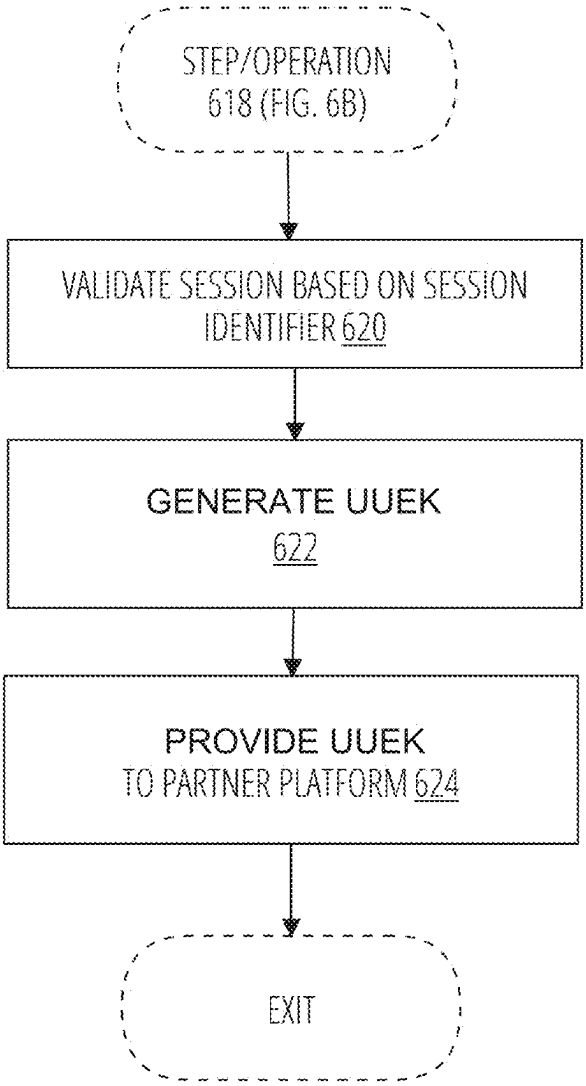

STEP/OPERATION
618 (FIG. 6B)
VALIDATE SESSION BASED ON SESSION IDENTIFIER 620
GENERATE UUEK
622
PROVIDE UUEK
TO PARTNER PLATFORM 624
EXIT

FIG. 6C

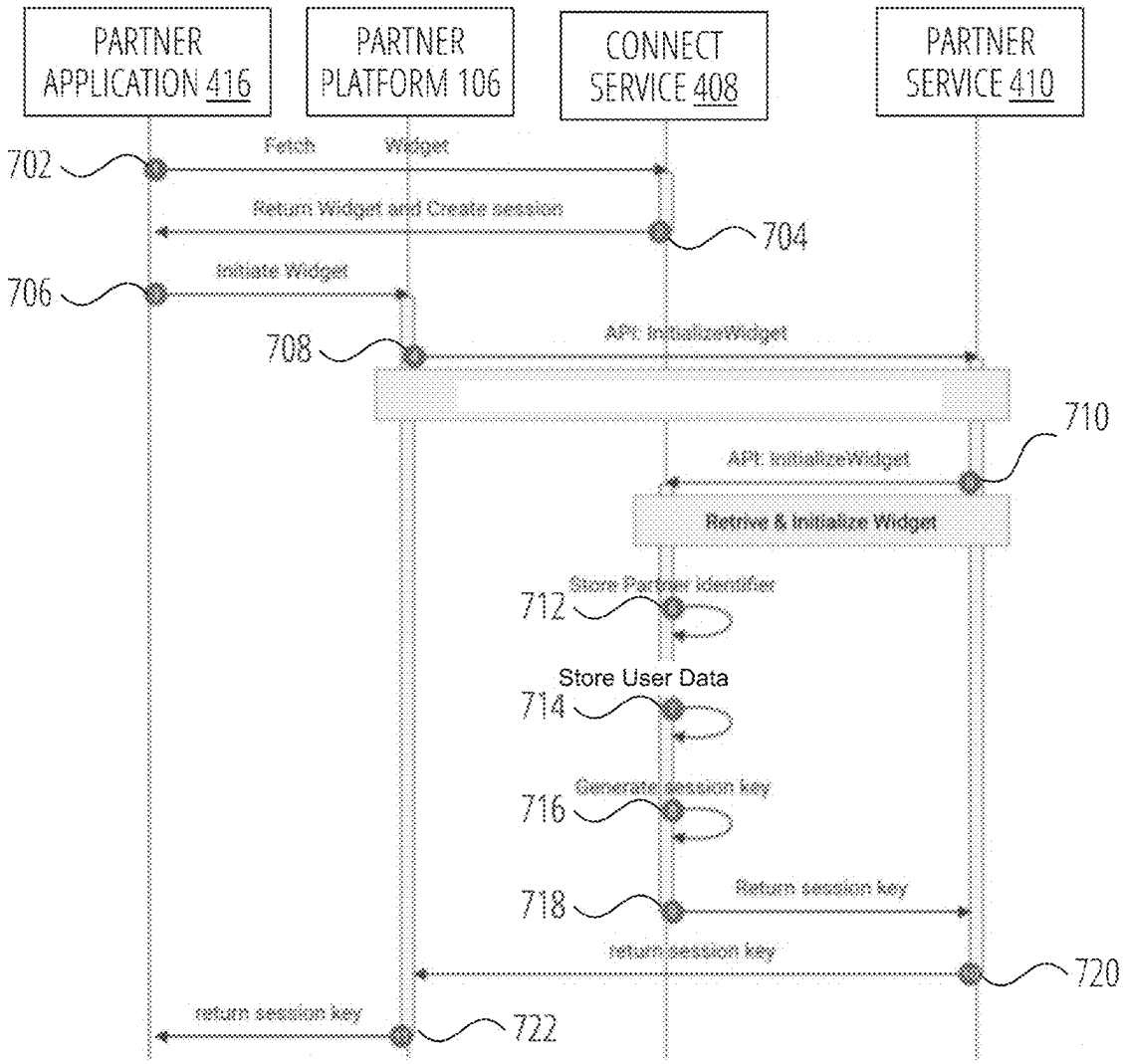

PARTNER APPLICATION 416
PARTNER PLATFORM 106
CONNECT SERVICE 408
PARTNER SERVICE 410
Fetch Widget
702
Return Widget and Create session
704
Initiate Widget
706
API: InitializeWidget
708
710
API: InitializeWidget
Retrive & Initialize Widget
Store Partner Identifier
712
Store User Data
714
Generate Session key
716
Return session key
718
return session key
720
return session key
722

FIG. 7A

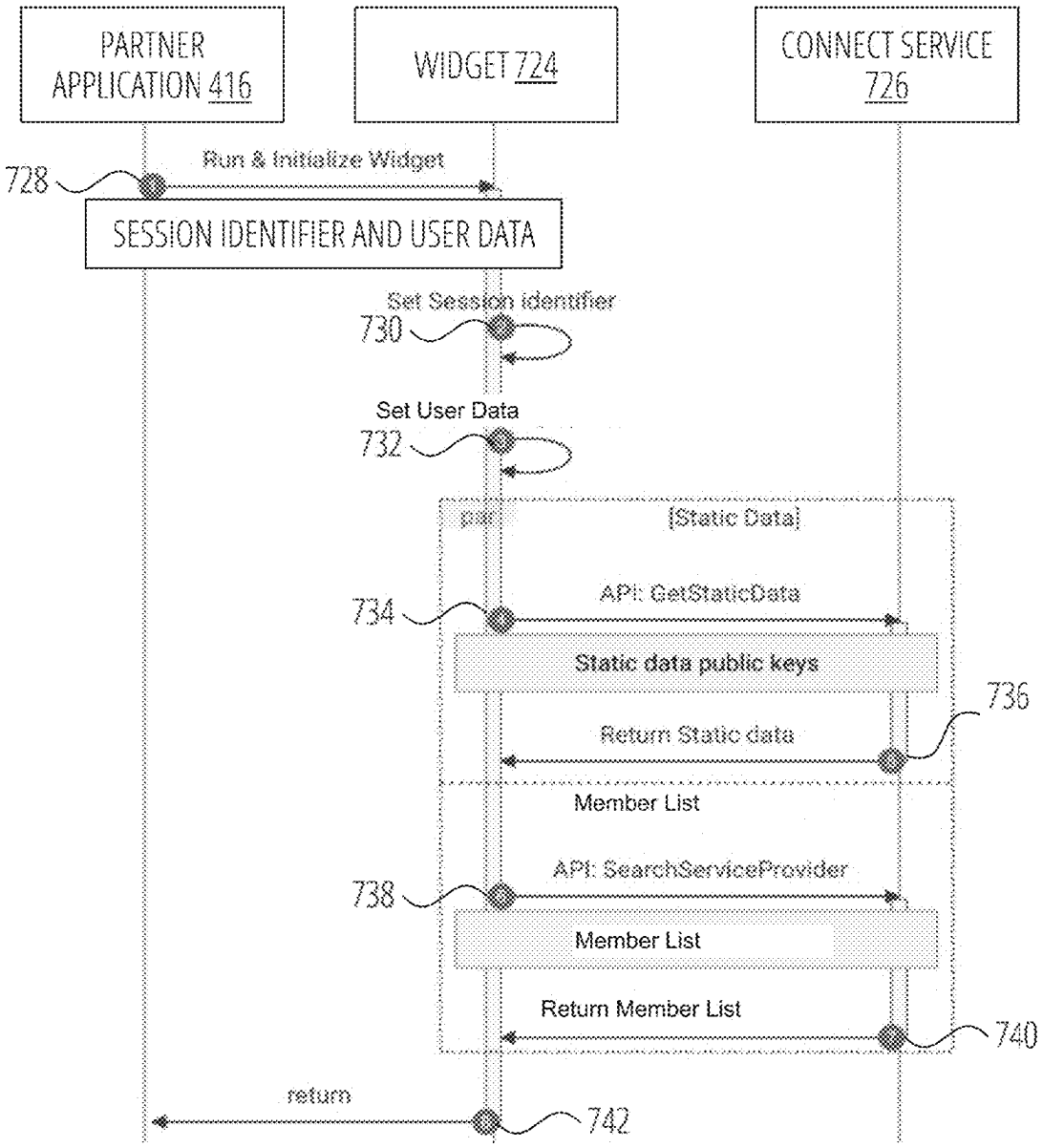

PARTNER APPLICATION 416
WIDGET 724
CONNECT SERVICE 726
728
Run & Initialize Widget
SESSION IDENTIFIER AND USER DATA
Set Session Identifier
730
Set User Data
732
[Static Data]
API: GetStaticData
734
Static data public keys
736
Return Static data
Member List
API: SearchServiceProvider
738
Member List
Return Member List
740
return
742

FIG. 7B

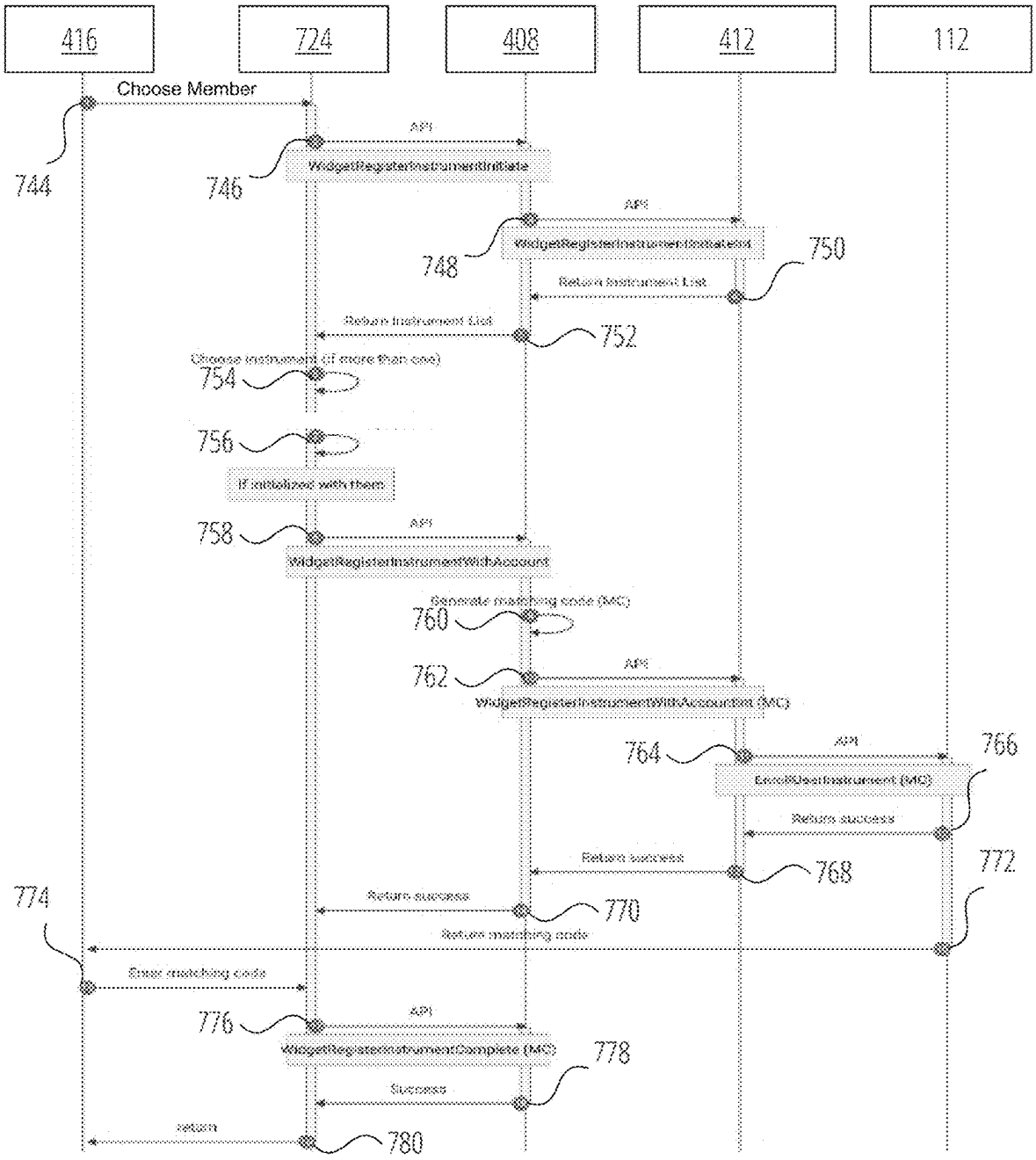

416
724
408
412
112
Choose Member
744
API
746
748
750
752
754
756
758
760
762
764
766
768
770
772
774
776
778
780
Return success
Return matching code
Error matching code
Success
return

FIG. 7C

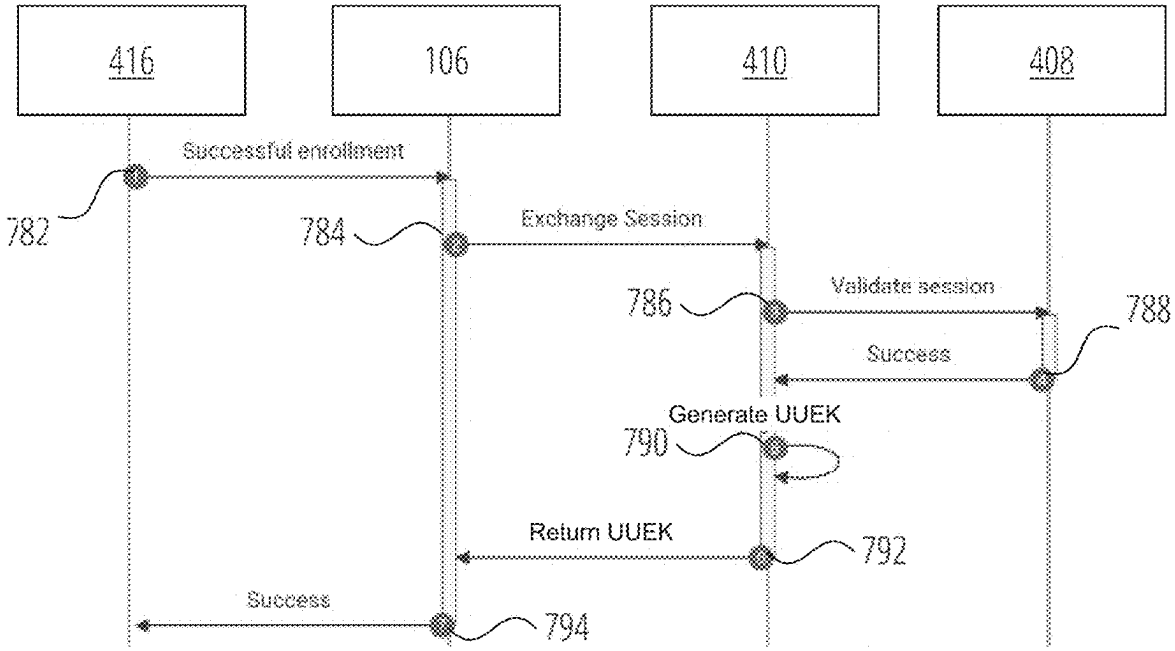

416
106
410
408
Successful enrollment
782
784
Exchange Session
786
Validate session
788
Success
Generate UUEK
790
Return UUEK
792
Success
794

FIG. 7D

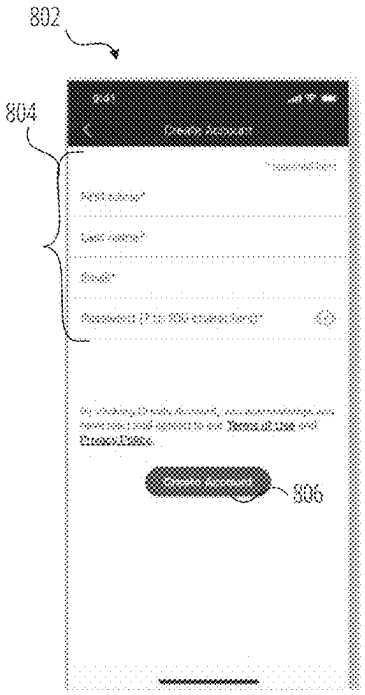


FIG. 8A

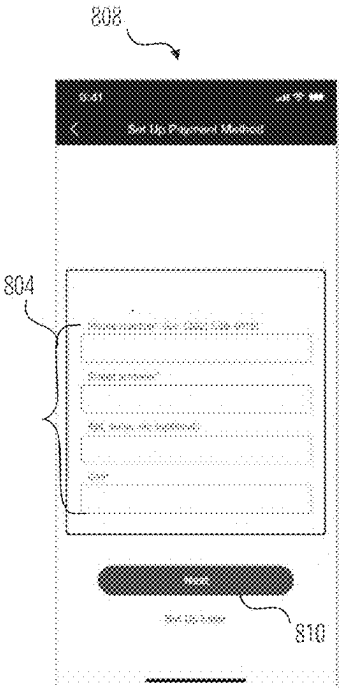


FIG. 8B

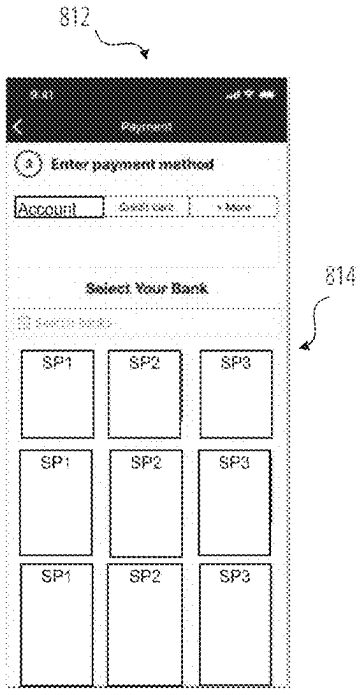


FIG. 8C

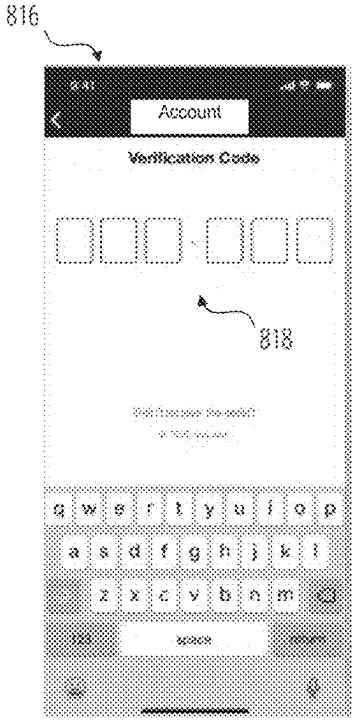


FIG. 8D

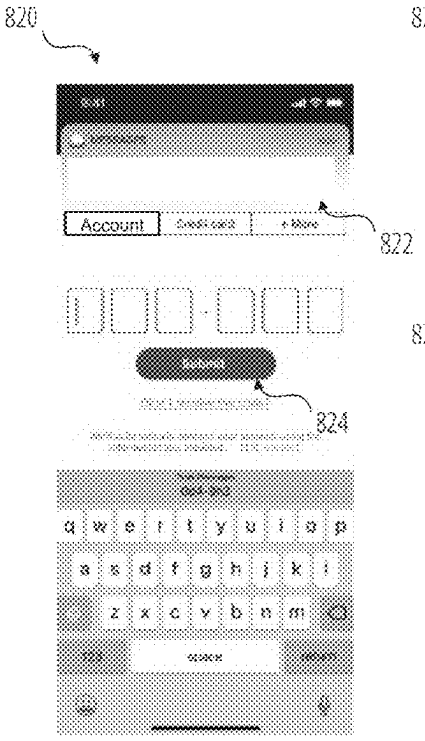


FIG. 8E

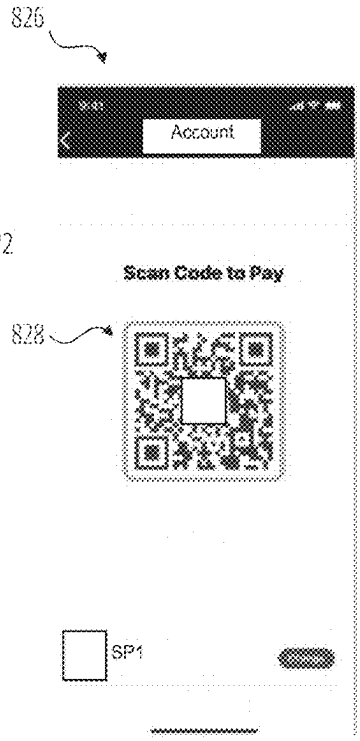


FIG. 8F

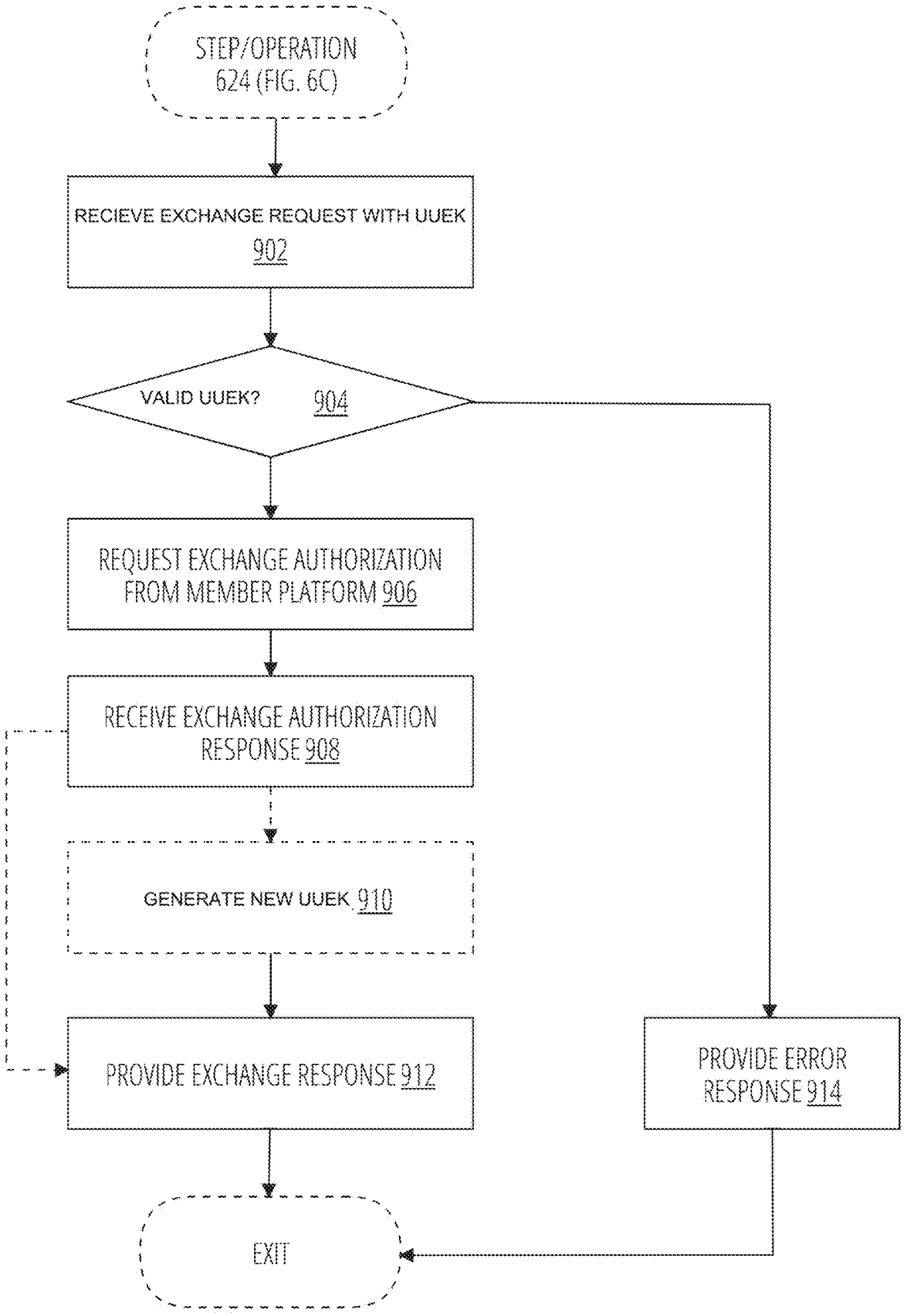

STEP/OPERATION 624 (FIG. 6C)
RECIEVE EXCHANGE REQUEST WITH UUEK 902
VALID UUEK? 904
REQUEST EXCHANGE AUTHORIZATION FROM MEMBER PLATFORM 906
RECEIVE EXCHANGE AUTHORIZATION RESPONSE 908
GENERATE NEW UUEK 910
PROVIDE EXCHANGE RESPONSE 912
PROVIDE ERROR RESPONSE 914
EXIT

FIG. 9

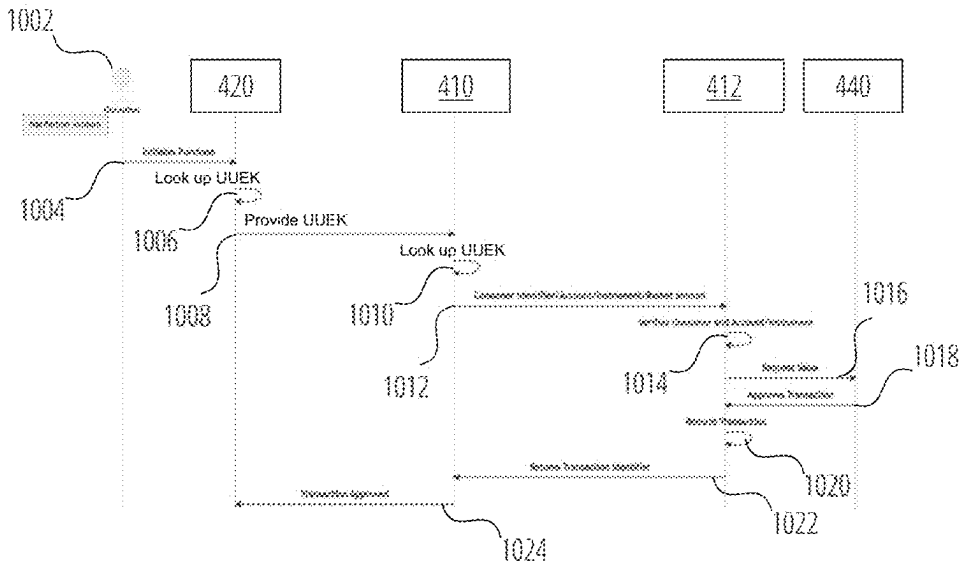

1002
420
410
412
440
1004
Look up UUEK
1006
Provide UUEK
1008
Look up UUEK
1010
1012
1014
1016
1018
1020
1022
1024

FIG. 10

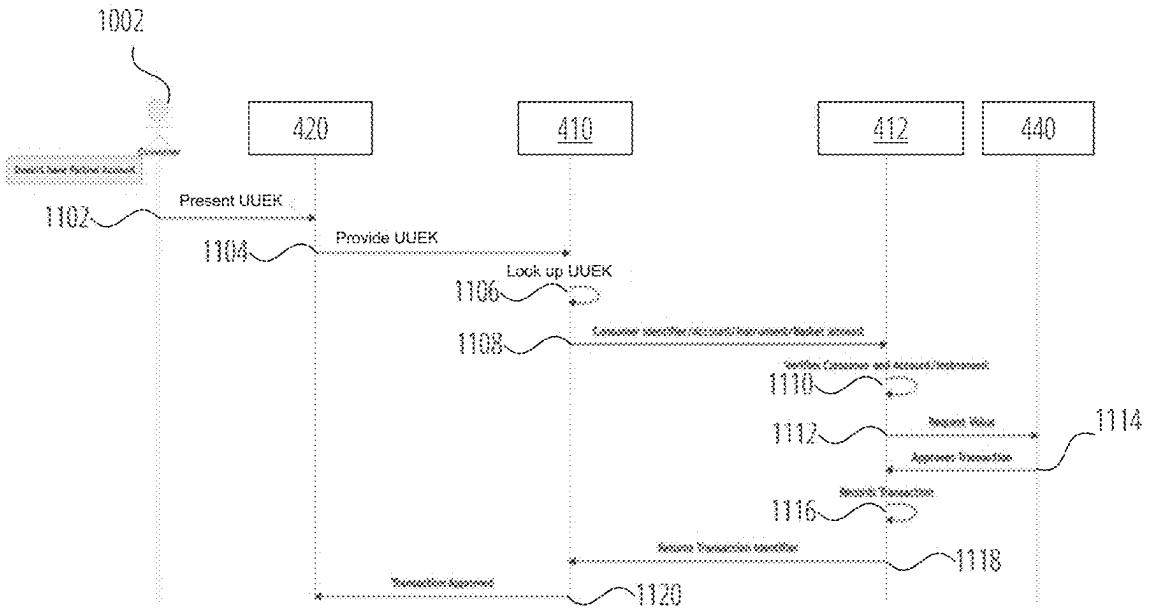

1002
420
410
412
440
Present UUEK
1102
Provide UUEK
1104
Look up UUEK
1106
1108
1110
1112
1114
1116
1118
1120

FIG. 11

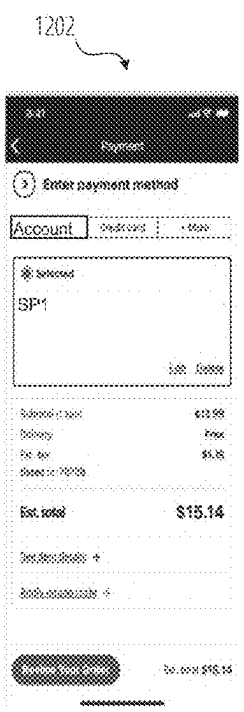


FIG. 12A

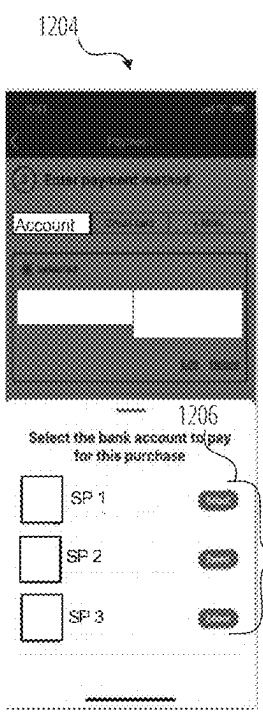


FIG. 12B

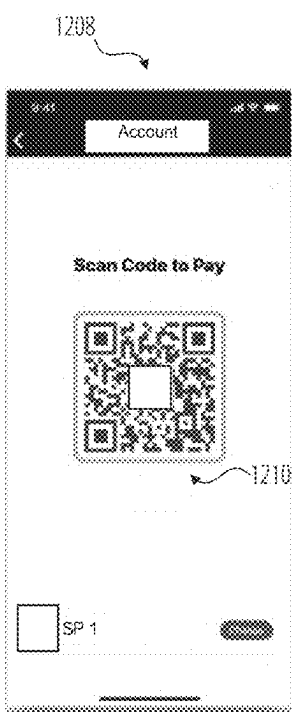


FIG. 12C

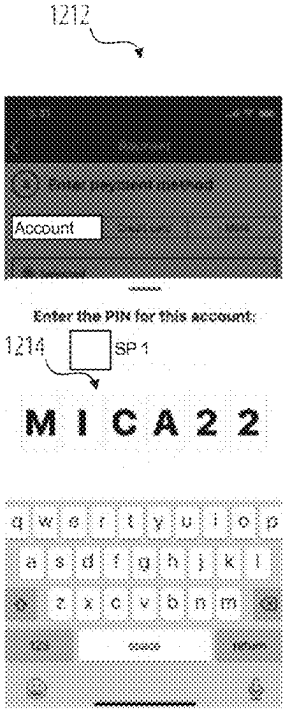


FIG. 12D

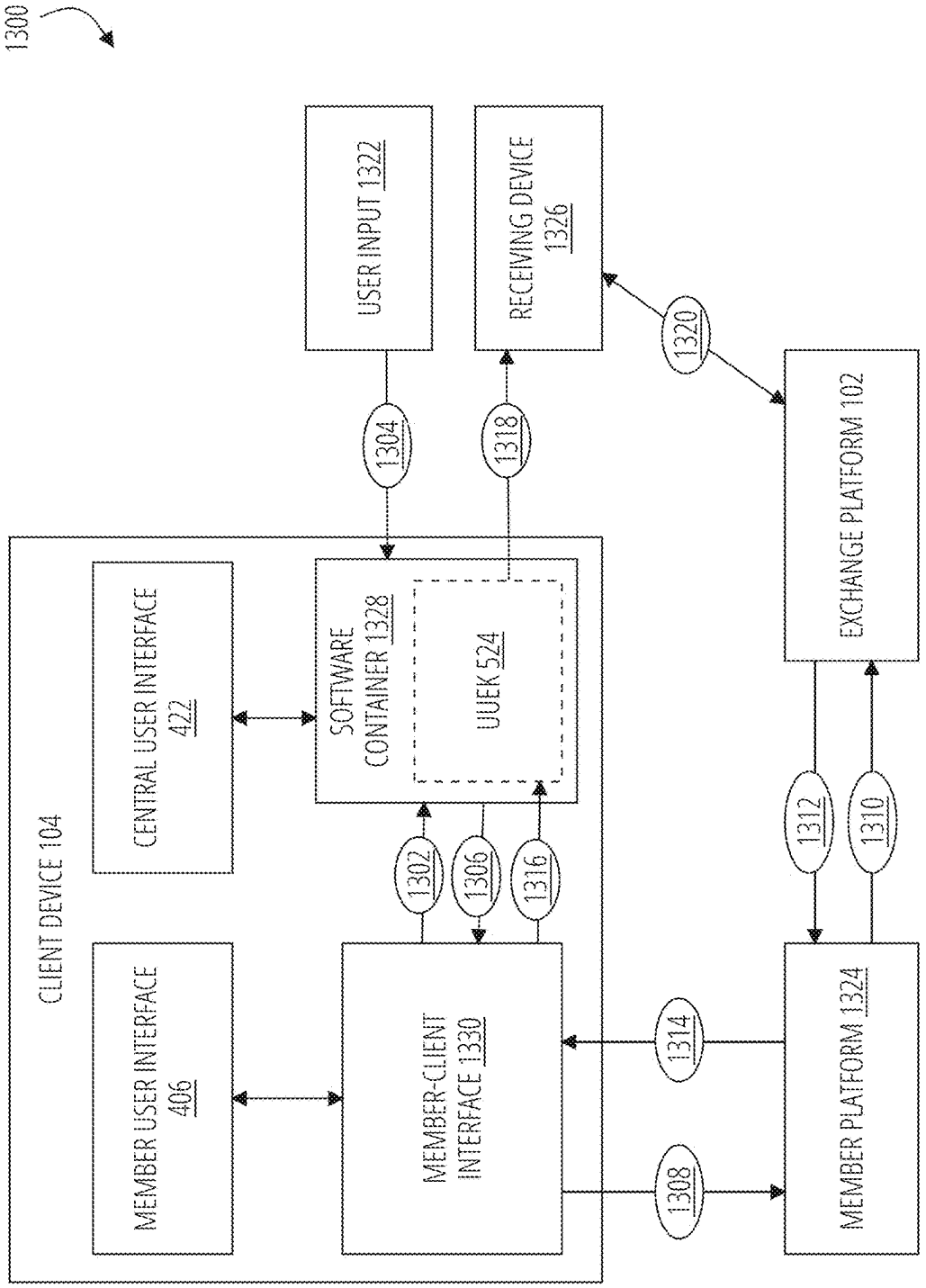

1300
USER INPUT 1322
RECEIVING DEVICE 1326
1304
1318
1320
CLIENT DEVICE 104
CENTRAL USER INTERFACE 422
SOFTWARE CONTAINER 1328
UUEK 524
EXCHANGE PLATFORM 102
1302
1306
1316
1312
1310
MEMBER USER INTERFACE 406
MEMBER-CLIENT INTERFACE 1330
1314
MEMBER PLATFORM 1324
1308

FIG. 13

CENTRALIZED CLIENT INTERFACE FOR FACILITATING CREDENTIAL-LESS NETWORK-BASED COMMUNICATION EXCHANGES BETWEEN PARTICIPATING MEMBER PLATFORMS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation-in-part of U.S. patent application Ser. No. 19/057,119, filed on Feb. 19, 2025, which is a continuation of U.S. patent application Ser. No. 18/329,107, filed on Jun. 5, 2023, and claims the benefit of U.S. Provisional Patent Application Ser. No. 63/370,280 filed on Aug. 3, 2022 and U.S. Provisional Patent Application Ser. No. 63/370,279 filed on Aug. 3, 2022. This application claims the benefit of U.S. Provisional Application Ser. No. 63/561,062 filed on Mar. 4, 2024. The contents of all the above identified applications are incorporated herein by reference in their entireties, including any figures, tables, drawings, and appendices.

TECHNOLOGICAL FIELD

[0002] Embodiments of the present disclosure generally relate to credential-less exchanges of value between multiple entities in a value system.

BACKGROUND

[0003] Various embodiments of the present disclosure address technical challenges related to network-based value transactions given limitations of existing transaction processing techniques and architectures. Existing processes for executing a transaction over a computing network rely on the use of persistent credentials, such as payment credentials (e.g., card numbers, usernames, passwords, bank routing numbers, account numbers, etc.) and their proxies, which expose recipients of the credentials to fraud, regulatory and compliance costs, and reputational risk. Moreover, due to the static nature of traditional credentials, users must accept risk of financial loss, damaged credit scores, identity theft, and other outcomes each time the user provides their credentials to enable a transaction. The inherent insecurity of persistent credentials is conventionally addressed using strict communication protocols, data governance procedures, and authentication schemes, each of which introduce additional technical problems by adding overhead and complicating network-based transactions without solving the root technical problem of data security.

[0004] For example, traditional service providers that manage user accounts may limit their exposure using disclaimers that prevent users from providing their credentials to certain third parties. This leads to network congestion as a limited number of approved parties are overloaded by requests across a population. Moreover, approved parties are required to enroll a user by obtaining sensitive, persistent credentials (e.g., username, passwords, routing/transit credentials, etc.) from the user and then subsequently manage a robust number of persistent credentials across a number of enrolled users. This presents a single attack vector for malicious parties to obtain sensitive user information for a population of users. To counter such attacks, traditional transaction processing entities are required to adopt costly, resource intensive, and robust data governance procedures and authentication schemes that are imperfect and still subject to infiltration.

[0005] Other techniques for addressing data security include limiting exchange communications, such as those for financial transactions, to strict messaging standards, such as ISO messaging standards, which are inflexible and, by design, unable to provide contextual data for transactions. Thus, such communication standards increase the network security at the cost of transaction functionality.

[0006] Various embodiments of the present disclosure make important contributions to various existing network-based value transaction processing techniques by addressing each of these technical challenges.

BRIEF SUMMARY

[0007] Various embodiments of the present disclosure disclose a secure intermediary computing platform and computing services that facilitate the credential-less execution of a value-based exchange that leverages UUEK (Universally Unique Ephemeral Key) to eliminate the use of persistent credentials. To do so, the intermediary computing platform may facilitate interactions between one or more member platforms to enroll a user instrument in a value exchange system that is powered by a new, ephemeral data structure referred to herein as an UUEK. Unlike conventional enrollment systems, the intermediary computing platform does not receive or rely upon persistent user or instrument credentials to enroll a user's instrument. The elimination of such credentials enables the use of new, more flexible, interfaces, such as application programming interfaces (APIs) described herein, that are leveraged by the intermediary computing platform to communicate with different network members to enroll a user's instrument, without exposing user credentials at any step in the process. Once enrolled, the intermediary computing platform may issue UUEKs to a member platform that may replace traditional, persistent credentials. The issued UUEKs are not reflective of persistent credentials or any other sensitive user or instrument information. Interfaces between a member platforms and the intermediary platform may allow (i) a user to present the issued UUEK (without explicit reference to a persistent credential) from a member platform to an intermediate platform, and (ii) the intermediary platform to map the issued UUEK to instrument keys for the same or another member platform and provide the instrument keys to the member platform to authorize a value-based exchange. In this way, network-based transactions may be authorized in a seamless process without exposing sensitive user or instrument information that may be susceptible to network attacks. Ultimately, this enables additional flexibility (e.g., through the use of new interfaces, etc.) and security (e.g., through the elimination of persistent credentials, etc.), while reducing computing power requirements and enabling significantly greater network throughput for exchange processing relative to traditional techniques.

[0008] In some embodiments, a method includes receiving, by a client device, user input to an icon corresponding to a software container within a central interface repository, wherein the software container corresponds to a member platform of a network of member platforms associated with an exchange platform; providing, using a member-client interface, a container activation request based on the user input; receiving, using the member-client interface, a uni-

versally unique ephemeral key (UUEK) for the software container, wherein the UUEK comprises an external representation of an exchange identifier that is issued to the member platform from the exchange platform; storing the UUEK within the software container for a temporary time period; and providing a message transmission that identifies the UUEK and initiates an exchange request from a receiving device, wherein the exchange request comprises the UUEK and is provided by the receiving device to the exchange platform.

[0009] In some embodiments, a computing system includes a memory and one or more processors communicatively coupled to the memory, the one or more processors configured to receive, by a client device, user input to an icon corresponding to a software container within a central interface repository, wherein the software container corresponds to a member platform of a network of member platforms associated with an exchange platform; provide, using a member-client interface, a container activation request based on the user input; receive, using the member-client interface, a universally unique ephemeral key (UUEK) for the software container, wherein the UUEK comprises an external representation of an exchange identifier that is issued to the member platform from the exchange platform; store the UUEK within the software container for a temporary time period; and provide a message transmission that identifies the UUEK and initiates an exchange request from a receiving device, wherein the exchange request comprises the UUEK and is provided by the receiving device to the exchange platform.

[0010] One or more non-transitory computer-readable storage media including instructions that, when executed by one or more processors, cause the one or more processors to receive, by a client device, user input to an icon corresponding to a software container within a central interface repository, wherein the software container corresponds to a member platform of a network of member platforms associated with an exchange platform; provide, using a member-client interface, a container activation request based on the user input; receive, using the member-client interface, a universally unique ephemeral key (UUEK) for the software container, wherein the UUEK comprises an external representation of an exchange identifier that is issued to the member platform from the exchange platform; store the UUEK within the software container for a temporary time period; and provide a message transmission that identifies the UUEK and initiates an exchange request from a receiving device, wherein the exchange request comprises the UUEK and is provided by the receiving device to the exchange platform.

BRIEF DESCRIPTION THE DRAWINGS

[0011] Having thus described the disclosure in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

[0012] FIG. **1** is an example diagram of a computing ecosystem in accordance with one or more embodiments of the present disclosure;

[0013] FIG. **2** is an example schematic of a computing platform in accordance with one or more embodiments of the present disclosure;

[0014] FIG. **3** is an example schematic of a client device in accordance with one or more embodiments of the present disclosure;

[0015] FIG. **4** is an example block diagram of an example credential-less value exchange system in accordance with one or more embodiments of the present disclosure;

[0016] FIG. **5** is an example data diagram for facilitating a credential-less exchange of value in accordance with one or more embodiments of the present disclosure;

[0017] FIGS. **6**A-C provide process flows for establishing a cross-entity relationship in accordance with one or more embodiments of the present disclosure;

[0018] FIGS. **7**A-D provide messaging flows for establishing a cross-entity relationship in accordance with one or more embodiments of the present disclosure;

[0019] FIG. **8**A-F provides example interfaces for establishing a cross-entity relationship in accordance with one or more embodiments of the present disclosure;

[0020] FIG. **9** provides a process flow for facilitating a credential-less exchange of value in accordance with one or more embodiments of the present disclosure;

[0021] FIG. **10** provides a first messaging flow for facilitating a credential-less exchange of value in accordance with one or more embodiments of the present disclosure;

[0022] FIG. **11** provides a second messaging flow for facilitating a credential-less exchange of value in accordance with one or more embodiments of the present disclosure;

[0023] FIG. **12**A-D provides example interfaces for facilitating a credential-less exchange of value in accordance with one or more embodiments of the present disclosure.

[0024] FIG. **13** is an example block diagram of an example centralized network key infrastructure in accordance with one or more embodiments of the present disclosure.

DETAILED DESCRIPTION OF SOME EXAMPLE EMBODIMENTS

[0025] Various embodiments of the present disclosure are described more fully hereinafter with reference to the accompanying drawings, in which some, but not all embodiments of the present disclosure are shown. Indeed, the present disclosure may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that the present disclosure will satisfy applicable legal requirements. The term "or" is used herein in both the alternative and conjunctive sense, unless otherwise indicated. The terms "illustrative" and "example" are used to be examples with no indication of quality level. Terms such as "computing," "determining," "generating," and/or similar words are used herein interchangeably to refer to the creation, modification, or identification of data. Further, "based at least in part on," "based at least on," "based upon," and/or similar words are used herein interchangeably in an open-ended manner such that they do not necessarily indicate being based at least in part only on or based solely on the referenced element or elements unless so indicated. Like numbers refer to like elements throughout.

I. GENERAL OVERVIEW AND TECHNICAL ADVANTAGES

[0026] Various embodiments of the present disclosure provide technical solutions for managing network-based exchanges. In various embodiments, an exchange platform

may be configured to facilitate a credential-less exchange of value between one or more member platforms. These exchanges may be facilitated in real time, without persistent credentials that may expose members to financial, legal, reputational, or other risks. Accordingly, in various embodiments, client devices may purchase, sell, and/or execute a value-based exchange, in real-time, over any network, without exposing sensitive information susceptible to network-based attacks.

[0027] Embodiments of the present disclosure provide improved instrument enrollment and exchange processing techniques that leverage interfaces and data transformation and encryption techniques to increase data security, while reducing computing resource expenditure requirements for safeguarding sensitive data through network communications. Some techniques of the present disclosure, for example, retrieve and transform data objects into unique data keys recognizable only to approved entities. The data keys may be provided and/or established by leveraging exchange interfaces between an exchange platform and other member platforms. Once established, the data keys may be mapped to sensitive credentials stored within a source platform (e.g., a service provider platform), without requiring the network transmission of the sensitive credentials. Future communications to facilitate a value-based exchange may replace traditional, persistent credentials with data keys to enable a source platform to identify persistent credentials and/or perform one or more actions for a particular instrument associated therewith. In this manner, the exchange platform may facilitate an exchange using keys (and/or other identifiers) that are not, by themselves, traceable to underlying sensitive information. This, in turn, allows the exchange platform to holistically track, facilitate, and distribute network-based communications without exposing a member to network attacks. In this way, the enrollment techniques of the present disclosure provide improved data and network security techniques that may be practically applied for a network-based exchange to securely enroll an instrument with an exchange platform.

[0028] In addition to the above, embodiments of the present disclosure present network-based exchange processing techniques for facilitating credential-less exchanges. To do so, some of the techniques of the present disclosure leverage new data structures, UUEKs, that may replace persistent credentials traditionally used to authorize a value-based exchange. Using the techniques of the present disclosure, a UUEK may be securely issued across member platforms to allow a user to execute a value-based exchange using an identifier that is recognizable to a single party, the exchange platform. The UUEK may be mapped to unique identifiers that may reference sensitive information without directly identifying the sensitive information. A unique identifier, for example, may reference a mapping only interpretable by a source platform, such that the identifiers are unusable by malicious parties unaffiliated with the exchange platform. In this manner, the exchange platform may distribute, track, and facilitate exchanges without exposing member platforms to data security risks. Moreover, the exchange platform may continuously update, modify, and/or redistribute UUEKs to the member platforms to continuously adapt UUEKs in real time. In this manner, the exchange platform may provide technical improvements to data and network security, while reducing the computing resource requirements (e.g., for securely encrypting persistent credentials) for facilitating value-based exchanges.

[0029] Example inventive and technologically advantageous embodiments of the present disclosure include (i) data transformation, mapping, and processing schemes for facilitating the network-based credential-less enrollment of users, (ii) exchange interfaces and network-based communication schemes for improving network security for cross-platform communications, and (iii) ephemeral data structures and data management techniques for distributing the ephemeral data structures to facilitate real-time, secure, and dynamic value-based exchanges.

II. EXAMPLE DEFINITIONS

[0030] In some embodiments, the term "exchange platform" refers to a computing entity that is configured to facilitate credential-less exchanges of value for one or more members in a network. The exchange platform may include one or more processing devices, memory devices, and/or the like that are physically and/or wirelessly coupled and configured to collectively (and/or individually) perform the one or more computing tasks for facilitating a value system agnostic exchange. In some examples, the exchange platform may include, define, and/or otherwise leverage one or more application programming interfaces (APIs) for facilitating communications (e.g., requests and responses, etc.) between a plurality of members. As described herein, the APIs may be leveraged to facilitate a secure exchange between one or more members in any value system.

[0031] In some embodiments, the term "member" refers to an entity that collaborates with the exchange platform to take part in an exchange of value. As examples, a member may include (i) a partner that utilizes the exchange platform to receive value, (ii) a service provider that utilizes the exchange platform to provide value, and/or (iii) both a partner and a service provider. As used herein, a member may refer to as a partner when it receives value through a value exchange and/or a service provider when it provides value through a value exchange. Thus, the same member may be a partner or a service provider depending on the role of the member in a value exchange. For example, a member may be a partner that receives value for a value exchange. The same member may be a service provider that provides value in another value exchange. In some examples, the same member may be both the partner and the service provider in the same value exchange, such that the member utilizes the exchange platform to provide and then receive value in a sole member value exchange.

[0032] In some embodiments, a member is a partner when it utilizes a service provided by a service provider. A partner may include any value seeking entity in any value system. As an example, in a financial value system, a partner may include a merchant (e.g., retailer, brick-and-mortar establishment, etc.) that may utilize a service provider, such as a financial institution, to access funds for a financial transaction. In addition, or alternatively, in an information value system, a partner may include a news publisher (e.g., a newspaper, media organization, etc.) that may utilize a service provider, such as a news agency (e.g., wire service, news service, etc.) to access information for an information transaction. As will be understood, the techniques of the present disclosure may be applied to any value system and the partner may include any value seeker for any respective value system.

[0033] In some embodiments, a member is a service provider when it provides a service for a partner. A service provider may include a source of value in any value system. As an example, in a financial value system, a service provider may include a financial institution (e.g., bank, currency exchange platform, credit union, etc.) that may provide access to funds for a financial transaction between one or more entities. In addition, or alternatively, in an information value system, a service provider may include a news agency (e.g., wire service, news service, etc.) that may source information for publication by a news publisher. As will be understood, the techniques of the present disclosure may be applied to any value system and the service provider may include any source of value for any respective value system.

[0034] In some embodiments, the term "member platform" refers to a computing entity corresponding to a member. The member platform entity may include a partner computing platform acting on behalf of a partner, a service provider computing platform acting on behalf of a service provider, and/or both. In some examples, a member platform may be both a partner platform and the service provider platform. For example, the same member platform may be configured to operate on behalf of a partner for one value exchange and a service provider for another value exchange. In some examples, the same member platform may be configured to operate on behalf of both a partner and service provider in a single value exchange. It is noted that the term member platform may refer to a partner platform, a service provider platform, or both and, in some examples, may depend on the role of the member platform in a value exchange (e.g., and/or one or more APIs utilized by the member platform in the value exchange).

[0035] In some embodiments, a partner platform is a computing entity that is configured to perform one or more operations on behalf of a partner. A partner platform, for example, may include one or more processing devices, memory devices, and/or the like that are physically and/or wirelessly coupled and configured to collectively (and/or individually) perform the one or more computing tasks for requesting value in a value system agnostic exchange. In some examples, a partner platform may include, define, and/or otherwise leverage one or more APIs for facilitating communications (e.g., requests and responses, etc.) with the exchange platform. In some examples, a partner platform may be configured to host one or more user-facing applications (e.g., a partner application, etc.) for interacting with one or more users.

[0036] In some embodiments, a service provider platform is a computing entity that is configured to perform one or more operations on behalf of a service provider. A service provider platform, for example, may include one or more processing devices, memory devices, and/or the like that are physically and/or wirelessly coupled and configured to collectively (and/or individually) perform the one or more computing tasks for providing value in a value system agnostic exchange. In some examples, a service provider platform may include, define, and/or otherwise leverage one or more APIs for facilitating communications (e.g., requests and responses, etc.) with the exchange platform. In some examples, a service provider platform may be configured to facilitate one or more service provider instruments. In some examples, the service provider platform may be configured to host one or more user-facing applications (e.g., a service provider application, etc.) for managing the one or more service provider instruments.

[0037] In some embodiments, the term "exchange interfaces" refers to a set of instructions for facilitating communications between the exchange platform and one or more member platforms and/or internal services. An exchange interface may include an API, file based interface, a message queue based interface, and/or the like. For instance, an exchange interface may include an API including, as examples, one or more simple object access protocol (SOAP) APIs, one or more remote procedure call (RPC) APIs, one or more websocket APIs, one or more representational state transfer (REST) APIs, and/or the like. In some embodiments, an exchange interface may include one or more RPC APIs, such as one or more gRPC APIs.

[0038] The exchange platform may include, define, and/or otherwise leverage one or more different exchange interfaces for facilitating communication with one or more external platforms, such as one or more member platforms (e.g., a partner platform, service provider platform, etc.). Each API may include a plurality of communication instructions, message definitions, and/or the like for exchanging requests and/or responses between the exchange platform and an entity that is taking part in a value exchange. By way of example, an exchange interface may include a partner API for facilitating communication with a partner platform and/or a service provider API for facilitating communication with a service provider platform.

[0039] In some embodiments, the term "partner interface" refers to an exchange interface for facilitating one or more communications between a partner platform and the exchange platform. The partner interface may define one or more communication instructions, message definitions, and/or the like for facilitating one or more request messages and/or response messages between a partner platform and the exchange platform. The partner interface, for example, may include an API that defines (i) requests to the exchange platform from a computing entity acting as a partner platform and/or (ii) requests from the exchange platform to the partner platform. For example, the partner interface may define one or more registration messages, session messages, transaction messages, and/or the like for facilitating an exchange of value for the partner. In some embodiments, the partner interface defines one or more identifiers for securely identifying one or more portions of a value exchange.

[0040] In some embodiments, the term "service provider interface" refers to an exchange interface for facilitating one or more communications between a service provider platform and the exchange platform. The service provider interface may define one or more communication instructions, message definitions, and/or the like for facilitating one or more request messages and/or response messages between a service provider platform and the exchange platform. The service provider interface, for example, may include an API that defines (i) requests to the exchange platform from a computing entity acting as a service provider platform and/or (ii) requests from the exchange platform to the service provider platform. The service provider interface, for example, may define one or more registration messages, session messages, transaction messages, and/or the like for facilitating an exchange of value using a service provider instrument. In some embodiments, the service

provider interface defines one or more identifiers for securely identifying one or more portions of a value exchange.

[0041] In some embodiments, the term "entity partition" refers to a unique identifier for a computing entity. An entity partition may include a unique number, alpha-numeric, and/or the like that represents a particular computing entity. An entity partition, for example, may include a member partition that represents a member platform, a service provider partition that represents a service provider platform, a partner partition that represents a partner platform, and/or the like.

[0042] In some embodiments, the term "service provider partition" refers to a unique identifier for a service provider and/or service provider platform of a service provider. The service provider partition may include a sequence of numeric, alpha-numeric, any/or any other characters or symbols that are representative of a service provider that is associated (e.g., onboarded, registered, etc.) with the exchange platform. The exchange platform, for example, may include a plurality of service provider partitions that respectively identify a service provider platform that is affiliated with (e.g., onboarded with, registered with, etc.) the exchange platform. Each service provider partition may represent a service provider platform that has configured one or more exchange platform software development kits (SDKs), and/or like for implementing a service provider interface of the exchange platform.

[0043] In some embodiments, a "partner partition" refers to a unique identifier for a partner and/or a partner platform of a partner. The partner partition may include a sequence of numeric, alpha-numeric, any/or any other characters or symbols that are representative of a partner that is associated with the exchange platform. The exchange platform, for example, may include a plurality of partner partitions that respectively identify a partner platform that is affiliated with (e.g., onboarded with, registered with, etc.) the exchange platform. Each partner partition may represent a partner platform that has configured one or more exchange SDKs, and/or the like for implementing a partner interface of the exchange platform.

[0044] In some embodiments, the term "user-facing application" refers to a computer program hosted by a computing entity for facilitating one or more user interactions. A user-facing application may include software (e.g., computer readable instructions, etc.) designed to perform one or more computing tasks for a computing entity, such as a member platform. For instance, a user-facing application may facilitate communication between a member and a user. As examples, the user-facing application may be configured to present one or more user interfaces for interacting with a user on behalf of a member. In some examples, the user-facing application may be configured to receive user input (e.g., via one or more user interfaces) to receive information from a user.

[0045] In some embodiments, a user-facing application is a partner application that is hosted by the partner platform (e.g., a member platform acting as a partner for a particular exchange, etc.) to facilitate functions for a partner. A partner application may include software (e.g., computer readable instructions, etc.) designed to perform one or more computing tasks for a partner. For instance, a partner application may be configured to present one or more user interfaces for interacting (e.g., browsing, purchasing, reviewing, etc.) with one or more products offered by a retail-based partner, one or more units of information offered by an information-based partner, and/or the like. In some examples, the partner application may be configured to receive user input (e.g., via one or more user interfaces) to receive information from a user.

[0046] In some embodiments, a user-facing application is a service provider application that is hosted by the service provider platform (e.g., a member platform acting as a service provider for a particular exchange, etc.) to facilitate functions for the service provider. A service provider application may include software (e.g., computer readable instructions, etc.) designed to perform one or more computing tasks for a service provider. For instance, a service provider application may be configured to present one or more user interfaces for interacting (e.g., reviewing, managing, auditing, enrolling, etc.) with one or more service provider instruments facilitated by the service provider. By way of example, in a financial value system, the service provider application may enable access to a bank account, brokerage account, line of credit, and/or the like, to manage funds, assets, and/or the like, handled by the respective accounts. In some examples, the service provider application may be configured to receive user input (e.g., via the one or more user interfaces) to receive information, authorizations, and/or the like from a user.

[0047] In some embodiments, the term "service provider instrument" refers to a mechanism leveraged by a service provider for providing value on behalf of a particular user. The service provider instrument may depend on the value system and/or service provider. In some examples, the service provider instrument may include an account with the service provider. For example, in a financial value system, a service provider instrument may include a bank account (e.g., checking, saving, etc.), brokerage account, line of credit, and/or the like. In an information value system, the service provider instrument may include a subscriber account, and/or the like. In some examples, a service provider instrument may include a virtual instrument hosted by a service provider platform.

[0048] In some embodiments, the term "instrument data object" refers to a data entity that represents a service provider instrument. The instrument data object may include one or more instrument identifiers and/or one or more instrument attributes. In some examples, the one or more instrument identifiers and/or one or more instrument attributes may be based on a type of instrument data object. By way of example, a service provider instrument may be represented in a member platform as a member instrument data object. In addition, or alternatively, the service provider instrument may be independently represented by a system instrument data object in an exchange platform. In some examples, the member instrument data object and the system instrument data object may include one or more of the same one or more instrument identifiers and/or one or more instrument attributes. By way of example, a member platform may register a plurality of service provider instruments with an exchange platform. During registration, the member platform may provide one or more of the instrument identifiers and/or instrument attributes and, in some examples, the exchange platform may return another identifier.

[0049] In some embodiments, the member instrument data object is an internal representation of a service provider instrument within a member platform. The member instru-

ment data object may include one or more instrument identifiers, such as a member instrument identifier, an instrument key from the exchange platform, and/or a user identifier. The user identifier, for example, may include a member user identifier. In addition, or alternatively, the member instrument data object may include one or more instrument attributes, such as an instrument type (e.g., credit-based instrument, debit-based instrument, information-based instrument, etc.), an instrument representation, and/or one or more contextual attributes. In some examples, the contextual attributes may depend on the value system. For instance, in a financial value system, the one or more contextual attributes may be indicative of a (i) currency associated with the service provider instrument, (ii) an asset availability (e.g., a balance, coverage, etc.) of the service provider instrument, (iii) one or more previous transactions with the service provider instrument, and/or the like.

[0050] In some embodiments, the system instrument data object is an external representation of a service provider instrument within the exchange platform. The system instrument data object may include one or more instrument identifiers, such as an instrument reference for a member platform, a system instrument identifier, and/or a user identifier. The user identifier, for example, may include a system user identifier. In addition, or alternatively, the system instrument data object may include one or more instrument attributes, such as an instrument type (e.g., credit-based instrument, debit-based instrument, information-based instrument, etc.), an instrument representation, and/or one or more contextual attributes. In some examples, the contextual attributes may depend on the value system. For instance, in a financial value system, the one or more contextual attributes may be indicative of a currency associated with the service provider instrument.

[0051] In some embodiments, the term "instrument identifier" refers to any representation of a service provider instrument. The instrument identifier may include an instrument identifier, instrument reference, instrument key, and/or the like, as described herein.

[0052] In some embodiments, the term "member instrument identifier" refers to a unique identifier for representing a service provider instrument within a member platform. The member instrument identifier, for example, may include a sequence of numeric, alpha-numeric, any/or any other characters or symbols that represent a service provider instrument to a service provider platform.

[0053] In some embodiments, the term "instrument reference" refers to a unique identifier for referencing a member instrument identifier. The instrument reference, for example, may be generated and/or provided by a member platform to an exchange platform to allow the exchange platform to reference an instrument maintained at the member platform. In some examples, the instrument reference is the same value as the member instrument identifier. In some examples, the instrument reference is a different value that is mapped to the member instrument identifier.

[0054] In some embodiments, the term "system instrument identifier" refers to a unique identifier for representing a service provider instrument within an exchange platform. The system instrument identifier, for example, may include a sequence of numeric, alpha-numeric, any/or any other characters or symbols that represent a service provider instrument to an exchange platform. In some examples, the system instrument identifier may include a UUID.

[0055] In some embodiments, the term "instrument key" refers to a unique identifier for referencing a system instrument identifier. The instrument key, for example, may be generated and/or provided by the exchange platform during a registration process of an instrument with the exchange platform. In some examples, the instrument key may include a wrapped system instrument identifier. For example, the instrument key may include a string of alpha-numeric characters that are formatted according to a key format established by the exchange platform (and/or one or more APIs thereof). The key format may include any number of characters, such as fifty characters or more. In some examples, the characters may be case sensitive. A first portion of the characters (e.g., the first six characters) may be reserved as a partition for identifying an entity associated with the key. For an instrument key, the partition may include a service provider partition. A second portion of the characters may identify the system instrument identifier. The key formats described herein may include one or more different portions, each of which may be arranged in any order.

[0056] In some embodiments, the term "instrument representation" refers to a unique identifier for representing a service provider instrument to a user. The instrument representation, for example, may include a sequence of numeric, alpha-numeric, any/or any other characters or symbols that are outwardly representative of a service provider instrument. The format and/or value of an instrument representation may be based at least in part on the type of service provider and/or service provider instrument. For instance, in a financial value system, an instrument reference may include a portion (e.g., the last four digits, etc.) of persistent credentials, such as an account number (e.g., debit account, credit account, etc.), a financial account name, and/or the like. As another example, in an information value system, an instrument reference may include a portion (e.g., one or more digits, alpha-numeric characters, etc.) of persistent credentials, such as a subscription account, and/or the like. For instance, the instrument representation may include a derivative of persistent credentials that may only allow entities with prior knowledge of the persistent credentials to identify the persistent credentials using the instrument representation. As another example, the instrument representation may include an instrument nickname that is assigned and thereafter recognized by a user.

[0057] In some embodiments, the term "user data object" refers to a data entity that represents a user that interacts with a member platform and/or the exchange platform. A user, for example, may include an entity (e.g., person, organization, group, etc.) that engages in an exchange of value governed by the exchange platform. In some examples, the user may indirectly cooperate with the exchange platform by creating a user account with a registered service provider, registering (and/or giving permission to register) a service provider instrument, and/or the like. In some examples, the exchange platform may act on the user's behalf without the user directly engaging with the exchange platform. For example, the exchange platform may act as a hidden intermediary between a user-facing application and a user's service provider instrument.

[0058] In some embodiments, a user data object includes one or more user identifiers and/or one or more user attributes. In some examples, the one or more user identifiers and/or one or more user attributes may be based on a type of user data object. By way of example, a user may be

represented in a member platform as a member user data object. In addition, or alternatively, the user may be independently represented by a system user data object in an exchange platform. In some examples, the member user data object and the system user data object may include one or more of the same one or more user identifiers and/or user attributes. By way of example, a member platform may register a plurality of users with an exchange platform. During registration, the member platform may provide one or more of the user identifiers and/or user attributes and, in some examples, the exchange platform may return another identifier.

[0059] In some embodiments, the member user data object is an internal representation of a user within a member platform. The member instrument data object may include one or more user identifiers, such as a member user identifier, a user key from the exchange platform, and/or the like. In addition, or alternatively, the member user data object may include one or more user attributes. The one or more user attributes may be indicative of one or more contextual characteristics for a user. In some examples, the user attributes may be indicative of one or more identifiable characteristics for a user. By way of example, the user attributes may be indicative of a user's first name, last name, email, physical address (e.g., one or more of a street, locality, region, postal code, country, etc.), birthday (e.g., a birth date, an age band, etc.), phone number, and/or the like. In some examples, the user attributes may include encrypted, hashed, and/or otherwise secured representations of the identifiable characteristics for a user. For instance, the user attributes may include one or more hashed identifiers for the user and/or the like.

[0060] In some embodiments, the system user data object is an external representation of a member's user within the exchange platform. The system user data object may include one or more user identifiers, such as an user reference for a member platform, a system user identifier, and/or the like. In addition, or alternatively, the system user data object may include one or more user attributes, such as those described herein. By way of example, a member platform may register a user with the exchange platform. During registration, the member platform may provide the user reference for the user and/or the one or more user attributes. In some examples, the user attributes may include hashed and/or encrypted identifiers for the user.

[0061] In some embodiments, the term "user identifier" refers to a unique identifier for a user involved in a value-based exchange. A user identifier may include a sequence of numeric, alpha-numeric, any/or any other characters or symbols that are representative of a user of the exchange platform and/or member platform. In some examples, a user identifier may include a user reference, a user key, a system user identifier, a member user identifier, and/or the like.

[0062] In some embodiments, the term "system user identifier" refers to a unique identifier for representing a user within an exchange platform. The system user identifier, for example, may include a sequence of numeric, alpha-numeric, any/or any other characters or symbols that represent a user to an exchange platform. In some examples, the system user identifier may include a UUID specific to a particular user.

[0063] In some embodiments, the term "member user identifier" refers to a unique identifier for representing a user within a member platform. The member user identifier, for example, may include a sequence of numeric, alpha-numeric, any/or any other characters or symbols that represent a user to a service provider platform.

[0064] In some embodiments, the term "user reference" refers to a unique identifier for referencing a member user identifier. The user reference, for example, may be generated and/or provided by a member platform to an exchange platform to allow the exchange platform to reference a user associated with the member platform. In some examples, the user reference is the same value as the member user identifier. In some examples, the user reference is a different value that is mapped to the member user identifier.

[0065] In some embodiments, the term "user key" refers to a unique identifier for referencing a system user identifier. The user key, for example, may be generated and/or provided by the exchange platform during a registration process of a user with the exchange platform. In some examples, the user key may include a wrapped system user identifier. For example, the user key may include a string of alpha-numeric characters that are formatted according to a key format established by the exchange platform (and/or one or more APIs thereof). The key format, for example, may include a first portion of the characters (e.g., the first six characters) that may be reserved as a partition for identifying an entity (e.g., a member, etc.) associated with the key. For example, for a user key, the partition may include a service provider partition and/or a partner partition. A second portion of the characters may identify the system user identifier.

[0066] In some embodiments, the term "exchange data object" refers to a data entity that represents an authorized value exchange between one or more members associated with the exchange platform. In some examples, the exchange data object may include one or more identifiers and/or one or more exchange attributes. For example, the one or more identifiers and/or one or more exchange attributes may be based on a type of exchange data object. By way of example, an exchange may be represented in a member platform as a member exchange data object. In addition, or alternatively, the exchange may be independently represented by a system exchange data object in an exchange platform. In some examples, the member exchange data object and the system exchange data object may include one or more of the same one or more identifiers and/or exchange attributes. By way of example, using some of the techniques of the present disclosure, the exchange platform may issue one or more unique identifiers to a member platform that may be used to authorize a value exchange.

[0067] In some embodiments, the system exchange data object is an internal representation of a value exchange that is intermediated using the exchange platform. In some examples, the system exchange data object may include one or more different identifiers and/or exchange attributes depending on the role of the system exchange data object in a value-based exchange.

[0068] For example, a system exchange data object may include a service provider-specific exchange data object that corresponds to a service provider platform. The service provider-specific exchange data object may include one or more identifiers, such as an exchange identifier, a system user identifier, a system instrument identifier, an UUEK, and/or the like. In addition, or alternatively, the service provider-specific exchange data object may include one or

more exchange attributes, such as an expiration date, a currency (e.g., for a financial value system, etc.), and/or the like.

[0069] In addition, or alternatively, the system exchange data object may include a partner-specific exchange data object that corresponds to a partner platform. The partner-specific exchange data object may include one or more identifiers, such as an exchange identifier, an instrument key, an UUEK, a member instrument reference (e.g., a partner-specific instrument reference, etc.), and/or the like. In addition, or alternatively, the partner-specific exchange data object may include one or more exchange attributes, such as an expiration date, a currency (e.g., for a financial value system, etc.), an instrument type, a previous UUEK identifier, and/or the like. In some embodiments, the member exchange data object is an external representation of a value exchange that is intermediated using the exchange platform. The member exchange data object may include one or more identifiers, such as a member exchange identifier, a member instrument identifier, an UUEK from the exchange platform, and/or the like.

[0070] In some embodiments, the term "exchange identifier" refers to a unique identifier for an exchange of value using the exchange platform. The exchange identifier may include a sequence of numeric, alpha-numeric, any/or any other characters or symbols that are representative of at least a user and/or a service provider instrument. In some examples, the unique exchange identifier may include a universally unique identifier (UUID) that may be mapped (e.g., through a series of identifiers, etc.) to a user, a service provider instrument, and/or a member registered with the exchange platform. In some examples, the exchange identifier may be randomly generated using one or more UUID generators. For instance, the exchange identifier may include a randomized sixteen bytes of information generated in accordance with one or more UUID formatting standards, such as UUID v4, and/or the like. Therefore, while the exchange identifier may be leveraged by the exchange platform and/or a member platform for one or more functions, the same exchange identifier will be useless to external parties without a prior association between the exchange identifier and one or more other identifiers. In some examples, the exchange identifier may be externally represented by a UUEK.

[0071] In some embodiments, an "universally unique ephemeral key" or "UUEK" refers to an external representation of an exchange identifier that may be issued (e.g., in place of the service provider exchange identifier and/or a partner exchange identifier) to an external entity, such as a user, partner, and/or service provider, to initiate a transaction using the exchange platform. To do so, the UUEK may be generated and issued by the exchange platform to the external entity. Each UUEK may include a plurality of values (e.g., up to fifty characters and/or more that may be case sensitive) that represent one or more aspects of a transaction. For example, the plurality of values may be indicative of an exchange identifier, a partition (e.g., identifying the recipient of the UUEK, etc.), an identifier type, and/or one or more flags. By way of example, an UUEK may include a partner-specific UUEK and/or a service provider-specific UUEK. The partner-specific UUEK may be correlated to a partner-specific exchange data object, whereas a service provider-specific UUEK may be correlated to a service provider-specific exchange data object, as described herein.

[0072] By way of example, an UUEK may be generated in accordance with a key format. The key format may include a plurality of characters including, for example, fifty characters or more that may be case sensitive. A first portion of the characters (e.g., the first six characters) may be reserved as a partition for identifying a recipient of the UUEK. The partition, for example, may include a partner partition, a service provider partition, and/or any other member partition. By way of example, an UUEK may be issued in response to a request from an authorized member, such as an affiliated partner and/or service provider.

[0073] In addition, or alternatively, at least one character (e.g., a seventh character) of the key format may identify a format of the UUEK. At least another character (e.g., an eighth character) may identify a type of UUEK. In some examples, a second portion of the characters may identify an exchange identifier (e.g., a group of twenty-two characters following the eighth character). A third portion of characters may be reserved (e.g., a group of twenty characters following the first portion of characters). An example representation is provided below:

[0074] pppppFiGGGGGGGGGGGGGGGGGGGGG-Grrrrrrrrrrrrrrrrrr

where p represents a partition character, F represents a format character, i represents an identifier type character, G represents an exchange identifier, and r represents a reserved character. The key format allows for 9.8×10 to the 84 unique permutations, which is more than the number of atoms in the known observable universe. This enables the generation and distribution of new UUEKs on-demand without compromising the security of underlying data to which the UUEKs may be mapped, such as identifiers for a user, an instrument, and/or any other potentially sensitive information. The key formats described herein may include one or more different portions, each of which may be arranged in any order.

[0075] In some embodiments, the term "session identifier" refers to a unique identifier for identifying a series of related message exchanges between the exchange platform and an external platform.

[0076] In some embodiments, the term "matching code" refers to a session-unique identifier for authorizing an enrollment session between one or more entities. The matching code, for example, may include a sequence of numeric, alpha-numeric, and/or the like characters that may be provided to multiple entities to ensure that each of the entities is involved in the same communication sequence. By way of example, a matching code may include a sequence of eight characters that may be generated by the exchange platform, provided to a service provider platform, and then received from a partner platform to ensure that the exchange platform, the service provider platform, and the partner platform are each interacting with the same end user (e.g., by comparing a received matching code to a generated matching code as described herein).

III. COMPUTER PROGRAM PRODUCTS, METHODS, AND COMPUTING ENTITIES

[0077] Embodiments of the present disclosure may be implemented in various ways, including as computer program products that comprise articles of manufacture. Such computer program products may include one or more soft-

ware components including, for example, software objects, methods, data structures, or the like. A software component may be coded in any of a variety of programming languages. An illustrative programming language may be a lower-level programming language such as an assembly language associated with a particular hardware architecture and/or operating system platform. A software component comprising assembly language instructions may require conversion into executable machine code by an assembler prior to execution by the hardware architecture and/or platform. Another example programming language may be a higher-level programming language that may be portable across multiple architectures. A software component comprising higher-level programming language instructions may require conversion to an intermediate representation by an interpreter or a compiler prior to execution.

[0078] Other examples of programming languages include, but are not limited to, a macro language, a shell or command language, a job control language, a script language, a database query or search language, and/or a report writing language. In one or more example embodiments, a software component comprising instructions in one of the foregoing examples of programming languages may be executed directly by an operating system or other software component without having to be first transformed into another form. A software component may be stored as a file or other data storage construct. Software components of a similar type or functionally related may be stored together such as, for example, in a particular directory, folder, or library. Software components may be static (e.g., pre-established or fixed) or dynamic (e.g., created or modified at the time of execution).

[0079] A computer program product may include a non-transitory computer-readable storage medium storing applications, programs, program modules, scripts, source code, program code, object code, byte code, compiled code, interpreted code, machine code, executable instructions, and/or the like (also referred to herein as executable instructions, instructions for execution, computer program products, program code, and/or similar terms used herein interchangeably). Such non-transitory computer-readable storage media include all computer-readable media (including volatile and non-volatile media).

[0080] In one embodiment, a non-volatile computer-readable storage medium may include a floppy disk, flexible disk, hard disk, solid-state storage (SSS) (e.g., a solid state drive (SSD), solid state card (SSC), solid state module (SSM), enterprise flash drive, magnetic tape, or any other non-transitory magnetic medium, and/or the like. A non-volatile computer-readable storage medium may also include a punch card, paper tape, optical mark sheet (or any other physical medium with patterns of holes or other optically recognizable indicia), compact disc read only memory (CD-ROM), compact disc-rewritable (CD-RW), digital versatile disc (DVD), Blu-ray disc (BD), any other non-transitory optical medium, and/or the like. Such a non-volatile computer-readable storage medium may also include read-only memory (ROM), programmable read-only memory (PROM), erasable programmable read-only memory (EPROM), electrically erasable programmable read-only memory (EEPROM), flash memory (e.g., Serial, NAND, NOR, and/or the like), multimedia memory cards (MMC), secure digital (SD) memory cards, SmartMedia cards, CompactFlash (CF) cards, Memory Sticks, and/or the like. Further, a non-volatile computer-readable storage medium may also include conductive-bridging random access memory (CBRAM), phase-change random access memory (PRAM), ferroelectric random-access memory (Fe-RAM), non-volatile random-access memory (NVRAM), magnetoresistive random-access memory (MRAM), resistive random-access memory (RRAM), Silicon-Oxide-Nitride-Oxide-Silicon memory (SONOS), floating junction gate random access memory (FJG RAM), Millipede memory, racetrack memory, and/or the like.

[0081] In one embodiment, a volatile computer-readable storage medium may include random access memory (RAM), dynamic random access memory (DRAM), static random access memory (SRAM), fast page mode dynamic random access memory (FPM DRAM), extended data-out dynamic random access memory (EDO DRAM), synchronous dynamic random access memory (SDRAM), double data rate synchronous dynamic random access memory (DDR SDRAM), double data rate type two synchronous dynamic random access memory (DDR2 SDRAM), double data rate type three synchronous dynamic random access memory (DDR3 SDRAM), Rambus dynamic random access memory (RDRAM), Twin Transistor RAM (TTRAM), Thyristor RAM (T-RAM), Zero-capacitor (Z-RAM), Rambus in-line memory module (RIMM), dual in-line memory module (DIMM), single in-line memory module (SIMM), video random access memory (VRAM), cache memory (including various levels), flash memory, register memory, and/or the like. It will be appreciated that where embodiments are described to use a computer-readable storage medium, other types of computer-readable storage media may be substituted for or used in addition to the computer-readable storage media described above.

[0082] As should be appreciated, various embodiments of the present disclosure may also be implemented as methods, apparatus, systems, computing devices, computing entities, and/or the like. As such, embodiments of the present disclosure may take the form of a data structure, apparatus, system, computing device, computing entity, and/or the like executing instructions stored on a computer-readable storage medium to perform certain steps or operations. Thus, embodiments of the present disclosure may also take the form of an entirely hardware embodiment, an entirely computer program product embodiment, and/or an embodiment that comprises combination of computer program products and hardware performing certain steps or operations.

[0083] Embodiments of the present disclosure are described below with reference to block diagrams, flowchart illustrations, messaging flows, and other representations of data, operations, and messaging schemes. It should be understood that each block of the block, arrow, and/or the like of the diagrams, flowchart illustrations, etc. may be implemented in the form of a computer program product, an entirely hardware embodiment, a combination of hardware and computer program products, and/or apparatus, systems, computing devices, computing entities, and/or the like carrying out instructions, operations, steps, and similar words used interchangeably (e.g., the executable instructions, instructions for execution, program code, and/or the like) on a computer-readable storage medium for execution. For example, retrieval, loading, and execution of code may be performed sequentially such that one instruction is retrieved, loaded, and executed at a time. In some example embodiments, retrieval, loading, and/or execution may be per-

formed in parallel such that multiple instructions are retrieved, loaded, and/or executed together. Thus, such embodiments may produce specifically-configured machines performing the steps or operations specified in the representations of the present disclosure. Accordingly, the representations of the present disclosure support various combinations of embodiments for performing the specified instructions, operations, or steps.

IV. EXAMPLE SYSTEM ARCHITECTURE

[0084] FIG. **1** provides an illustration of a computing ecosystem **100** that may be used in conjunction with various embodiments of the present disclosure. As shown in FIG. **1**, the architecture may include an exchange platform **102**, one or more client devices **104**, a network of member platforms **110**, one or more networks **120**, and/or the like. The network of member platforms **110** may include a first member platform **112***a*, a second member platform **112***b*, a third member platform **112***c*, and/or the like that are affiliated (e.g., registered, etc.) with the exchange platform **102**. For example, as described herein, the network of member platforms **110** may include a partner platform and/or a service provider platform. In some examples, the partner platform may include a first member platform **112***a* and the service provider platform may include a second member platform **112***b* that is different from the first member platform **112***a*. In some examples, the partner platform and/or the service provider platform may include a single member platform (e.g., third member platform **112***c*). In some examples, the network of member platforms **110** may be configured for one or more different services.

[0085] Each of the components of the computing ecosystem **100** may be in electronic communication with, for example, one another over the same or different wireless or wired networks **120** including, for example, a wired or wireless Personal Area Network (PAN), Local Area Network (LAN), Metropolitan Area Network (MAN), Wide Area Network (WAN), or the like. The network **120**, for example, may include any network connection including any type of network and/or across any geographic boundary (e.g., inter-country connections involving one or more sovereign entities, etc.). Additionally, while FIG. **1** illustrates certain systems as separate, standalone entities, the various embodiments are not limited to this particular architecture.

[0086] Although not explicitly illustrated, the exchange platform **102** may be a client device **104** and/or may be a part of the network of member platforms **110**. In addition, or alternatively, the member platforms **112***a-c* may be a client device **104** and/or a part of the exchange platform **102**. In some embodiments, each of the exchange platform **102** and/or the member platforms **112***a-c* may include the same computing platform.

a. Example Computing Platform

[0087] FIG. **2** is an example schematic of a computing platform **200** in accordance with one or more embodiments of the present disclosure. A computing platform **200**, such as the exchange platform **102**, the member platforms **112***a-c*, and/or the like of FIG. **1**, may include, or be in communication with, one or more processing elements **202** (also referred to as processors, processing circuitry, and/or similar terms used herein interchangeably) that communicate with other elements within the computing platform **200** via a bus, for example. As will be understood, the processing element **202** may be embodied in a number of different ways.

[0088] For example, the processing element **202** may be embodied as one or more complex programmable logic devices (CPLDs), microprocessors, multi-core processors, co-processing entities, application-specific instruction-set processors (ASIPs), microcontrollers, and/or controllers. Further, the processing element **202** may be embodied as one or more other processing devices or circuitry. The term circuitry may refer to an entirely hardware embodiment or a combination of hardware and computer program products. Thus, the processing element **202** may be embodied as integrated circuits, application specific integrated circuits (ASICs), field programmable gate arrays (FPGAs), programmable logic arrays (PLAs), hardware accelerators, other circuitry, and/or the like.

[0089] As will therefore be understood, the processing element **202** may be configured for a particular use or configured to execute instructions stored in volatile or non-volatile media or otherwise accessible to the processing element **202**. As such, whether configured by hardware or computer program products, or by a combination thereof, the processing element **202** may be capable of performing steps or operations according to embodiments of the present disclosure when configured accordingly.

[0090] In some embodiments, the computing platform **200** includes, or is in communication with, non-volatile memory **204** (also referred to as non-volatile storage, media, memory storage, memory circuitry, and/or similar terms used herein interchangeably). In some examples, the non-volatile memory **204** may include one or more non-volatile storage or memory media, including, but not limited to, hard disks, ROM, PROM, EPROM, EEPROM, flash memory, MMCs, SD memory cards, Memory Sticks, CBRAM, PRAM, FeRAM, NVRAM, MRAM, RRAM, SONOS, FJG RAM, Millipede memory, racetrack memory, and/or the like.

[0091] As will be recognized, the non-volatile memory **204** may store data, databases, database instances, database management systems, files, applications, programs, program modules, scripts, source code, object code, byte code, compiled code, interpreted code, machine code, executable instructions, and/or the like. The term database, database instance, database management system, and/or similar terms used herein interchangeably may refer to a collection of records or data that is stored in a computer-readable storage medium using one or more database models, such as a hierarchical database model, network model, relational model, entity-relationship model, object model, document model, semantic model, graph model, and/or the like.

[0092] In some embodiments, the computing platform **200** includes, or is in communication with, volatile memory **206** (also referred to as volatile storage, media, memory storage, memory circuitry, and/or similar terms used herein interchangeably). In some examples, the volatile memory **206** may also include one or more volatile storage or memory media, including, but not limited to, RAM, DRAM, SRAM, FPM DRAM, EDO DRAM, SDRAM, DDR SDRAM, DDR2 SDRAM, DDR3 SDRAM, RDRAM, TTRAM, T-RAM, Z-RAM, RIMM, DIMM, SIMM, VRAM, cache memory, register memory, and/or the like.

[0093] As will be recognized, the volatile memory **206** may be used to store at least portions of the databases, database instances, database management systems, data, applications, programs, program modules, scripts, source

code, object code, byte code, compiled code, interpreted code, machine code, executable instructions, and/or the like being executed by, for example, the processing element **202**. Thus, the databases, database instances, database management systems, data, applications, programs, program modules, scripts, source code, object code, byte code, compiled code, interpreted code, machine code, executable instructions, and/or the like may be used to control certain aspects of the step/operation of the computing platform **200** with the assistance of the processing element **202** and operating system.

[0094] As indicated, in one embodiment, the computing platform **200** may also include one or more network interfaces **208** for communicating with various computing entities (e.g., one or more components of FIG. **1**), such as by communicating data, content, information, and/or similar terms used herein interchangeably that may be transmitted, received, operated on, processed, displayed, stored, and/or the like. Such communication may be executed using a wired data transmission protocol, such as fiber distributed data interface (FDDI), digital subscriber line (DSL), Ethernet, asynchronous transfer mode (ATM), frame relay, data over cable service interface specification (DOCSIS), or any other wired transmission protocol. Similarly, the computing platform **200** may be configured to communicate via wireless external communication networks using any of a variety of protocols, such as general packet radio service (GPRS), Universal Mobile Telecommunications System (UMTS), Code Division Multiple Access 2000 (CDMA2000), CDMA2000 1× (1×RTT), Wideband Code Division Multiple Access (WCDMA), Global System for Mobile Communications (GSM), Enhanced Data rates for GSM Evolution (EDGE), Time Division-Synchronous Code Division Multiple Access (TD-SCDMA), Long Term Evolution (LTE), Evolved Universal Terrestrial Radio Access Network (E-UTRAN), Evolution-Data Optimized (EVDO), High Speed Packet Access (HSPA), High-Speed Downlink Packet Access (HSDPA), IEEE 802.11 (Wi-Fi), Wi-Fi Direct, 802.16 (WiMAX), ultra-wideband (UWB), infrared (IR) protocols, near field communication (NFC) protocols, Wibree, Bluetooth protocols, wireless universal serial bus (USB) protocols, and/or any other wireless protocol.

[0095] Although not shown, the computing platform **200** may include, or be in communication with, one or more input elements, such as a keyboard input, a mouse input, a touch screen/display input, motion input, movement input, audio input, pointing device input, joystick input, keypad input, and/or the like. The computing platform **200** may also include, or be in communication with, one or more output elements (not shown), such as audio output, video output, screen/display output, motion output, movement output, and/or the like.

[0096] As indicated, the computing platform **200** may be an example of one or more of the components of FIG. **1**, such as the exchange platform **102** and/or the member platforms **112***a-c*.

b. Example Client Device

[0097] FIG. **3** is an example schematic of a client device **104** in accordance with one or more embodiments of the present disclosure. Client devices **104** may be operated by various entities, and an example computing ecosystem may include one or more client devices **104**. For example, a client device **104** may be associated with, owned by, operated by, and/or the like by one or more end users. In various embodiments, an end user of a client device **104** may wish to engage in a value exchange between a partner and a service provider. As described herein, the user may do so by interacting leverage one or functionalities provided by an exchange platform through user input with the client device **104**.

[0098] For example, a client device **104** may be a personal computing device, smartphone, tablet, laptop, personal digital assistant, and/or the like. In various embodiments, the computing platform **200** may communicate with and manage value exchanges for one or more client devices **104**. As shown in FIG. **3**, the client device **104** may include an antenna **312**, a transmitter **304** (e.g., radio), a receiver **306** (e.g., radio), and a processing element **308** (e.g., CPLDs, microprocessors, multi-core processors, co-processing entities, ASIPs, microcontrollers, and/or controllers) that provides signals to and receives signals from the transmitter **304** and receiver **306**, respectively.

[0099] The signals provided to and received from the transmitter **304** and the receiver **306**, respectively, may include signaling information/data in accordance with air interface standards of applicable wireless systems. In this regard, the client device **104** may be capable of operating with one or more air interface standards, communication protocols, modulation types, and access types. More particularly, the client device **104** may operate in accordance with any of a number of wireless communication standards and protocols, such as those described above with regard to the computing platform **200**. In a particular embodiment, the client device **104** may operate in accordance with multiple wireless communication standards and protocols, such as UMTS, CDMA2000, 1×RTT, WCDMA, GSM, EDGE, TD-SCDMA, LTE, E-UTRAN, EVDO, HSPA, HSDPA, Wi-Fi, Wi-Fi Direct, WiMAX, UWB, IR, NFC, Bluetooth, USB, and/or the like. Similarly, the client device **104** may operate in accordance with multiple wired communication standards and protocols, such as those described above with regard to the computing platform **200** via a network interface **320**.

[0100] Via these communication standards and protocols, the client device **104** may communicate with a computing platform **200** using concepts such as Unstructured Supplementary Service Data (USSD), Short Message Service (SMS), Multimedia Messaging Service (MMS), Dual-Tone Multi-Frequency Signaling (DTMF), and/or Subscriber Identity Module Dialer (SIM dialer). The client device **104** may also download changes, add-ons, and updates, for instance, to its firmware, software (e.g., including executable instructions, applications, program modules), and operating system.

[0101] In some embodiments, the client device **104** includes location determining aspects, devices, modules, functionalities, and/or similar words used herein interchangeably. For example, the client device **104** may include outdoor positioning aspects, such as a location module adapted to acquire, for example, latitude, longitude, altitude, geocode, course, direction, heading, speed, universal time (UTC), date, and/or various other information/data. In one embodiment, the location module may acquire data, sometimes known as ephemeris data, by identifying the number of satellites in view and the relative positions of those satellites (e.g., using global positioning systems (GPS)). The satellites may be a variety of different satellites, including Low Earth Orbit (LEO) satellite systems, Department of

Defense (DOD) satellite systems, the European Union Galileo positioning systems, the Chinese Compass navigation systems, Indian Regional Navigational satellite systems, and/or the like. This data may be collected using a variety of coordinate systems, such as the DecimalDegrees (DD); Degrees, Minutes, Seconds (DMS); Universal Transverse Mercator (UTM); Universal Polar Stereographic (UPS) coordinate systems; and/or the like. Alternatively, the location information/data may be determined by triangulating the position of the client device **104** in connection with a variety of other systems, including cellular towers, Wi-Fi access points, and/or the like. Similarly, the client device **104** may include indoor positioning aspects, such as a location module adapted to acquire, for example, latitude, longitude, altitude, geocode, course, direction, heading, speed, time, date, and/or various other information/data. Some of the indoor systems may use various position or location technologies including RFID tags, indoor beacons or transmitters, Wi-Fi access points, cellular towers, nearby computing devices (e.g., smartphones, laptops) and/or the like. For instance, such technologies may include the iBeacons, Gimbal proximity beacons, Bluetooth Low Energy (BLE) transmitters, NFC transmitters, and/or the like. These indoor positioning aspects may be used in a variety of settings to determine the location of someone or something to within inches or centimeters.

[0102] In some embodiments, the client device **104** may include a user interface **316** (e.g., a display screen, a speaker, a tactile mechanization, etc. coupled to a processing element **308**) and/or a user input interface **318** (e.g., a touch screen, a microphone, etc. coupled to a processing element **308**). For example, the user interface **316** may be a present one or more application screens presented by one or more computing platforms described herein. The user input interface **318** may include any of a number of devices or interfaces allowing the client device **104** to receive data, such as a keypad (hard or soft), a touch display, voice/speech or motion interfaces, or other input device. In examples including a keypad, the keypad may include (or cause display of) the conventional numeric (0-9) and related keys (#, *), and other keys used for operating the client device **104** and may include a full set of alphabetic keys or set of keys that may be activated to provide a full set of alphanumeric keys. In addition to providing input, the user input interface may be used, for example, to activate or deactivate certain functions, such as screen savers and/or sleep modes.

[0103] The client device **104** may also include volatile memory **322** and/or non-volatile memory **324**, which may be embedded and/or may be removable. For example, the non-volatile memory **324** may be ROM, PROM, EPROM, EEPROM, flash memory, MMCs, SD memory cards, Memory Sticks, CBRAM, PRAM, FeRAM, NVRAM, MRAM, RRAM, SONOS, FJG RAM, Millipede memory, racetrack memory, and/or the like. The volatile memory **322** may be RAM, DRAM, SRAM, FPM DRAM, EDO DRAM, SDRAM, DDR SDRAM, DDR2 SDRAM, DDR3 SDRAM, RDRAM, TTRAM, T-RAM, Z-RAM, RIMM, DIMM, SIMM, VRAM, cache memory, register memory, and/or the like. The volatile and non-volatile storage or memory may store databases, database instances, database management systems, data, applications, programs, program modules, scripts, source code, object code, byte code, compiled code, interpreted code, machine code, executable instructions, and/or the like to implement the functions of the client device **104**. As indicated, this may include a partner application, service provider application, and/or the like that is resident on the client device **104** and/or accessible through a browser or other user interface for communicating with a computing platform **200**.

[0104] In some embodiments, the client device **104** may include one or more components or functionality that are the same or similar to those of a computing platform **200**, as described in greater detail above. As will be recognized, these architectures and descriptions are provided for example purposes only and are not limited to the various embodiments.

[0105] In various embodiments, the client device **104** may be embodied as an artificial intelligence (AI) computing entity, such as an Amazon Echo, Amazon Echo Dot, Amazon Show, Google Home, and/or the like. Accordingly, the client device **104** may be configured to provide and/or receive information/data from an end user via an input/output mechanism, such as a display, a camera, a speaker, a voice-activated input, and/or the like. In certain embodiments, an AI computing entity may comprise one or more predefined and executable program algorithms stored within an onboard memory storage module, and/or accessible over a network. In various embodiments, the AI computing entity may be configured to retrieve and/or execute one or more of the predefined program algorithms upon the occurrence of a predefined trigger event.

c. Example Networks

[0106] In some embodiments, any two or more of the illustrative components of the computing ecosystem **100** of FIG. **1** may be configured to communicate with one another via respective communicative couplings to one or more networks **120**. The networks **120** may include, but are not limited to, any one or a combination of different types of suitable communications networks such as, for example, cable networks, public networks (e.g., the Internet), private networks (e.g., frame-relay networks), wireless networks, cellular networks, telephone networks (e.g., a public switched telephone network), or any other suitable private and/or public networks. Further, the networks **120** may have any suitable communication range associated therewith and may include, for example, global networks (e.g., the Internet), MANs, WANs, LANs, or PANs. In addition, the networks **120** may include any type of medium over which network traffic may be carried including, but not limited to, coaxial cable, twisted-pair wire, optical fiber, a hybrid fiber coaxial (HFC) medium, microwave terrestrial transceivers, radio frequency communication mediums, satellite communication mediums, or any combination thereof, as well as a variety of network devices and computing platforms provided by network providers or other entities.

d. Example Value Exchange System

[0107] FIG. **4** is an example block diagram of an example network-based exchange system **400** in accordance with one or more embodiments of the present disclosure. The network-based exchange system **400** includes a new computing ecosystem and computing platforms that provide an end-to-end value exchange solution to replace traditional exchange processing systems. As described herein, the network-based exchange system **400** may be value system agnostic and may be applied to any value-based exchange including, as

examples, information-based exchanges, financial-based exchanges, reputation-based exchanges, healthcare-based exchanges, benefit-based exchanges, and/or the like. In any value system, the network-based exchange system **400** may leverage an intermediary entity and one or more defined communication interfaces to facilitate a network-based exchange between a value seeking entity (e.g., a partner) and a value providing entity (e.g., a service provider) that may be associated with one or more member platforms of the network-based exchange system **400**.

[0108] As depicted, the network-based exchange system **400** may include an exchange platform **102**, a partner platform **420**, and/or a service provider platform **440** that may be configured to communicate through one or more exchange interfaces. The partner platform **420** and/or service provider platform **440** may include one or more member platforms **112***a-c* from the network of member platforms **110**. For instance, the partner platform **420** and the service provider platform **440** may include a single member platform (e.g., member platform **112***c*). In addition, or alternatively, the partner platform **420** and the service provider platform **440** may include one or more different member platforms (e.g., member platforms **112***a* and **112***b*). In some examples, a user may interact with one or more of the platforms through a client device **104**.

[0109] In some embodiments, the exchange platform **102** is a computing entity that is configured to facilitate a credential-less exchange of value for one or more members in a network. The exchange platform **102** may include one or more processing devices, memory devices, and/or the like that are physically and/or wirelessly coupled and configured to collectively (and/or individually) perform the one or more computing tasks for facilitating a value system agnostic exchange. In some examples, the exchange platform **102** may include, define, and/or otherwise leverage one or more exchange interfaces for facilitating communications (e.g., requests, responses, etc.) between a plurality of members. As described herein, the interfaces may be leveraged to facilitate a secure exchange between one or more members in any value system.

[0110] In some embodiments, the member is an entity that collaborates with the exchange platform **102** to take part in an exchange of value. As examples, a member may include (i) a partner that utilizes the exchange platform **102** to receive value, (ii) a service provider that utilizes the exchange platform **102** to provide value, and/or (iii) both a partner and a service provider. As used herein, a member may be referred to as a partner when it receives value through a value exchange and/or a service provider when it provides value through a value exchange. Thus, the same member may be a partner or a service provider depending on the role of the member in a value exchange. For example, a member may be a partner that receives value for a value exchange. The same member may be a service provider that provides value in another value exchange. In some examples, the same member may be both the partner and the service provider in the same value exchange, such that the member utilizes the exchange platform **102** to provide and then receive value in a sole member value exchange.

[0111] In some embodiments, a member is a partner when it utilizes a service provided by a service provider. A partner may include any value seeking entity in any value system. As an example, in a financial value system, a partner may include a merchant (e.g., retailer, brick-and-mortar establishment, etc.) that may utilize a service provider, such as a financial institution, to access funds for a financial transaction. In addition, or alternatively, in an information value system, a partner may include a news publisher (e.g., a newspaper, media organization, etc.) that may utilize a service provider, such as a news agency (e.g., wire service, news service, etc.) to access information for an information transaction. As will be understood, the techniques of the present disclosure may be applied to any value system and the partner may include any value seeker for any respective value system.

[0112] In some embodiments, a member is a service provider when it provides a service for a partner. A service provider may include a source of value in any value system. As an example, in a financial value system, a service provider may include a financial institution (e.g., bank, currency exchange, credit union, etc.) that may provide access to funds for a financial transaction between one or more entities. In addition, or alternatively, in an information value system, a service provider may include a news agency (e.g., wire service, news service, etc.) that may source information for publication by a news publisher. As will be understood, the techniques of the present disclosure may be applied to any value system and the service provider may include any source of value for any respective value system.

[0113] A service provider and a partner may communicate through one or more respective member platforms that are respectively associated with the entities. As one example, a service provider may be associated with a service provider platform **440** and a partner may be associated with a partner platform **420**.

[0114] In some embodiments, a member platform is a computing entity corresponding to a member associated with the exchange platform **102**. The member platform may include a partner platform **420** acting on behalf of a partner, a service provider platform **440** acting on behalf of a service provider, and/or both. In some examples, a member platform may be both a partner platform **420** and a service provider platform **440**. For example, the same member platform may be configured to operate on behalf of a partner for one value exchange and a service provider for another value exchange. In some examples, the same member platform may be configured to operate on behalf of both a partner and service provider in a single value exchange. It is noted that the term member platform may refer to a partner platform **420**, a service provider platform **440**, or both and, in some examples, may depend on the role of the member platform in a value exchange (e.g., and/or one or more interfaces utilized by the member platform in the value exchange).

[0115] In some embodiments, the partner platform **420** is a computing entity that is configured to perform one or more operations on behalf of a partner. The partner platform **420**, for example, may include one or more processing devices, memory devices, and/or the like that are physically and/or wirelessly coupled and configured to collectively (and/or individually) perform the one or more computing tasks for requesting value in a value system agnostic exchange. In some examples, the partner platform **420** may include, define, and/or otherwise leverage one or more exchange interfaces for facilitating communications (e.g., requests, responses, etc.) with the exchange platform **102**. In some examples, the partner platform **420** may be configured to host one or more user-facing applications (e.g., a partner application, etc.) for interacting with one or more users.

[0116] The partner platform **420**, for example in a financial value system, may host an online marketplace for the partner that allows a user to interact (e.g., search, browse, purchase, return, etc.) with one or more products or services offered by the partner. In the event of a product purchase, the partner platform **420** may cooperate with one or more service providers to access funds for the purchase. Traditionally, access to funds from a service provider is facilitated using a card number, account number, and/or another financial credential that may expose a user to malicious parties. To address network security and data privacy concerns with traditional financial systems (and/or other value-based systems), the partner platform **420** may register with the exchange platform **102** by configuring one or more software development kits (SDKs), APIs, and/or the like for facilitating communications with the exchange platform **102**. For example, the partner platform **420** may include, define, and/or otherwise leverage one or more partner interface **402** for facilitating communications (e.g., requests, responses, etc.) with the exchange platform **1020**.

[0117] In some embodiments, the service provider platform **440** is a computing entity that is configured to perform one or more operations on behalf of a service provider. A service provider platform **440**, for example, may include one or more processing devices, memory devices, and/or the like that are physically and/or wirelessly coupled and configured to collectively (and/or individually) perform the one or more computing tasks for providing value in a value system agnostic exchange. In some examples, a service provider platform **440** may include, implement, and/or otherwise leverage one or more interfaces for facilitating communications (e.g., requests, responses, etc.) with the exchange platform **102**. In some examples, a service provider platform **440** may be configured to facilitate one or more service provider instruments. In some examples, the service provider platform **440** may be configured to host one or more user-facing applications (e.g., a service provider applications, etc.) for managing the one or more service provider instruments.

[0118] In some examples, the service provider platform **440**, for example in a financial value system, may maintain one or more financial assets (e.g., lines of credit, bank accounts, etc.) that allow a user to fund a transaction for purchasing a product from a partner. In the event of a product purchase, the service provider platform **440** may cooperate with partner platform **420** to authorize a transaction and/or otherwise provide access to funds for the purchase. Traditionally, access to funds from the service provider is facilitated by presenting a card number, account number, and/or another financial credential to the service provider platform **440** which may expose a user, service provider, or partner to malicious parties, especially when provided over an unsecure network (e.g., public network, and/or the like). To address network security and data privacy concerns with traditional financial systems (and/or other value-based systems), the service provider platform **440** may register with the exchange platform **102** by configuring one or more software development kits (SDKs), APIs, and/or the like for facilitating communications with the exchange platform **102**. For example, the service provider platform **440** may include, implement, and/or otherwise leverage one or more service provider interfaces **404** for facilitating communications (e.g., requests, responses, etc.) with the exchange platform **102**.

[0119] As described herein, a service provider interface **404** may enable the exchange platform **102** to identify and request the use of a service provider instrument for facilitating a transaction. For example, the service provider platform **440** may be configured to facilitate one or more service provider instruments.

[0120] In some embodiments, a service provider instrument is a mechanism leveraged by a service provider for providing value (e.g., on behalf of a particular user, organization, etc.). The service provider instrument may depend on the value system and/or service provider. In some examples, the service provider instrument may include an account with the service provider. For example, in a financial value system, a service provider instrument may include a bank account (e.g., a checking, saving, etc.), brokerage account, line of credit, and/or the like. In an information value system, a benefits value system and/or the like, the service provider instrument may include a member account, and/or the like. In some examples, a service provider instrument may include a virtual instrument (e.g., virtual account, line of credit, etc.) hosted by a service provider platform **440**. For instance, the service provider platform **440** may be configured to maintain a plurality of member instrument data objects indicative of a plurality of service provider instruments for a plurality of affiliated entities.

[0121] In some embodiments, the instrument data object is a data entity that represents a service provider instrument. The instrument data object may include one or more instrument identifiers and/or one or more instrument attributes. In some examples, the one or more instrument identifiers and/or one or more instrument attributes may be based on a type of instrument data object. By way of example, a service provider instrument may be represented in a member platform (e.g., the service provider platform **440**) as a member instrument data object. In addition, or alternatively, the service provider instrument may be independently represented by a system instrument data object in an exchange platform **102**. In some examples, the member instrument data object and the system instrument data object may include one or more of the same one or more instrument identifiers and/or one or more instrument attributes. By way of example, a member platform may register a plurality of service provider instruments with the exchange platform **102** (e.g., using a service provider interface **404**). During registration, the member platform (e.g., service provider platform **440**) may provide one or more of the instrument identifiers and/or instrument attributes and, in some examples, the exchange platform **102** may return another identifier.

[0122] In some embodiments, the member instrument data object is an internal representation of a service provider instrument within a member platform, such as the service provider platform **440**. The member instrument data object may include one or more instrument identifiers, such as a member instrument identifier, an instrument key from the exchange platform **102**, and/or a user identifier. The user identifier, for example, may include a member user identifier, as described herein. In addition, or alternatively, the member instrument data object may include one or more instrument attributes, such as an instrument type (e.g., credit-based instrument, debit-based instrument, information-based instrument, etc.), an instrument representation, and/or one or more contextual attributes. In some examples, the contextual attributes may depend on the value system. For instance, in a financial value system, the one or more

contextual attributes may be indicative of a (i) currency associated with the service provider instrument, (ii) an asset availability (e.g., a balance, coverage, etc.) of the service provider instrument, (iii) one or more previous transactions with the service provider instrument, and/or the like.

[0123] In some embodiments, the system instrument data object is an external representation of a service provider instrument within the exchange platform **102**. The system instrument data object may include one or more instrument identifiers, such as an instrument reference for a member platform, a system instrument identifier, and/or a user identifier. The user identifier, for example, may include a system user identifier, as described herein. In addition, or alternatively, the system instrument data object may include one or more instrument attributes, such as an instrument type (e.g., credit-based instrument, debit-based instrument, information-based instrument, etc.), an instrument representation, and/or one or more contextual attributes. In some examples, the contextual attributes may depend on the value system. For instance, in a financial value system, the one or more contextual attributes may be indicative of a currency associated with the service provider instrument.

[0124] In some examples, a member platform, such as the partner platform **420** and/or service provider platform **440**, may be associated with one or more user-facing applications for facilitating one or more interactions with a user and/or other affiliated entities (e.g., through the client device **104**). In addition, or alternatively, the exchange platform **102** (and/or a third party centralization platform separate from the exchange platform) may be associated with one or more user-facing applications for facilitating one or more interactions with a user and/or other affiliated entities.

[0125] In some embodiments, the one or more user-facing applications are computer programs hosted by a computing entity for facilitating one or more user interactions. A user-facing application may include software (e.g., computer readable instructions, etc.) designed to perform one or more computing tasks for a computing entity, such as a member platform, the exchange platform **102**, and/or a third party platform not depicted in FIG. **4**. For instance, a user-facing application may facilitate communication between a member, a user, and/or one or more third parties. As examples, the user-facing applications may be configured to present one or more member user interfaces **406** (e.g., via a client device **104**) for interacting with a user on behalf of a member. In addition, or alternatively, the user-facing applications may be configured to present one or more central user interfaces **422** (e.g., via a client device **104**) for interacting with a user on behalf of a member, exchange platform **102**, and/or another third party. In some examples, the user-facing application may be configured to receive user input (e.g., via the one or more member user interfaces **406**, central user interfaces **422**) to receive information from a user.

[0126] In some embodiments, a user-facing application is a partner application **416** that is hosted by the partner platform (e.g., a member platform acting as a partner for a particular exchange, etc.) to facilitate functions for a partner. A partner application may include software (e.g., computer readable instructions, etc.) designed to perform one or more computing tasks for a partner. In some examples, the partner application **416** may be configured with one or more devices (e.g., point of sale terminals, etc.) from a standalone partner establishment (e.g., a brick and mortar bank, etc.). For instance, a partner application **416** may be configured to present one or more member user interfaces **406** for interacting (e.g., browsing, purchasing, reviewing, etc.) with one or more products offered by a retail-based partner, one or more units of information offered by an information-based partner, and/or the like. In some examples, the partner application **418** may be configured to receive user input (e.g., via one or more member user interfaces **406**) to receive information from a user.

[0127] In some embodiments, the service provider platform **440** is configured to host one or more service provider applications **418** for managing one or more service provider instruments. For example, a user-facing application may be a service provider application **418** that is hosted by the service provider platform **440** (e.g., a member platform acting as a service provider for a particular exchange, etc.) to facilitate functions for the service provider. In some examples, the service provider application **418** may be configured with one or more devices from a standalone service provider establishment (e.g., a brick and mortar bank, etc.). A service provider application **418** may include software (e.g., computer readable instructions, etc.) designed to perform one or more computing tasks for a service provider. For instance, a service provider application **418** may be configured to present one or more user interfaces for interacting (e.g., reviewing, managing, auditing, enrolling, etc.) with one or more service provider instruments facilitated by the service provider. By way of example, in a financial value system, the service provider application **418** may enable access to a bank account, brokerage account, line of credit, and/or the like, to manage funds, assets, and/or the like, handled by the respective accounts. In some examples, the service provider application **418** may be configured to receive user input (e.g., via the one or more member user interfaces **406**) to receive information, authorizations, and/or the like from a user.

[0128] In some embodiments, the exchange platform **102**, and/or a third party platform not depicted, is configured to host an intermediary application for managing one or more keys (e.g., a UUEK) issued by the exchange platform. For example, a user-facing application may be a central client application that is hosted by the exchange platform **102**, a member platform acting as a third party, and/or a third party platform, to facilitate a credential-less exchange, as described herein. The intermediary application may include software (e.g., computer readable instructions, etc.) designed to perform one or more computing tasks for executing a credential-less exchange. For instance, the intermediary application may be configured to present one or more user interfaces for interacting (e.g., retrieving, storing managing, transmitting, etc.) with keys issued (e.g., through any of the member platforms with an existing relationship with the exchange platform **102**) by the exchange platform **102**.

[0129] By way of example, the intermediary application may provide a central user interface **422** within the client device **104**. The central user interface **422** may comprise a set of icons for interacting with UUEKs, or other keys, issued by the exchange platform **102**. For instance, the central user interface **422** may comprise a set of exchange container icons **424** that correspond to a set of exchange containers. The set of exchange containers may encapsulate a set of instructions for initiating one or more of the enrollment and/or credential-less exchange operations dis-

cussed herein. For instance, upon receiving user input to an exchange container icon of the set of exchange container icons **424**, the intermediary application may execute a set of instructions to enroll an instrument with the exchange platform as described herein with reference to FIGS. **6**A-**8**F, receive a key, such as a UUEK, from an exchange platform, and/or initiate an exchange request based on the key as described herein with reference to FIGS. **9**-**12**D. In this way, the central user interface **422** may define an intermediary digital environment through which a different, credentialless exchange may be initiated at the touch of a button without exposing persistent credentials underlying an instrument.

[0130] In some embodiments, the exchange platform **102** facilitates communication between the partner platform **420** and the service provider platform **440** using one or more exchange interfaces.

[0131] In some embodiments, an exchange interface is a set of instructions for facilitating communications between the exchange platform **102** and one or more member platforms and/or internal services. An exchange interface may include an API, file based interface, a message queue based interface, and/or the like. For instance, an exchange interface may include an API including, as examples, one or more simple object access protocol (SOAP) APIs, one or more remote procedure call (RPC) APIs, one or more websocket APIs, one or more representational state transfer (REST) APIs, and/or the like. In some embodiments, an exchange interface may include one or more RPC APIs, such as one or more gRPC APIs.

[0132] The exchange platform **102** may include, define, and/or otherwise leverage one or more different exchange interfaces for facilitating communication with one or more external platforms, such as one or more member platforms (e.g., a partner platform **420**, service provider platform **440**, etc.). Each interface may include a plurality of communication instructions, message definitions, and/or the like for exchanging requests and/or responses between the exchange platform **102** and an entity that is taking part in a value exchange. By way of example, an exchange interface may include a partner interface **402** for facilitating communication with a partner platform **420** and/or a service provider interface **404** for facilitating communication with a service provider platform **440**.

[0133] In some embodiments, the partner interface **402** is an exchange interface for facilitating one or more communications between a partner platform **420** and the exchange platform **102**. The partner interface **402** may define one or more communication instructions, message definitions, and/or the like for facilitating one or more request messages and/or response messages between a partner platform **420** and the exchange platform **102**. The partner interface **402**, for example, may include an API that defines (i) requests to the exchange platform **102** from a computing entity acting as a partner platform **420** and/or (ii) requests from the exchange platform **102** to the partner platform **420**. For example, the partner interface **402** may define one or more registration messages, session messages, transaction messages, and/or the like for facilitating an exchange of value for the partner. In some embodiments, the partner interface **402** defines one or more identifiers for securely identifying one or more portions of a value exchange.

[0134] In some embodiments, the service provider interface **404** is an exchange interface for facilitating one or more communications between a service provider platform **440** and the exchange platform **102**. The service provider interface **404** may define one or more communication instructions, message definitions, and/or the like for facilitating one or more request messages and/or response messages between a service provider platform **440** and the exchange platform **102**. The service provider interface **404**, for example, may include an API that defines (i) requests to the exchange platform **102** from a computing entity acting as a service provider platform **440** and/or (ii) requests from the exchange platform **102** to the service provider platform **44**—. The service provider interface **404**, for example, may define one or more registration messages, session messages, transaction messages, and/or the like for facilitating an exchange of value using a service provider instrument. In some embodiments, the service provider interface **404** defines one or more identifiers for securely identifying one or more portions of a value exchange.

[0135] The exchange platform **102** may facilitate communications between a network of member platforms. The network of members, for example, may include a plurality of entities that have been onboarded with the exchange platform **102** by, for example, registering with the exchange platform **102**, configuring a respective interface for communicating with the exchange platform **102**, and/or the like. In some examples, the exchange platform **102** may execute one or more individual services for interacting with each onboarded entity. The individual services, for example, may include one or more partner services **410** and/or service provider services **412**.

[0136] In some embodiments, the exchange platform **102** instantiates a separate partner-specific service, the partner service **410**, for each of the network of members. In addition, or alternatively, for example in a multi-tenant environment, the partner service **410** may be instantiated for one or more partners from the network or members. The partner service **410** may be configured to execute one or more exchange operations for resolving exchange requests from a partner platform **420**. In some embodiments, the exchange platform **102** instantiates a separate service provider-specific service, the service provider service **412**, for each of the network of members. In addition, or alternatively, for example in a multi-tenant environment, the service provider service **412** may be instantiated for one or more service providers from the network or members. The service provider service **412** may be configured to execute one or more exchange operations for acquiring and resolving an exchange request from a partner platform **420**. The exchange operations may include any of the steps and/or operations described herein.

[0137] In some embodiments, the partner service **410** and/or the service provider service **412** interact, through one or more local communication mechanisms, with each other and/or one or more other components of the exchange platform **102** to perform an exchange operation. For example, the exchange platform **102** may include a connect service **408** that is configured to establish, maintain, and verify a secure network session with a member platform, such as the partner platform **420**. In some examples, the connect service **408** and/or partner service **410** may collaboratively operate to enroll a user (and/or a user's service provider instrument) with the exchange platform **102**. In addition, or alternatively, the partner service **410** and/or service provider service **412** may collaboratively operate to

enroll a user (and/or a user's service provider instrument) and/or facilitate a value exchange between the partner platform **420** and the service provider platform **440**. In some examples, the connect service **408** may be a portion of the partner service **410**.

[0138] Through the performance of one or more exchange operations, the partner service **410** and/or service provider service **412** may generate and leverage a plurality of non-traditional identifiers for referencing one or more aspects of a user, a service provider instrument, and/or a value exchange. At least some of these identifiers may include universally unique identifiers, such as a UUEK, that may be leveraged to provide a credential-less value exchange. Each identifier may be at least temporarily stored in a platform data vault **414**. The platform data vault **414** may include any type of memory device as described herein. In some examples, each service and/or one or more sets of services may be associated with an individual portion of the platform data vault **414**.

[0139] As described herein, one or more identifiers may be stored in associated with each other to form identifier mappings that may be leveraged by the exchange platform **102** (and/or one or more services thereof) to reference a user, service provider instrument, and/or any other aspect of a value exchange from communications between the partner platform **420**, the service provider platform **440**, and/or any other member platform without including user credentials. An example of the non-traditional identifiers will now further be described with reference to FIG. **5**.

e. Example Data Structures

[0140] FIG. **5** is an example data diagram **500** for facilitating a credential-less exchange of value in accordance with one or more embodiments of the present disclosure. The data diagram **500** illustrates a plurality of related identifiers of different types. As depicted, each identifier may be associated with at least one related identifier to form identifier mappings within one or more platforms, such as the exchange platform **102** and/or a service provider platform **440**. The identifier mappings empower communications between the exchange platform **102** and the service provider platform **440** that reference a service provider instrument **518** without exposing persistent credentials **514** (e.g., username, password, card number, etc.) associated with the service provider instrument **518** that are susceptible to fraud, misuse, and exploitation by malicious parties. As illustrated, using some of the techniques of the present disclosure, the persistent credentials **514** may never have to be communicated outside of a service provider platform **440**. The data diagram **500** illustrates just some of the plurality of identifiers that may be generated, stored, and/or leveraged by the various embodiments of the present disclosure. It will be understood that the illustrated identifiers are not an exhaustive list and may include other, non-illustrated identifiers. Each of the identifiers may be labeled as an identifier, reference, key, and/or other similar terms. These terms are used herein interchangeably to refer to a unit of information for identifying data structures, entities, and/or any other component described herein.

[0141] As illustrated, some of the plurality of related identifiers in various embodiments of the present disclosure may include, as examples, (i) one or more user references **502** that may be mapped to member user identifiers **522** of the service provider platform **440**, (ii) one or more service provider partitions **504** corresponding to a network of onboarded service provider platforms, such the service provider platform **440**, (iii) one or more partner partitions **506** corresponding to a network of onboarded partner platforms, (iv) one or more instrument references **520** that may be mapped to member instrument identifiers **508** of the service provider platform **440**, (v) one or more keys **516** and/or system identifiers **512** that may be associated with the user references **502** and/or instrument references **520**, (vi) one or more exchange identifiers **510** that may be mapped to either the system identifiers **512** and/or the keys **516**, and/or (vii) one or more UUEKs **524** that may be mapped to the exchange identifiers **510** and/or at least one of a partner partition **506** and/or the service provider partition **504**.

[0142] In some examples, the service provider platform **440** may store one or more identifiers that may be mapped to a service provider instrument **518** and/or one or more identifier of the exchange platform **102** to enable the service provider platform **440** to reference a service provider instrument **518** based at least in part on identifiers that, by themselves, are not indicative of any aspect of the service provider instrument **518**, including the persistent credentials **514** thereof.

[0143] By way of example, the service provider platform **440** may store, maintain, and/or otherwise access one or more keys **516** that map to (e.g., is a duplicate of, derivative of, etc.) one or more system identifiers **512** of the exchange platform **102**. The keys **516**, for example, may include the system identifiers **512** as a portion of the keys **516**. The keys **516** may be mapped to member instrument identifiers **508** and/or member user identifiers **522** that may internally reference a user and/or service provider instrument **518** of the service provider platform. The keys **516**, for example, may be provided during a registration process between the service provider platform **440** and/or the exchange platform **102**.

[0144] As another example, the exchange platform **102** may store, maintain, and/or otherwise access one or more references, such as the instrument reference **520** and/or the user reference **502** that map to (e.g., is a duplicate of, derivative of, etc.) one or more member identifiers, such as the member instrument identifier **508** and/or the member user identifier **522** of the service provider platform **440**. The references, for example, may be provided during a registration process between the service provider platform **440** and/or the exchange platform **102**.

[0145] In some embodiments, the exchange platform **102** references each member platform of a network of member platforms using one or more entity partitions. In some embodiments, an entity partition is a unique identifier for a computing entity. An entity partition may include a unique number, alpha-numeric, and/or the like that represents a particular computing entity. An entity partition, for example, may include a member partition that represents a member platform, a service provider partition **504** that represents the service provider platform **440**, a partner partition **506** that represents a partner platform **420**, and/or the like.

[0146] In some embodiments, the service provider partition **504** is a unique identifier for a service provider and/or service provider platform **440** of a service provider. The service provider partition **504** may include a sequence of numeric, alpha-numeric, any/or any other characters or symbols that are representative of a service provider that is associated (e.g., onboarded, registered, etc.) with the

exchange platform **102**. The exchange platform **102**, for example, may include a plurality of service provider partitions that respectively identify a service provider platform **440** that is affiliated with (e.g., onboarded with, registered with, etc.) the exchange platform **102**. Each service provider partition **504** may represent a service provider platform **440** that has configured one or more exchange platform software development kits (SDKs), and/or like for implementing a service provider interface of the exchange platform **102**.

[0147] In some embodiments, the partner partition **506** is a unique identifier for a partner and/or a partner platform of a partner. The partner partition **506** may include a sequence of numeric, alpha-numeric, any/or any other characters or symbols that are representative of a partner that is associated with the exchange platform **102**. The exchange platform **102**, for example, may include a plurality of partner partitions that respectively identify a partner platform that is affiliated with (e.g., onboarded with, registered with, etc.) the exchange platform **102**. Each partner partition **506** may represent a partner platform that has configured one or more exchange SDKs, and/or the like for implementing a partner interface of the exchange platform **102**.

[0148] In some embodiments, the entity partitions are generated to identify a member when the member platform is onboarded with the exchange platform **102**. In some examples, after onboarding with the exchange platform, the member platforms may leverage one or more exchange interfaces to register one or more service provider instruments with the exchange platform **102**. A service provider instrument **518** may be registered with the exchange platform **102** by exchanging one or more instrument identifiers with the exchange platform **102**.

[0149] In some embodiments, an instrument identifier includes any representation of the service provider instrument **518** that identifies the service provider instrument without the exposing persistent credentials **514** of the service provider instrument **518**. The instrument identifier may include a member instrument identifier **508**, a system instrument identifier, an instrument reference **520**, instrument key, and/or the like, as described herein.

[0150] In some embodiments, a member instrument identifier **508** is a unique identifier for representing a service provider instrument **518** within a member platform, such as the service provider platform **440**. The member instrument identifier **508**, for example, may include a sequence of numeric, alpha-numeric, any/or any other characters or symbols that represent a service provider instrument **518** to the service provider platform **440**. In some examples, the member instrument identifier **508** may include a table identifier for a member instrument data object.

[0151] In some embodiments, the instrument reference **520** is a unique identifier for referencing a member instrument identifier **508**. The instrument reference **520**, for example, may be generated and/or provided by a member platform to the exchange platform **102** to allow the exchange platform **102** to reference the service provider instrument **518** maintained at the member platform. In some examples, the instrument reference **520** is the same value as the member instrument identifier **508**. In some examples, the instrument reference **520** is a different value that is mapped to the member instrument identifier **508**.

[0152] In some embodiments, a system instrument identifier is a unique identifier for representing a service provider instrument **518** within the exchange platform **102**. The system instrument identifier, for example, may include a sequence of numeric, alpha-numeric, any/or any other characters or symbols that represent the service provider instrument **518** to the exchange platform **102** without exposing the persistent credentials **514** of the service provider instrument **518**. In some examples, the system instrument identifier may include a UUID. In some examples, the system instrument identifier may include at least one of the system identifiers **512**.

[0153] In some embodiments, the instrument key is a unique identifier for referencing a system instrument identifier. The instrument key, for example, may be generated and/or provided by the exchange platform **102** during a registration process of the service provider instrument **518** with the exchange platform **102**. In some examples, the instrument key may include a wrapped system instrument identifier. For example, the instrument key may include a string of alpha-numeric characters that are formatted according to a key format established by the exchange platform **102** (and/or one or more APIs thereof). The key format may include any number of characters, such as fifty characters or more. In some examples, the characters may be case sensitive. A first portion of the characters (e.g., the first six characters) may be reserved as a partition for identifying an entity associated with the key. For an instrument key, for example, the partition may include the service provider partition **504**. A second portion of the characters may identify the system instrument identifier. In some examples, the instrument key may include at least one of the keys **516**. The key formats described herein may include one or more different portions, each of which may be arranged in any order.

[0154] In some embodiments, after onboarding with the exchange platform **102**, a member platform may leverage one or more exchange interfaces to register one or more users with the exchange platform **102**. A user may be registered with the exchange platform **102** by exchanging one or more user identifiers with the exchange platform **102**. The user identifiers, for example, may be leveraged to generate, maintain, and/or update one or more user data objects reflective of a user of a member platform and/or the exchange platform **102**.

[0155] In some embodiments, a user data object is a data entity that represents a user that interacts with a member platform and/or the exchange platform **102**. A user, for example, may include an entity (e.g., person, organization, group, etc.) that engages in an exchange of value governed by the exchange platform **102**. In some examples, the user may indirectly cooperate with the exchange platform **102** by creating a user account with a registered service provider, registering (and/or giving permission to register) a service provider instrument **518**, and/or the like. In some examples, the exchange platform **102** may act on the user's behalf without the user directly engaging with the exchange platform **102**. For example, the exchange platform **102** may act as a hidden intermediary between a user-facing application and a user's service provider instrument **518**.

[0156] In some embodiments, a user data object includes one or more user identifiers and/or one or more user attributes. In some examples, the one or more user identifiers and/or one or more user attributes may be based on a type of user data object. By way of example, a user may be represented in a member platform as a member user data object. In addition, or alternatively, the user may be inde-

pendently represented by a system user data object in an exchange platform. In some examples, the member user data object and the system user data object may include one or more of the same one or more user identifiers and/or user attributes. By way of example, a member platform may register a plurality of users with the exchange platform **102**. During registration, the member platform may provide one or more of the user identifiers and/or user attributes and, in some examples, the exchange platform **102** may return another identifier.

[0157] In some embodiments, a member user data object is an internal representation of a user within a member platform, such as the service provider platform **440**. The member instrument data object may include one or more user identifiers, such as a member user identifier **522**, a user key from the exchange platform **102**, and/or the like. In addition, or alternatively, the member user data object may include one or more user attributes. The one or more user attributes may be indicative of one or more contextual characteristics for a user. In some examples, the user attributes may be indicative of one or more identifiable characteristics for a user. By way of example, the user attributes may be indicative of a user's first name, last name, email, physical address (e.g., one or more of a street, locality, region, postal code, country, etc.), birthday (e.g., a birth date, an age band, etc.), phone number, and/or the like. In some examples, the user attributes may include encrypted, hashed, and/or otherwise secured representations of the identifiable characteristics for a user. For instance, the user attributes may include one or more hashed identifiers for the user and/or the like.

[0158] In some embodiments, the system user data object is an external representation of a member's user within the exchange platform **102**. The system user data object may include one or more user identifiers, such as an user reference **502** for a member platform, a system user identifier, and/or the like. In addition, or alternatively, the system user data object may include one or more user attributes, such as those described herein. By way of example, a member platform may register a user with the exchange platform **102**. During registration, the member platform may provide the user reference **502** for the user and/or the one or more user attributes. In some examples, the user attributes may include hashed and/or encrypted identifiers for the user.

[0159] In some embodiments, a user identifier includes a unique identifier for a user involved in a value-based exchange. A user identifier may include a sequence of numeric, alpha-numeric, any/or any other characters or symbols that are representative of a user of the exchange platform **102** and/or a member platform. In some examples, a user identifier may include a user reference **502**, a user key, a system user identifier, a member user identifier, and/or the like.

[0160] In some embodiments, a system user identifier is a unique identifier for representing a user within the exchange platform **102**. The system user identifier, for example, may include a sequence of numeric, alpha-numeric, any/or any other characters or symbols that represent a user to the exchange platform **102**. In some examples, the system user identifier may include a UUID specific to a particular user. In some examples, the system user identifier may include at least one of the system identifiers **512**.

[0161] In some embodiments, a member user identifier **522** is a unique identifier for representing a user within a member platform. The member user identifier, for example, may include a sequence of numeric, alpha-numeric, any/or any other characters or symbols that represent a user to the service provider platform **440**.

[0162] In some embodiments, a user reference **502** may be a unique identifier for referencing a member user identifier **522**. The user reference **502**, for example, may be generated and/or provided by a member platform to an exchange platform **102** to allow the exchange platform **102** to reference a user associated with the member platform. In some examples, the user reference **502** is the same value as the member user identifier **522**. In some examples, the user reference **502** is a different value that is mapped to the member user identifier **522**.

[0163] In some embodiments, a user key is a unique identifier for referencing a system user identifier. The user key, for example, may be generated and/or provided by the exchange platform **102** during a registration process of a user with the exchange platform **102**. In some examples, the user key may include a wrapped system user identifier. For example, the user key may include a string of alpha-numeric characters that are formatted according to a key format established by the exchange platform (and/or one or more APIs thereof). The key format, for example, may include a first portion of the characters (e.g., the first six characters) that may be reserved as a partition for identifying an entity (e.g., a member, etc.) associated with the key. For example, for a user key, the partition may include a service provider partition **504** and/or a partner partition. A second portion of the characters may identify the system user identifier.

[0164] As illustrated by FIG. **5**, the keys **516**, such as the user and instrument keys described herein, may be shared across the exchange platform **102** and the service provider platform **440**. In addition, in some examples, references, such as the instrument reference **520** and user reference **502**, may be shared across entities. These identifiers, and the mapping schemes described herein, allow the exchange platform **102** to reference a service provider instrument **518** without knowledge of persistent credentials **514** (e.g., card numbers, etc.) of the service provider instrument **518**. As described herein, one or more of the keys **516** and/or references may be provided to the service provider platform **440** individually, or in any combination. In some examples, each of the keys **516** and the references may be provided to the service provider platform **440** in a redundant process that allows the service provider platform to verify that a communication is provided by the exchange platform **102** (e.g., an entity with access to the specific set of keys and references, etc.).

[0165] In some embodiments, persistent credentials **514** for a service provider instrument **518** include sensitive user and/or instrument credentials, such as a card number, account number, subscription number, and/or the like, that may expose a user, member, and/or intermediary entity to risk. The persistent credentials **514** may be generated, accessed, and/or otherwise provided by a service provider platform **440** to a user when a user applies for, is authorized for, and/or otherwise is enabled to open a new service provider instrument **518**. Traditionally, persistent credentials **514** are then used by the user to initiate value exchanges using the service provider instrument. By doing so, the user is forced to expose sensitive credentials that are tied directly to the service provider instrument **518** each time the service provider instrument **518** is used. The keys **516**, references,

and identifier mapping scheme of the present disclosure overcome these technical deficiencies.

[0166] In some examples, each of the identifiers are interpretable to a computing platform, such as the exchange platform **102** and/or service provider platform **440**, but not the user. To enable the user to select a service provider instrument **518** while maintaining the enhanced security features of the present disclosure, in some examples, the identifiers of FIG. **5** may be further enhanced with instrument representations.

[0167] In some embodiments, an instrument representation (not depicted by FIG. **5**) is a unique identifier for representing a service provider instrument **518** to a user, without exposing the persistent credentials **514** of the service provider instrument **518**. The instrument representation, for example, may include a sequence of numeric, alpha-numeric, any/or any other characters or symbols that are outwardly representative of a service provider instrument **518** only to entities with previous knowledge of service provider instrument **518**. The format and/or value of an instrument representation may be based at least in part on the type of service provider and/or service provider instrument **518**. For instance, in a financial value system, an instrument representation may include a portion (e.g., the last four digits, etc.) of the persistent credentials **514**, such as a card number (e.g., debit card, credit card, etc.), a financial account number, and/or the like. As another example, in an information value system, an instrument representation may include a portion (e.g., one or more digits, alpha-numeric characters, etc.) of persistent credentials **514**, such as a subscription account, and/or the like. For instance, the instrument representation may include a derivative of persistent credentials **514** that may only allow entities with prior knowledge of the persistent credentials **514** to identify the persistent credentials **514** using the instrument representation. As another example, the instrument representation may include an instrument nickname that is assigned by and thereafter recognized by a user.

[0168] In some embodiments, the instrument representation may be provided (e.g., during a registration process) the exchange platform **102** in place of the persistent credentials **514**. In this manner, the exchange platform **102** may represent the service provider instrument **518** using the instrument representation without knowledge of the persistent credentials **514** from which the instrument representation may be derived. For example, unlike traditional network-based exchange platforms, the exchange platform **102** may not require the persistent credentials **514** corresponding to a service provider instrument **518** to implement various computing tasks of the present disclosure. This, in turn, allows the exchange platform **102** to operate more flexibly, while storing previously unrecorded contextual data, lowering operational computing costs, and improving user and platform safeguards from infiltration attacks by malicious computing entities.

[0169] In some embodiments, the identifier mapping scheme is supplemented by unique ephemeral keys that are issued to member platforms to facilitate secure, real time value exchanges. For example, the exchange platform **102** may facilitate additional layers of network and data security by implementing exchange identifiers **510** for representing aspects of a value-based exchange. Some examples of exchange identifiers **510** may include a service provider-specific exchange identifier and/or the partner-specific exchange identifier. A service provider-specific exchange identifier may include an ephemeral, unique exchange identifier that temporarily represents the service provider instrument **518** and the service provider platform **440**. The service provider-specific exchange identifier, for example, may be mapped to the system identifiers **512** for the service provider instrument **518**. A partner-specific exchange identifier may include an ephemeral, unique exchange identifier that temporarily represents the service provider instrument **518** and a partner platform. The partner-specific exchange identifier, for example, may be mapped to the keys **516** for the service provider instrument **518** which may be used to identify the service provider platform **440**. In some examples, such mapping may be defined by exchange data objects.

[0170] In some embodiments, an exchange data object is a data entity that represents an authorized value exchange between one or more members associated with the exchange platform **102**. In some examples, the exchange data object may include one or more identifiers and/or one or more exchange attributes. For example, the one or more identifiers and/or one or more exchange attributes may be based on a type of exchange data object. By way of example, an exchange may be represented in a member platform as a member exchange data object. In addition, or alternatively, the exchange may be independently represented by a system exchange data object in the exchange platform **102**. In some examples, the member exchange data object and the system exchange data object may include one or more of the same one or more identifiers and/or exchange attributes. By way of example, using some of the techniques of the present disclosure, the exchange platform **102** may issue one or more unique identifiers to a member platform that may be used to authorize a value exchange.

[0171] In some embodiments, the system exchange data object is an internal representation of a value exchange that is intermediated using the exchange platform **102**. In some examples, the system exchange data object may include one or more different identifiers and/or exchange attributes depending on the role of the system exchange data object in a value-based exchange.

[0172] For example, a system exchange data object may include a service provider-specific exchange data object that corresponds to the service provider platform **440**. The service provider-specific exchange data object may include one or more identifiers, such as an exchange identifier **510**, system identifiers **512**, such as the system user identifier and/or the system instrument identifier, an UUEK **524**, and/or the like. In addition, or alternatively, the service provider-specific exchange data object may include one or more exchange attributes, such as an expiration date, a currency (e.g., for a financial value system, etc.), and/or the like.

[0173] In addition, or alternatively, the system exchange data object may include a partner-specific exchange data object that corresponds to a partner platform. The partner-specific exchange data object may include one or more identifiers, such as an exchange identifier **510**, one or more keys **516**, such as an instrument key, an UUEK **524**, a member instrument reference (e.g., a partner-specific instrument reference, etc.), and/or the like. In addition, or alternatively, the partner-specific exchange data object may include one or more exchange attributes, such as an expiration date, a currency (e.g., for a financial value system, etc.), an instrument type, and/or the like.

[0174] In some embodiments, a member exchange data object is an external representation of a value exchange that is intermediated using the exchange platform **102**. The member exchange data object may include one or more identifiers, such as a member exchange identifier, a member instrument identifier **508**, an UUEK **524** from the exchange platform **102**, and/or the like.

[0175] In some embodiments, an exchange identifier **510** is a unique identifier for an exchange of value using the exchange platform **102**. The exchange identifier **510** may include a sequence of numeric, alpha-numeric, any/or any other characters or symbols that are representative of at least a user and/or a service provider instrument **518**. In some examples, the exchange identifier **510** may include a universally unique identifier (UUID) that may be mapped (e.g., through a series of identifiers, etc.) to a user, a service provider instrument **518**, and/or a member registered with the exchange platform **102**. In some examples, the exchange identifier **510** may be generated using one or more UUID generators. For instance, the exchange identifier **510** may include sixteen bytes of information generated in accordance with one or more UUID formatting standards, such as UUID v4, and/or the like. Therefore, while the exchange identifier **510** may be leveraged by the exchange platform **102** and/or a member platform for one or more functions, the same exchange identifier **510** will be useless to external parties without a prior association between the exchange identifier **510** and one or more other identifiers. In addition to the prior identifier associations, the exchange identifier **510** may be associated with the exchange platform **102**. Thus, even if the exchange identifier **510** is identified by an adverse party, the adverse party would still be required to impersonate the exchange platform **102** in order to use the exchange identifier **510**. Moreover, the adverse party would need to update settlement accounts to accounts owned by the adverse party, among a number of other tasks before the exchange identifier **510** may be used adversely. Each of these tasks increase the amount of work necessary to overcome the layers of enhanced security added by the exchange identifier **510**. When paired with the ephemeral nature of the exchange identifier **510**, these tasks may become prohibitively expensive.

[0176] In some examples, the exchange identifier **510** may be externally represented by a UUEK **524**. By way of example, to facilitate credential-less exchanges, the exchange platform **102** may issue one or more UUEKs **524** to one or more member platforms. As described herein, the UUEKs **524** may eliminate the reliance on traditional, persistent credentials **514** by identifying aspects of a value exchange through previously mapped data entities.

[0177] In some embodiments, a UUEK **524** is an external representation of an exchange identifier **510** that may be issued (e.g., in place of the exchange identifier **510**) to an external entity, such as a user, partner platform, and/or service provider platform, and/or the like, to initiate a value-based exchange using the exchange platform **102**. To do so, the UUEK **524** may be generated and issued by the exchange platform **102** to the external entity. Each UUEK **524** may include a plurality of values (e.g., up to fifty characters and/or more that may or may not be case sensitive) that represent one or more aspects of a value-based exchange. For example, the plurality of values may be indicative of an exchange identifier **510**, a partition (e.g., identifying the recipient of the UUEK **524**, etc.), an identifier type, and/or one or more flags. By way of example, an UUEK **524** may include a partner-specific UUEK and/or a service provider-specific UUEK. The partner-specific UUEK may be correlated to a partner-specific exchange data object and may include a partner partition **506**, whereas a service provider-specific UUEK may be correlated to a service provider-specific exchange data object and may include a service provider partition **504**, as described herein

[0178] By way of example, an UUEK **524** may be generated in accordance with a key format. The key format may include a plurality of characters including, for example, fifty characters or more that may or may not be case sensitive. A first portion of the characters (e.g., the first six characters) may be reserved as a partition for identifying a recipient of the UUEK **524**. The partition, for example, may include a partner partition **506**, a service provider partition **504**, and/or any other member partition. By way of example, an UUEK **524** may be issued in response to a request from an authorized member, such as an affiliated partner and/or service provider.

[0179] In addition, or alternatively, at least one character (e.g., a seventh character) of the key format may identify a format of the UUEK **524**. At least another character (e.g., an eighth character) may identify a type of UUEK **524**. In some examples, a second portion of the characters may identify an exchange identifier **510** (e.g., a group of twenty-two characters following the eighth character). A third portion of characters may be reserved (e.g., a group of twenty characters following the first portion of characters). An example representation is provided below:

[0180] ppppppFiGGGGGGGGGGGGGGGGGGGGG-Grrrrrrrrrrrrrrrrr

where p represents partition characters, F represents a format character, i represents an identifier type character, G represents the exchange identifier **510**, and r represents reserved characters. The key format allows for 9.8×10 to the 84 unique permutations, which is more than the number of atoms in the known observable universe. This enables the generation and distribution of new UUEKs **524** on-demand without compromising the security of underlying data to which the UUEKs **524** may be mapped, such as identifiers for a user, an instrument, and/or any other potentially sensitive information.

[0181] As described herein, the unique sequences of identifiers and mapping schemes between the identifiers may facilitate a credential-less value exchange system for enrolled and/or unenrolled entities. In some examples, one or more of the identifiers may be generated through a registration or enrollment process configured to establish a cross-entity relationship between a user, partner, and service provider entities. An example process for establishing a cross-entity relationship will now further be described with reference to FIGS. **6**A-C.

V. EXAMPLE NETWORK EXCHANGE OPERATIONS

[0182] FIGS. **6**A-C provide process flows for establishing a cross-entity relationship in accordance with one or more embodiments of the present disclosure. The process flows illustrate one or more stages of an enrollment process **600** for enrolling a user and/or a service provider instrument with an exchange platform to facilitate a credential-less value exchange between a partner platform and a service provider platform. FIGS. **6**A-C illustrate an example process **600** for

explanatory purposes. Although the example process **600** depicts a particular sequence of steps/operations, the sequence may be altered without departing from the scope of the present disclosure. For example, some of the steps/operations depicted may be performed in parallel or in a different sequence that does not materially impact the function of the process **600**. In other examples, different components of an example device or system that implements the process **600** may perform functions at substantially the same time or in a specific sequence.

[0183] Various embodiments of the process **600** address technical challenges related to the data security and efficiency of network-based exchanges in a value exchange between one or more computing entities. Traditional systems address these challenges using enrollment mechanisms that require a user to expose sensitive and persistent credentials to a third-party enrollment service. These traditional enrollment services then validate a user's account ownership and provide the persistent credentials to a partner platform for storage and subsequent processing. By doing so, user credentials are transmitted and exposed to multiple different entities during the course of traditional enrollment processes ultimately increasing the risk of exposure to malicious parties during and after network communications. Various embodiments of the process **600** provide improved network communication, data encryption, and data management techniques for enabling a credential-less exchange enrollment capability that reduces the data security risks imposed by traditional processes.

[0184] One or more embodiments of the process **600** may be implemented by one or more computing devices, entities, and/or systems described herein. For example, via the various steps/operations of the process **600**, the exchange platform **102** may leverage the credential-less enrollment techniques to overcome the various limitations with traditional enrollment mechanisms by enrolling a service provider instrument with a partner platform without access to persistent credentials of the service provider instrument. By doing so, sensitive information underlying a service provider instrument for engaging in a value exchange is never exposed to potentially malicious parties or a partner platform that may be susceptible to network-based attacks. For instance, unlike traditional techniques the exchange platform **102** never receives identifiable or operable account information for the user, whereas a service provider that manages the account is engaged in the enrollment process rather than being disintermediated by a potentially insecure enrollment service. This, in turn, removes the need to implement resource data governance standards across each device involved in an enrollment process, ultimately resulting in improved computing resource utilization, while enhancing network and data security.

[0185] FIG. **6**A is a flowchart showing an example of a first stage of an enrollment process **600** for enrolling a user with an exchange platform without exposing persistent credentials associated with the user and/or a service provider instrument. The flowchart depicts communication techniques to overcome various limitations of traditional enrollment systems by circumventing traditional systems' reliance on sensitive and persistent credentials. The communication techniques may be implemented by one or more computing devices, entities, and/or systems described herein, such as the exchange platform to establish a secure communication session with a user through a partner application.

[0186] In some embodiments, the process **600** includes, at step/operation **602**, establishing an enrollment session for a user and a partner platform. For example, the enrollment process **600** may begin on a partner application (e.g., a partner website, user application, etc.) at which point the partner platform may allow a user to enroll a partner account on the partner application with the exchange platform to facilitate access to a service provider instrument. The partner platform may enable the enrollment of the user by initiating an enrollment session with the exchange platform.

[0187] For example, a user may access the partner application through a portal, such as a browser, web application, and/or the like, via a client device, as described herein. The user's browser, web application, mobile application, and/or the like may fetch a platform connect widget from the content delivery network (CDN) and issue a communication session request to the partner platform to establish the enrollment session. In response to the request, the partner platform may generate (e.g., using one or more exchange interfaces, etc.) a communication session request for the exchange platform (e.g., a partner service thereof). The communication session request may include an API request, provided through the partner interface, to initiate an enrollment widget for establishing an enrollment session for the user.

[0188] In some embodiments, the communication session request includes one or more enrollment attributes, such as user data, user identifiers, user hashes, time stamps, device identifiers, partner identifiers, and/or the like. As described herein, some techniques of the present disclosure enable a computing entity to identify a service provider instrument using identifiers without including persistent credentials of the service provider instrument with the communication session request. For instance, the partner platform may be configured to obtain user data for the user (e.g., through user input to a user interface screen, pre-recorded data from a partner account, etc.) and provide the user data to the exchange platform to begin the enrollment process. In some examples, the user data may be provided by the partner platform (e.g., through one or more API calls of the partner interface, etc.) with the communication session request to the exchange platform (e.g., a partner service thereof) to initialize a widget session. In some examples, the user data may be encrypted, hashed, and/or the like before transmission to the exchange platform. In some examples, the user data may include one or more user attributes as described herein.

[0189] In some embodiments, the exchange platform (e.g., a partner service thereof) receives, using the partner interface, the communication session request to initialize the enrollment session at the client device of the user. In some examples, the communication session request may include user data for the user. In addition, or alternatively, the enrollment initialization request may include one or more user attributes for the user. In some examples, the user attributes may be encrypted and/or hashed as described herein.

[0190] In some embodiments, the process **600** includes, at step/operation **604**, setting user and partner data. For example, the exchange platform (e.g., the connect service, partner service, etc. thereof) may identify and/or generate user and/or partner data from the data provided in the communication session request. In some examples, the user data may include one or more user attributes. In some

examples, the user data may include one or more encrypted and/or hashed user attributes. In some examples, the partner data may include a shared identifier between the exchange platform and the partner platform, such as a partner partition as described herein.

[0191] In some embodiments, the process **600** includes, at step/operation **606**, generating a session identifier for the enrollment session. For example, the exchange platform (e.g., a connect service, partner service, etc. thereof) may generate a session identifier for a communication session between a partner platform and the exchange platform to track communications exchanged during the enrollment session. The session identifier, for example, may include a unique number, string of characters, and/or the like for authenticating messages exchanged during the course of an enrollment session. The exchange platform may utilize a connect service and/or the partner service to establish the enrollment session. For example, in response to the enrollment initialization request, a partner service may call another service, such as the connect service, to establish a communication session that may be used by a client-side widget to provide an interface between a user and the partner service to complete a user enrollment. The connect service may generate the session identifier and return the session identifier to the partner service. The partner service may return the session identifier to the partner platform, which may utilize the session identifier to initialize a client-side widget through an instance of the partner application on a client device. Once the partner application receives the session identifier, the partner application may start up (e.g., execute, initialize, etc.) the client-side widget. The user may then interact with the widget to complete the enrollment process **600**.

[0192] In some embodiments, the process **600** includes, at step/operation **608**, determining and providing a member list for the user. The member list may be a service provider list. For example, the exchange platform (e.g., the connect service, partner service, etc. thereof) may determine the service provider list for the user from a network of service providers that are affiliated with (e.g., registered with, etc.) the exchange platform. In some examples, the service provider list may include each service provider platform affiliated with the exchange platform. In addition, or alternatively, the service provider list may include a subset of the affiliated service provider platforms that is tailored to the user.

[0193] For example, the exchange platform may determine one or more service provider platforms based at least in part on the user attributes for the enrollment session and tailor the service provider list to the one or more service provider platforms. By way of example, the exchange platform may include a plurality of system user data objects and/or system instrument data objects, as described herein. In some examples, the exchange platform may identify one or more system user data objects corresponding to the user based on the user attributes. In some examples, each system user data object may identify a service provider platform affiliated with the user. In this manner, the exchange platform may determine one or more service providers affiliated with the user based on the one or more system user data objects.

[0194] In addition, or alternatively, the exchange platform (e.g., one or more service provider services thereof) may provide a presence request for user presence data (e.g., via a service provider interface) from each of the service provider platforms in the network of member platforms. The user presence request may include one or more user attributes (e.g., encrypted attributes, hashed attributes, etc.) for the user that may be leveraged by the service provider platforms to determine whether a user has an instrument with the service provider platforms. In response to the request, the exchange platform (e.g., one or more service provider services thereof) may receive presence data from one or more of the service provider platforms that is indicative of the presence of an instrument with the respective service provider platforms. The exchange platform (e.g., partner service thereof) may determine the one or more service providers based at least in part on the presence data.

[0195] In some examples, the exchange platform (e.g., the connect service, partner service, etc. thereof) may initiate, using the partner interface and via an enrollment user interface provided by a partner application, the presentation of a pre-enrollment screen based at least in part on the one or more service providers. The client device, for example, may be configured to access a partner application that is hosted by the partner platform. The enrollment user interface may be presented to the user on the client device through a widget within the partner application. The widget can be internally defined by the partner or can be provided by the exchange platform. The pre-enrollment screen may present a plurality of selectable icons indicative of the service provider list.

[0196] Next, the enrollment process **600** may proceed to a second stage, in which an instrument identifier corresponding to the user is identified through interactions between the exchange platform, the user, and the service provider platform, as described in further detail with reference to FIG. **6**B.

[0197] Referring now to FIG. **6**B, FIG. **6**B is a flowchart showing an example of a second stage of an enrollment process **600** for enrolling a service provider instrument with a partner platform without exposing persistent credentials associated with the user and/or a service provider instrument. The flowchart depicts communication techniques to overcome various limitations of traditional enrollment systems by circumventing traditional systems' reliance on persistent credentials, such as a card number, and/or the like, provided by a user. The communication techniques may be implemented by one or more computing devices, entities, and/or systems described herein, such as the exchange platform to establish a connection between a user, a partner platform, and a service provider instrument.

[0198] In some embodiments, the process **600** includes, at step/operation **610**, determining and providing a service provider instrument list for a user. The service provider instrument list may be determined based at least in part on a selection of a service provider from the pre-enrollment screen. For instance, in some examples, the exchange platform (e.g., the connect service, partner service, etc. thereof) may receive, using the partner interface, pre-selection data indicative of a selection of a particular service provider from the one or more service providers presented by the pre-enrollment screen. For instance, the widget may receive the pre-selection data from the partner application and provide an instrument registration request (e.g., via the partner interface) to the exchange platform (e.g., the connect service, partner service, etc. thereof). The instrument registra-

tion request may include the session identifier and/or a service provider identifier indicative of a selected service provider.

[0199] Responsive to the request, the exchange platform (e.g., connect service, partner service, etc. thereof) may receive service provider-instrument data based at least in part on the pre-selection data. The service provider-instrument data may be indicative of the one or more service provider instruments for the user that are facilitated by the selected service provider platform. For example, the service provider-instrument data may include one or more system instrument identifiers and/or corresponding instrument representations from one or more instrument data objects that correspond to the service provider and the user. Each of the instrument data objects, for example, may include a system user identifier that corresponds to the user.

[0200] In addition, or alternatively, the exchange platform (e.g., one or more service provider services thereof) may provide an instrument request for the service provider-instrument data (e.g., via a service provider interface) from the selected service provider platform. The instrument request, for example, may include a user reference that corresponds to a member user identifier of the service provider platform. In response to the request, the service provider platform may identify one or more member instrument data objects that include the member user identifier, identify one or more instrument references corresponding to the one or more member instrument data objects, and provide service provider-instrument data to the exchange platform that is indicative of the one or more instrument references and/or one or more corresponding instrument representations.

[0201] The exchange platform (e.g., connect service, partner service, etc. thereof) may initiate, using the partner interface and via the enrollment user interface, the presentation of an instrument enrollment screen via the client device of the user based at least in part on the service provider-instrument data. The instrument enrollment screen may be internally defined by the partner and/or be provided by the exchange platform. The instrument enrollment screen, for example, may be indicative of one or more service provider instruments associated with the user and the selected service provider. By way of example, the instrument enrollment screen may be indicative of a respective instrument representation for each of the one or more service provider instruments. In some examples, for instance when the user is only affiliated with a single service provider instrument, the instrument enrollment screen may include a confirmation prompt to confirm the user's intention to enroll the service provider instrument.

[0202] In some embodiments, the process **600** includes, at step/operation **612**, receiving selection data. The selection data, for example, may be indicative of a selection of a service provider instrument from the enrollment user interface. By way of example, the selection data may identify a service provider instrument from the service provider instrument list affiliated with the user. In addition, or alternatively, the selection data may be indicative of a confirmation of a single service provider instrument that is affiliated with the user. In some examples, the selection data may be received through an enrollment user interface overlaid to a central user interface, as described herein with reference to FIG. **13**.

[0203] For example, the exchange platform may receive, using the partner interface, a register instrument with account request from the client-side widget. The request may include selection data and/or the session identifier. The selection data may be indicative of a selection of a service provider instrument from the enrollment user interface. For example, the selection data may be indicative of an instrument representation (e.g., last four digits of an account, an account nickname, etc.) for a selected service provider instrument. In some examples, the selection data may include at least one of an instrument type, a currency type (e.g., in a financial value system), and/or an instrument identifier (e.g., instrument representation, etc.) corresponding to the selection.

[0204] In some embodiments, the client-side widget may be configured to authenticate the user before initiating the register instrument with account request. For example, the client-side widget may be configured to generate a user verification prompt based at least in part on the user data. The user verification prompt is indicative of a confirmation request for at least one portion of the user data. In some examples, the widget may be configured to present the user verification prompt to the user. In some embodiments, the exchange platform may initiate, using the partner interface, the presentation of the user verification prompt. In response to user input indicative of a confirmation of at least a portion (e.g., one or more user attributes, etc.) of the user data, the widget may provide the register instrument with account request to the exchange platform.

[0205] In some examples, the user verification prompt may be provided in response to an initial, client-side authentication through one or more security mechanisms of the client device. For example, the one or more security mechanisms may comprise a biometric-based authentication (e.g., fingerprint, facial recognition, eye recognition), a personal identification number (PIN) authentication, and/or the like. The client-side widget may request an initial, client-side authentication and, in response to a verification of the user, provide the user verification prompt. In addition, or alternatively, the initial, client-side authentication may replace the user verification prompt.

[0206] In some embodiments, the process **600** includes, at step/operation **614**, generating a matching code. In some examples, the exchange platform (e.g., the connect service, partner service, etc. thereof) may generate the matching code. In some examples, the matching code may be generated in response to the user input indicative of a confirmation of the at one portion of the user data and/or the register instrument with account request indicative of the confirmation. The exchange platform (e.g., connect service, partner service, etc. thereof) may generate the matching code for authenticating the user.

[0207] In some embodiments, the matching code is a session-unique identifier for authorizing an enrollment session between one or more entities. The matching code, for example, may include a sequence of numeric, alpha-numeric, and/or the like characters that may be provided to multiple entities to ensure that each of the entities is involved in the same communication sequence. By way of example, a matching code may include a sequence of one or more distinct characters of a dynamic length (e.g., six, eight characters, etc.) that may be generated by the exchange platform, provided to a service provider platform, and then received from a partner platform to ensure that the exchange platform, the service provider platform, and the partner platform are each interacting with the same end user (e.g., by

comparing a received matching code to a generated matching code as described herein). The one or more distinct characters may include one or more alpha-numeric, emoji, kanji, wingdings, and/or the like.

[0208] In some embodiments, the process **600** includes, at step/operation **616**, providing an enrollment request with the matching code to the service provider platform corresponding to the service provider instrument. For example, the exchange platform (e.g., a service provider service, etc. thereof) may provide, using the service provider interface, an enrollment request to a service provider platform corresponding to the service provider instrument. The enrollment request may include service provider enrollment data indicative of the matching code, one or more user identifiers for the user, and/or one or more instrument identifiers for the service provider instrument. In response to the enrollment request, the service provider platform may verify the service provider instrument using the one or more identifiers.

[0209] The service provider enrollment data, for example, may include one or more identifiers for referencing the service provider instrument without using the persistent credentials for the service provider instrument (e.g., card number, account number, etc.) in communications between the exchange platform, the service provider platform, and/or the partner platform. The one or more identifiers, for example, may include various combinations of user identifiers and/or instrument identifiers to validate a user and/or instrument through one or more redundancy checks. For example, the user identifiers for the user may include a user reference for the service provider platform and/or a user key from the exchange platform that corresponds to the user reference. As another example, the instrument identifiers for the service provider instrument may include an instrument reference for the service provider platform and/or an instrument key from the exchange platform that corresponds to the instrument reference.

[0210] The service provider enrollment data may include any combination of references, keys, and/or identifiers described herein. In one example, the service provider enrollment data may include one of the instrument reference, instrument key, user reference, and/or user key. In addition, or alternatively, the service provider enrollment data may include a combination of the corresponding instrument reference, instrument key, user reference, and user key for built in redundancies. In some examples, a combination of identifiers may be specified by an interface call. The combination may be service provider specific and/or be dynamically changed according to a communication scheme. In this way, the specific combination of identifiers provided in an enrollment request may be leveraged as an additional verification check to ensure that the enrollment request is received from an affiliated platform, such as the exchange platform.

[0211] The service provider may compare the identifiers from the enrollment request to one or more member data objects (e.g., a member instrument data object, a member user data object, etc.) to identify a service provider instrument corresponding to the enrollment request without exposing the persistent credentials of the service provider instrument.

[0212] In some embodiments, the process **600** includes, at step/operation **618**, receiving a matching code from the partner platform. For example, the exchange platform may receive, using the partner API, an authentication message that includes the matching code and/or the session identifier. The authentication message may be received from the partner platform in response to user input to the enrollment user interface.

[0213] The exchange platform may compare the matching code to the previously generated matching code to authenticate the user. For example, the service provider platform may be configured to provide the matching code to the user through one or more preexisting communication protocols (e.g., via a service provider application, a registered phone number, an email address, etc.) between the service provider platform and the user. In the event that the exchange platform receives the matching code from a partner platform, the exchange platform may verify that the user interacting with the partner platform is an authorized user of the service provider.

[0214] In some examples, the exchange platform may initiate, using the partner interface and via the enrollment user interface, a presentation of an authentication user screen. At substantially the same time, the service provider platform may provide the matching code to the user (e.g., via the client device, and/or other pre-configured means). The user may enter the matching code (e.g., received from the service provider platform) through the authentication user screen and the partner platform may forward the matching code to the exchange platform. The exchange platform may receive, using the partner interface, the authentication message based at least in part on the user input to the authentication user screen.

[0215] In some embodiments, the exchange platform authenticates the enrollment session in response to the authentication of the user based at least in part on the matching code. Upon successful enrollment, control is passed back to the partner application running on the client device, which requests an UUEK, as described in further detail with reference to FIG. **6**C.

[0216] Referring now to FIG. **6**C, FIG. **6**C is a flowchart showing an example of a third stage of an enrollment process **600** for issuing an UUEK for facilitating a credential-less exchange of value. The flowchart depicts communication techniques to overcome various limitations of traditional enrollment systems by circumventing traditional systems' reliance on instrument references, such as a card number, and/or the like, provided by a user. The communication techniques may be implemented by one or more computing devices, entities, and/or systems described herein, such as the exchange platform to establish a user-instrument record for enrolling a user with the exchange platform.

[0217] In some embodiments, the process **600** includes, at step/operation **620**, validating the enrollment session based at least in part on a session identifier. For example, the exchange platform may receive, via the partner interface, a session exchange request for exchanging the session identifier for an UUEK. The session exchange request may include the session identifier and a member instrument reference for the service provider instrument. The member instrument reference may include a partner specific reference for the service provider instrument. The exchange platform (e.g., partner service thereof) may receive the session exchange request, validate (e.g., via the connect service, partner service, etc. thereof) the session identifier by

comparing the session identifier to the previously generated session identifier, and, in response to match, validate the enrollment session.

[0218] In some embodiments, the process **600** includes, at step/operation **622**, generating an UUEK. For example, the exchange platform may generate an UUEK in response to a validation of the enrollment session. By way of example, the exchange platform may generate an UUEK that corresponds to the user, the service provider instrument, and the partner platform. The exchange platform may store the UUEK in a partner-specific exchange data object that associates the UUEK with an exchange identifier, an instrument key, and the partner-specific instrument reference, as described herein.

[0219] In some embodiments, the process **600** includes, at step/operation **624**, providing the UUEK to the partner platform. For example, the exchange platform may provide, using the partner interface, data indicative of the UUEK to the partner platform. In some examples, the partner platform may provide the UUEK and/or a representation thereof to the user (e.g., for storage in a repository associated with an intermediate application). By way of example, the UUEK may be represented in one or more different forms, such as a machine readable optical image (e.g., barcode, quick response code, etc.), a keyword, a virtual widget, and/or the like. In some examples, the UUEK may be stored within a software container and/or a UUEK representation may be provided in response to user input to an exchange container icon corresponding to the software container, as described herein with reference to FIG. **13**.

[0220] FIGS. **7**A-D provide message flow diagrams illustrating steps/operations for establishing a cross-entity relationship in relation to FIGS. **6**A-C. As will be recognized, these may be executed and carried out with the corresponding steps/operations of FIGS. **6**A-C. In general, the steps/operations for establishing a secure communication session with a user through a partner application as illustrated in FIGS. **7**A-B may be applicable and/or be related to the step/operations of FIG. **6**A. For example, the steps/operations illustrated in FIGS. **7**A-B may correspond to and/or be related to certain operations of the first stage of the enrollment process **600** for enrolling a service provider instrument with a partner platform without exposing persistent credentials associated with the user and/or a service provider instrument.

[0221] At step/operation **702**, a partner application **416** fetches a widget (e.g., a set of instructions, such as a javascript widget, etc.) from the connect service **408**. At step/operation **704**, the connect service **408** returns the widget and creates a session. In various embodiments, step/operation **704** is performed responsive to step/operation **702**.

[0222] At step/operation **706**, the partner application **416** initiates the widget using the partner platform **420** (e.g., a host, etc.). At step/operation **708**, the partner platform **420** initializes the widget by calling, using a partner interface (e.g., an Initialize-widget call, etc.), a widget initialization function of the partner service **410**. In some examples, the widget initialization call may include user data, such as one or more user attributes. At step/operation **710**, the partner service **410** retrieves and initializes the widget, using the partner interface (e.g., an Initialize-widget call, etc.), by calling the connect service **408**. In various embodiments, step/operation **710** is performed responsive to step/operation **708**.

[0223] At step/operation **712**, the connect service **408** stores a partner identifier for the partner corresponding to the partner platform **420**. At step/operation **714**, the connect service **408** stores the user data for the user. At step/operation **716**, the connect service **408** generates a session identifier for identifying the communication session between the partner and exchange platform. At step/operation **718**, the connect service **408** provides the session identifier to the partner service **410**. At step/operation **720**, the partner service **410** returns the session identifier to the partner platform **420**. And, at step/operation **722**, the partner platform **420** returns the session identifier to the partner application **416**. In various embodiments, upon execution of step/operation **722**, a communication session may be initialized.

[0224] Turning to FIG. **7**B, at step/operation **728**, the partner application **416** executes the widget **724** and hands over control to the widget **724** to continue the enrollment process. The widget **724** is provided with the session identifier and the user data. At step/operation **730**, the widget **724** sets the session identifier. At step/operation **732**, the widget **724** sets the user data. At step/operation **734**, the widget **724** requests, using the partner interface, public keys from the connect service **408**. At step/operation **736**, the connect service **408** returns the public keys to the widget **724**. At step/operation **738**, the widget **724** requests, using the partner interface, a service provider list from the connect service **408**. And, at step/operation **740**, the connect service **408** returns the service provider list. In some examples, at step/operation **742**, the widget **724** returns the service provider list to the partner application **416** for presentation to a user (e.g., via a client device).

[0225] Turning to FIG. **7**C, the enrollment process may proceed to a second stage, illustrated by the step/operations of FIG. **7**C, after establishing a secure communication session with a partner application. In general, the steps/operations illustrated in FIG. **7**C may be applicable and/or be related to the step/operations of FIG. **6**B. For example, the steps/operations illustrated in FIG. **7**C may correspond to and/or be related to certain operations of the second stage of the enrollment process **600** for enrolling a service provider instrument with a partner platform without exposing persistent credentials associated with the user and/or a service provider instrument.

[0226] At step/operation **744**, the partner application **416** receives input indicative of a service provider from the service provider list and transmits a service provider identifier to the widget **724**. At step/operation **746**, the widget **724** transmits, using the partner interface (e.g., a widget register instrument initiate call, etc.), a request to the connect service **408** to initiate the registration of a service provider instrument for the service provider platform. The request may include the service provider identifier (e.g., a service provider partition, etc.). At step/operation **748**, the connect service **408** requests, using the partner interface (e.g., a widget register instrument initiate call, etc.), an instrument list corresponding to the user and service provider. At step/operation **750**, the service provider service **412** returns an instrument list to the connect service **408** At step/operation **752**, the connect service **408** returns the instrument list to the widget **724**, which may provide a pre-

enrollment screen indicative of the instrument list (e.g., one or more instrument representations thereof) to a user.

[0227] At step/operation **754**, the widget **724** receives input indicative of a service provider instrument (e.g., an instrument representation, etc.). At step/operation **756**, the widget **724** confirms user data with the user (e.g., through one or more user verification screens, etc.). At step/operation **758**, the widget **724** provides, using the partner interface (e.g., a widget registration instrument with account call, etc.), a request to register the service provider instrument to the connect service **408**. In various embodiments, step/operation **758** is performed responsive to a confirmation of user data at step/operation **756**.

[0228] At step/operation **760**, the connect service **408** generates a matching code. At step/operation **762**, the connect service **408** provides, using the partner interface (e.g., a widget registration instrument with account call, etc.), a request to enroll the service provider instrument to the service provider service **412**. The request may include the matching code and the session identifier. At step/operation **764**, the service provider service **412** provides, using the service provider interface (e.g., an enroll user instrument call, etc.), a request to enroll the service provider instrument to the service provider platform **440**. The request may include an instrument reference, a user reference, a user key, an instrument key, and/or the matching code. The service provider platform **440** may enroll the service provider instrument and, at step/operation **766**, provide an enrollment success response, using the service provider interface, to the service provider service **412**. At step/operation **768**, the service provider service **412** provides data indicative of the enrollment success response to the connect service **408**. The connect service **408**, at step/operation **770**, provides data indicative of the enrollment success response to the widget **724**.

[0229] Meanwhile, at step/operation **772**, the service provider platform **440** provides, using one or more preexisting communication channels, the matching code to the user. The user may access the matching code and, at step/operation **774**, enter the matching code to a verification interface presented by the widget **724**.

[0230] At step/operation **776**, the widget **724** provides, using the partner interface, a registration complete response to the connect service **408**. In various embodiments, step/operation **776** is performed responsive to a confirmation of a matching code provided at step/operation **774**.

[0231] At step/operation **778**, the connect service **408** provides a response to the widget **724** indicating a successful registration. At step/operation **780**, the widget **724** provides data indicative of the response to the partner application **416**.

[0232] Turning to FIG. **7**D, the enrollment process may proceed to a third stage, illustrated by the steps/operations of FIG. **7**D, after authorizing the user based at least in part on the confirmation of the matching code as described above. In general, the steps/operations illustrated in FIG. **7**D may be applicable and/or be related to the step/operations of FIG. **6**C. For example, the steps/operations illustrated in FIG. **7**D may correspond to and/or be related to certain operations of the third stage of the enrollment process **600** for enrolling a service provider instrument with a partner platform without exposing persistent credentials associated with the user and/or a service provider instrument.

[0233] At step/operation **782**, the partner application **416** provides data indicative of a successful enrollment to the partner platform **420**. At step/operation **784**, the partner platform **420** provides a key request, using the partner interface, to the partner service **410**. The partner service **410**, at step/operation **786**, validates the communication session by providing the session identifier to the connect service **408**. The connect service **408** compares the session identifier to the identifier issued to initiate the communication session and, if the identifiers match, at step/operation **788**, provides data indicative of the validated session to the partner service **410**.

[0234] At step/operation **790**, the partner service **410** generates a UUEK for the partner and exchanges the session identifier with a UUEK. At step/operation **792**, the partner service **410** provides, using the partner interface, the UUEK to the partner platform **420**. At step/operation **794**, the partner platform **420** may provide an indication of the successful enrollment to the partner application **416**. In some examples, the indication of successful enrollment may include a UUEK representation, such as a barcode, QR code, and/or the like for representing the UUEK to a user.

[0235] Having thus described various operations, processes, methods, functions, and/or the like for enrolling a user for credential-less transactions, various user interface screens for controlling, initiating, executing, and/or the like such steps/operations are provided and described. In various embodiments, the user interface screens provided and described in the present disclosure are configured to be provided via a user interface of a client device **104**.

[0236] FIGS. **8**A-F provide an example user interface flow configured for a client device **104**. The user interface flow may include a plurality of user interface screens that may be configured to guide a user through a credential-less enrollment process to facilitate a credential-less exchange between a partner platform and a service provider platform. In some examples, these transactions may be managed through a user account with the partner platform. For example, the user interface screen **802** of FIG. **8**A includes an account set-up screen for entering user attributes **804** for the user account. The user interface screen **802** may include a selectable account creation icon **806** for initiating the account creation process. In addition, or alternatively, a user may enroll with the partner platform through an exchange screen. For example, the user interface screen **808** of FIG. **8**B includes an enrollment set-up screen for entering one or more user attributes **804** through a widget executed by the partner application. The user interface screen **808** of FIG. **8**B may include a selectable enrollment navigation **810** for proceeding to the next step of the enrollment process.

[0237] The step of the enrollment process may include selecting a service provider for which the user has a service provider instrument that may be enrolled with the partner platform. The user interface screen **812** of FIG. **8**C may facilitate the selection of the service provider by providing a service provider list **814** of selectable icons. In some examples, the service provider list **814** may be automatically matched to the user attributes (e.g., provided through one or more previous user interface screens) available to the user. The service provider list **814**, for example, may be tailored to the user and, in some examples, may be proactively limited to service providers for which the user has an affiliation. As shown by the user interface screen **812**, the service providers may include financial institutions, such as banks, and/or the like, for a financial-based value exchange.

This is provided as one example only. As described herein, the techniques of the present disclosure may be applicable to any value exchange system.

[0238] Upon selection of the service provider, the user may be directed to another user interface screen (not illustrated) to select a service provider instrument for the service provider. Once selected, the exchange platform may execute an enrollment process to enroll the service provider instrument with the partner platform. During the enrollment process, the user may be transitioned to the user interface screen **816** of FIG. **8**D which may include a verification prompt **818** for entering a matching code. As shown, by the user interface screen **820** of FIG. **8**E, the matching code may be automatically provided to the user through a message **822** from a service provider platform. The user may answer the verification prompt **818** by entering the matching code and select the submission icon **824** to complete the enrollment process. The next screen, user interface screen **826** of FIG. **8**F, may display an UUEK representation **828** of an UUEK for the user. The UUEK representation **828**, for example, may include a scannable representation (e.g., a barcode, QR code, non-fungible token, near-field communication sequence, etc.) of an UUEK. The scannable representation may be saved to a partner account of the partner platform to enable the user to execute a value-based transaction using the service provider instrument without referencing persistent credentials of the service provider instrument.

[0239] FIG. **9** provides a process flow for facilitating a credential-less exchange of value in accordance with one or more embodiments of the present disclosure. The process flow depicts a communication and data encryption process **900** for leveraging an UUEK to securely authorize an exchange in a value agnostic exchange. The process **900** may be leveraged to overcome various limitations of traditional exchange systems that expose sensitive and persistent credentials to multiple third parties, as described herein. The process **900** may be implemented by one or more computing devices, entities, and/or systems described herein. For example, via the various steps/operations of the process **900**, the exchange platform may leverage the communication and data encryption techniques to overcome the various limitations with traditional mechanisms of exchange by eliminating reliance on static, sensitive credentials.

[0240] FIG. **9** illustrates an example process **900** for explanatory purposes. Although the example process **900** depicts a particular sequence of steps/operations, the sequence may be altered without departing from the scope of the present disclosure. For example, some of the steps/operations depicted may be performed in parallel or in a different sequence that does not materially impact the function of the process **900**. In other examples, different components of an example device or system that implements the process **900** may perform functions at substantially the same time or in a specific sequence.

[0241] In some examples, the process **900** begins after the enrollment process **600** of FIGS. **6**A-C, where a user and/or partner platform may receive an UUEK for facilitating a credential-less exchange of value. However, the process **900** may also be performed before the enrollment process **600**. For example, the user may obtain an UUEK directly from a service provider platform instead of completing the enrollment process for a partner platform. In the event that an enrollment process **600** is completed, a value-based exchange may be facilitated by the partner platform using the partner interface and an UUEK specific to the partner platform, otherwise the value-based exchange may be facilitated by the partner platform using an UUEK specific to and provided by a service provider platform.

[0242] By way of example, when a user wishes to perform a value-based exchange with a partner at which the user has an enrolled partner account, the partner platform may look up the enrolled partner account and identify an issued UUEK for the user from the partner account for use in authorizing the value-based exchange. In the event that the user wishes to perform a value-based exchange with a partner at which the user does not have an enrolled partner account, the user may present a previously issued UUEK (e.g., issued to a service provider platform, etc.) to the partner platform (e.g., through a partner application, etc.) and the partner platform may use the UUEK for authorizing the value-based exchange.

[0243] In some examples, a user may initiate a request for a credential-less exchange through a request to a member platform, such as the partner and/or service provider platform. In some examples, to initiate the request, the user may interact with a UUEK representation (and/or an icon, such as an exchange container icon preceding or independent of the UUEK representation) that may be associated with one or more security mechanisms. For example, the one or more security mechanisms may comprise a biometric-based authentication (e.g., fingerprint, facial recognition, eye recognition), a PIN authentication, and/or the like. The user may request, via the client device, a credential-less exchange using an instrument previously enrolled with the exchange platform. In response to the request, the client device (e.g., via a member and/or central user interface) may execute a security mechanism, such as a biometric scan, to verify the presence of the user. In response to a verification, the client device may initiate a request to perform the credential-less exchange.

[0244] The partner platform (and/or service provider platform) may generate an exchange request data object for executing the value-based exchange based at least in part on the UUEK for the particular use case (e.g., a partner UUEK when the user has an enrolled account, a service provider UUEK when the user does not have an enrolled account, etc.). The exchange request data object may include request data that identifies the UUEK and transaction attributes for the requested value-based exchange. The process **900** may begin in the event that the partner platform issues an exchange request based on the exchange request data object.

[0245] In some embodiments, the process **900** includes, at step/operation **902**, receiving an exchange request with an UUEK. For example, the exchange platform (e.g., a partner service, etc. thereof) may receive, using a partner interface, an exchange request for executing a value-based exchange. The exchange request may be indicative of the UUEK and/or one or more transaction attributes.

[0246] The transaction attributes may be indicative of one or more characteristics of the requested exchange. For example, the one or more transaction attributes may include at least one transaction attribute that is indicative of a transaction value (e.g., a basket amount, etc.). The transaction value, for example, may include a summation of one or more line items in a financial exchange including one or more modifiers, such as taxes, discounts, and/or the like. Staying with a financial-based value system example, in some examples, the transaction attributes may include (i) an

order number, (ii) one or more line item attributes including a sequence, a line item group, a product code, a description, a quantity, a unit-item, gram, kilogram, etc., a unit amount, a unit tax amount, a line amount (e.g., amount of the line item), a line tax amount, etc., and/or (iii) one or more line item adjustments including a sequence, an adjustment type (e.g., manufactures discount, a store discount, a return, a payment cash, a payment gift card, payment other, etc.,), a product code, a description, a quantity, a unit-item, gram, kilogram, etc., a unit amount, a unit tax amount, a line amount (e.g., amount of the line item), a line tax amount, and/or the like.

[0247] In addition, or alternatively, the transaction attributes may include a request approval type (e.g., full or partial), a partner transaction reference (e.g., the partner platform's reference for the transaction), a channel (e.g., a type of money exchange for a financial value system, such as a push or pull value transfer, a real time payment, etc.), a currency (e.g., for financial value systems, etc.), an organization key (e.g., a platform identifier for a partner organization), an organization category (e.g., airline, apparel, etc.), an establishment key (e.g., a platform identifier for a retail location, etc.), a clerk identifier, and/or any other traceable information for a value-based exchange.

[0248] In some embodiments, the process **900** includes, at step/operation **904**, verifying the UUEK. For example, the exchange platform (e.g., a partner service thereof) may look up the UUEK to identify a matching identifier from a platform data vault **414**. For example, the UUEK may include an exchange identifier that corresponds to an exchange data object. The exchange platform may identify the exchange identifier based at least in part on the UUEK and leverage the exchange identifier to identify a corresponding exchange data object.

[0249] As described herein, an UUEK may correspond to a partner platform and/or a service provider platform. By way of example, the UUEK may include a partner partition that identifies a partner platform in the event that the UUEK was issued to a partner platform. In such a case, the UUEK includes an exchange identifier that corresponds to a partner-exchange data object. As another example, the UUEK may include a service provider partition that identifies a service provider platform in the event that the UUEK was issued to a service provider platform. In such a case, the UUEK includes an exchange identifier that corresponds to a service provider-exchange data object. In some examples, the exchange platform may process a UUEK based on the entity partition.

[0250] In some embodiments, the exchange platform (e.g., a partner service, etc. thereof) receives a UUEK that includes a partner partition identifying a partner platform. The exchange platform may identify a partner-specific exchange data object using the exchange identifier. The partner-specific exchange data object may include an instrument key corresponding to a service provider instrument of a member platform. The exchange platform may identify a system instrument data object based on the instrument key. For instance, the exchange platform may identify a member platform based on an entity partition of the instrument key and provide the instrument key to a service (e.g., a service provider service, etc.) that corresponds to the member platform. The service may identify the system instrument data object based on the instrument key. The system instrument data object may then be leveraged to identify one or more identifiers (e.g., user identifiers, instrument identifiers, etc.) for processing the exchange request.

[0251] In some embodiments, the exchange platform (e.g., a partner service, etc. thereof) receives a UUEK that includes a service provider partition identifying a service provider platform. The exchange platform (e.g., a partner service, etc. thereof) may determine that a partner-specific exchange data object is unavailable. In response to this determination, the exchange platform may identify a member platform based on the service provider partition and provide the UUEK to a service (e.g., a service provider service, etc.) that corresponds to the member platform. The service may identify a service provider-specific exchange data object based at least in part on the exchange identifier of the UUEK. The service provider-specific exchange data object may be leveraged to identify the system instrument data object based on the member platform and the exchange identifier. The system instrument data object may then be leveraged to identify one or more identifiers (e.g., user identifiers, instrument identifiers, etc.) for processing the exchange request.

[0252] In some examples, the exchange platform may perform one or more verification actions for the UUEK. For instance, the exchange data object may include one or more exchange attributes that are indicative of an expiration status. In some examples, the expiration status may be indicative of (i) whether the UUEK has been previously used to authorize a value-based exchange and/or (ii) a valid time period in which the UUEK may be valid. The verification action may include identifying the expiration status corresponding to the UUEK and verifying the UUEK based at least in part on the expiration status. By way of example, the exchange platform may verify the UUEK in the event that the expiration status indicates (i) that the UUEK has not been previously used to authorize a value-based exchange and/or (ii) that the UUEK has been presented within the valid time period.

[0253] In some examples, the verification action may include verifying that the sender of the UUEK is affiliated with the origin entity to which the UUEK was issued. In some examples, the UUEK may include an entity partition that is indicative of the origin entity (e.g., member platform, such as a partner or service provider platform) to which the UUEK was issued. The exchange platform may leverage the entity partition of the UUEK to determine an entity (e.g., an origin entity) that corresponds to UUEK. In some examples, the verification action may include verifying that the sender of the exchange request matches and/or is affiliated with the origin entity of the UUEK. In response to a determination that the sender is the origin entity, the exchange platform may verify the UUEK.

[0254] In the event that the UUEK is verified, the process **900** may proceed to step/operation **906**. Otherwise, the process **900** may proceed to step/operation **914**, where the exchange platform provides, using the partner interface, an error response to the partner platform.

[0255] In some embodiments, the process **900** includes, at step/operation **906**, requesting an exchange authorization from a member platform. For example, the exchange platform (e.g., a service provider service thereof) may request the exchange approval from a service provider platform of a service provider instrument correlated to the UUEK. In some examples, the exchange platform (e.g., a partner service thereof) may identify the member platform based at

least in part on the UUEK (e.g., the entity partition thereof). In addition, or alternatively, the exchange platform (e.g., a service provider service thereof) may identify the service provider instrument based at least in part on the UUEK (e.g., the exchange identifier).

[0256] The exchange platform (e.g., a service provider service thereof) may provide, using the service provider interface, an exchange authorization request to the member platform. The exchange authorization request may be indicative of at least one of the one or more transaction attributes and/or an instrument identifier for the service provider instrument. By way of example, the exchange platform may generate the exchange authorization request based on a system instrument data object identified from one or more aspects of the UUEK. The exchange authorization request may include an instrument key and/or an instrument reference from the system instrument data object.

[0257] In some examples, the exchange authorization request may be indicative of a user identifier associated with the service provider instrument. By way of example, the exchange platform may generate the exchange authorization request based on a system user data object identified from one or more aspects of the UUEK. In some examples, the system user data object may be identified based on a user identifier (e.g., system user identifier) of the exchange data object. In addition, or alternatively, the system user data object may be identified based on a user identifier (e.g., system user identifier) of the system instrument data object. In some examples, the exchange authorization request may include a user key and/or user reference from the system user data object.

[0258] In addition, or alternatively, the transaction authorization request may be indicative of a transaction identifier. By way of example, the exchange platform may generate a transaction identifier for representing the value-based exchange and provide the transaction identifier to the member platform.

[0259] In some embodiments, the process **900** includes, at step/operation **908**, receiving an exchange authorization response. For example, the exchange platform (e.g., a service provider service thereof) may receive, using the service provider interface, an exchange authorization response that is indicative of at least one of a transaction approval and/or a transaction denial. In some embodiments, the exchange authorization response is based at least in part on a comparison between the transaction value and an asset availability of a service provider instrument. For example, responsive to receiving an exchange authorization request, a member platform may be configured to compare the transaction value to an asset availability of an identified service provider instrument. A value-based exchange may be authorized (e.g., resulting in a transaction approval, etc.) in the event that the asset availability exceeds the transaction value, otherwise the exchange may be denied (e.g., resulting in a transaction denial).

[0260] In some examples, the exchange authorization response may be indicative of one or more response attributes. The response attributes may include one or more error codes and/or the like for characterizing the exchange authorization response.

[0261] The exchange platform may generate a transaction record for the value-based exchange based at least in part on the exchange authorization request and/or the exchange authorization response. In some examples, the transaction record may be indicative of the transaction identifier, the one or more transaction attributes, one or more response attributes, the exchange authorization response, one or more instrument and/or user identifiers, and/or any other data related to the value-based exchange. In some examples, the exchange platform may store the transaction record in the platform data vault in association with the one or more instrument and/or user identifiers.

[0262] In some embodiments, the process **900** includes, at step/operation **910**, optionally generating a replacement UUEK. For example, the exchange platform may automatically generate a replacement UUEK to replace the received UUEK.

[0263] In some examples, this may include (i) invalidating the received UUEK for future authorization requests and/or (ii) generating the replacement UUEK. For instance, the exchange platform may modify an expiration status of the UUEK to invalidate the UUEK for subsequent value exchanges. In addition, or alternatively, the exchange platform may move, delete, and/or otherwise modify the exchange data object corresponding to the UUEK to invalidate the UUEK. The replacement UUEK may include a new unique exchange identifier (e.g., a different universally unique identifier) that corresponds to a service provider instrument to replace the invalidated exchange identifier. In this manner, an UUEK may be continuously modified and changed as a user completes exchanges across different platforms, thereby limiting user and platform exposure to malicious parties.

[0264] In some embodiments, the process **900** includes, at step/operation **912**, providing an exchange response to a member platform. For example, the exchange platform (e.g., a partner service thereof) may provide, using the partner interface, an exchange response to a member platform, such as a partner platform, etc. The exchange response may be based at least in part on the exchange authorization response. For instance, the exchange response may be indicative of the transaction approval and/or the transaction denial. In some examples, the exchange response may be indicative of a replacement UUEK (if generated), one or more transaction attributes, a transaction identifier, and/or one or more response attributes. In some examples, the member platform may be configured to replace the UUEK with the replacement UUEK. For instance, the exchange response may be provided to a partner platform. The partner platform may receive the exchange response and replace the UUEK with the replacement UUEK.

[0265] FIGS. **10** and **11** provide message flow diagrams illustrating steps/operations in relation to FIG. **9** for facilitating a credential-less exchange of value in accordance with one or more embodiments of the present disclosure. As will be recognized, these may be executed and carried out with the corresponding steps/operations of FIG. **9**. FIG. **10**, for example, may illustrate a first message flow for facilitating a credential-less exchange through an enrolled partner account, whereas FIG. **11** may illustrate a second message flow for facilitating a credential-less transaction without an enrolled partner account.

[0266] In the first message flow, at step/operation **1004**, the user initiates a transaction through an enrolled partner account. At step/operation **1006**, the partner platform **420** retrieves an UUEK for the user to execute the transaction on the user's behalf. At step/operation **1008**, the partner platform **420** provides an exchange request, using a partner

interface, to at least one of a plurality of partner services **410** of the exchange platform that corresponds to the partner platform **420**. The exchange request may be indicative of the UUEK and/or one or more transaction attributes for a value-based exchange.

[0267] At step/operation **1010**, the partner service **410** looks up the partner-specific transaction token (e.g., in a partner-specific data store, such as a portion of the platform data vault, etc.) to determine a member platform corresponding to the UUEK (e.g., via a mapping to a service provider partition, etc.). At step/operation **1012**, the partner service **410** provides data indicative of the exchange request to the service provider service **412** of the exchange platform that corresponds to the member platform.

[0268] At step/operation **1014**, the service provider service **412** verifies the UUEK (and/or an exchange identifier thereof). At step/operation **1016**, the service provider service **412** provides, using the service provider interface, an exchange authorization request to the service provider platform **440**. The exchange authorization request may include one or more keys (e.g., user key, instrument key, etc.), references (e.g., instrument reference, user reference, etc.), and/or one or more transaction attributes.

[0269] At step/operation **1018**, the service provider platform **440** approves the transaction and provides an exchange authorization response, using the service provider interface, to the service provider service **412**. At step/operation **1020**, the service provider service **412** records the value-based exchange in association with the one or more keys (e.g., user key, instrument key, etc.), references (e.g., instrument reference, user reference, etc.), and/or the like. At step/operation **1022**, the service provider service **412** provides the exchange authorization response to the partner service **410**. The partner service **410**, at step/operation **1024**, provides, using the partner interface, an exchange response to the partner platform **420**.

[0270] In the second message flow, at step/operation **1102**, the user **1002** initiates a transaction by presenting a UUEK (and/or a UUEK representation thereof) to a partner platform **420**. At step/operation **1104**, the partner platform **420** provides an exchange request, using a partner interface, to a partner service **410** of the exchange platform that corresponds to the partner platform **420**. The exchange request may identify the UUEK and/or one or more transaction attributes for a value-based exchange.

[0271] At step/operation **1106**, the partner service **410** looks up the exchange identifier (e.g., in a partner-specific data store, such as a portion of the platform data vault, etc.) to determine whether an exchange data object exists. In the event that it does not exist, at step/operation **1108**, the partner service **410** provides the UUEK to a service provider service **412** of the exchange platform that corresponds to a service provider platform identified from the UUEK.

[0272] At step/operation **1110**, the service provider service **412** verifies the exchange identifier of the UUEK. At step/operation **1112**, the service provider service **412** provides, using the service provider interface, an exchange authorization request to the service provider platform **440**. The exchange authorization request may include one or more keys (e.g., user key, instrument key, etc.), references (e.g., instrument reference, user reference, etc.), and/or one or more transaction attributes.

[0273] At step/operation **1114**, the service provider platform **440** approves the exchange and provides an exchange authorization response, using the service provider interface, to the service provider service **412**. At step/operation **1116**, the service provider service **412** records the transaction in association with the one or more keys (e.g., user key, instrument key, etc.), references (e.g., instrument reference, user reference, etc.), etc. At step/operation **1118**, the service provider service **412** provides the exchange authorization response indicative of the response to the partner service **410**. The partner service **410**, at step/operation **1120**, provides, using the partner interface, an exchange response to the partner platform **420**.

[0274] Having thus described various operations, processes, methods, functions, and/or the like for handling an exchange on behalf of a user, various user interface screens for controlling, initiating, executing, and/or the like such steps/operations are provided and described. In various embodiments, the user interface screens provided and described in the present disclosure are configured to be provided via a user interface of a client device **104**.

[0275] FIGS. **12**A-D provide an example user interface flow configured for a client device **104**. The user interfaces may be configured to guide a user through a credential-less exchange process to facilitate a value-based exchange between one or more member platforms without exposing sensitive and persistent credentials for a service provider instrument that is used to execute the value-based exchange. The credential-less exchange process may begin when the user selects a payment method from a partner application's transaction processing screen **1202**, as shown by FIG. **12**A. Upon selection of a payment method facilitated by the exchange platform, the user may be transitioned to an instrument selection screen **1204**, as shown by FIG. **12**B. The instrument selection screen **1204** may include a plurality of selectable instrument icons **1206** that may each be affiliated with an UUEK issued by the exchange platform using various techniques described herein. The user may execute the exchange by selecting one or more of the selectable instrument icons **1206**.

[0276] In some examples, in response to the selection, a scanning screen **1208** may be provided for an in-store transaction. The scanning screen **1208** may present a scannable UUEK representation **1210** corresponding to an UUEK. In some examples, the scanning screen may be provided in response to a verification of the user via one or more security mechanisms, such as a biometric-based authentication (e.g., fingerprint, facial recognition, eye recognition, voice), a personal identification number (PIN) authentication, and/or the like. In response to a verification of the user, the user may access the scannable UUEK representation and scan the scannable UUEK representation **1210** to complete the value-based exchange. In addition, or alternatively, in an online setting, the user may be transitioned to a verification user screen **1212** to supply a personal identification number (PIN), a biometric input (e.g., fingerprint, face, voice), and/or any other tertiary verification data associated with a service provider instrument. The user may enter the PIN, biometric input, and/or the like to complete the exchange.

VI. EXAMPLE CENTRALIZED INTERFACE OPERATIONS

[0277] FIG. **13** is an example block diagram of an example centralized network key infrastructure in accordance with one or more embodiments of the present disclosure. The

centralized network key infrastructure may be at least partially encapsulated within an intermediary application executed by a client device **104**. In some examples, the centralized network key infrastructure may comprise a central interface, a central interface repository, a central user interface **422**, and/or one or more centralization services. The central interface, for example, may comprise one or more member-client interfaces, such as the member-client interface **1330**, that may define one or more messaging protocols between the centralization services, one or more member platforms, and/or one or more member applications thereof. By way of example, up to each of the member-client interfaces may comprise APIs, messaging protocols, and/or the like that may be encapsulated within and/or accessible through an intermediary application configured to execute the one or more intermediary services, initiate a rendering of a central user interface **422**, and/or the like, and/or member application configured to execute the one or more member services, initiate a rendering of the member user interface **406**, and/or the like.

[0278] In some examples, the central interface repository may comprise a portion of memory (e.g., a portion of a client device cache, a portion of a client device's persistent memory) associated with the intermediary application. In addition, or alternatively, the central interface repository may comprise a portion of memory that may be external to the intermediary application (e.g., a portion of memory associated with a member application, a portion of memory of an external device). In such a case, a central interface may define one or more request and/or response messages between the intermediary application and an external device, application, and/or the like that is associated with the central interface repository.

[0279] As described herein, central interface repository of the centralized network key infrastructure may define a set of software containers, such as the software container **1328**, that may be leveraged using one or more messaging protocols to authenticate, verify, and/or otherwise secure a network communication. By doing so, the central network key infrastructure may be applied in various domains to secure communications across different devices, platforms, and/or services over a wired and/or wireless network. For example, the central network key infrastructure may be leveraged in information exchanges to authenticate information provided between two computing entities. As other examples, the central network key infrastructure may be leveraged in value exchanges, such as the transfer of digital assets (e.g., cryptocurrency, fiat currency, credit, non-fungible tokens). By way of example, the centralized network key infrastructure may function as a supplement and/or a replacement to a digital wallet that may expand the exchange functionality of traditional digital wallets, while implementing security mechanisms to secure messages that initiate such exchanges.

[0280] Traditionally, digital wallets are used to connect consumers to a variety of instruments (e.g., currency instruments, ticketing instruments) by storing the credentials of such instruments within a single location. For example, digital wallets may provide consumers with a repository for various instruments, such as airline, movie and concert tickets, payment cards, insurance cards, and/or the like. Traditionally, each of these instruments may be stored as static passes within the repository. In such a case, the underlying credentials associated with each pass is fixed within the wallet and exposed during use of the pass. By doing so, a digital wallet or other containerized environment for storing instrument details may provide more accessibility to different instruments at the cost of security as storing the static credentials within one central location provides an additional attack vector for malicious parties.

[0281] In some cases, security vulnerabilities of such an environment may be addressed by layering on one or more security mechanisms, such as biometrics, PINs, and/or the like. For example, a security mechanism may be applied at the wallet or individual pass level to secure access to the underlying credentials of passes stored within a digital environment. However, such mechanisms do not secure the underlying credentials from view or exposure during use of the pass itself and, more importantly, they do not address the underlying problem—the storage of sensitive static credentials within a single repository. The centralized network key infrastructure of the present disclosure addresses these problems by replacing static credentials within the containers of a centralized environment, such as a digital wallet, with dynamic keys, such as the UUEK **524** of the present disclosure, that may be refreshed, issued, and temporarily stored to facilitate dynamic key exchanges in real-time.

[0282] More particularly, to improve upon traditional network exchanges, the present disclosure provides a software container **1328** that replaces underlying credentials with instructions for temporarily retrieving and storing temporary keys, such as the UUEK **524** described herein. The software container **1328**, for example, may comprise a memory structure into which ephemeral keys may be provided at the time of use (e.g., immediately preceding a credential-less network exchange). In this manner, the exchange containers **1328** may remove attack vectors from malicious parties by replacing sensitive credentials (e.g., that are valuable in isolation) with temporary keys only recognizable to authorized parties and refreshed before each use (e.g., useless in isolation).

a. Initialization

[0283] In some embodiments, during an initialization operation, a software container **1328** is initialized for a UUEK **524**. For example, the software container **1328** may be initialized using an enrollment process, as described herein with respect to FIGS. **6**A-**8**F. By way of example, a software container **1328** may be initialized in response to a successful enrollment of a service provider instrument and/or member platform, a reception of a UUEK **524** for a member platform, and/or the like. In some examples, in response to a successful enrollment (e.g., at step/operation **782** and/or **794** of FIG. **7**D), an enrollment user interface may render one or more integration icons that respectively correspond to one or more connected applications, such as the intermediary application. The integration icons, for example, may comprise a selectable central integration icon (e.g., an add to wallet icon) that requests an integration of an enrolled instrument with the intermediary application. In some examples, the software container **1328** may be generated in response to a selection of the selectable central integration icon.

[0284] In some examples, the enrollment process may be initiated from (i) a member user interface **406** corresponding to a member application hosted by a member platform and/or (ii) the central user interface **422**. For example, the enrollment user interface may be overlaid to the central user interface **422** in response to an initial user input to an

initialization icon within the central user interface **422**. In addition, or alternatively, the enrollment user interface may be overlaid to the member user interface **406** in response to an initial user input to an initialization icon within the member user interface **406**. In some examples, the initialization icon may be rendered within the member user interface **406** using the member-client interface. For example, the member-client interface may connect an enrollment service of the centralization services to the member user interface **406**.

[0285] In some embodiments, a user of the client device **104** interacts with the enrollment user interface to initiate a software container for an instrument. For example, the client device **104** may receive, via the enrollment user interface overlaid to the member user interface **406** or the central user interface **422**, enrollment user input comprising selection data that identifies a service provider instrument of the member platform. The enrollment user input may be provided directly to the exchange platform **102** in accordance with the enrollment process described herein.

[0286] In some embodiments, the software container is created in response to a successful a matching code based enrollment. For example, a matching code may be provided, from the member platform **1324**, to the user of the client device **104**. As described herein, the matching code may originate from the exchange platform **102**, which may issue the matching code to the member platform **1324**. The matching code may be provided to the user via the central user interface **422**, member user interface **406**, and/or another communication interface between the user and the member platform **1324** (e.g., a phone number, text message). In some examples, the client device **104** may receive the matching code from the member platform **1324**, for example, via a push notification of the member user interface **406**.

[0287] In some embodiments, the client device **104** may receive, via the enrollment user interface, a matching code input. The matching code input may be provided directly to the exchange platform **102** to verify the matching code against the matching code originating from the exchange platform **102**. The client device **104** (e.g., an initialization service of the centralized network key infrastructure) may generate the software container in response to a match between the matching code input and the matching code (e.g., as identified by the exchange platform **102**).

[0288] In addition, or alternatively, the software container is created in response to a successful a linking code based enrollment. For example, the exchange platform **102** may generate one or more linking codes (e.g., the same or different structure as the matching code) for a first member platform, such as a service provider platform associated with an instrument. In response to an enrollment request from a user (e.g., via a second member platform, the client device **104**) that indicates a second member platform, such as a partner platform, the first member platform may provide the linking code to the user. The user may provide, via the second member platform, the linking code to the exchange platform **102**. The exchange platform **102** may verify the linking code and, in response to a verification, issue a UUEK to the second member platform. The software container may be generated in response to the reception of the UUEK by the client device, and/or an indication of the verification of the linking code.

[0289] In addition, or alternatively, the software container is created in response to a successful a member driven enrollment. For example, the exchange platform **102** may receive an enrollment request from a user via the client device and/or a first member platform, such as a partner platform. The enrollment request may identify an instrument (e.g., without exposing persistent credentials thereof) to the exchange platform **102**. The exchange platform **102** may provide the enrollment request to a second member platform associated with the instrument. The second member platform may request verification credentials from the user (e.g., via an in-app push notification, a biometric verification request via the client device **104**, or other security mechanism) and, in response to a verification of the user, may respond to the exchange platform **102** with an enrollment success response. In response to the enrollment success response, the exchange platform **102** may issue a UUEK for the user. The software container may be generated in response to the reception of the UUEK by the client device, and/or an indication of the enrollment success response.

b. Key Exchange

[0290] In some examples, in response to the initialization of a software container, the central user interface may render an exchange container icon. The exchange container icon may comprise a virtual representation of the software container. The exchange container icon, for example, may comprise an interactive button, such as a push button, that initiates an API request, from a member-client interface, in response to a user interaction (e.g., a voice prompt, tactile input). The API request, for example, may comprise a container activation request, as described herein.

[0291] In some examples, the exchange container icon may reflect an instrument representation to identify the member platform(s), service provider instrument, and/or the like associated with the software container. In addition, or alternatively, the exchange container icon may reflect one or more contextual attributes for a software container, such as an activation status, an expiration time, and/or the like.

[0292] In some embodiments, the central interface repository comprises a plurality of software containers that respectively correspond to a subset of the network of member platforms. In some examples, an icon corresponding to a software container for up to each of the plurality of software containers may be rendered within the central user interface **422**. Unlike traditional digital wallets and/or other centralized instrument repositories, the enrollment process for initializing software containers, as described herein, enables the creation of multiple software containers for a single service provider instrument. For example, a first software container may correspond to a partner platform that is enrolled with a service provider instrument of a service provider platform. In this manner, the same instrument may be invoked from a set of different icons, each corresponding to a single member platform of a different combination of member platforms. This, in turn, enables the accrual of credit (e.g., a merchant loyalty program loaded with a credit card may accrue both loyalty points and card points), tracking of user activity, and/or other operations across multiple member platforms through the invocation of a single icon rendered within the central user interface.

[0293] In some embodiments, at a first activation operation **1304**, user input **1322** is received by the client device **104**. The user input **1302** may correspond to an icon (e.g., an

exchange container icon **424**) rendered within the central user interface **422**. The icon, for example, may comprise an interactive widget corresponding to a software container within a central interface repository associated with the central user interface **422**. In some examples, the software container may comprise a software container **1328** that corresponds to a member platform **1324** of a network of member platforms associated with an exchange platform **102**.

[0294] In some embodiments, during a second activation operation **1306**, the client device **104** provides, using a member-client interface **1330**, a container activation request based on the user input **1322**. In some examples, the container activation request is provided in response to a verification of the user using one or more of the security mechanisms described herein (e.g., biometrics, PIN).

[0295] The container activation request comprises an internal and/or external API request message that is triggered by user input of an exchange container icon. For instance, the container activation request may comprise a request message that is defined by a member-client interface **1330**. The request message may comprise a UUEK request for the software container that is directed to a member platform **1324** corresponding to the software container.

[0296] In some examples, the container activation request is provided based on an activation status of the software container **1328**. An activation status, for example, may comprise a binary status indicator that indicates whether a software container contains a UUEK **524** (e.g., "1" or "active") or is empty (e.g., "0" or "inactive"). In addition, or alternatively, the activation status may comprise activation attributes, such as a time-to-live of a currently stored UUEK, an expiration time of the UUEK, and/or the like. In some instances, the container activation request may be provided in response to a determination that the activation status of the software container **1328** is inactive. Otherwise, the client device **104** may proceed directly to the operation **1318**, in which the client device **104** provides a message transmission that identifies a UUEK **524** stored within the software container **1328**.

[0297] In some examples, the member-client interface **1330** may comprise an internal and/or external API. The internal API may define one or more endpoints within a client-side application corresponding to a software application hosted by the member platform **1324**. The external API may define one or more endpoints within a software application hosted by the member platform **1324**.

[0298] In some examples, an exchange container icon may correspond to an internal and/or external container activation request respectively defined by the internal and/or external APIs. For instance, an internal container activation request may be transmitted to an endpoint within the client-side application. By way of example, the internal container activation request may comprise an internal API call that transmits data between the intermediary application and an instance of the member application executed on the client device **104** (e.g., a credit card software container issues an internal container activation request to a credit card application executed on the client device). As another example, an external container activation request may be transmitted to an endpoint within the server-side application hosted by a member platform **1324** (e.g., a credit card software container issues an external container activation request directly to the credit card platform). By way of example, the external container activation request may comprise an external API call that transmits data between the intermediary application and the member platform **1324**.

[0299] In some embodiments, the internal container activation request and/or external container activation request comprises a unique identifier corresponding to the user and/or instrument associated with the exchange container. For example, the unique identifier may be issued by the member platform **1324** associated with the software container (e.g., a partner platform of an enrolled partner account, a service provider platform associated with an underlying instrument).

[0300] In some embodiments, during a third activation operation **1308**, the client device **104** provides, using the member-client interface **1330**, a request to the member platform **1324**. The third activation operation **1308** may comprise an optional operation that is performed if the exchange container icon corresponds to an internal container activation request. In such a case, a client-side instance of the member application may receive the internal container activation request and forward the request to the member platform **1324**.

[0301] In some embodiments, during a fourth activation operation **1310**, the member platform **1324** provides, using a member interface, a request to the exchange platform **102**. The member platform **1324**, for example, may provide a request to the exchange platform **102** to request a UUEK **524** for a service provider instrument. The request may comprise a user and/or instrument identifier corresponding to an exchange data object of the exchange platform **102**. For example, the request may comprise a user reference and/or an instrument reference previously registered with the exchange platform **102**. The exchange platform **102** may verify the user and/or instrument references based on the sender of the request and, in response to the verification, proceed to a fifth activation operation **1312**.

[0302] In some embodiments, during a fifth activation operation **1312**, the member platform **1324** receives, using the member interface, a response from the exchange platform **102**. For example, the exchange platform **102** may receive the new UUEK request, process the request as described herein, and issue a UUEK **524** to the member platform **1324**.

[0303] In some embodiments, during a sixth activation operation **1314**, the member platform **1324** provides, using the member-client interface **1330**, the response to the client device **104**. The response, for example, may comprise the UUEK **524** issued by the exchange platform **102**.

[0304] In some embodiments, during a seventh activation operation **1316**, the client device **104** receives, using the member-client interface, a UUEK **524** for the software container **1328**. The UUEK **524**, for example, may comprise an external representation of an exchange identifier that is issued to the member platform **1324** from the exchange platform **102**. In some examples, the UUEK **524** may be issued to a client-side instance of a member application executed on the client device **104**. In addition, or alternatively, the UUEK **524** may be issued directly to the intermediary application. If provided to the client-side instance of a member application, the client-side instance of a member application may forward the UUEK **524** to the intermediary application.

[0305] In some examples, the UUEK **524** may be associated with one or more use constraints that restrict the use of

the UUEK. The use constraints, for example, may comprise a time-to-live constraint, a use limit (e.g., a one-time use), and/or the like that may invalidate the UUEK **524** after an amount of time, use, or any other restriction. The one or more use constraints may be tracked by the client-side instance of a member application and/or the intermediary application. For example, the client-side instance of a member application may track a timing and/or use of a UUEK **524** and issue a UUEK revocation after a time-to-live elapses, a use limit is reached (e.g., after a completion of an exchange), and/or the like. In some cases, the intermediary application may track the timing and use of a UUEK and issue a UUEK revocation after a time-to-live elapses, a use limit is reached (e.g., after a completion of an exchange), and/or the like.

[0306] In some embodiments, the client device **104** stores the UUEK **524** within the software container **1328** for a temporary time period (e.g., a set time-to-live, dynamic based on frequency of use). In addition, or alternatively, the client device **104** may modify the activation status of the software container to indicate that the UUEK **524** is stored within the software container **1328**. In some examples, in response to the storage of the UUEK and/or modification of the activation status, the exchange container icon may be updated to reflect an active status of the software container **1328**.

[0307] In some embodiments, during an eighth activation operation **1318**, the client device **104** provides a message transmission that identifies the UUEK **524**. In some examples, the client device **104** may provide the message transmission in response to the user input **1322** and/or the modification of the activation status of the software container **1328**. In addition, or alternatively, the client device **104** may receive a subsequent user input to the icon corresponding to the software container. In some examples, the client device may provide the message transmission in response to the subsequent user input.

[0308] In some embodiments, the message transmission comprises an external communication from the client device. The external communication may comprise a text output, a visual output (e.g., providing a scannable UUEK representation), a radio output, and/or the like. By way of example, the UUEK may be encoded within a UUEK representation that may be rendered (e.g., within the central user interface **422**) as a message transmission. In addition, or alternatively, the message transmission may comprise a near-field communication (NFC) message, and/or the like. By way of example, the receiving device may comprise a barcode scanner, an NFC terminal, and/or the like.

[0309] In some embodiments, the message transmission initiates an exchange request from the receiving device **1326**. For example, the exchange request may comprise the UUEK **524** and may be provided by the receiving device **1326** to the exchange platform **102** to initiate a credentialless exchange, as described herein with reference to FIGS. **9-12**D.

[0310] In some embodiments, the client device **104** modifies the software container based on the one or more use constraints. For example, responsive to a determination that the temporary time period has lapsed, a threshold number uses has been met, and/or the like, the client device **104** may remove the UUEK **524** (e.g., issue a UUEK revocation, delete the UUEK from memory) from the software container **1328** and/or modify the activation status of the software container **1328** to indicate that the software container **1328** is empty. In addition, or alternatively, the client device **104** may remove the UUEK **524** (e.g., issue a UUEK revocation, delete the UUEK from memory) from the software container **1328** and/or modify the activation status of the software container **1328** in response to one or more additional stimuli, such as an indication of a successful message transmission, and/or the like. In some examples, in response to the storage of the UUEK and/or modification of the activation status, the exchange container icon may be updated to reflect an inactive status of the software container **1328**. In this manner, the centralized network key infrastructure may continuously refresh ephemeral keys with a central repository to enable secure network exchanges with reduced susceptibility to network attacks.

VII. CONCLUSION

[0311] Many modifications and other embodiments will come to mind to one skilled in the art to which this disclosure pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the disclosure is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

1. A computer-implemented method comprising:

receiving, by one or more processors of a client device, user input to an icon corresponding to a software container within a central interface repository, wherein the software container corresponds to a member platform of a network of member platforms associated with an exchange platform;

providing, by the one or more processors and using a member-client interface, a container activation request based on the user input;

receiving, by the one or more processors and using the member-client interface, a universally unique ephemeral key (UUEK) for the software container, wherein the UUEK comprises an external representation of an exchange identifier that is issued to the member platform from the exchange platform;

storing, by the one or more processors, the UUEK within the software container for a temporary time period; and

providing, by the one or more processors, a message transmission that identifies the UUEK and initiates an exchange request from a receiving device, wherein the exchange request comprises the UUEK and is provided by the receiving device to the exchange platform.

2. The computer-implemented method of claim **1**, wherein the member-client interface is an external application programming interface that defines one or more endpoints within a software application hosted by the member platform.

3. The computer-implemented method of claim **1**, wherein the member-client interface is an internal application programming interface that defines one or more endpoints within a client-side application corresponding to a software application hosted by the member platform.

4. The computer-implemented method of claim 1, wherein the message transmission comprises a near-field communication (NFC) message and the receiving device comprises an NFC terminal.

5. The computer-implemented method of claim 1, wherein the central interface repository comprises a plurality of software containers that respectively correspond to a subset of the network of member platforms.

6. The computer-implemented method of claim 1, wherein the container activation request is provided based on an activation status of the software container and the computer-implemented method further comprises:

modifying the activation status of the software container to indicate that the UUEK is stored within the software container;

receiving a subsequent user input to the icon; and

in response to the subsequent user input, providing the message transmission.

7. The computer-implemented method of claim 1, further comprising, responsive to a determination that the temporary time period has lapsed:

removing the UUEK from the software container; and

modifying the activation status of the software container to indicate that the software container is empty.

8. The computer-implemented method of claim 1, wherein the software container is previously generated according to an initialization protocol comprising:

receiving, via enrollment user interface overlayed to a member user interface or the central user interface, enrollment user input comprising selection data that identifies a service provider instrument of the member platform, wherein the enrollment user input is provided directly to the exchange platform;

receiving, using the member-client interface, a matching code from the member platform, wherein the matching code originates from the exchange platform;

receiving, via the enrollment user interface, a matching code input, wherein the matching code input is provided directly to the exchange platform; and

generating the software container in response to a match between the matching code input and the matching code.

9. The computer-implemented method of claim 8, wherein the icon corresponding to the software container is rendered within a central user interface and the enrollment user interface is overlayed to the central user interface in response to an initial user input to an initialization icon within the central user interface.

10. The computer-implemented method of claim 9, wherein the enrollment user interface is overlayed to the member user interface in response to an initial user input to an initialization icon within the member user interface and the initialization icon is rendered within the member user interface using the member-client interface.

11. A computing system comprising memory and one or more processors communicatively coupled to the memory, the one or more processors configured to:

receive, by a client device, user input to an icon corresponding to a software container within a central interface repository, wherein the software container corresponds to a member platform of a network of member platforms associated with an exchange platform;

provide, using a member-client interface, a container activation request based on the user input;

receive, using the member-client interface, a universally unique ephemeral key (UUEK) for the software container, wherein the UUEK comprises an external representation of an exchange identifier that is issued to the member platform from the exchange platform;

store the UUEK within the software container for a temporary time period; and

provide a message transmission that identifies the UUEK and initiates an exchange request from a receiving device, wherein the exchange request comprises the UUEK and is provided by the receiving device to the exchange platform.

12. The computing system of claim 11, wherein the member-client interface is an external application programming interface that defines one or more endpoints within a software application hosted by the member platform.

13. The computing system of claim 11, wherein the member-client interface is an internal application programming interface that defines one or more endpoints within a client-side application corresponding to a software application hosted by the member platform.

14. The computing system of claim 11, wherein the message transmission comprises a near-field communication (NFC) message and the receiving device comprises an NFC terminal.

15. The computing system of claim 11, wherein the central interface repository comprises a plurality of software containers that respectively correspond to a subset of the network of member platforms.

16. The computing system of claim 11, wherein the container activation request is provided based on an activation status of the software container and the one or more processors are further configured to:

modify the activation status of the software container to indicate that the UUEK is stored within the software container;

receive a subsequent user input to the icon; and

in response to the subsequent user input, provide the message transmission.

17. The computing system of claim 10, wherein the one or more processors are further configured to, responsive to a determination that the temporary time period has lapsed:

remove the UUEK from the software container; and

modify the activation status of the software container to indicate that the software container is empty.

18. One or more non-transitory computer-readable storage media including instructions that, when executed by one or more processors, cause the one or more processors to:

receive, by a client device, user input to an icon corresponding to a software container within a central interface repository, wherein the software container corresponds to a member platform of a network of member platforms associated with an exchange platform;

provide, using a member-client interface, a container activation request based on the user input;

receive, using the member-client interface, a universally unique ephemeral key (UUEK) for the software container, wherein the UUEK comprises an external representation of an exchange identifier that is issued to the member platform from the exchange platform;

store the UUEK within the software container for a temporary time period; and

provide a message transmission that identifies the UUEK and initiates an exchange request from a receiving

device, wherein the exchange request comprises the UUEK and is provided by the receiving device to the exchange platform.

19. The one or more non-transitory computer-readable storage media of claim **18**, wherein the software container is previously generated according to an initialization protocol comprising:

receiving, via enrollment user interface overlayed to a member user interface or the central user interface, enrollment user input comprising selection data that identifies a service provider instrument of the member platform, wherein the enrollment user input is provided directly to the exchange platform;

receiving, using the member-client interface, a matching code from the member platform, wherein the matching code originates from the exchange platform;

receiving, via the enrollment user interface, a matching code input, wherein the matching code input is provided directly to the exchange platform; and

generating the software container in response to a match between the matching code input and the matching code.

20. The one or more non-transitory computer-readable storage media of claim **18**, wherein the icon corresponding to the software container is rendered within a central user interface and the enrollment user interface is overlayed to the central user interface in response to an initial user input to an initialization icon within the central user interface.

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