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(54) Title: PRIVATE INTERACTION HUBS

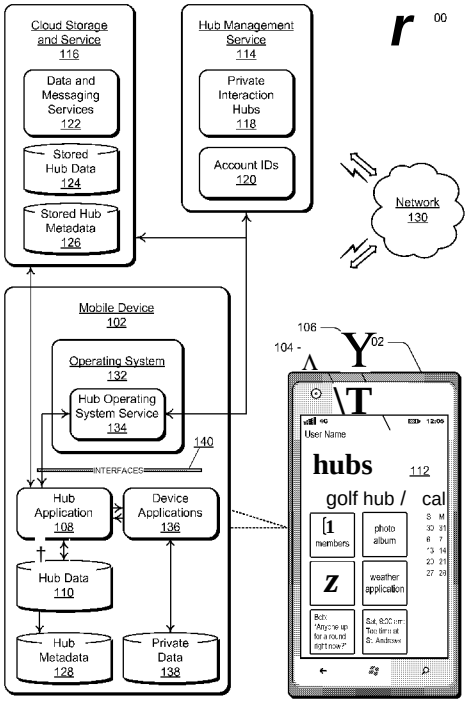


FIG. 1

(57) Abstract: In embodiments of private interaction hubs, a mobile device has memory storage to maintain hub data that is associated with a private interaction hub, where the hub data includes multiple types of displayable data that is editable by different types of device applications. The memory storage at the device also maintains private data that is displayable and is viewable with one of the device applications. The mobile device also includes a display device to display the multiple types of the hub data in a hub user interface of a hub application. The display device can also display the private data and a subset of the hub data that are both associated with a device application in a device application user interface.

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PRIVATE INTERACTION HUBS

BACKGROUND

[0001] Many types of devices, such as mobile phones, tablet devices, and other computing, communication, and entertainment devices increasingly offer more functions, applications, and features which are beneficial to a user, and can enhance one's personal time as well as work and social activities. However, even with the many communication applications for email, text, and instant messaging, as well as the seemingly unlimited number of third-party organization-centric applications that are available to users of the devices, such as calendar, list, and other types of user data-sharing applications, it can still be difficult or inefficient for families or other groups of people to collectively get together the many different resources and unrelated applications to effectively coordinate efforts.

SUMMARY

[0002] This Summary introduces features and concepts of private interaction hubs, which is further described below in the Detailed Description and/or shown in the Figures. This Summary should not be considered to describe essential features of the claimed subject matter, nor used to determine or limit the scope of the claimed subject matter.

[0003] Private interaction hubs are described. In embodiments, a mobile device has memory storage to maintain hub data that is associated with a private interaction hub, where the hub data includes multiple types of displayable data. Each type of displayable data is editable by a respective different type of device application. The memory storage at the device also maintains private data that is displayable and is viewable with one of the device applications. The mobile device also includes a display device to display the multiple types of the hub data in a hub user interface of a hub application. The hub user

interface is generally not used to display private data. The display device can also display, in an application user interface different than the hub user interface, the private data and a subset of the hub data of a particular type that is associated with one of the device applications in a device application user interface.

[0004] In embodiments, the subset of the hub data that is displayed in the hub user interface can be selected to initiate the subset of the hub data being displayed in the device application user interface in conjunction with the private data. Similarly, the subset of the hub data that is displayed in the device application user interface can be selected to initiate the subset of the hub data being displayed in the hub user interface with the multiple types of the hub data. The private interaction hub associates members of the hub for private interaction, and each of the hub members have an associated mobile device. The multiple types of the hub data is viewable in the hub user interface that is displayable at each of the associated mobile devices of the members of the private interaction hub.

[0005] In embodiments, a hub operating system service is implemented to integrate the device applications with an operating system of the mobile device to implement the private interaction hub. The hub operating system service can receive social network updates for one or more members of the private interaction hub, and then aggregate the social network updates for display in the hub user interface. The hub operating system service can also integrate a third-party application with the private interaction hub, where third-party application data is displayable in the hub user interface in conjunction with the hub data. The hub operating system service is also implemented to manage multi-user interactive updates to an event that is coordinated in the private interaction hub. The hub operating system service can initiate an invitation to join the private interaction hub as an SMS message that is communicated by a hub management service to a new member mobile device, and the hub operating system service receives

hub metadata that associates the new member in the private interaction hub based on an account identifier associated with the new member.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Embodiments of private interaction hubs are described with reference to the following Figures. The same numbers may be used throughout to reference like features and components that are shown in the Figures:

FIG. 1 illustrates an example system in which embodiments of private interaction hubs can be implemented.

FIG. 2 illustrates example method(s) of private interaction hubs in accordance with one or more embodiments.

FIG. 3 illustrates example method(s) of private interaction hubs in accordance with one or more embodiments.

FIG. 4 illustrates an example system with an example device that can implement embodiments of private interaction hubs.

FIG. 5 illustrates an example system in which embodiments of private interaction hubs and/or family coordination can be implemented.

FIG. 6 illustrates various client device services and features in accordance with one or more embodiments.

FIG. 7 illustrates examples of a family hub in accordance with one or more embodiments.

FIG. 8 illustrates an example mobile device in which embodiments of private interaction hubs and/or family coordination can be implemented.

FIG. 9 illustrates example method(s) of private interaction hubs and/or family coordination in accordance with one or more embodiments.

DETAILED DESCRIPTION

[0007] Embodiments of private interaction hubs (or simply "hubs"), as well as systems, methods, user interfaces, services, and applications to support the private interaction hubs, are described. A private interaction hub is a private network or association of member users who voluntarily elect to privately interact and collaborate with each other in a bi-directional manner, such as by interacting and collaborating from multiple applications installed on their mobile devices. For example, the members of a private interaction hub may interact by exchanging hub messages, status updates, event notifications, and/or location "check-ins" that are shared with each other. As another example, the members of a private interaction hub may collaboratively curate or edit a collection of shared content such as shared notes, documents, tasks, photos, contacts, calendar events, location updates, applications (to include collaborative gaming applications), and/or other media content, such as any type of audio, music, video, and/or image data. As yet another example, the members of a private interaction hub may interactively participate in collaborative multi-player games or other multi-user applications.

[0008] A member user of a private interaction hub may access, create, and/or modify hub data, such as shared messages, content, events, media, and application data through multiple applications on a single mobile device. For example, a member of a "golf hub" may access a hub message sent to the hub members through the user interface of a native messaging application on his or her mobile device, and also access this same message through a hub user interface of a hub application that presents the hub message in conjunction with other hub data from the "Golf hub," such as shared calendar events relating to golf outings. A private interaction hub can be provisioned for any association of people, such as family members, coworkers, friends, neighbors, and/or other groups of

people. Additionally, a member user of one private interaction hub may also be a member of multiple hubs, which can be based on a single member sign-on that identifies the member user for association in a single private interaction hub, or in multiple hubs.

[0009] While features and concepts of private interaction hubs can be implemented in any number of different devices, systems, networks, environments, and/or configurations, embodiments of private interaction hubs are described in the context of the following example devices, systems, and methods.

[0010] FIG. 1 illustrates an example system 100 in which embodiments of private interaction hubs can be implemented. The system 100 includes an example mobile device 102, which may be any one or combination of a wired or wireless device, such as a mobile phone, tablet, computing, communication, entertainment, gaming, media playback, and/or other type of device. Any of the devices can be implemented with various components, such as a processing system and memory, as well as any number and combination of differing components as further described with reference to the example device shown in FIG. 4.

[0011] The mobile device 102 includes an integrated display device 104 on which user interfaces can be displayed, such as a hub user interface 106 of a hub application 108. The hub application 108 aggregates disparate types of the hub data 110 originating from the various member users of the private interaction hub. Thus, the hub user interface offers a unified interactive view of or access to different kinds of hub data 110 for a single, private interaction hub. For example, the hub user interface may provide a single unified access point to shared hub messages, status updates, check-ins, hub calendar events, hub media, hub applications, and other types of hub content. As described above, a private interaction hub (or simply "hub") is a private network or association of member users who voluntarily elect to privately interact and collaborate with each other in a bi-directional

manner. The hub data 110 includes any shared data or metadata that is used to facilitate the interaction and collaboration between the members of a private interaction hub, and may include shared data for messaging, notes, contact management, documents, tasks, location updates, photos, calendar events, applications (to include collaborative gaming applications), and/or other media content, such as any type of audio, music, video, and/or image data that may be available or accessed from any source.

[0012] The basic functionality of an example private interaction hub is shown as a golf hub displayed in the hub user interface 106 of the hub application 108. For example, the hub user interface can include various selectable user interface tiles 112, such as a members tile that is selectable to initiate a display of the constituent members of the private interaction hub. The user interface tiles 112 may also include hub chat and/or messages tiles to allow a hub member to participate in messaging threads with the other member users of the hub. For example, as shown, the member "Bob" has asked "Anyone up for a round right now?" The user interface tiles 112 may also include a photo album tile that is selectable to view photos shared by any of the hub members with the hub, and a shared notebook tile from which the hub members can view shared notes. For example, the golf hub may include a shared notes document that compiles the hub members' collective research of new golf equipment. The hub user interface 106 may also display a shared calendar that allows a member of the hub to view, edit, and post calendar events that will be shared with all of the other hub members. For example, the calendar tile shows an upcoming tee time at St. Andrews on Saturday at 9:00 a.m. for all of the members. When a user selects a group item (e.g., the message from Bob) or tile (e.g., the messaging tile), further details about the selected item or group items related to the selected tile may be displayed by the hub application itself or the hub application may call

a different device application 136 (e.g., a messaging application) to display further details about the item(s).

[0013] When a user selects or otherwise engages with a piece of displayed hub data, such as the golf message from Bob, the hub application may provide additional details or options to the user to permit the user to interact further with the hub data. For example, the hub application may display controls to allow the user to edit or reply to Bob's message. Alternatively or in addition, when a user selects or otherwise engages with a piece of displayed hub data *(e.g.,* Bob's message), the hub application may launch or call another device application to permit the user to further interact with the piece of hub data *(e.g.,* the hub application may call a native messaging application).

[0014] The hub user interface 106 of the hub application 108 can also include user-selectable access to third-party applications, such as when an application is "pinned" to, or otherwise shared with a private interaction hub. A pinned third-party application may also utilize the shared hub data, such as shared application preferences or shared application state data. For example, the golf hub shown displayed in the hub user interface 106 includes a live tile representing a third-party weather application that the members of the hub can quickly access to check the weather forecast at their local golf club, such as when planning an upcoming golf outing. A user of the mobile device 102 can also customize display aspects of a hub user interface, such as the content of the user interface and how the elements of the hub user interface are arranged. Another example of a hub user interface of the hub application 108 is a panoramic hub user interface, such as for a family-centric private interaction hub as shown and described in greater detail with reference to FIG. 7.

[0015] The example system 100 also includes a hub management service 114, and a cloud storage and service 116. The hub management service 114 manages the formation and maintenance of private interaction hubs 118. The hub management service can correlate or associate member users of a hub by associating account identifiers 120 of the members with one or more of the private interaction hubs. The account identifier 120 of a member user may be associated with an identifier of a private interaction hub 118 in a data table that the hub management service maintains to correlate the hub members with one or more of the private interaction hubs. The hub management service 114 may also associate devices that correspond to hub members based on device identifiers. The account identifiers 120 can include user membership identifiers and/or sign-on credentials, such as an email and password combination, or a username and password combination. The sign-on credentials may be single sign-on ("SSO") credentials that are utilized for authentication purposes at a number of Web services, including the cloud storage and service 116.

[0016] The cloud storage and service 116 can include any type of cloud-based *(e.g.,* network-based) data and messaging services 122. The messaging services may include any type of email, text *(e.g.,* SMS, MMS), and/or instant messaging services. The data services may include any type of calendar, photo album, file or document sharing, location, mapping, music sharing, video sharing, gaming, contacts management, and/or notebook services, as well as any other type of services that can be used to share stored hub data 124. The stored hub data can include any form of messages, updates, events, content, media, and information that is maintained for the private interaction hubs 118, and is accessible from the mobile device 102, either upon a request from a device and/or upon a data "push" to the device. The cloud storage and service 116 also maintains stored hub metadata 126 that includes settings and information pertaining to the private

interaction hubs 118, such as the name of a hub, the background image or photo of the hub, and an association of the hub members.

[0017] Although shown together as data and messaging services 122, various application data services and various messaging services may be operated on separate devices and/or operated by separate, distinct entities. Additionally, although the hub management service 114 and the cloud storage and service 116 are shown as independent services, they may be implemented together as a single service. Further, a server device (or group of server devices) can include implementations of both the hub management service 114 and the cloud storage and service 116, representative of a single entity that may be the same server system, company system, domain, and the like.

[0018] The cloud storage and service 116, and its constituent data and messaging services 122, interchange the stored hub data 124 and the stored hub metadata 126 between the mobile devices that are associated with member users of a private interaction hub 118. For example, a data and/or messaging service of the cloud storage and service 116 can receive a copy of hub data 110 and/or hub metadata 128 from the mobile device 102 that is used by a hub member, store this hub data and hub metadata in the cloud storage as the respective stored hub data 124 and stored hub metadata 126, and then distribute the stored hub data and stored hub metadata to other mobile devices associated with other member users of the same private interaction hub, as well as to other mobile devices associated with the same hub member. The stored hub metadata 126 can include membership information pertaining to the member users of a private interaction hub, hub identifiers that correlate a piece of hub data to a particular private interaction hub, user identifiers that correlate a piece of hub data to a particular member user, modification dates, and/or other metadata.

[0019] The cloud storage and service 116, and its constituent data and messaging services 122, may utilize single sign-on ("SSO") credentials for authentication purposes to limit the dissemination of the stored hub data 124 and the stored hub metadata 126 to only the authorized devices of hub members. Additionally, any of the devices and services *(e.g.,* implemented as server devices) described herein can communicate via a network 130, which can be implemented to include a wired and/or a wireless network. The network can also be implemented using any type of network topology and/or communication protocol, and can be represented or otherwise implemented as a combination of two or more networks, to include IP-based networks and/or the Internet. The network may also include mobile operator networks that are managed by a mobile network operator and/or other network operators, such as a communication service provider, mobile phone provider, and/or Internet service provider. Alternatively or in addition, peer-to-peer communication techniques may be utilized, such as multiple devices connected using a peer-to-peer communication network.

[0020] The mobile device 102 includes an operating system 132 of the device, and the operating system includes a hub operating system service 134 that is implemented to integrate cloud-based services, a hub application 108, and local device applications 136 with the operating system to implement aspects of the private interaction hubs 118. The aspects that may be implemented include hub formation and membership maintenance, synchronizing the hub data 110 on the mobile device with the stored hub data 124, and the hub metadata 128 with the stored hub metadata 126, with the cloud storage and service 116, and providing the hub application 108 and the local device applications 136 on the mobile device 102 with access to the hub data 110 and the hub metadata 128. For example, the hub operating system service 134 may directly access the stored hub metadata 126 at the cloud storage and service 116.

[0021] The hub operating system service 134 (or alternatively, the hub application 108) may also determine and maintain a local copy of the membership associations of member users account identifiers 120 and identifiers of the private interaction hubs. The hub operating system service 134 may also synchronize the stored hub data 124 from the cloud storage and service 116 with the hub data 110 at the mobile device 102, and synchronize the stored hub metadata 126 from the cloud storage and service with the hub metadata 128 at the mobile device. The hub operating system service 134 may also synchronize with the cloud storage and service 116 *(e.g.,* by sending changes or additions to hub data 110 and hub metadata 128 to the cloud storage and service 116). Such data synchronizations may occur in response to a user launching the hub application.

[0022] The mobile device 102 includes the device applications 136 that permit a user of the mobile device to access, create, and/or modify the hub data 110, private data 138 of the user, as well as the stored hub data 124 that is managed by any of the data and messaging services 122 at the cloud storage and service 116. Some or all of the device applications 136 may be implemented as client-side components or modules of any of the data and messaging services 122, or may be implemented as standalone, native applications *(e.g.,* local device applications) at the mobile device. The device applications 136 typically each consume and provide access to only a portion or subset of the hub data 110 and the private data 138, such as only a single type of hub data and private data (e.g., only messaging data, but not calendar data). The device applications also typically present the consumed hub data to a user in conjunction with the private data 138. Private data is data or metadata that is not associated with a private interaction hub and that has not been shared with other members of the hub *(e.g.,* data that has not been shared via the cloud storage and service 116).

[0023] The device applications 136 at the mobile device 102 may include a native or third-party messaging application that provides a user with messaging alerts and access to messaging threads. The messaging application provides access to both shared message threads shared with a private interaction hub and private message threads between a user of the mobile device and others who are not members of the hub. The messaging application also allows a user to send a message to all of the hub members without accessing a hub user interface of the hub application. The messaging application may not provide user access to other types of the hub data 110, other than the hub messages. For example, the messaging application may not provide access to the shared calendar events or shared photo albums of the hub.

[0024] The device applications 136 may also include a native or third-party calendaring application that provides scheduling alerts and access to a visual calendar. The calendaring application provides user access to both shared calendar events that are shared with hub members, and private calendar events *(e.g.,* Exchange calendar events) that have not been shared with other members of the hub. The calendaring application also allows a user to create and/or share a calendar event to all members of the hub without accessing a hub user interface of the hub application. The application may not provide user access to other types of the hub data 110, other than the hub calendar events. For example, the calendaring application may not provide access to the shared message threads or shared photo albums of the hub.

[0025] The device applications 136 may also include a native or third-party media viewing and/or editing application that provides access to photo albums of digital photos or other digital media. The media application provides user access to both shared media files *(e.g.,* photos, videos, and/or music) shared with a private interaction hub, and private media files that have not been shared with other members of the hub. The media

application also allows a user to share media files with all members of the hub without accessing a hub user interface of the hub application. The media application may not provide user access to other types of hub data 110, other than hub media files. For example, the media application may not provide access to the shared message threads or shared calendar events of the hub.

[0026] The hub operating system service 134 can expose one or more Application Programming Interfaces ("APIs"), application binary interfaces, and/or other types of interfaces 140 to the hub application 108 and to the device applications 136 on the mobile device 102 to allow these applications to access, generate, and/or modify the hub data 110 and/or the hub metadata 128, as described herein. The hub operating system service 134 can be implemented as an integrated software component or module of the operating system 132. The hub operating system service can be maintained at the mobile device 102 as executable instructions that are stored on computer-readable storage media, such as any suitable memory device or electronic data storage as described with reference to the example device shown in FIG. 4. Additionally, the hub operating system service can be executed with a processing system at the mobile device to implement aspects of private interaction hubs.

[0027] In embodiments, the hub operating system service 134 can initiate the hub management service 114 to provision a private interaction hub 118. A user of the mobile device 102 can start a private interaction hub 118 and also invite others to join an existing private interaction hub. For example, the hub user interface 106 of the hub application 108 may provide an existing hub member with the option to add a new member to the hub, and the user may identify the prospective member by providing either a mobile device number, or by selecting an existing contact from one of their social networks or other contacts.

[0028] The hub operating system service 134 can receive the request from an existing member user of the device and, in response, the hub operating system service 134 and/or the hub management service 114 communicates an invitation to join the hub as an SMS, MMS, or instant message sent to the prospective member's mobile device that may include a link to a registration site or other registration instructions. The hub operating system service 134 and/or the hub management service 114 receives *(e.g.,* via a registration website) an acceptance to the invitation to join the private interaction hub that includes at least an account identifier (such as an SSO credential), and associates the new member with the existing hub at the hub management service 114. Updated membership information, including the new member's account identifier 120 may also be propagated to other mobile devices of other members in the private interaction hub from the hub management service 114. When the new member user joins the hub, he or she may be prompted to download and/or install various applications configured to provide access to the stored hub data 124 and the stored hub metadata 126, such as the hub application 108 and/or the any of the device applications 136. The hub application 108 may also be the entry point by which a user creates a new hub and/or modifies the membership of an existing hub.

[0029] A private interaction hub 118 can be provisioned for any association of people, such as family members, coworkers, friends, neighbors, and any other people that may be associated together in a hub. Additionally, a member user of one private interaction hub may also be a member of multiple hubs, which can be based on a single member sign-on that identifies the member to the hub operating system service 134 and/or to the hub management service 114. For example, a person may be a member of a family hub that associates members of the person's family, as well as a member of a

neighborhood hub that associates members of the person's neighborhood, and a golf hub that associates the person's friends that often golf together.

[0030] The integration of the hub application 108 with the operating system 132 of the mobile device provides that a user of the device can view a message or update on the hub user interface 106 and in an application user interface of an application that is associated with the message or the update. For example, a hub calendar is integrated with the calendar application *(e.g.,* a device application 136) on the mobile device 102, and a calendar update that is displayed in the hub user interface 106 can be selected by the user to initiate the update being displayed in a calendar user interface of the calendar application. Alternatively, the user may view the calendar user interface and select a calendar event that is associated with a private interaction hub to initiate a display of the hub calendar, which includes the calendar event for the members of the hub. As another example, a hub calendar event can be displayed in a hub user interface, and the device calendar application can access and display the hub calendar event along with any private data calendar events that only the user of the device has access to view in a user interface of the device calendar application. The hub application 108 and the device application 136 both acquire the same hub calendar event data *(e.g.,* the same hub data 110 stored on the mobile device). The two different user interfaces *(e.g.,* a hub user interface and a device application user interface) display the same calendar event data.

[0031] In another example, the hub messages and chat features are integrated with messaging applications *(e.g.,* the device applications 136) on the mobile device 102, and an email, text, or instant message that is displayed in the hub user interface 106 can be selected by the user of the mobile device 102 to initiate the message being displayed in a messaging application user interface. Alternatively, the user may view a recent message from a member of a private interaction hub in a messaging application user interface, and

select the message to initiate a display of the hub messages interface, such as to view the discussion thread associated with the recent message.

[0032] In embodiments, the hub operating system service 134 at the mobile device 102 can receive social network updates for the member users of a private interaction hub 118, such as when two or more of the members of a hub are also "friends" on a public social network site, such as (e.g., FACEBOOK®, TWITTER®, or LINKEDIN®). The social network updates can be pulled from a social network site based on the established association of the account identifiers 120 of the hub members of a private interaction hub 118 at the hub management service 114. The hub operating system service 134 can then aggregate the social network updates for a particular hub for display in the hub user interface 106 or on a homepage "live tile" associated with the hub. The hub operating system service 134 at the mobile device 102 can also be implemented to coordinate multi-user interactive updates to an event that is managed in a private interaction hub. For example, several members of a hub may participate in a multi-player interactive game, and each successive interactive update from a member of the hub is initiated by the member at a respective associated mobile device. In some examples, the hub application 108 performs some or all of the functionalities of the hub operating system service 134 described herein.

[0033] Example methods 200, 300, and 900 are described with reference to respective FIGs. 2, 3, and 9 in accordance with one or more embodiments of private interaction hubs. Generally, any of the services, components, modules, methods, and operations described herein can be implemented using software, firmware, hardware *(e.g.,* fixed logic circuitry), manual processing, or any combination thereof. Example methods may be described in the general context of executable instructions stored on computer-

readable storage media that is local and/or remote to a computer processing system, and implementations can include software applications, programs, functions, and the like.

[0034] FIG. 2 illustrates example method(s) 200 of private interaction hubs. The order in which the method is described is not intended to be construed as a limitation, and any number or combination of the method operations can be combined in any order to implement a method, or an alternate method.

[0035] At 202, hub data that is associated with a private interaction hub is maintained, where the hub data includes multiple types of displayable data that is editable by different types of device applications. For example, during a hub synchronization operation, or as a result of a push operation by a messaging service or other service 122, the hub operating system service 134 of the mobile device 102 (FIG. 1) may obtain copies of the stored hub data 124 and/or the stored hub metadata 126 that are associated with a private interaction hub 118, and maintain these copies locally as the hub data 110 and the hub metadata 128. The hub operating system service 134 may also synchronize with the cloud storage and service 116 by sending data updates and changes, or additions to hub data 110 and hub metadata 128 at the mobile device 102, to the cloud storage and service 116. Such data synchronizations may occur in response to a user launching the hub application.

[0036] The different types of device applications 136 may include any type of software applications, and the functions and features thereof, that run *(e.g.,* execute) on the mobile device 102, such as for user interaction with messaging, calendaring, gaming, media playback and viewing, document editing and viewing, Web browsing, communication applications, and any other type of user-interactive application. The device applications may also include system-level components that users of a device generally do not access or utilize, but that typically run in the background while the device

is operational. Accordingly, the different types of hub data 110 includes multiple, different types of displayable data that is viewable and/or editable by the respective different types of device applications 136. Non-exhaustive types of editable and displayable data include SMS, MMS, or instant messaging data; calendar events and appointment data; any type of video and/or image data; and any type of documents that are generated and/or downloaded for editing and viewing.

[0037] At 204, private data of a user of the device is maintained, where the private data is displayable and viewable with one of the device applications. For example, the mobile device 102 maintains the private data 138 of a user in memory, and the private data is displayable and associated with one of the device applications 136 for viewing.

[0038] At 206, the hub data is displayed in a hub user interface of a hub application. The hub user interface displays the multiple types of the hub data, and typically does not display the private data of the user. For example, the mobile device 102 includes the display device 104 to display the hub data 110 in the hub user interface 106. The hub data that is displayed in the hub user interface may be viewable by each of the members of the private interaction hub 118 at a respective associated mobile device of each member.

[0039] At 208, the private data and a subset of the hub data that is associated with the same device application as the private data is displayed in a device application user interface. The device application user interface typically does not display the other types of maintained hub data that are not associated with the same device application. For example, the mobile device 102 includes the display device 104 to display the private data 138 and a subset of the hub data 110 that is associated with the sane device application 136 as the private data in a device application user interface.

[0040] At 210, a user selection of the subset of the hub data that is displayed in the hub user interface is received and, (at 208), the subset of the hub data is displayed in the device application user interface in conjunction with the private data responsive to the user selection of the subset of the hub data. For example, the hub operating system service 134 at the mobile device 102 receives a user selection of the subset of the hub data 110 that is displayed in the hub user interface 106, and responsive to the user selection, the subset of the hub data can be displayed in the device application user interface in conjunction with the private data.

[0041] At 212, a user selection of the subset of the hub data that is displayed in the device application user interface is received and, (at 206), the subset of the hub data is displayed in the hub user interface with the multiple types of the hub data. For example, the hub operating system service 134 at the mobile device 102 receives a user selection of the subset of the hub data 110 that is displayed in the device application user interface, and responsive to the user selection, the subset of the hub data can be displayed in the hub user interface 106 with the multiple types of the hub data.

[0042] FIG. 3 illustrates example method(s) 300 of private interaction hubs. The order in which the method is described is not intended to be construed as a limitation, and any number or combination of the method operations can be combined in any order to implement a method, or an alternate method.

[0043] At 302, social network updates are received that reflect the social networking activities of members of a private interaction hub and, at 304, the social network updates are aggregated for display in the hub user interface in conjunction with the multiple types of the hub data. For example, the hub operating system service 134 at the mobile device 102 receives social network updates for the members of a private interaction hub 118, such as when two or more of the members are identified as "friends"

on a social network site, and the hub operating system service aggregates the social network updates for display in the hub user interface 106 in conjunction with the multiple types of the hub data 110.

[0044] At 306, multi-user interactive updates are managed for a multi-user activity that is coordinated in the private interaction hub. For example, the hub operating system service 134 at the mobile device 102 manages multi-user interactive updates for a multi-user activity that is coordinated in a private interaction hub 118, such as when several members of the hub participate in a multi-player interactive game, and each successive interactive update from a member of the hub is initiated by the member at a respective associated mobile device.

[0045] At 308, an invitation *(e.g.,* as an SMS or MMS message) to join the private interaction hub is initiated and communicated to a mobile device associated with a new member. For example, the hub operating system service 134 at the mobile device 102 initiates an invitation to join the private interaction hub 118, and the hub management service 114 communicates the invitation as an SMS or MMS message to a mobile device associated with the new member. An invitation may be communicated as an SMS, MMS, instant message, email, or other mode of digital communication, such as an NFC or other tap mechanism employed to communicate an invitation to join a private interaction hub. The hub management service 114 may then receive an acceptance reply to the invitation to join the private interaction hub, such as a single sign-on that identifies the new member to the hub operating system service 134 and/or to the hub management service 114.

[0046] At 310, hub metadata is received that associates the new member in the private interaction hub based on an account identifier associated with the new member. For example, the hub operating system service 134 at the mobile device 102 receives the

hub metadata 128 that associates the new member in the private interaction hub 118 based on an account identifier 120 associated with the new member.

[0047] At 312, a member of the private interaction hub is associated with multiple other private interaction hubs based on a single sign-on that identifies the member. For example, the hub operating system service 134 and/or to the hub management service 114 receives a single member sign-on that identifies the member to the hub operating system service 134 or to the hub management service 114, and the member is associated in multiple private interaction hubs 118. A user of the mobile device 102 can then view the hub data for each of the private interaction hubs in a separate hub user interface 106 on the display device 104 of the mobile device.

[0048] FIG. 4 illustrates an example system 400 that includes an example device 402, which can implement embodiments of private interaction hubs. The example device 402 can be implemented as any of the devices, services, and/or servers described with reference to the previous FIGs. 1-3 and subsequent FIGs. 5-9, such as any type of client or mobile device, mobile phone, tablet, computing, communication, entertainment, gaming, media playback, and/or other type of device. For example, the mobile device 102, hub management service 114, and/or cloud storage and service 116 shown in FIG. 1 may be implemented as the example device 402. Further, although aspects of private interaction hubs have been described in FIGs. 1-3 with reference to the mobile device 102, any of the described aspects and features of private interaction hubs can be implemented in a fixed computing device *(e.g.,* a wired and/or desktop computer).

[0049] The device 402 includes communication devices 404 that enable wired and/or wireless communication of device data 406, such as media content and the shared hub data, such as messages, updates, and events data at the device. The media content can include any type of audio, video, and/or image data. The communication devices 404 can

also include transceivers for cellular phone communication and/or for network data communication.

[0050] The device 402 also includes input / output (I/O) interfaces 408, such as data network interfaces that provide connection and/or communication links between the device, data networks, and other devices. The I/O interfaces can be used to couple the device to any type of components, peripherals, and/or accessory devices. The I/O interfaces also include data input ports via which any type of data, media content, and/or inputs can be received, such as user inputs to the device, as well as any type of audio, video, and/or image data received from any content and/or data source.

[0051] The I/O interfaces 408 also support natural user interface (NUI) inputs to the device 402, such as any interface technology that enables a user to interact with a device in a "natural" manner, free from artificial constraints imposed by input devices such as mice, keyboards, remote controls, and the like. Examples of natural user interface inputs may rely on speech recognition, touch and stylus recognition, gesture recognition on-screen and motion gesture recognition proximate the device, head, eye, and environment recognition and tracking, augmented reality and virtual reality systems, and any other type of audible, vision, touch, gesture, and/or machine intelligence that may determine user input intentions.

[0052] The device 402 includes a processing system 410 that may be implemented at least partially in hardware, such as with any type of microprocessors, controllers, and the like that process executable instructions. The processing system can include components of an integrated circuit, programmable logic device, a logic device formed using one or more semiconductors, and other implementations in silicon and/or hardware, such as a processor and memory system implemented as a system-on-chip (SoC). Alternatively or in addition, the device can be implemented with any one or combination

of software, hardware, firmware, or fixed logic circuitry that may be implemented with processing and control circuits. The device 402 may further include any type of a system bus or other data and command transfer system that couples the various components within the device. A system bus can include any one or combination of different bus structures and architectures, as well as control and data lines.

[0053] The device 402 also includes computer-readable storage media 412, such as data storage devices that can be accessed by a computing device, and that provide persistent storage of data and executable instructions *(e.g.,* software applications, programs, functions, and the like). Examples of computer-readable storage media include volatile memory and non-volatile memory, fixed and removable media devices, and any suitable memory device or electronic data storage that maintains data for computing device access. The computer-readable storage media can include various implementations of random access memory (RAM), read-only memory (ROM), flash memory, and other types of storage media in various memory device configurations.

[0054] Generally, computer-readable storage media is representative of media and/or devices that enable persistent and/or non-transitory storage of data in contrast to mere signal transmission, carrier waves, or signals *per se.* A computer-readable signal media may refer to a signal-bearing medium that transmits instructions, such as via a network. The signal media can embody computer-readable instructions as data in a modulated data signal, such as carrier waves or other transport mechanism.

[0055] The computer-readable storage media 412 provides storage of the device data 406 and various device applications 414. The computer-readable storage media 412 also provides storage for an operating system of the device that is maintained with the computer-readable storage media and executed by the processing system 410. In this example, the device also includes a hub operating system service 416 that implements

embodiments of private interaction hubs, such as when the example device 402 is implemented as the mobile device 102 shown in FIG. 1. An example of the hub operating system service 416 is the hub operating system service 134 that is integrated with the operating system 132 at the mobile device 102, as described with reference to FIG. 1.

[0056] The device applications 414 can also include any of the applications 418 that implement aspects of private interaction hubs and/or mobile devices family coordination, such as described with reference to the following FIGs. 5-9. The example device 402 also includes a family coordination architecture 420, which may be implemented in the general context of software, firmware, hardware *(e.g.,* fixed logic circuitry), or any combination thereof to support embodiments of private interaction hubs and/or mobile devices family coordination. The device 402 can also include a positioning system 422, such as a GPS transceiver, or similar positioning system components, that can be utilized to determine a global or navigational position of the device.

[0057] The device 402 also includes an audio and/or video system 424 that generates audio data for an audio device 426 and/or generates display data for a display device 428. The audio device and/or the display device include any devices that process, display, and/or otherwise render audio, video, display, and/or image data. In implementations, the audio device and/or the display device are integrated components of the example device 402. Alternatively, the audio device and/or the display device are external, peripheral components to the example device.

[0058] In embodiments, at least part of the techniques described for private interaction hubs may be implemented in a distributed system, such as over a "cloud" 430 in a platform 432. The cloud 430 includes and/or is representative of the platform 432 for services 434 and/or resources 436. For example, the services 434 may include the hub management service 114, the cloud storage and service 116, and any of the data and

messaging services 122 as described with reference to FIG. 1. Additionally, the resources 436 may include the stored hub data 124 and the stored hub metadata 126 as described with reference to FIG. 1.

[0059] The platform 432 abstracts underlying functionality of hardware, such as server devices *(e.g.,* included in the services 434) and/or software resources *(e.g.,* included as the resources 436), and connects the example device 402 with other devices, servers, etc. The resources 436 may also include applications and/or data that can be utilized while computer processing is executed on servers that are remote from the example device 402. Additionally, the services 434 and/or the resources 436 may facilitate subscriber network services, such as over the Internet, a cellular network, or Wi-Fi network. The platform 432 may also serve to abstract and scale resources to service a demand for the resources 436 that are implemented via the platform, such as in an interconnected device embodiment with functionality distributed throughout the system 400. For example, the functionality may be implemented in part at the example device 402 as well as via the platform 432 that abstracts the functionality of the cloud 430.

[0060] FIG. 5 illustrates an example system 500 in which various embodiments of private interaction hubs and/or family coordination can be implemented. Any of the aspects and features of private interaction hubs as described with reference to FIGs. 1-3 can be utilized to implement some or all of the features of family coordination described in the following FIGs. 5-9, to include family members that choose to be associated in a private interaction hub. The example system includes a client device 502, which may be any one or combination of a mobile phone 504, tablet device 506, computing device 508, communication, entertainment, gaming, navigation, and/or other type of portable electronic device. Any of the client devices 510 can be implemented with various components, such as a processor and/or memory system, as well as any number and

combination of differing components as further described with reference to the example device shown in FIG. 4.

[0061] The example system 500 includes a device association service 512 that associates or correlates the client devices 510 by device identifiers 514, user identifiers 516, and/or by any other type of identifiable association. Any of the devices and services can communicate via a network 518, which can be implemented to include wired and/or wireless networks. The network can also be implemented using any type of network topology and/or communication protocol, and can be represented or otherwise implemented as a combination of two or more networks, to include IP-based networks and/or the Internet. The communication network may also include mobile operator networks that are managed by mobile operators, such as a communication service provider, cell-phone provider, and/or Internet service provider. A mobile operator can facilitate mobile data and/or voice communication for any type of a wireless device or mobile phone.

[0062] The client devices 510 can each be associated with a different user, and the users are defined members of a family 520. The example client device 502 is representative of the various client devices 510 in the family. Any of the client devices in the family can include services, such as software applications *(e.g.,* computer-executable instructions), that can be executed by a processor or processor system to implement the embodiments described herein. In this example, the client device 502 includes a family coordination architecture 522 that implements features of a family hub; a parental control service 524 that implements features of a parent dashboard; a family check-in service 526; a device quiet service 528 that implements features of quiet time and quiet zone; a safe driving service 530; and a device sharing service 532. The client device services are further described with reference to FIG. 6.

[0063] Additionally, any one or combination of the various client device services may be abstracted for implementation by a network service provider, such as the device association service 512. For example, the client devices 510 that are associated in the family 520 can be interconnected through a central computing device or system *(e.g.,* may be one of the client devices 510), which may be local to the multiple devices or may be located remotely from the devices. In embodiments, the central computing device may be a cloud service of one or more server computers that are connected to the multiple devices via the communication network 518 or other communication link. The interconnection architecture enables functionality across multiple devices to provide a common and seamless experience to a user of the multiple devices. Each of the client devices may have different physical configurations and capabilities, and the central computing device implements a platform to enable delivery of an experience that is both tailored to a particular device and yet common to all of the devices.

[0064] FIG. 6 further illustrates the various client device services that are described with reference to FIG. 5. The client device 502 includes the family coordination architecture 522, the parental control service 524, the family check-in service 526, the device quiet service 528, the safe driving service 530, and the device sharing service 532. In embodiments, the family coordination architecture 522 may generally be implemented as a service, as described herein. Generally, any of the described services may be implemented and/or described in the general context of software, firmware, hardware *(e.g.,* fixed logic circuitry), manual processing, applications, routines, programs, objects, components, data structures, procedures, modules, functions, or any combination thereof. A software implementation represents program code that performs specified tasks when executed by a computer processor. In embodiments, any of the processing, computation,

filtering, code execution, etc. can be implemented with distributed computing services and/or devices, such as on a client device, a server device, and/or network-based service.

[0065] In this example of the client device services, the family coordination architecture 522 includes a family hub manager 600 that implements, coordinates, and/or manages various family features, such as family calendar 602, family chat 604, family shared contacts 606, family journal and memories 608, tasks and chores 610, family keys 612, and family budget 614. The parental control service 524 implements features such as a parent dashboard manager 616, age appropriate content control 618, and safe social networking 620. The device quiet service 528 implements features such as quiet time 622 and quiet zone 624. The various client device services and features are further described throughout the document.

[0066] Any of the client device services can include, be integrated with, or implement any of the other client device services and applications. For example, the family coordination architecture 522 can include any one or combination of the parental control service 524, the family check-in service 526, the device quiet service 528, the safe driving service 530, and the device sharing service 532. In embodiments, the family coordination architecture may be implemented for the coordination of time, messaging, data, activities, and any other shared services. The shared services may be any of the client device services and/or any type of shared services that may be associated with a service and/or multi-system operator (MSO) devices. Further, the parental control service can be implemented to throttle, expand, manage, and/or reallocate data sharing of the client device services.

[0067] Any of the family features and/or applications of the family coordination architecture can be implemented as private, some private and some public, or private with optional user control to share information and data with public third-party services and

applications. Similarly, any of the client device services and applications described herein may be private, public, sharable, user-controllable, and/or any combination thereof. In embodiments, the family coordination architecture and/or the family hub manager can be implemented as an overall managing architecture, a collective embodiment of, and/or integration of any of the client device services and/or applications that may be implemented for expandability and instantiated together as the family coordination and/or the family hub architecture. Further, any of the client device services can include, be integrated with, or implement any of the other client device services and applications, and collectively may be embodied as a family hub and/or coordination architecture or service.

[0068] **Family Hub**

[0069] FIG. 2 is an example of a system 200 showing two different examples of hub user-interfaces for a family-orientated hub. The description, layout, orientation, features, and organization of the text, images, photos, graphics, links, data, information, and presentation features shown with reference to the hub user interfaces, as well as with reference to any other user interfaces described herein and/or shown in the figures, are merely examples that may be altered in any aspect for various embodiments and/or implementations of mobile device check-in.

[0070] The hub is a central space for membership-orientated coordination of communications, activities, information, and integration. Designated member relationships can be utilized to define how the data and information is managed, and can be implemented to leverage the social contract, such as between members of a defined familial group in the illustrated example. In one or more implementations, the hub is implemented as a user interface (e.g., via a client device application) for integration and aggregation of the membership-orientated communications, activities, and information. A hub can be implemented as a private, shared space between defined members. The hub

contains links to other members' profiles, and based on restriction settings, allows aggregation for visibility of some of other members' data and information within the hub. The hub shares a group calendar which can be viewed and edited, a common text message window, a posting board, a shared photo album, a check-in feature, and any other type of shared information.

[0071] Devices and/or device accounts can be associated within a set of devices or device accounts (e.g., a family phone account, user accounts, a connected set of devices, and so on), and all or a subset of the devices or accounts can communicate with other devices or accounts. The members of a hub can be defined by any number of different classes of people, such as Junior, Teen, Mom, Dad, (or Parent), Grandparent, Nanny, Life-Coach, and so on for the illustrated example of a family. Further, the members of a family can be defined to distinguish a live-in Nanny from a Babysitter, for example.

[0072] Additionally, membership of the hub as well as use of the hub by the members can be controlled by a select collection of users, such as one or two mobile phones by the associated users of the client devices. For example, one of the members in the hub can be the designated control person, such as Mom who runs the household, employer, and so on.

[0073] From a single configuration of the members, the hub can be provisioned, setup, and propagated out, e.g., automatically. The features and configuration of a hub may default to an automatic, easy setup, but any rule, feature, or configuration aspect can be readily modified by a user. Provisioning a hub may be based on billing, e.g., a family or corporate billing plan. However, if a phone device is changed to a different carrier, for example, the phone device can still receive texts related to the hub. Alternatively or in addition, provisioning a hub can be based on email addresses, phone numbers, user account identifiers, or any other identifier.

[0074] A retail person selling a new phone package, for instance, can easily identify the members each to their new phone devices and initiate the hub being instantiated. From a consumer perspective, it just works and members can walk out of the store all set up. All of the data and information can be shared with a single selection, and thus the members do not have to share each item (e.g., a grocery list, photos, calendar, etc.) individually and separately.

[0075] The hub user interface may act as a shared space that is customizable and provides for user-generated and shared content. Some information can be shared, while other information is not. For example, Mom's complete Christmas list is not viewable by the other family members, but Dad and Kids can add to the list (and only view their contribution). Hub setup may be performed "a la carte," meaning only the features that members want displayed on the hub wall can be selected. For example, Mom wants to see the shopping list, whereas Dad does not shop and so wants to avoid having the list displayed on his device, yet he could still access the shopping list to add items when desired.

[0076] The hub user interface integrates functions, calendar functionality, event and/or data summaries (i.e., on the "wall"), as well as content that is shared between the members of the hub (e.g., lists, documents, etc.). For example, the hub user interface may include a "family check-in" or "check-in" option. The hub user interface may also include a chat section where location check-ins messaged are displayed along with other messages interchanged between the members of the hub. The hub "wall" is representative of an area via which members of the group may add to as desired, like a lunchroom bulletin board, family refrigerator, and so on. In implementations, the information can be aggregated in pillars or columns and shown on the hub wall as illustrated. The hub wall can also represent an interrelation between any of the information and data that appears on the wall

and its placement in time. The hub settings provide that a user can control which functions are integrated and displayed within the hub, such as on the wall.

[0077] The hub information may also be context relevant to the members of the hub, and the calendar includes shared hub events. Calendar updates can be posted as notice events on the wall, and a user can look at the wall to see upcoming hub events, or the events that pertain to one or more other members of the hub. Messaging may also be performed that is private among the members of the hub. A member can instant text (or other communication) to all other members in the hub. Texting - such as for a work meeting - can divide each members' display on their respective devices into individual screens for each member.

[0078] The hub may also be extensible, and may link to a hard drive on a home computer, or sync to just one of the other devices, the manager, or cloud control (e.g., from a network-based service). The hub may also be extensible to third parties that add a note on the hub wall, such as implemented with application program interfaces (APIs) for functions to post data to the hub. A third-party application, however, would not have access to the context of the hub wall, such as to obtain or display hub data. The private information and hub data could be encrypted and only decrypted by the phone devices that are associated with the hub.

[0079] Thus, the hub supported by the hub coordination architecture 112 may be thought of as a central space coordination of communications, activities, information, and integration of members of the hub. Hubs may be defined to support a variety of different membership, such as for family members, coworkers, friends, acquaintances, fan clubs, and so forth. Therefore, although examples are discussed that relate to a family in the following discussion it should be readily apparent that membership in the hub may be defined in a variety of other ways without departing from the spirit and scope thereof.

Accordingly, the hub coordination architecture may be used to support a variety of different functionality, and further aspects of private interaction hubs are also described further herein.

[0080] Family Calendar

[0081] A family calendar is visible on the family hub wall and shared by all of the family members to update other family members of family-orientated events and activities, as well as individual family member appointments. In embodiments, the family calendar is displayed as part of the family hub user interface, and the family calendar can be implemented as a client device application. Embodiments of a family calendar include any one or combination of implementation features, such as described herein.

[0082] The family calendar can include any type of icons or identifiers of past and future events, activities, appointments, etc. for any of the family members in the family group. Information noted on the family calendar can be context relevant to the members of the family group, and the calendar includes shared family events. Calendar updates can be posted as notice events on the family hub wall, where a family member can look at the wall to see upcoming family events, or the events that pertain to one or more other family members. Conflicts resolution can be implemented to resolve calendar scheduling conflicts among the family members. The calendar may be shared with others that are not specifically immediate family members, such as Grandma or the Nanny who picks up the kids from school. The family calendar can include action, event, and/or task reminders that are related *(e.g.,* cross-linked) in time. A school calendar can be integrated with the family calendar, and may be imported information from the kid's school, such as for assignments, events, grades, school calendar events, etc.

[0083] **Family Chat**

[0084] A family chat feature provides a privatized chat interface for the family members of the family group within the family hub. The family members can chat individually with one another, or with all of the family members. In embodiments, the family chat feature can be implemented as part of the family hub user interface, with a client device application.

[0085] **Family Shared Contacts**

[0086] A family shared contacts feature provides a shared phone, address, and/or contact listing for all of the family members in a family group. In embodiments, the family shared contacts feature can be implemented as part of the family hub user interface, with a client device application. Generally, one family member is the point of contact for the plumber, carpet cleaner, dog walker, and other service people - but when that family member is not available, the other family members typically don't have access or know who to contact. Embodiments of the family shared contacts feature provide that all of the family members have access to the family contacts, particularly when the usual point of contact family member is not available.

[0087] **Family Journal**

[0088] A family journal feature provides that any family member can share any type of material, information, newspaper or magazine subscription, linked reference, television programs, videos, music, etc., and tag the material for the attention of the other family members within the family group to generate the family's own journal. In embodiments, the family journal can be implemented as part of the family hub user interface, with a client device application. Embodiments of the family journal feature include any one or combination of implementation features, such as described herein.

[0089] The family journal can be utilized for subscriptions, such as a family newspaper subscription, family content tagging, television programs, videos, magazine articles, music, etc. to create the family journal. A family journal includes the concept of a scrapbook or memories *(e.g.,* past events and information), however, the family journal generally pertains to the present or future tense collation of material for the family members. Additionally, each family member may have his or her own respective journal that the other family members can access and view.

[0090] **Family Photos and Video**

[0091] A family memories feature provides photos, video, images, and the like in a shared private photo album for the family members of the family group. Access to a photo album of family memories can be granted to non-family members. In embodiments, the family memories feature can be implemented as part of the family hub user interface, with a client device application. Embodiments of the family memories feature provide that a family memories journal or photo album can be implemented for the designated family members, and/or for extended family members, non-family members, friends, and the like.

[0092] **Tasks & Chores**

[0093] A family tasks and chores feature provides that a family member can identify and define tasks and/or chores for other family members to complete. The family tasks and chores feature can be integrated with other family hub features, such as the family calendar, family check-in, and eWallet. For example, the completion of tasks and chores can correlate to kids' allowance, or may be used as a family incentive to reach a milestone that all of the family members will benefit from, such as a family vacation, movie night, etc. In embodiments, the family tasks and chores feature can be implemented as part of the family hub user interface, with a client device application.

[0094] **Family Keys**

[0095] A family keys feature provides that a mobile phone or other portable communication device can be implemented to interrelate with an automobile or building, and give a user the ability to grant or restrict access and/or use of the automobile or building to someone either within the family group, or outside of the family group. In embodiments, the family keys features can be implemented as a user interface with the family hub and/or as a client device application. The family keys feature can also be implemented for interaction with application and on-line content stores *(e.g.,* Windows Store, iTunes, etc.). Embodiments of the family keys features include any one or combination of implementation features, such as described in the following paragraphs.

[0096] Family keys provides electronic house and/or vehicle keys, and can be implemented with near field communication (NFC) security or other proximity security in a phone device. In embodiments, the phone is the identity that is associated with the electronic key to a house, building, or vehicle. A parent can unlock a car for someone, or unlock the front door of the house for a child coming home from school, for maid access, or for a delivery person. Family keys can also be used to monitor when a child enters and exits the house. A parent can also easily "change the locks" with the electronic family keys, and the key codes can be updated on all of the family members' devices.

[0097] The family keys can be set as variable time locks, such as to limit access to a vehicle after a designated time in the evening. Alternatively, a family key may be implemented as a portable permission slip to allow a kid access to a vehicle, television, computer, etc. Family keys can be implemented as an intersection of the house and family. For example, the television may not display some channels or content when only the kids are home, but will allow the channels and/or content to display when a parent is home (presumably monitored by adult).

[0098] Family keys can also be implemented to provide a kid money on his or her phone with a spending limit and/or a time limit. A parent doesn't have to then transfer money or access cash to give to the kid. This may be incorporated with remote parental approval. Related to family keys, people care about the safety and security of their families. In eWallet scenarios, a phone user may have fewer authentication checks for accessing a wallet if the user's phone is connected to the home WiFi and GPS shows that the user is located at the home. The user's phone may also manage a child's allowance. In terms of NFC, if a home's front door is NFC-enabled, a user can grant access to the housecleaning service and get notified when they attempt access or even require a response from my phone to "buzz them in". This can also be used to limit access within the house once a service provider has entered.

[0099] **Family Budget**

[00100] A family budget feature provides that a family member in a family group can allocate electronic funds to any of the other family members, or to non-family members. The family budget feature can also link with third-party applications to purchase and distribute such things as tickets and gift cards to any of the other family members in the family group. The family budget may be implemented in conjunction with an eWallet application, and can be implemented for vacation shopping, pre-paid passes, gift cards, and to keep track of electronic receipts. In embodiments, the family budget feature can be implemented as part of the family hub user interface, with a client device application.

[00101] FIG. 8 illustrates an example mobile device 800 in which embodiments of private interaction hubs and/or family coordination can be implemented. The mobile device 800 is an example of the mobile device 102 (FIG. 1), the client device 502, or any of the other devices 510 described with reference to FIGs. 1-7. The mobile device

includes the family hub manager 600 of the family coordination architecture 522, and the mobile device can be implemented with various components, such as a processor and/or memory system, as well as any number and combination of differing components as further described with reference to the example device shown in FIG. 4. The mobile device 800 includes an integrated display device 802 on which a user interface 804 can be displayed, such as a portion of the family hub user interface 704 shown in this example.

[00102] The mobile device 800 includes the family hub manager 600 of the family coordination architecture 522, and is implemented to manage a family hub 806 that is a private, shared space of the family members. The family hub manager can provision the family hub based on designated family member classes 808 that define relationships between the family members, such as Parent, Grandparent, Teen, Child, and any other family member class. The family hub manager can then coordinate shared family information 810, shared family communications 812, and shared family activities 814 based on the designated family member classes associated with the family members in the family hub.

[00103] As described with reference to the family hub user interfaces 702 and 704 shown in FIG. 7, a family hub user interface can be implemented to display family information that includes a shared calendar, shared pictures, shared contacts, and a shared list. The shared calendar, shared pictures, shared contacts, and shared list are all editable by any of the family members from associated devices, and any of the family members may have more than one device from which the family hub features and information can be accessed. The family hub manager 600 can initiate posting calendar updates to the shared calendar as notice events that are displayed on the family hub user interface. The family hub user interface can also display the communications that include private group messages between the family members. The family hub manager also can be implemented

to setup a wireless data connection when initiated by a family member via one of the associated devices, and then share settings for the wireless data connection with the associated devices on the family hub user interface.

[00104] FIG. 9 illustrates example method(s) 900 of private interaction hubs and/or family coordination. The order in which the method is described is not intended to be construed as a limitation, and any number or combination of the method operations can be combined in any order to implement a method, or an alternate method.

[00105] At 902, a family hub is provisioned as a private, shared space of family members. For example, the family hub manager 600 of the family coordination architecture 522 that is implemented at the mobile device 800 (FIG. 8) provisions the family hub 806 as the private, shared space of the family members, and the family hub is provisioned based on designated family member classes that define relationships between the family members. Similarly, the various client devices 510 (FIG. 5) can each implement a family hub manager of a family hub.

[00106] At 904, family information, communications, and activities associated with the family members in the family hub are coordinated. For example, the family hub manager 600 implemented at the mobile device 800 coordinates the shared family information 810, the shared family communications 812, and the shared family activities 814 based on the designated family member classes. Similarly, the family hub manager 600 at the client device 502 coordinates family information, communications, and activities associated with the family members in the family hub.

[00107] At 906, a family hub user interface is displayed on associated devices. For example, the mobile device 800 includes the integrated display device 802 on which a user interface 804 is displayed, such as a portion of the family hub user interface 704. The

family hub user interface includes the displayed family information, communications, and activities associated with the family members that correspond to the associated devices, and the family information includes at least a shared calendar, shared pictures, shared contacts, and a shared list. Similarly, the various client devices 510 each include an integrated display device to display a family hub user interface.

[00108] At 908, a shared calendar, shared pictures, shared contacts, and/or a shared list is edited based on input from a family member at one of the associated devices. For example, the family hub manager 600 implemented at the mobile device 800 receives an input from a family member via an associated device to edit the shared calendar, shared pictures, shared contacts, and/or shared list that is displayed on the family hub user interface. Similarly, the family hub manager at the client device 502 edits and/or updates the family information that is displayed as part of a family hub user interface.

[00109] At 910, calendar updates to the shared calendar are posted as notice events that are displayed on the family hub user interface and, at 912, the communications are displayed that include private group messages between the family members. For example, the family hub manager 600 implemented at the mobile device 800 posts calendar updates as notice events that display on the family hub user interface 704, and the family hub manager initiates displaying private group messages between the family members on the family hub user interface 704. Similarly, the family hub manager at the client device 502 posts notice events for display and initiates displaying the private group messages between family members on a family hub user interface.

[00110] At 914, settings for a wireless data connection are shared with the associated devices on the family hub user interface. For example, the family hub manager 600 implemented at the mobile device 800 can setup a wireless data connection when initiated by a family member via one of the associated devices, and then shares the settings

for the wireless data connection with the associated devices on the family hub user interface 704. Similarly, the family hub manager at the client device 502 can setup a wireless data connection and share the settings for the wireless data connection with the associated devices 510 on a family hub user interface.

[00111] Although embodiments of private interaction hubs have been described in language specific to features and/or methods, the appended claims are not necessarily limited to the specific features or methods described. Rather, the specific features and methods are disclosed as example implementations of private interaction hubs.

CLAIMS

1. A mobile device, comprising:

memory storage configured to maintain hub data that is associated with a private interaction hub, the hub data comprising multiple types of displayable data, wherein each type of displayable data corresponds to a different device application,

the memory storage further configured to maintain private data that is displayable and viewable with at least one of the different device applications; and

a display device configured to display multiple types of the hub data in a hub user interface, the display device further configured to display the private data and a single type of the hub data that is associated with the at least one different device application in a user interface of the at least one different device application.

2. A mobile device as recited in claim 1, wherein the single type of the hub data that is displayable in the hub user interface is selectable to initiate the single type of the hub data being displayed in the device application user interface in conjunction with the private data.

3. A mobile device as recited in claim 1, wherein the single type of the hub data that is displayable in the device application user interface is selectable to initiate the single type of the hub data being displayed in the hub user interface with the multiple types of the hub data.

4. A mobile device as recited in claim 1, wherein a hub application and the at least one device application both acquire the same subset of the hub data that is maintained at the mobile device in the memory storage.

5. A method, comprising:

maintaining hub data that is associated with a private interaction hub, the hub data comprising multiple types of displayable data that is editable by different types of device applications;

maintaining private data that is displayable and viewable with at least one of the device applications;

displaying the hub data in a hub user interface of a hub application, the hub user interface displaying the multiple types of the hub data; and

displaying the private data and a subset of the hub data that is associated with the same device application as the private data in a device application user interface.

6. A method as recited in claim 5, further comprising:

receiving a user selection of the subset of the hub data that is displayed in the hub user interface; and

responsive to the user selection, displaying the subset of the hub data in the device application user interface in conjunction with the private data.

7. A method as recited in claim 5, further comprising:

receiving a user selection of the subset of the hub data that is displayed in the device application user interface; and

responsive to the user selection, displaying the subset of the hub data in the hub user interface with the multiple types of the hub data.

8. A method as recited in claim 5, further comprising:

receiving social network updates for one or more members of the private interaction hub; and

aggregating the social network updates for display in the hub user interface in conjunction with the multiple types of the hub data.

9. A method as recited in claim 5, further comprising:

managing multi-user interactive updates for a multi-user activity that is coordinated in the private interaction hub.

10. A method as recited in claim 5, further comprising:

initiating an invitation to join the private interaction hub as an SMS message that is communicated to a mobile device associated with a new member; and

receiving hub metadata that associates the new member in the private interaction hub based on an account identifier associated with the new member.

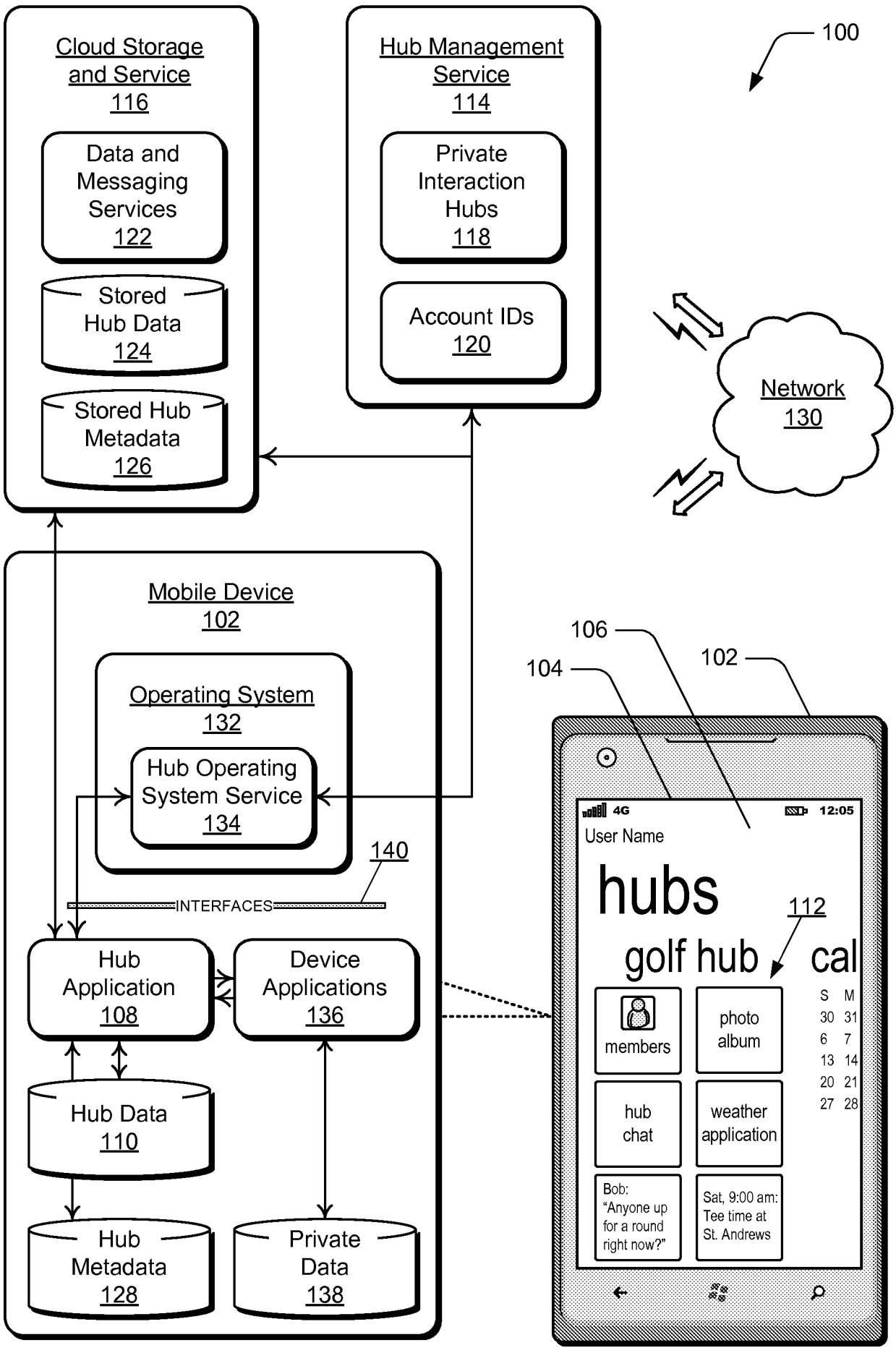

100
Cloud Storage and Service 116
Data and Messaging Services 122
Stored Hub Data 124
Stored Hub Metadata 126
Hub Management Service 114
Private Interaction Hubs 118
Account IDs 120
Network 130
Mobile Device 102
Operating System 132
Hub Operating System Service 134
140
INTERFACES
Hub Application 108
Device Applications 136
Hub Data 110
Hub Metadata 128
Private Data 138
106
104
102
4G
12:05
User Name
hubs
112
golf hub
cal
members
photo album
hub chat
weather application
Bob: "Anyone up for a round right now?"
Sat, 9:00 am: Tee time at St. Andrews
S M
30 31
6 7
13 14
20 21
27 28

FIG. 1

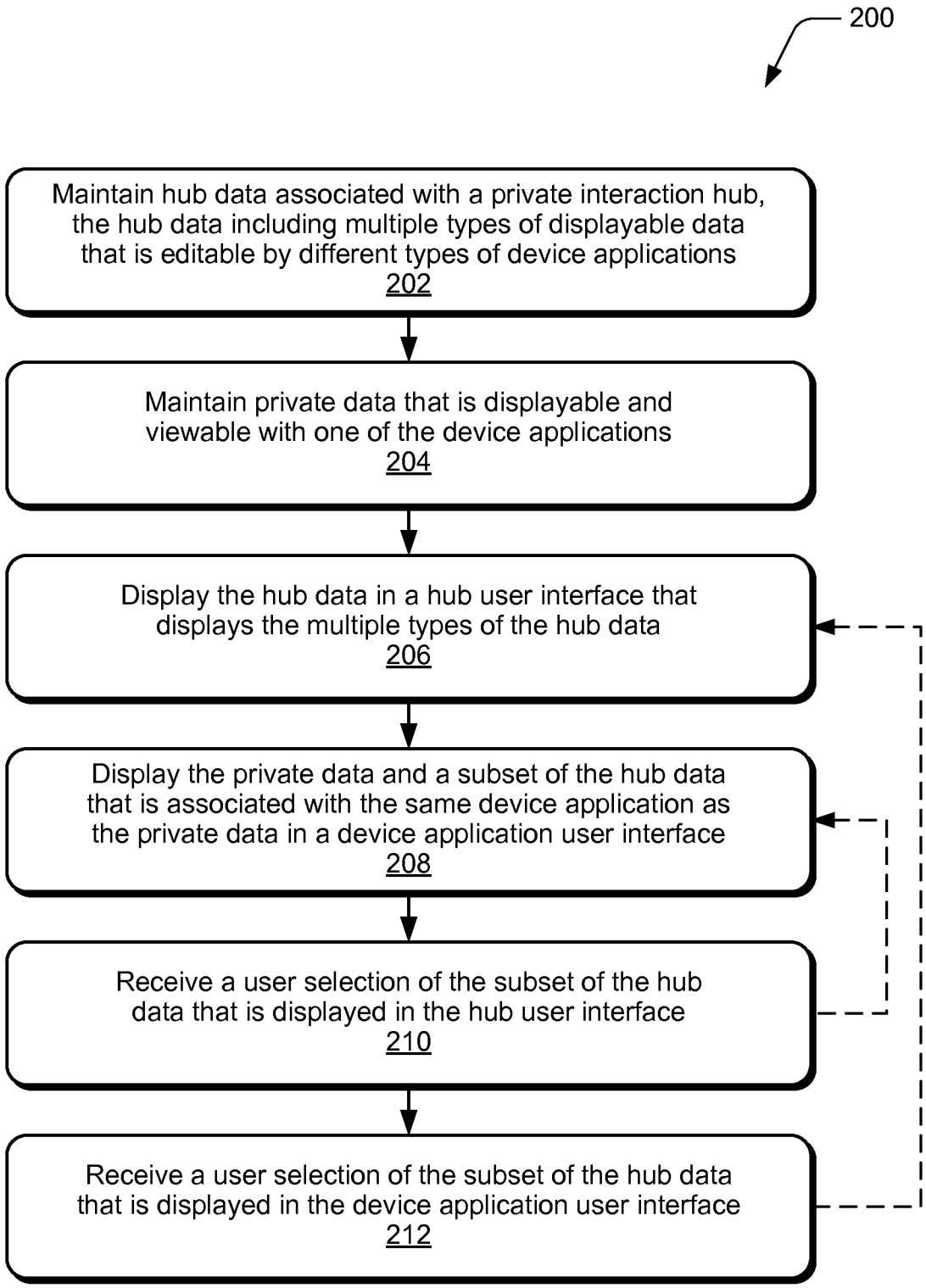

200
Maintain hub data associated with a private interaction hub, the hub data including multiple types of displayable data that is editable by different types of device applications
202
Maintain private data that is displayable and viewable with one of the device applications
204
Display the hub data in a hub user interface that displays the multiple types of the hub data
206
Display the private data and a subset of the hub data that is associated with the same device application as the private data in a device application user interface
208
Receive a user selection of the subset of the hub data that is displayed in the hub user interface
210
Receive a user selection of the subset of the hub data that is displayed in the device application user interface
212

FIG. 2

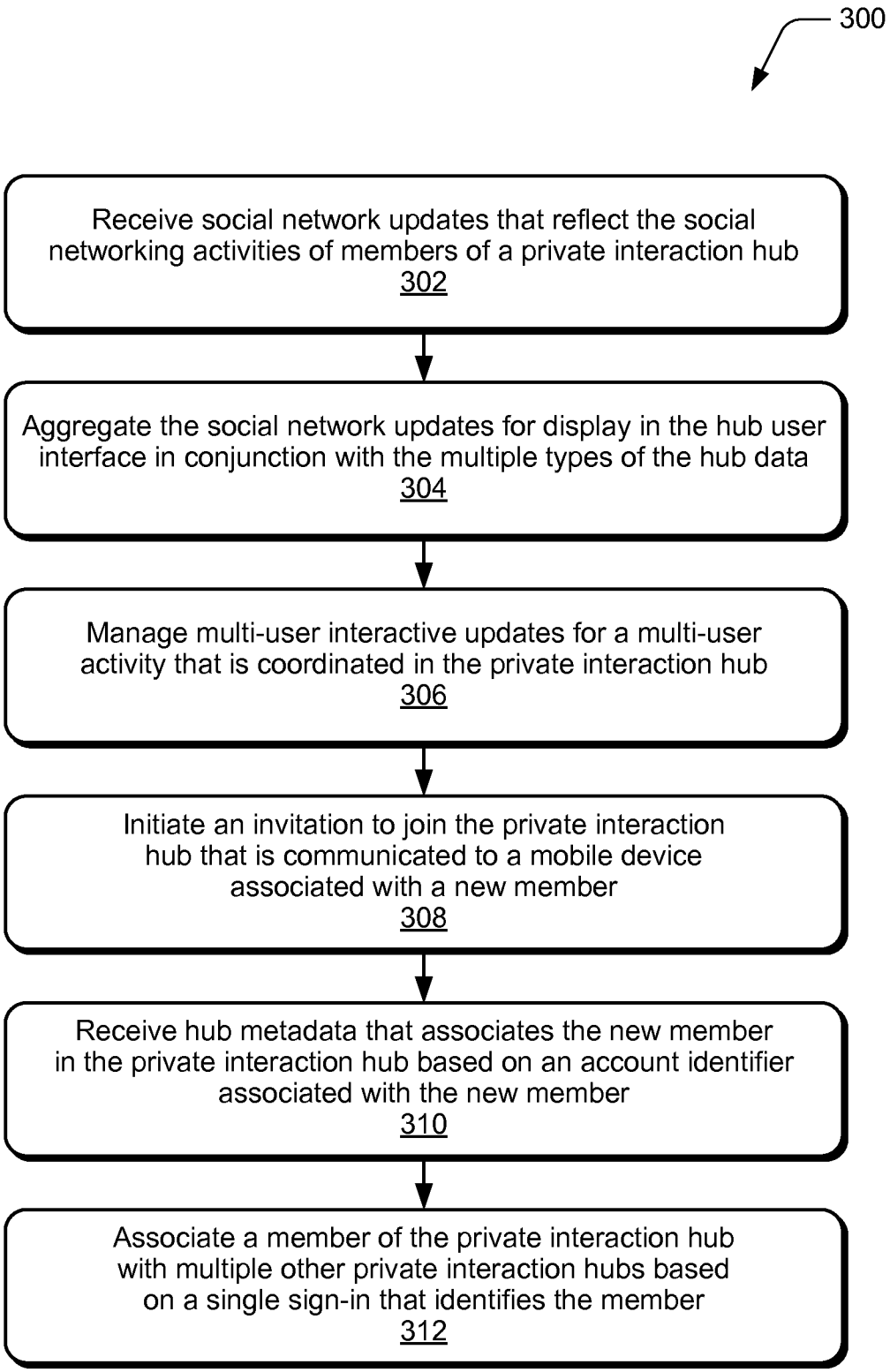

300
Receive social network updates that reflect the social networking activities of members of a private interaction hub
302
Aggregate the social network updates for display in the hub user interface in conjunction with the multiple types of the hub data
304
Manage multi-user interactive updates for a multi-user activity that is coordinated in the private interaction hub
306
Initiate an invitation to join the private interaction hub that is communicated to a mobile device associated with a new member
308
Receive hub metadata that associates the new member in the private interaction hub based on an account identifier associated with the new member
310
Associate a member of the private interaction hub with multiple other private interaction hubs based on a single sign-in that identifies the member
312

FIG. 3

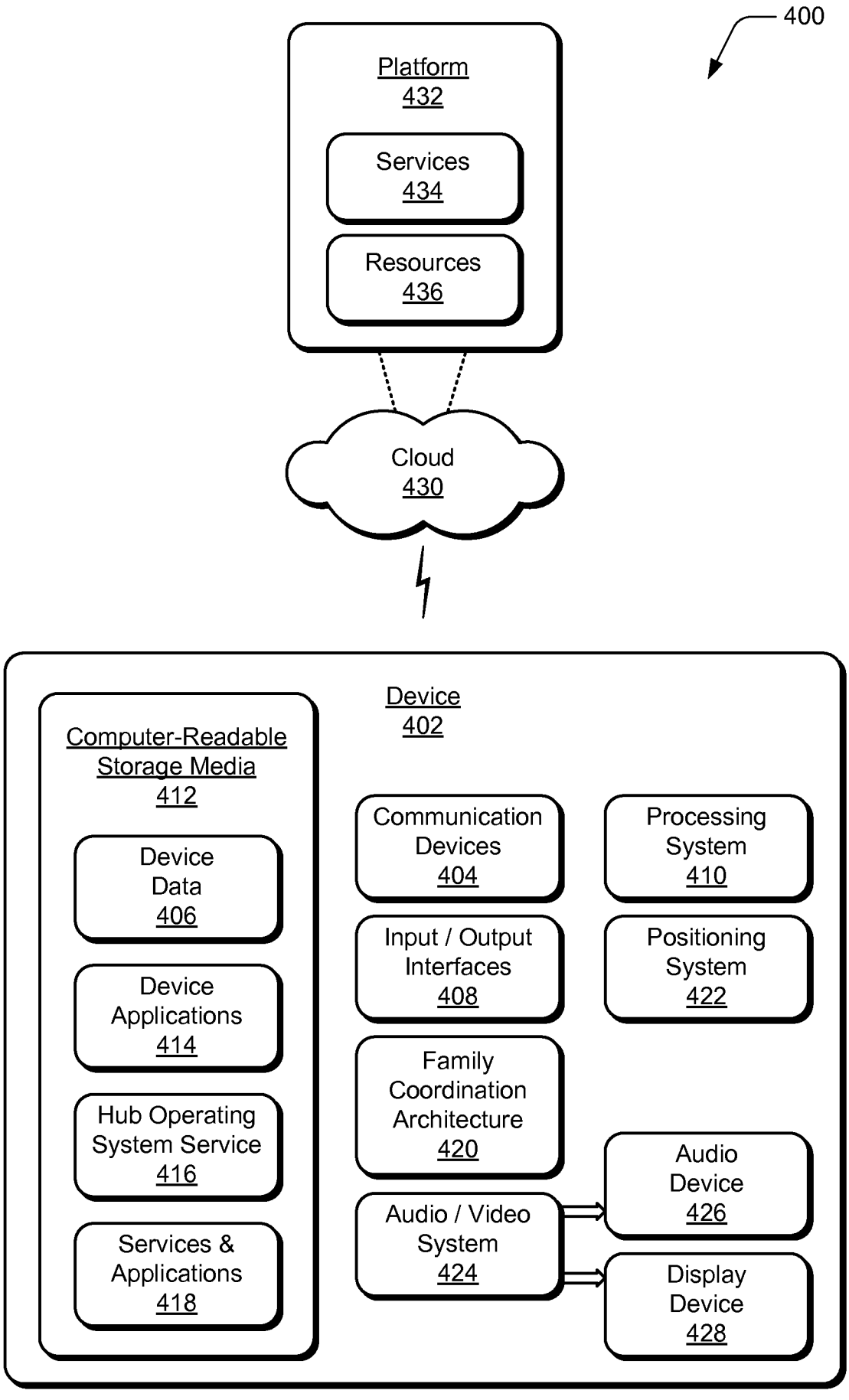

400
Platform
432
Services
434
Resources
436
Cloud
430
Device
402
Computer-Readable
Storage Media
412
Device
Data
406
Device
Applications
414
Hub Operating
System Service
416
Services &
Applications
418
Communication
Devices
404
Input / Output
Interfaces
408
Family
Coordination
Architecture
420
Audio / Video
System
424
Processing
System
410
Positioning
System
422
Audio
Device
426
Display
Device
428

FIG. 4

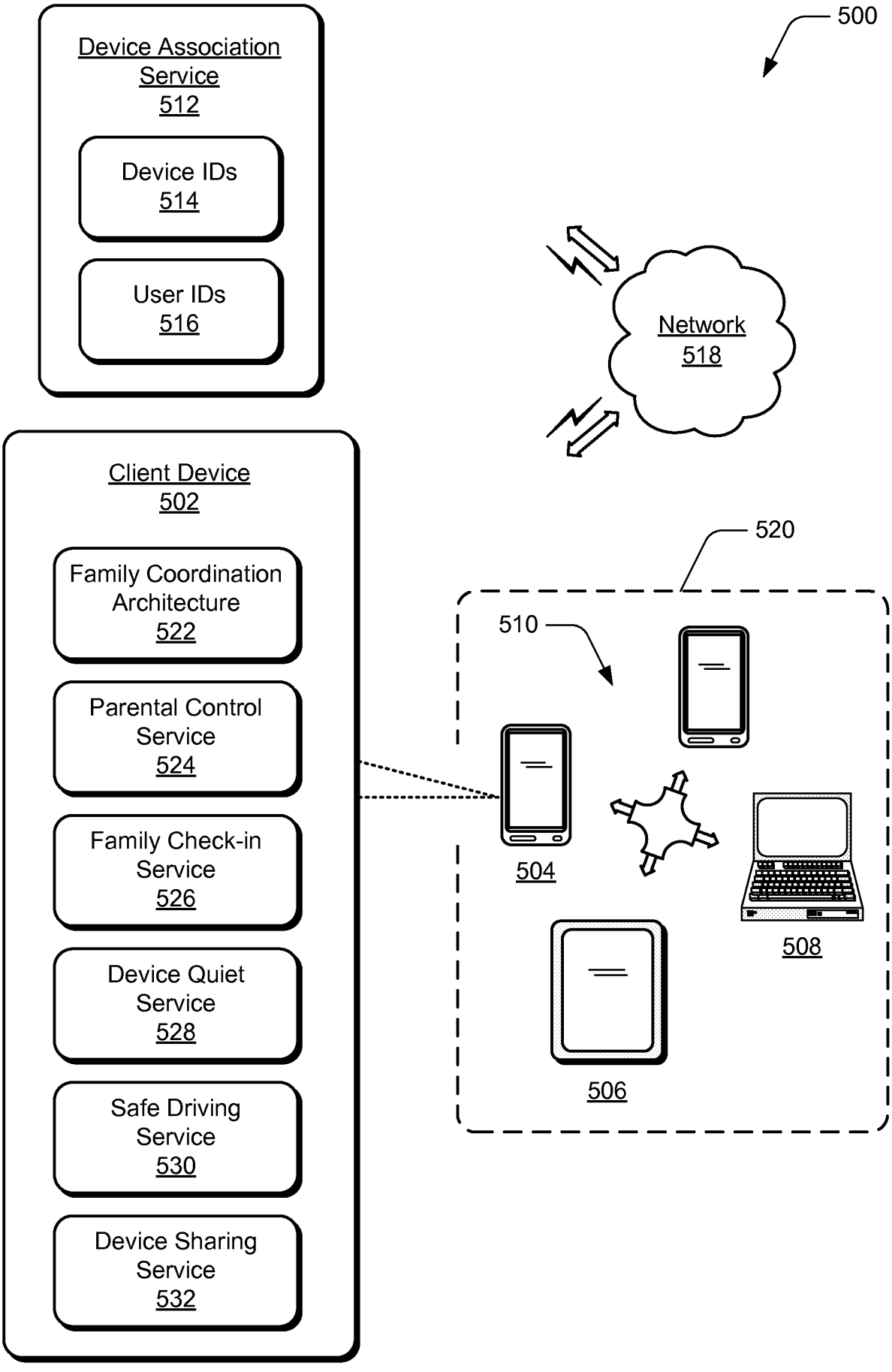

500
Device Association Service 512
Device IDs 514
User IDs 516
Network 518
Client Device 502
Family Coordination Architecture 522
Parental Control Service 524
Family Check-in Service 526
Device Quiet Service 528
Safe Driving Service 530
Device Sharing Service 532
520
510
504
508
506

FIG. 5

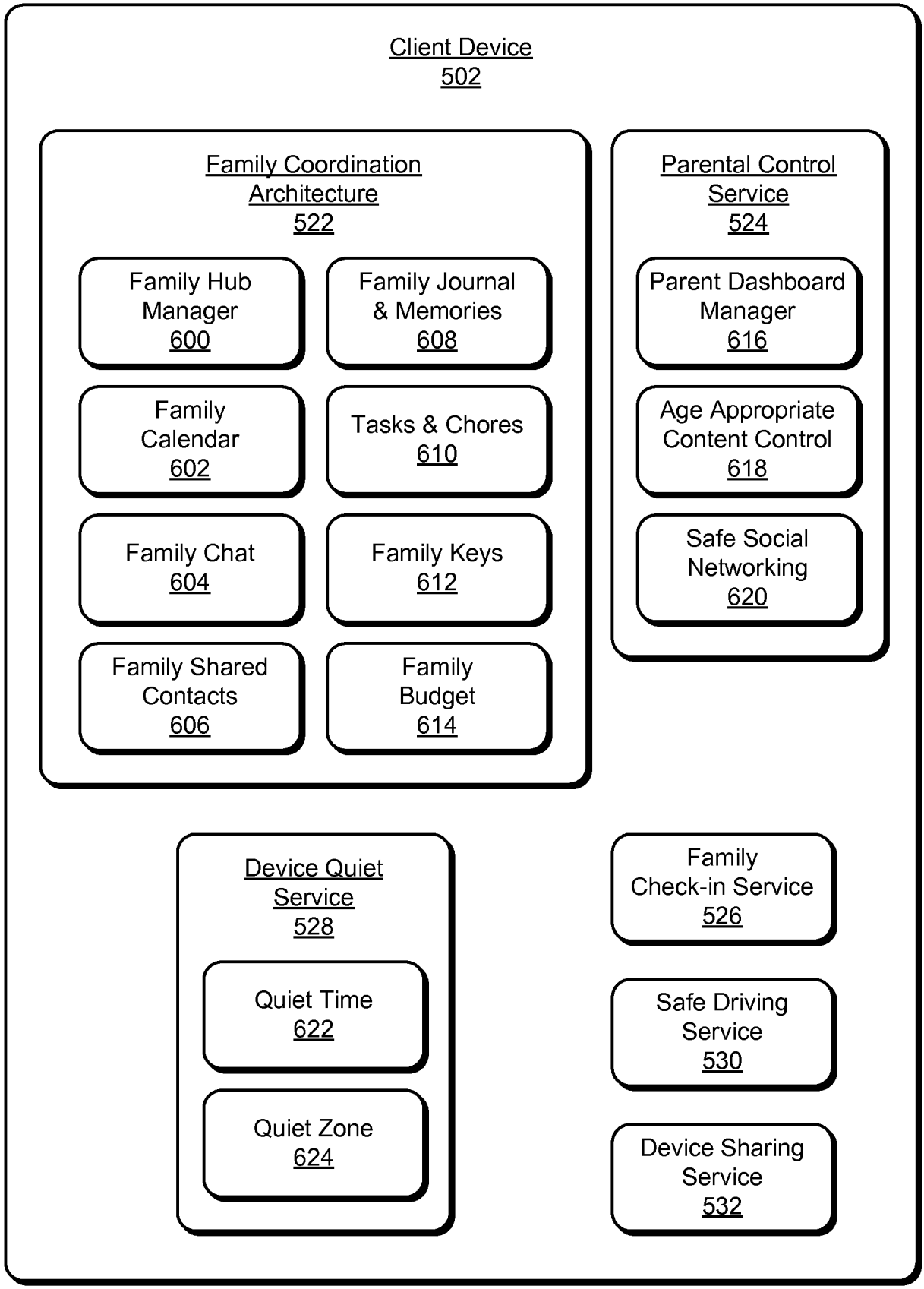
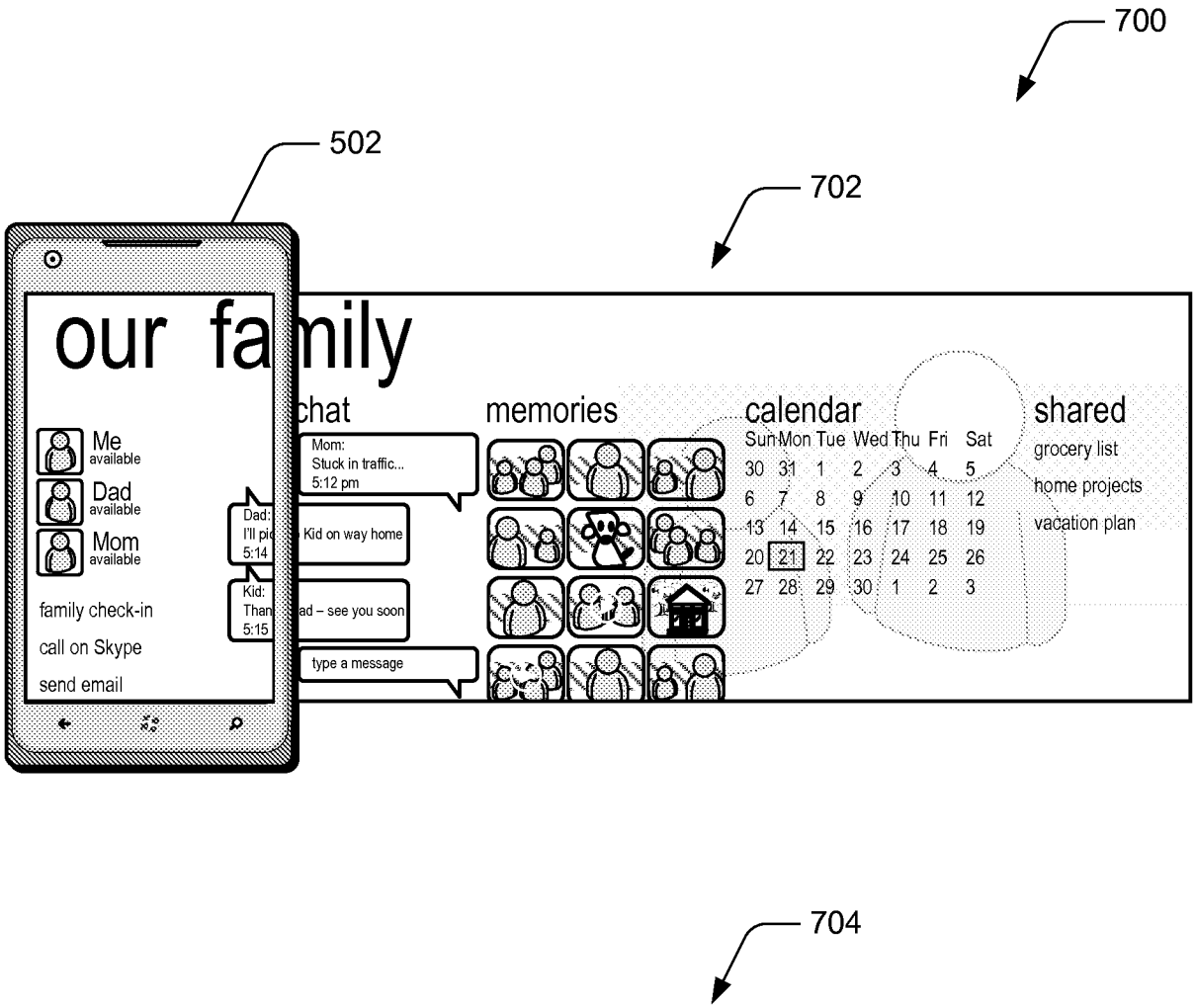

Client Device
502
Family Coordination Architecture
522
Family Hub Manager
600
Family Journal & Memories
608
Family Calendar
602
Tasks & Chores
610
Family Chat
604
Family Keys
612
Family Shared Contacts
606
Family Budget
614
Parental Control Service
524
Parent Dashboard Manager
616
Age Appropriate Content Control
618
Safe Social Networking
620
Device Quiet Service
528
Quiet Time
622
Quiet Zone
624
Family Check-in Service
526
Safe Driving Service
530
Device Sharing Service
532

FIG. 6


700
502
702
our family
Me
available
Dad
available
Mom
available
family check-in
call on Skype
send email
chat
Mom:
Stuck in traffic...
5:12 pm
Kid on way home
type a message
memories
calendar
Sun Mon Tue Wed Thu Fri Sat
30 31 1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 1 2 3
shared
grocery list
home projects
vacation plan

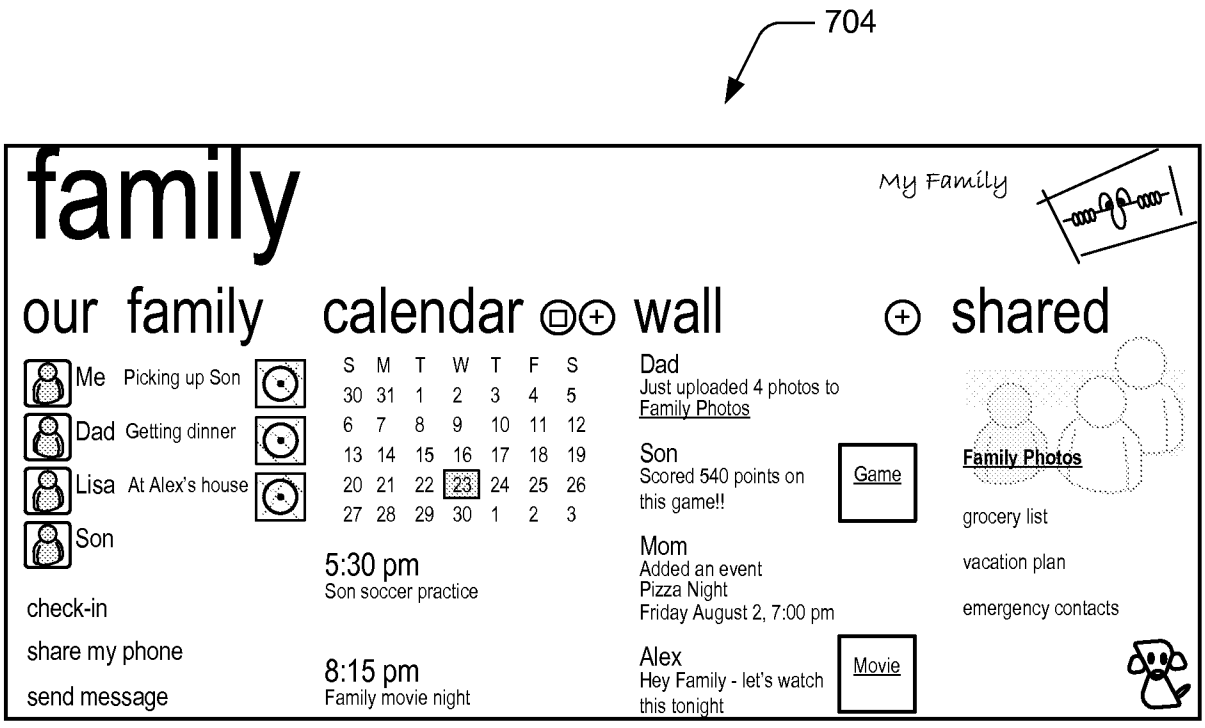

704
family
My Family
our family
Me Picking up Son
Dad Getting dinner
Lisa At Alex's house
Son
check-in
share my phone
send message
calendar
wall
shared
S M T W T F S
30 31 1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 1 2 3
5:30 pm
Son soccer practice
8:15 pm
Family movie night
Dad
Just uploaded 4 photos to
Family Photos
Son
Scored 540 points on
this game!!
Game
Mom
Added an event
Pizza Night
Friday August 2, 7:00 pm
Alex
Hey Family - let's watch
this tonight
Movie
Family Photos
grocery list
vacation plan
emergency contacts

FIG. 7

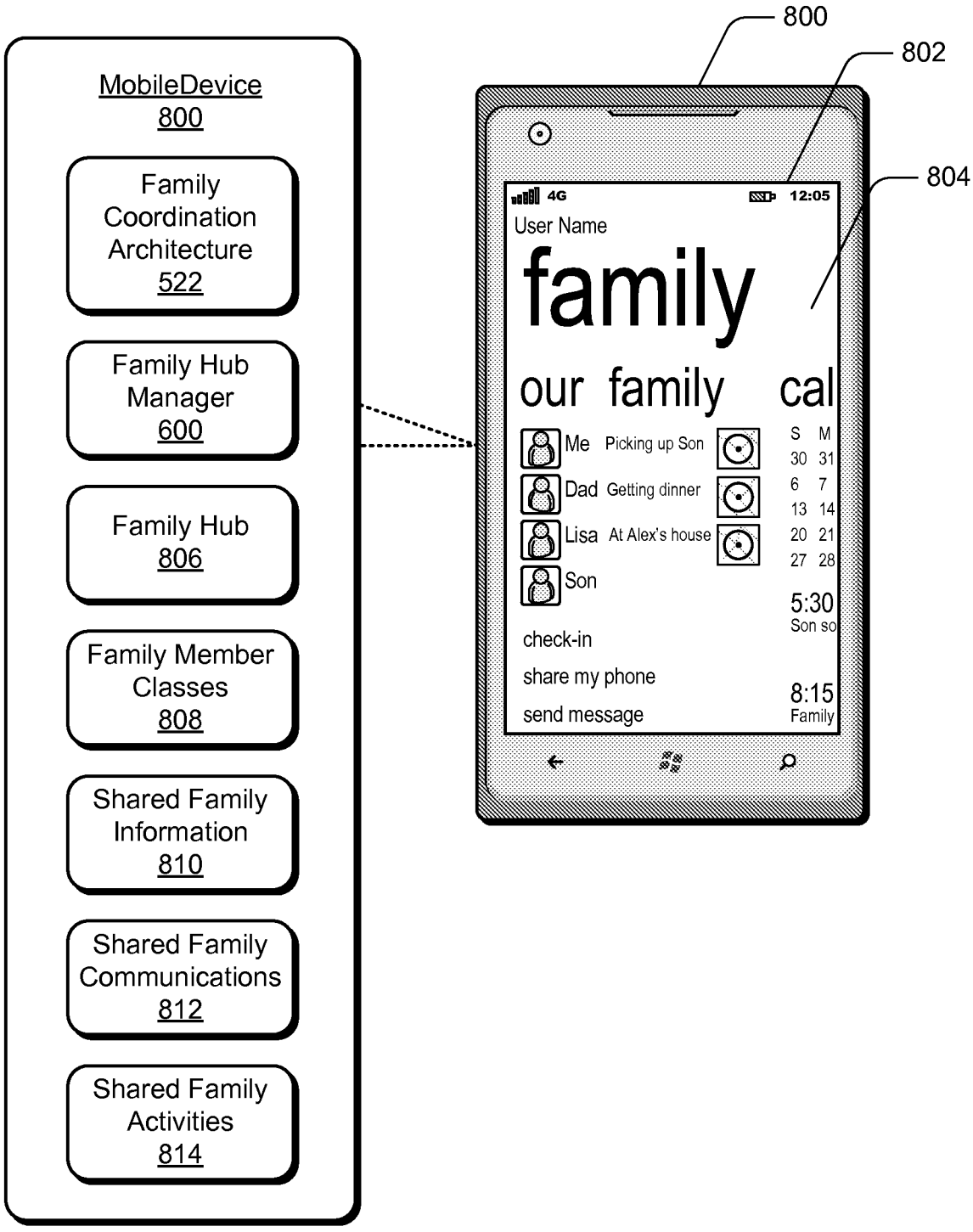

MobileDevice
800
Family Coordination Architecture
522
Family Hub Manager
600
Family Hub
806
Family Member Classes
808
Shared Family Information
810
Shared Family Communications
812
Shared Family Activities
814
800
802
804
4G
12:05
User Name
family
our family cal
Me Picking up Son
Dad Getting dinner
Lisa At Alex's house
Son
S M
30 31
6 7
13 14
20 21
27 28
5:30
Son so
check-in
share my phone
send message
8:15
Family

FIG. 8

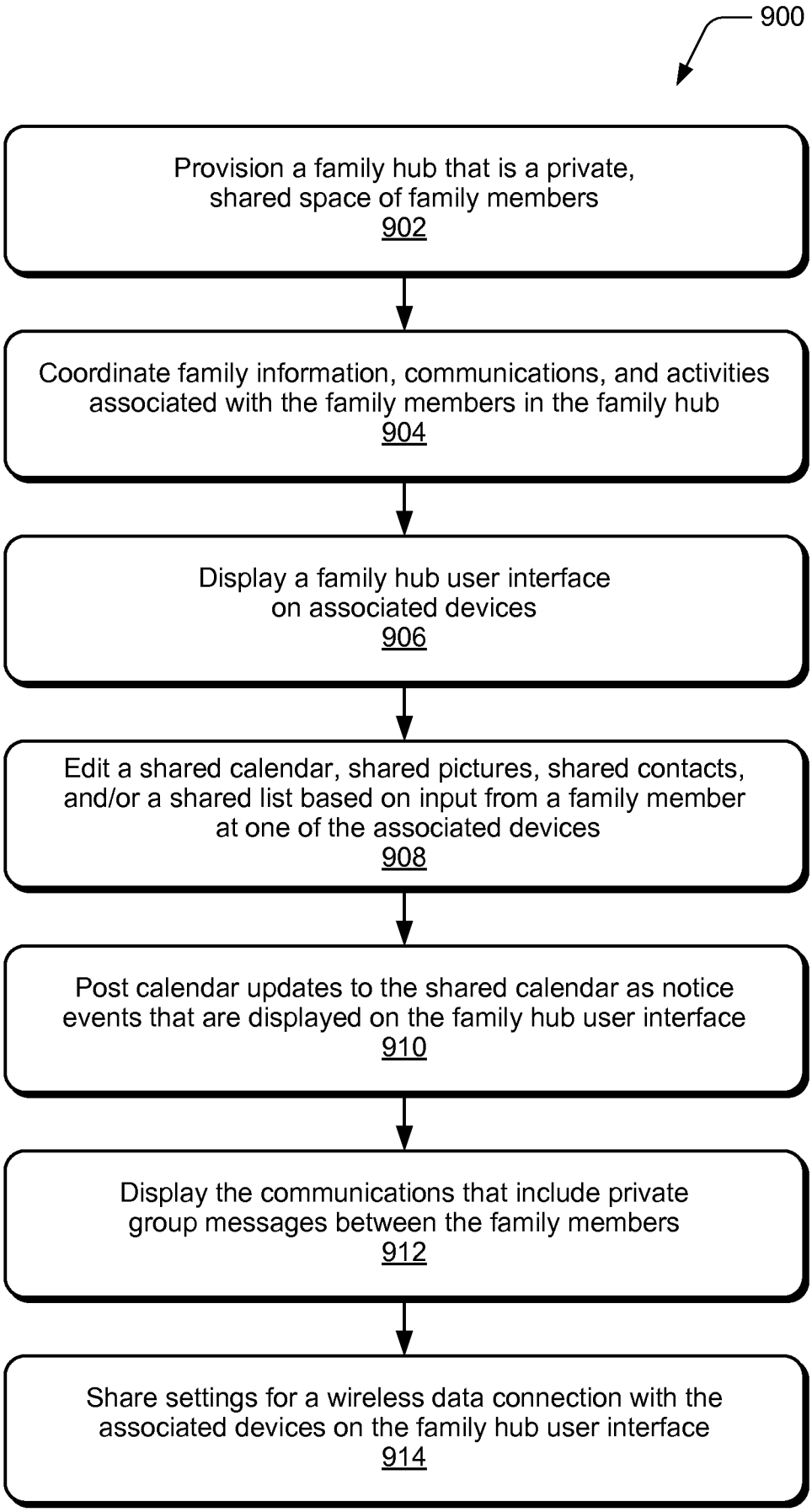

900
Provision a family hub that is a private, shared space of family members
902
Coordinate family information, communications, and activities associated with the family members in the family hub
904
Display a family hub user interface on associated devices
906
Edit a shared calendar, shared pictures, shared contacts, and/or a shared list based on input from a family member at one of the associated devices
908
Post calendar updates to the shared calendar as notice events that are displayed on the family hub user interface
910
Display the communications that include private group messages between the family members
912
Share settings for a wireless data connection with the associated devices on the family hub user interface
914

FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/071555

A. CLASSIFICATION OF SUBJECT MATTER

G06F 3/01(2006.01)i, G06F 3/06(2006.01)1, G06F 3/14(2006.01)1, G06F 9/44(2006.01)1, H04W 88/02(2009.01)1

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G06F 3/01; G06F 3/048; G06F 15/16; G06F 15/00; G06F 17/00; G06F 3/0481

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: interact, hub, application, aggregate, share, social network, and similar terms.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2011-0197160 A1 (KIM, HY0 YOUNG et al.) 11 August 2011 See paragraphs [0033], [0036]-[0039], [0043]-[0044], and [0071H0073]; claims 1-3 and 16; and figures 2, 6, and 8.	1--10
A	US 2011-0283185 A1 (0BASANJ0, OLUDARE V. et al.) 17 November 2011 See paragraphs [0015]-[0016], [0021], [0023], [0027] and [0059H0061]; claims 1, 3-5, and 19; and figures 7-8.	1--10
A	CUI, YANQING. `Facilitating Consumption of Online Social Networking Services on Mobile Devices.` Proceedings of the 13th international conference on Ubiquitous Computing, pp. 511-514. September 17-21, 2011, Beijing, China. See left column of page 511, lines 25-35; right column of page 511, lines 5-27; left column of page 512, lines 1-12.	1--10
A	KR 10-2011-0093528 A (SAMSUNG ELECTRONICS CO., LTD.) 18 August 2011 See paragraphs [0041]-[0047]; claims 1-3, 10, and 12; and figures 2-4.	1--10
A	JP 2002-530783 A (SHENZHEN LIMING NETWORK SYSTEMS CO., LTD.) 17 September 2002 See paragraphs [0017H0018] and [0020]-[0025]; and figures 1A-1B and 3.	1--10

☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 April 2013 (25.04.2013)	**25 April 2013 (25.04.2013)**

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-70 1, Republic of Korea Facsimile No. 82-42-472-7140	NHO, Ji Myong Telephone No. 82-42-481-8528

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/071555

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 7,680,882 B2 (TIU, JR. WILLIAM K. et al.) 16 March 2010 See column 4, lines 25-32; column 8, lines 15-41; and figures 2-4 and 6.	1-10

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/071555

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		us 2012-0096531 A1	19. 04,,2012
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		us 2012-0102115 A1	26. 04,,2012
		us 2012-0102404 A1	26. 04,,2012
		us 2012-0233260 A1	13. 09,,2012
		us 2012-0304050 A1	29. 11,,2012
		us 2012-0323903 A1	20. 12,,2012
		us 2012-0324012 A1	20. 12,,2012
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