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The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 61/252,153**

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Title

DEVICE GROUP PARTITIONS AND SETTLEMENT PLATFORM

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DEVICE GROUP PARTITIONS AND SETTLEMENT PLATFORM

CROSS REFERENCE TO OTHER APPLICATIONS

[0001] This application claims priority to U.S. Provisional Patent Application No. 61/206,354 (Attorney Docket No. RALEP001+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed January 28, 2009, U.S. Provisional Patent Application No. 61/206,944 (Attorney Docket No. RALEP002+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed February 4, 2009, U.S. Provisional Patent Application No. 61/207,393 (Attorney Docket No. RALEP003+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed February 10, 2009, U.S. Provisional Patent Application No. 61/207,739 (Attorney Docket No. RALEP004+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed on February 13, 2009, U.S. Provisional Patent Application No. 61/270,353 (Attorney Docket No. RALEP022+) entitled DEVICE ASSISTED CDR CREATION, AGGREGATION, MEDIATION AND BILLING filed on July 6, 2009, U.S. Provisional Patent Application No. 61/275,208 (Attorney Docket No. RALEP023+) entitled ADAPTIVE AMBIENT SERVICES filed on August 25, 2009, and U.S. Provisional Patent Application No. 61/237,753 (Attorney Docket No. RALEP024+) entitled ADAPTIVE AMBIENT SERVICES filed on August 28, 2009, which are incorporated herein by reference for all purposes.

BACKGROUND OF THE INVENTION

[0002] With the advent of mass market digital communications, applications and content distribution, many access networks such as wireless networks, cable networks and DSL (Digital Subscriber Line) networks are pressed for user capacity, with, for example, EVDO (Evolution-Data Optimized), HSPA (High Speed Packet Access), LTE (Long Term Evolution), WiMax (Worldwide Interoperability for Microwave Access), DOCSIS, DSL, and Wi-Fi (Wireless Fidelity) becoming user capacity constrained. In the wireless case, although network capacity will increase with new higher capacity wireless radio access technologies, such as MIMO (Multiple-Input Multiple-Output), and with more frequency spectrum and cell splitting being

deployed in the future, these capacity gains are likely to be less than what is required to meet growing digital networking demand.

[0003] Similarly, although wire line access networks, such as cable and DSL, can have higher average capacity per user compared to wireless, wire line user service consumption habits are trending toward very high bandwidth applications and content that can quickly consume the available capacity and degrade overall network service experience. Because some components of service provider costs go up with increasing bandwidth, this trend will also negatively impact service provider profits.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] Various embodiments of the invention are disclosed in the following detailed description and the accompanying drawings.

[0005] **Figure 1** illustrates a wireless network architecture for providing device group partitions and a settlement platform in accordance with some embodiments.

[0006] **Figure 2** illustrates another wireless network architecture for providing device group partitions and a settlement platform in accordance with some embodiments.

[0007] **Figure 3** illustrates another wireless network architecture including a settlement platform in accordance with some embodiments.

[0008] **Figure 4** illustrates a flow diagram for providing device based service usage information in accordance with some embodiments.

[0009] **Figure 5** illustrates a flow diagram for providing a settlement platform service in accordance with some embodiments.

DETAILED DESCRIPTION

[0010] The invention can be implemented in numerous ways, including as a process; an apparatus; a system; a composition of matter; a computer program product embodied on a computer readable storage medium; and/or a processor, such as a processor configured to
5 execute instructions stored on and/or provided by a memory coupled to the processor. In this specification, these implementations, or any other form that the invention may take, may be referred to as techniques. In general, the order of the steps of disclosed processes may be altered within the scope of the invention. Unless stated otherwise, a component such as a processor or a memory described as being configured to perform a task may be implemented as a general
10 component that is temporarily configured to perform the task at a given time or a specific component that is manufactured to perform the task. As used herein, the term ‘processor’ refers to one or more devices, circuits, and/or processing cores configured to process data, such as computer program instructions.

[0011] A detailed description of one or more embodiments of the invention is provided
15 below along with accompanying figures that illustrate the principles of the invention. The invention is described in connection with such embodiments, but the invention is not limited to any embodiment. The scope of the invention is limited only by the claims and the invention encompasses numerous alternatives, modifications and equivalents. Numerous specific details are set forth in the following description in order to provide a thorough understanding of the
20 invention. These details are provided for the purpose of example and the invention may be practiced according to the claims without some or all of these specific details. For the purpose of clarity, technical material that is known in the technical fields related to the invention has not been described in detail so that the invention is not unnecessarily obscured.

[0012] In some embodiments, device group partitions (e.g., partitions of devices based on
25 associated device groups) are provided, as described herein. For example, one or more device service processor settings are controlled by a service controller, which can be partitioned to allow groups of devices (e.g., device group partitions, such as based on type of device, service plan (such as a service plan that is based on a revenue share and/or any other service plan), geography, service provider, enterprise, user group, or based on any other criteria for grouping

devices) to be securely controlled. In some embodiments, a device group partition control capability is enabled by providing a secure network connection to the service policy settings tools that define the device pre-provisioning settings, the device pre-activation service profile settings, the network equipment service activity control policy settings (e.g., access control, routing policy, traffic control, usage limits, and/or policy for usage limit overage), and/or the network billing system database. By providing server tools that enable such settings to be controlled (e.g., or perhaps only observed, such as with respect to the billing system) by a secure workstation or secure website interface that provides network communication with the equipment that programs the settings, and providing for a secure partitioning of the devices that can be controlled by a given secure workstation or secure website interface, a central provider or service provider can provide such services to, for example, multiple entities who all have different device and service plan combinations that they desire different flavors of services for such devices (e.g., various ambient services, revenue sharing service models, and/or any other services/service plans). In some embodiments, the networking equipment is implemented to secure device group partitions in which the service policies for a group of devices can be securely controlled.

[0013] In some embodiments, service usage information includes network based service usage information. In some embodiments, the network based service usage information includes CDRs (Charging Data Records). In some embodiments, service usage information includes device based service usage information. In some embodiments, the device based service usage information includes micro-CDRs, as described herein. In some embodiments, micro-CDRs are used for CDR mediation or reconciliation that provides for service usage accounting on any device activity that is desired (e.g., providing granular service usage information, such as based on application layer service usage monitoring, transaction service usage monitoring, etc.). In some embodiments, each device includes a service processor (e.g., a service processor executed on the mobile device). In some embodiments, each device activity that is desired to be associated with a billing event is assigned a micro-CDR transaction code, and the service processor is programmed to account for that activity associated with that transaction code (e.g., various transaction codes associated with the usage of Apple iTunes, Apple App Store, FaceBook social networking site, Google search, eBay ecommerce site, and Amazon Kindle, respectively, can be used for providing granular service usage for these various Internet/network

based services/sites and/or any other Internet/network based services/sites, which can include transactional based services, such as Apple iTunes, Apple App Store, and Amazon Kindle). For example, using these techniques, as described herein, essentially any type of device activity can be individually accounted for and/or controlled (e.g., throttled, restricted, and/or otherwise controlled as desired). In some embodiments, the service processor periodically reports (e.g., during each heartbeat or based on any other periodic, push, and/or pull communication technique(s)) micro-CDR usage measures to, for example, a service controller or some other network element. In some embodiments, the service controller reformats the heartbeat micro-CDR usage information into a valid CDR format (e.g., a CDR format that is used and can be processed by an SGSN or GGSN) and then transmits it to CDR mediation. In some embodiments, CDR mediation is used to properly account for the micro-CDR service usage information by depositing it into an appropriate service usage account and deducting it from the user device bulk service usage account. For example, this technique provides for a flexible service usage billing solution that uses pre-existing solutions for CDR mediation and billing. For example, the billing system can process the mediated CDR feed from CDR mediation, apply the appropriate account billing codes to the aggregated micro-CDR information that was generated by the device, and then generate billing events in a manner that does not require changes to billing systems (e.g., using new transaction codes to label the new device assisted billing capabilities).

[0014] In some embodiments, a revenue sharing model is provided using a settlement platform. In some embodiments, a revenue sharing model is provided using a settlement platform for providing one or more of the following: service activation revenue share or bounty (e.g., to one or more partners, such as OEMs, distributors, MVNOs, carriers, and/or service providers), service usage billing (e.g., to one or more partners, such as OEMs, distributors, MVNOs, carriers, and/or service providers), service usage revenue share (e.g., to one or more partners, such as OEMs, distributors, MVNOs, carriers, and/or service providers), and transactional revenue share (e.g., to one or more partners, such as OEMs, distributors, MVNOs, carriers, and/or service providers). For example, a revenue sharing model can allow for a distribution partner to access activation information for a specified device or a specified device group for which they are potentially entitled to a bounty (e.g., a fixed fee or some other payment or credit terms, etc.) for activation, and the revenue sharing model can also allow for one or more

OEMs access to information regarding service usage for the specified device or the specified device group for which they are potentially entitled to a service usage revenue share (e.g., percentage, fixed fee, transactional fee or credit, etc.) for the associated or particular service usage. For example, a distributor (e.g., Amazon, Best Buy, etc.) can be allocated a bounty for each activated eBook reader based on service activation for that eBook reader (e.g., the value/terms of the bounty can vary based on the type of service that is activated for that eBook reader, such as an ambient service versus a premium data plan service), and the bounty can also require activation within a certain period of time of the sale (e.g., if activated within 30 days after sale by the distributor of the eBook to a customer). As another example, a service revenue share can be provided with an OEM (e.g., Sony or Google, or another eBook manufacturer), for example, for a period of time after the initial activation of the eBook reader (e.g., 2 years after activation), which is referred to herein as, for example, a service revenue bounty, a service revenue share, or a service revenue sharing model. In some embodiments, a partner (e.g., Amazon, Barnes & Noble, or Google) pays for or subsidizes the cost of the associated service usage for the eBook reader, and a revenue share for each book paid for by the service provider is provided (e.g., a transactional service revenue share) between the service provider (e.g., carrier, central provider, MVNO, and/or other service provider) and the partner. In some embodiments, these and other revenue share model techniques are implemented using a settlement platform, as described herein. In some embodiments, these and other revenue share and service billing techniques are implemented using a settlement platform and micro-CDRs, as described herein.

[0015] In some embodiments, a billing interface is provided between the service controller and the billing system (e.g., an external plan read/write interface). In some embodiments, the service controller periodically polls the billing system interface with a request/command (e.g., "read-billing-plan" command) to determine if the user has changed the service plan of choice through some interface other than the service processor service plan selection UI (User Interface) (e.g., Internet or phone). If the user has changed the service plan, then the service controller updates the service plan of record on the service controller database and on the device. In some embodiments, another request/command (e.g., the "write-billing-plan" interface command) is used to inform the billing system when the user has selected a new or initial plan option from the service processor service plan selection UI.

[0016] In some embodiments, a settlement platform is provided, as described herein. In some embodiments, the settlement platform includes support for an activation process (e.g., to facilitate tracking and payment of a bounty for one or more partners for an activation). In some embodiments, the settlement platform provides a service/transactional revenue share settlement platform. In some embodiments, the settlement platform distributes accounting and settlement information to one or more of carriers, distribution partners, MVNOs (Mobile Virtual Network Operator), wholesale partners, and/or other partners (e.g., for a service usage billing to one or more partners and/or for a service/transactional revenue share with one or more partners). In some embodiments, the settlement platform receives and processes CDRs and/or micro-CDRs. In some embodiments, the settlement platform processes CDRs and/or micro-CDRs for CDR mediation that provides for service usage accounting (e.g., service usage billing allocation and/or service usage/transactional revenue share) on any device activity that is desired. In some embodiments, the settlement platform receives and processes micro-CDRs to determine accounting and settlement information for various services used by such devices. In some embodiments, the settlement platform receives and processes micro-CDRs to determine accounting and settlement information for various services for such devices and distributes the accounting and settlement information to one or more of carriers, distribution partners, MVNOs, wholesale partners, and/or other partners, as described herein.

[0017] In some embodiments, multiple device groups are supported in which each device group is provided an independent and secure management for transparent reconciliation. In some embodiments, a service provider selects who receives a reconciliation report of activations and service usage based on a service plan type. In some embodiments, service usage information (e.g., CDRs and/or micro-CDRs) are used for service plan billing and/or reconciliation reports. In some embodiments, different service plans on the same device can be communicated to different partners and/or the same partner (e.g., one or more of carriers, distribution partners, MVNOs, and/or wholesale partner). In some embodiments, multi-device and multi-user reconciliation capabilities are provided. In some embodiments, service /transactional revenue share techniques as described herein are provided to augment and/or replace bounty-plus-subsidy models for non-carrier channels. For example, the settlement platform can be used to implement a revenue share model allocating shared service usage revenue among two or more partners (e.g., one or more of carriers, distribution partners, MVNOs, wholesale partners, and/or other partners)

for one or more services (e.g., for a discounted bounty or in lieu of a bounty, the mobile device provider can receive a service/transactional revenue share for one or more services provided by a service provider for a mobile device distributed/sold through the service provider).

[0018] **Figure 1** illustrates a wireless network architecture for providing device group partitions and a settlement platform in accordance with some embodiments. As shown, Figure 1 includes a 4G/3G/2G wireless network operated by, for example, a central provider. As shown, various wireless devices 100 are in communication with base stations 125 for wireless network communication with the wireless network, and other devices 100 are in communication with Wi-Fi Access Points (APs) or Mesh 702 for wireless communication to Wi-Fi Access CPE 704 in communication with central provider access network 109. In some embodiments, each of the wireless devices 100 includes a service processor 115 (as shown), and each service processor connects through a secure control plane link to a service controller 122.

[0019] In some embodiments, service usage information includes network based service usage information (e.g., CDRs), which is obtained from one or more network elements. In some embodiments, service usage information includes micro-CDRs. In some embodiments, micro-CDRs are used for CDR mediation or reconciliation that provides for service usage accounting on any device activity that is desired. In some embodiments, each device activity that is desired to be associated with a billing event is assigned a micro-CDR transaction code, and the service processor 115 is programmed to account for that activity associated with that transaction code. In some embodiments, the service processor 115 periodically reports (e.g., during each heartbeat or based on any other periodic, push, and/or pull communication technique(s)) micro-CDR usage measures to, for example, the service controller 122 or some other network element. In some embodiments, the service controller 122 reformats the heartbeat micro-CDR usage information into a valid CDR format (e.g., a CDR format that is used and can be processed by an SGSN or GGSN) and then transmits it to CDR mediation. In some embodiments, CDR mediation is used to account for the micro-CDR service usage information by depositing it into an appropriate service usage account and deducting it from the user device bulk service usage account. For example, this technique provides for a flexible service usage billing solution that uses pre-existing solutions for CDR mediation and billing. For example, the billing system processes the mediated CDR feed from CDR mediation, applies the appropriate account billing codes to the

aggregated micro-CDR information that was generated by the device, and then generates billing events in a manner that does not require changes to billing systems (e.g., using new transaction codes to label the new device assisted billing capabilities).

[0020] As shown in Figure 1, a CDR storage, aggregation, mediation, feed 118 is provided (and other network elements as shown in Figure 1). In some embodiments, the CDR storage, aggregation, mediation, feed 118 receives, stores, aggregates and mediates micro-CDRs received from mobile devices 100. In some embodiments, the CDR storage, aggregation, mediation, feed 118 also provides a settlement platform using the mediated micro-CDRs, as described herein. In some embodiments, another network element provides the settlement platform using aggregated and/or mediated micro-CDRs (e.g., central billing interface 127 and/or another network element). In some embodiments, various techniques for partitioning of device groups are used for partitioning the mobile devices 100 (e.g., allocating a subset of mobile devices 100 for a distributor, an OEM, a MVNO, and/or another partner). As also shown, a MVNO core network 210 also includes a MVNO CDR storage, aggregation, mediation, feed 118, a MVNO billing interface 122, and a MVNO billing system 123 (and other network elements as shown in Figure 1). In some embodiments, the MVNO CDR storage, aggregation, mediation, feed 118 receives, stores, aggregates and mediates micro-CDRs received from mobile devices 100 (e.g., MVNO group partitioned devices). Those of ordinary skill in the art will appreciate that various other network architectures can be used for providing device group partitions and a settlement platform, and Figure 1 is illustrative of just one such example network architecture for which device group partitions and settlement platform techniques described herein can be provided.

[0021] In some embodiments, CDR storage, aggregation, mediation, feed 118 (e.g., service usage 118, including a billing aggregation data store and rules engine) is a functional descriptor for, in some embodiments, a device/network level service usage information collection, aggregation, mediation, and reporting function located in one or more of the networking equipment boxes attached to one or more of the sub-networks shown in Figure 1 (e.g., central provider access network 109 and/or central provider core network 110), which is in communication with the service controller 122, and a central billing interface 127. As shown, service usage 118 provides a function in communication with the central provider core network

110. In some embodiments, the CDR storage, aggregation, mediation, feed 118 function is located elsewhere in the network or partially located in elsewhere or integrated with/as part of other network elements. In some embodiments, CDR storage, aggregation, mediation, feed 118 functionality is located or partially located in the AAA server 121 and/or the mobile wireless center/Home Location Register(HLR) 132 (as shown, in communication with a DNS/DHCP server 126). In some embodiments, service usage 118 functionality is located or partially located in the base station, base station controller and/or base station aggregator, collectively referred to as base station 125 in Figure 1. In some embodiments, CDR storage, aggregation, mediation, feed 118 functionality is located or partially located in a networking component in the central provider access network 109, a networking component in the core network 110, the central billing system 123, the central billing interface 127, and/or in another network component or function. This discussion on the possible locations for the network based and device based service usage information collection, aggregation, mediation, and reporting function (e.g., CDR storage, aggregation, mediation, feed 118) can be easily generalized as described herein and as shown in the other figures described herein by one of ordinary skill in the art. Also as shown in Figure 1, the service controller 122 is in communication with the central billing interface 123 (also sometimes referred to as the external billing management interface or billing communication interface) 127, which is in communication with the central billing system 123. As shown, an order management 180 and subscriber management 182 are also in communication with the central provider core network 110 for facilitating order and subscriber management of services for the devices 100 in accordance with some embodiments.

[0022] In some embodiments, the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) provides a device/network level service usage information collection, aggregation, mediation, and reporting function. In some embodiments, the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) collects device generated usage information for one or more devices on the wireless network (e.g., devices 100); and provides the device generated usage information in a syntax and a communication protocol that can be used by the wireless network to augment or replace network generated usage information for the one or more devices on the wireless network. In some embodiments, the syntax is a charging data record (CDR), and the communication protocol is selected from one or more of the following: 3GPP,

3GPP2, or other communication protocols. In some embodiments, as described herein, the CDR storage, aggregation, mediation, feed 118 collects/receives micro-CDRs for one or more devices on the wireless network (e.g., devices 100). In some embodiments, the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) includes a service usage data store (e.g., a billing aggregator) and a rules engine for aggregating the collected device generated usage information. In some embodiments, the network device is a CDR feed aggregator, and the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) also aggregates CDRs and/or micro-CDRs for the one or more devices on the wireless network; applies a set of rules to the aggregated CDRs and/or micro-CDRs using a rules engine (e.g., bill by account, transactional billing, revenue sharing model, and/or any other billing or other rules for service usage information collection, aggregation, mediation, and reporting), and communicates a new set of CDRs for the one or more devices on the wireless network to a billing interface or a billing system (e.g., providing a CDR with a billing offset by account/service). In some embodiments, a revenue sharing platform is provided, as described herein.

[0023] In some embodiments, the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) communicates a new set of CDRs (e.g., aggregated and mediated CDRs and/or micro-CDRs that are then translated into standard CDRs) for the one or more devices on the wireless network to a billing interface (e.g., central billing interface 127) or a billing system (e.g., central billing system 123). In some embodiments, the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) communicates with a service controller (e.g., service controller 122) to collect the device generated usage information (e.g., micro-CDRs) for the one or more devices on the wireless network. In some embodiments, the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) communicates with a service controller, in which the service controller is in communication with a billing interface or a billing system. In some embodiments, the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) communicates the device generated usage information to a billing interface or a billing system. In some embodiments, the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) communicates with a

transport gateway and/or a Radio Access Network (RAN) gateway to collect the network generated usage information for the one or more devices on the wireless network. In some embodiments, the service controller 122 communicates the device generated service usage information (e.g., micro-CDRs) to the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements).

[0024] In some embodiments, the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) performs rules for performing a bill by account aggregation and mediation function. In some embodiments, the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) performs rules for performing a service billing function, as described herein, and/or for performing a service/transactional revenue sharing function, as described herein. In some embodiments, the service controller 122 in communication with the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) performs a rules engine for aggregating and mediating the device generated usage information (e.g., micro-CDRs). In some embodiments, a rules engine device in communication with the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) performs a rules engine for aggregating and mediating the device generated usage information.

[0025] In some embodiments, the rules engine is included in (e.g., integrated with/part of) the CDR storage, aggregation, mediation, feed 118. In some embodiments, the rules engine and associated functions, as discussed herein, is a separate function/device. In some embodiments, the service controller 122 performs some or all of these rules engine based functions, as discussed herein, and communicates with the central billing interface 127. In some embodiments, the service controller 122 performs some or all of these rules engine based functions, as discussed herein, and communicates with the central billing system 123.

[0026] In some embodiments, a settlement platform service is provided. For example, micro-CDRs can be aggregated and mediated to associate service usage for one or more services used by a user on a mobile device. A rules engine or another function can determine a revenue share allocation for the service usage for a particular service to determine the settlement for such

service usage for the revenue sharing allocation/model and to distribute accounting and settlement information to one or more of carriers, distribution partners, MVNOs, wholesale partners, and/or other partners. In some embodiments, the service is a transactional service.

[0027] In some embodiments, duplicate CDRs are sent from the network equipment to the billing system 123 that is used for generating service billing. In some embodiments, duplicate CDRs are filtered to send only those CDRs/records for devices controlled by the service controller and/or service processor (e.g., the managed devices). For example, this approach can provide for the same level of reporting, lower level of reporting, and/or higher level of reporting as compared to the reporting required by the central billing system 123.

[0028] In some embodiments, a bill-by-account billing offset is provided. For example, bill-by-account billing offset information can be informed to the central billing system 123 by providing a CDR aggregator feed that aggregates the device based service usage data feed to provide a new set of CDRs for the managed devices to the central billing interface 127 and/or the central billing system 123. In some embodiments, transaction billing is provided using similar techniques. For example, transaction billing log information can be provided to the central billing interface 127 and/or the central billing system 123.

[0029] In some embodiments, the rules engine (e.g., performed by the service usage 118 or another network element, as discussed herein) provides a bill-by-account billing offset. For example, device generated usage information (e.g., micro-CDRs) includes a transaction type field or transaction code (e.g., indicating a type of service for the associated service usage information). The rules engine can apply a rule or a set of rules based on the identified service associated with the device generated usage information to determine a bill-by-account billing offset (e.g., a new CDR can be generated to provide the determined bill-by-account billing offset). In some examples, the determined bill-by-account billing offset can be provided as a credit to the user's service usage account (e.g., a new CDR can be generated with a negative offset for the user's service usage account, such as for network chatter service usage, or transactional service usage, or for any other purposes based on one or more rules performed by the rules engine).

[0030] As another example, for a transactional service, a first new CDR can be generated with a negative offset for the user's service usage account for that transactional service related usage, and a second new CDR can be generated with a positive service usage value to charge that same service usage to the transactional service provider (e.g., Amazon, eBay, or another transactional service provider). In some embodiments, the service controller 122 generates these two new CDRs, and the service usage 118 stores, aggregates, and communicates these two new CDRs to the central billing interface 127. In some embodiments, the service controller 122 generates these two new CDRs, and the service usage 118 stores, aggregates, and communicates these two new CDRs to the central billing interface 127, in which the central billing interface 127 applies rules (e.g., performs the rules engine for determining the bill-by-account billing offset).

[0031] In some embodiments, the service controller 122 sends the device generated CDRs to the rules engine (e.g., service usage 118), and the rules engine applies one or more rules, such as those described herein and/or any other billing/service usage related rules as would be apparent to one of ordinary skill in the art. In some embodiments, the service controller 122 generates CDRs similar to other network elements, and the rules (e.g., bill-by-account) are performed in the central billing interface 127. For example, for the service controller 122 to generate CDRs similar to other network elements, in some embodiments, the service controller 122 is provisioned on the wireless network and behaves substantially similar to other CDR generators on the network) as would be apparent to one of ordinary skill in the art.

[0032] In some embodiments, the service controller 122 is provisioned as a new type of networking function that is recognized as a valid and secure source for CDRs by the other necessary elements in the network (e.g., CDR storage, aggregation, mediation, feed 118). In some embodiments, where the network necessary apparatus will only recognize CDRs from certain types of networking equipment (e.g. RAN Gateway 410 or Transport Gateway 420), then the Service Controller 122 can provide authentication credentials to the other networking equipment that indicate it is one of the approved types of equipment. In some embodiments, the link between the Service Controller 122 and the necessary CDR aggregation and mediation equipment is secured, authenticated, encrypted and/or signed.

[0033] In some embodiments, the CDR storage, aggregation, mediation, feed 118 discards the network based service usage information (e.g., network based CDRs) received from one or more network elements. In these embodiments, the service controller 122 can provide the device based service usage information (e.g., device based CDRs or micro-CDRs) to the CDR storage, aggregation, mediation, feed 118 (e.g., the CDR storage, aggregation, mediation, feed 118 can just provide a store, aggregate, and communication function(s)), and the device based service usage information is provided to the central billing interface 127 or the central billing system 123.

[0034] In some embodiments, the device based CDRs (e.g., micro-CDRs) and/or new CDRs generated based on execution of a rules engine as described herein are provided only for devices that are managed and/or based on device group, service plan, or any other criteria, categorization, and/or grouping, such as based on ambient service or ambient service provider or transactional service or transactional service provider.

[0035] **Figure 2** illustrates a wireless network architecture for providing device group partitions and a settlement platform in accordance with some embodiments. As shown, Figure 2 includes various mobile devices 100 including service processors 115. For example, mobile devices 100 can include various types of mobile phones, PDAs, computing devices, laptops, netbooks, tablets, cameras, music/media players, GPS devices, networked appliances, and any other networked device. The mobile devices are in communication with service control 210 and central provider access and core networks 220. Service policies and accounting functions 230 are also provided in communication with the central provider access and core networks 220. Mobile devices 100 can communicate via the central provider access and core networks 220 to the Internet 120 for access to various Internet sites/services (e.g., Google sites/services, Yahoo sites/services, Blackberry services, Apple iTunes and AppStore, Amazon.com, FaceBook, etc.).

[0036] In some embodiments, Figure 2 provides a wireless network architecture that supports partitioned device groups, in which each device group can be provided independent and secure management of transparent reconciliation. Those of ordinary skill in the art will appreciate that various other network architectures can be used for providing device group partitions and a settlement platform, and Figure 2 is illustrative of just another such example

network architecture for which device group partitions and settlement platform techniques described herein can be provided. In some embodiments, a service provider selects who receives a reconciliation report of activations and usage by service plan type. In some embodiments, service usage information (e.g., based on CDRs and/or micro-CDRs or other service usage
5 measures) are used for service plan billing and for reconciliation reports. In some embodiments, different service plans on the same device (e.g., mobile device 100) can be sent to different partners or the same partner. In some embodiments, multi-device and multi-user reconciliation capabilities are provided. In some embodiments, a settlement platform service is provided. In some embodiments, various revenue share techniques as described herein are provided (e.g.,
10 implemented using a settlement platform service).

[0037] In some embodiments, partitioned device groups are provided. In some embodiments, each partitioned group of devices (e.g., mobile devices 100) can be uniquely managed with secure admin log-ins. In some embodiments, multi-device, multi-user accounting is provided. In some embodiments, capabilities are provided to support multi-party/multi-service
15 reconciliation records to carriers and carrier partners, which can also support various service/transactional revenue share techniques (e.g., for reducing or eliminating the up-front subsidy and associated up-front subsidy risk of certain bounty models). In some embodiments, service usage and profitability analytics are provided. For example, a partitioned beta test group of devices can be tested and optimized for various service usage policies and/or service plans,
20 and then the optimized service usage policies and/or service plans can be published to an entire or larger device group. In some embodiments, a carrier can be provided a carrier branded device group, and/or a MVNO can be provided a MVNO branded device group.

[0038] **Figure 3** illustrates another wireless network architecture including a settlement platform in accordance with some embodiments. As shown in Figure 3, a settlement platform
25 310 is provided (and other network elements as similarly shown in and described above with respect to Figure 2). In some embodiments, the settlement platform 310 receives, stores, aggregates and mediates micro-CDRs received from mobile devices 100. In some embodiments, the settlement platform 310 provides a settlement platform using the mediated micro-CDRs, as described herein. In some embodiments, the settlement platform 310 in combination with one or
30 more other network element provides the settlement platform using aggregated and/or mediated

micro-CDRs (e.g., central billing interface 127 and/or service policies & accounting 230). Those of ordinary skill in the art will appreciate that various other network architectures can be used for providing device group partitions and a settlement platform, and Figure 3 is illustrative of just one such example network architecture for which device group partitions and settlement platform techniques described herein can be provided.

[0039] As shown in Figure 3, the settlement platform 310 provides a function in communication with the central provider access & core networks 220. In some embodiments, the settlement platform 310 (e.g., including a billing aggregation data store and rules engine) is a functional descriptor for, in some embodiments, a device/network level service usage information collection, aggregation, mediation, and reporting function located in one or more of the networking equipment boxes attached to one or more of the sub-networks, which is in communication with the service control 210 and/or service policies & accounting 230. In some embodiments, the settlement platform 310 function is located elsewhere in the network or partially located in elsewhere or integrated with/as part of other network elements (e.g., settlement platform 310 functionality can be located or partially located in the service control 210 and/or the service policies & accounting function 230 as shown in Figure 2; and/or in the AAA server 121, the mobile wireless center/Home Location Register(HLR) 132, the base station 125, the networking component in the central provider access network 109, a networking component in the core network 110, the central billing system 123, the central billing interface 127, and/or in another network component or function, as shown in Figure 1).

[0040] In some embodiments, the settlement platform 310 includes the CDR storage, aggregation, mediation, feed 118 function as shown in and described above with respect to Figure 1 and further provides a device/network level service usage information collection, aggregation, mediation, and reporting function. In some embodiments, the rules engine is included in (e.g., integrated with/part of) the settlement platform 310. In some embodiments, the rules engine and associated functions, as discussed herein, is a separate function/device. In some embodiments, the service control 210 performs some or all of these rules engine based functions, as discussed herein, and communicates with the settlement platform 310 and/or the service policies & accounting 230. In some embodiments, the service control 210 includes the service controller 122 as shown in and similarly described above with respect to Figure 1.

[0041] In some embodiments, a settlement platform service is provided at least in part by the settlement platform 310. For example, as similarly described above, micro-CDRs can be aggregated and mediated to associate service usage for one or more services used by a user on a mobile device. A rules engine or another function can determine a revenue share allocation for the service usage for a particular service to determine the settlement (e.g., billing and/or revenue share) for such service usage, such as for a service/transactional revenue share, and to distribute accounting and settlement information to one or more of carriers, distribution partners, MVNOs, wholesale partners, and/or other partners. In some embodiments, the service is a transactional service.

[0042] **Figure 4** illustrates a flow diagram for providing device based service usage information in accordance with some embodiments. At 402, the process for device based service usage information begins. At 404, service usage on the device is monitored (e.g., using the service processor of the device). At 406, the monitored service usage is associated with a transaction ID or transaction code (e.g., using a service processor, such as service processor 115 that provides, for example, application service level monitoring, different transaction codes are assigned to Google services, eBay services, Amazon services, Apple iTunes services, etc.). In some embodiments, monitored services include transaction based services that are monitored and assigned unique transaction codes. At 408, micro-CDR(s) are generated for the monitored service usage. At 410, the generated micro-CDRs are stored (e.g., at least until the micro-CDR(s) are communicated to the network, e.g., the service controller or another network element, such as service control 210). At 412, a heartbeat communication event is determined. At 414, if a heartbeat communication is to be provided (e.g., to communicate to the network, such as service controller 122 or another network element, such as service control 210), then the micro-CDRs are sent to the service controller (e.g., service controller 122 or another network element, such as in service control 210). At 416, a request for service usage information is determined. At 418, in response to such a request, the micro-CDRs are sent to the service controller (e.g., service controller 122 or another network element, such as in service control 210). At 420, the process is repeated for any other monitored service usage. At 422, the process is completed.

[0043] **Figure 5** illustrates a flow diagram for providing a settlement platform service in accordance with some embodiments. At 502, the process for a settlement platform begins. At 504, device service usage information is received (e.g., micro-CDRs). At 506, device service usage information is aggregated (e.g., based on device and service). At 508, the aggregated
5 device service usage information is stored. At 510, the device service usage information is mediated/reconciled (e.g., based on various other measures, such as network service usage information, and/or other metrics/criteria or techniques). At 512, whether the device is a member of a device group is determined. At 514, the rules associated with that device's device group are determined. At 516, whether any settlement platform rules apply to that device group
10 and a given service for the stored device service usage information for the device is determined (e.g., service billing and/or service/transactional revenue share related rules). At 518, the settlement platform rules for the associated service usage for that device and the relevant service are applied. In some embodiments, a revenue share for the service usage for a particular service is used to determine the settlement for such service usage based on the revenue sharing
15 allocation/model and is further used to distribute accounting and settlement information to one or more of carriers, distribution partners, MVNOs, wholesale partners, and/or other partners. In some embodiments, service billing is allocated among one or more partners for a service usage. In some embodiments, a transactional revenue share among one or more partners for a transactional service is applied. At 520, the process is repeated for additional settlement
20 platform rules. At 522, the process is completed.

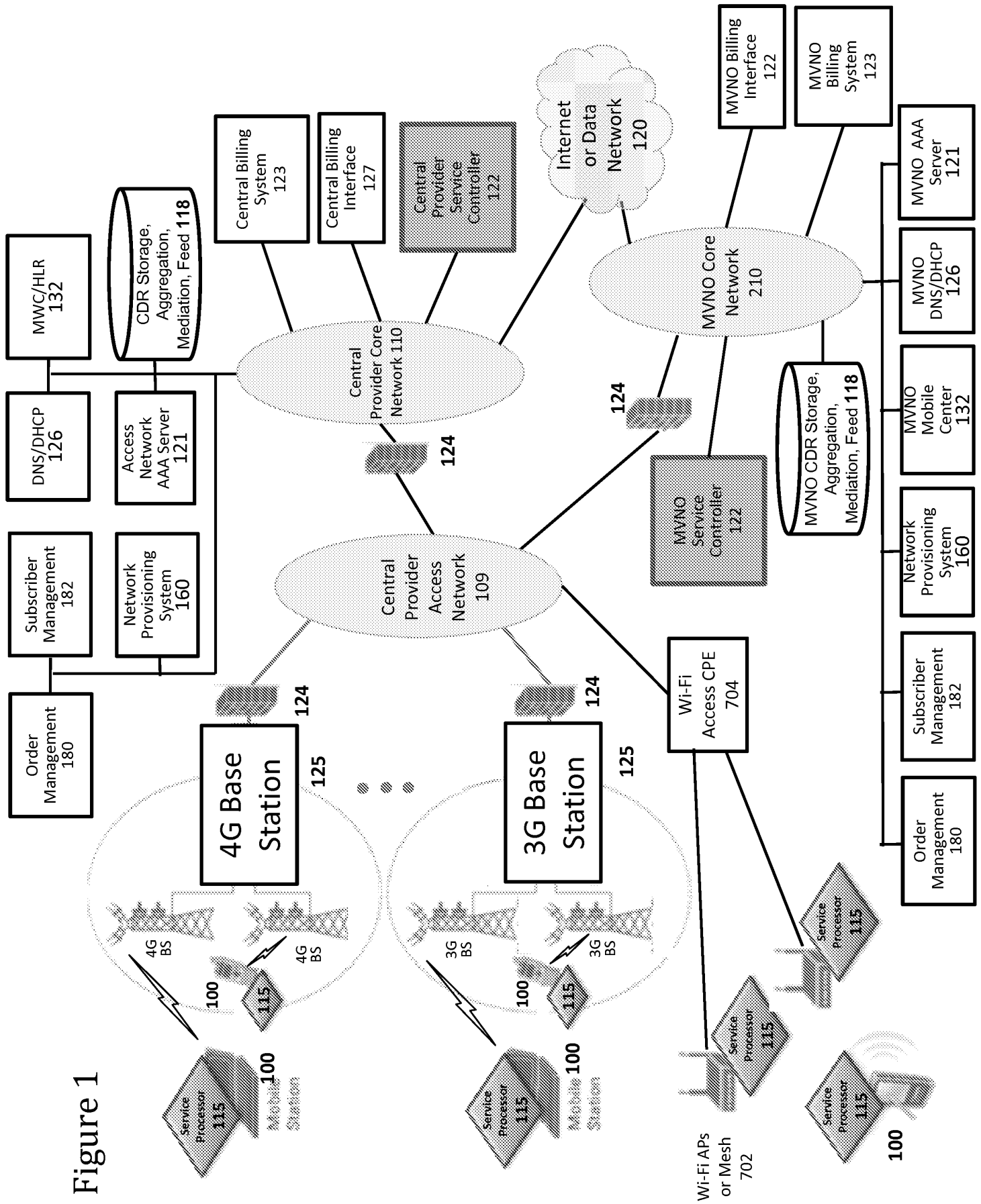
[0044] Although the foregoing embodiments have been described in some detail for purposes of clarity of understanding, the invention is not limited to the details provided. There are many alternative ways of implementing the invention. The disclosed embodiments are illustrative and not restrictive.

DEVICE GROUP PARTITIONS AND SETTLEMENT PLATFORM

ABSTRACT OF THE DISCLOSURE

[0045] Device group partitions and a settlement platform are provided. In some embodiments, device group partitions (e.g., partitions of devices based on associated device groups) are provided. In some embodiments, a settlement platform service is provided. In some embodiments, a settlement platform service is provided for partitioned devices. In some embodiments, a settlement platform implements a service billing allocation and/or a service/transactional revenue share among one or more partners. In some embodiments, service usage information includes micro-CDRs, which are used for CDR mediation or reconciliation that provides for service usage accounting on any device activity that is desired. In some embodiments, each device activity that is desired to be associated with a billing event is assigned a micro-CDR transaction code, and a service processor of the device is programmed to account for that activity associated with that transaction code. In some embodiments, the service processor periodically reports (e.g., during each heartbeat or based on any other periodic, push, and/or pull communication technique(s)) micro-CDR usage measures to, for example, a service controller or some other network element for CDR mediation or reconciliation.

Figure 1



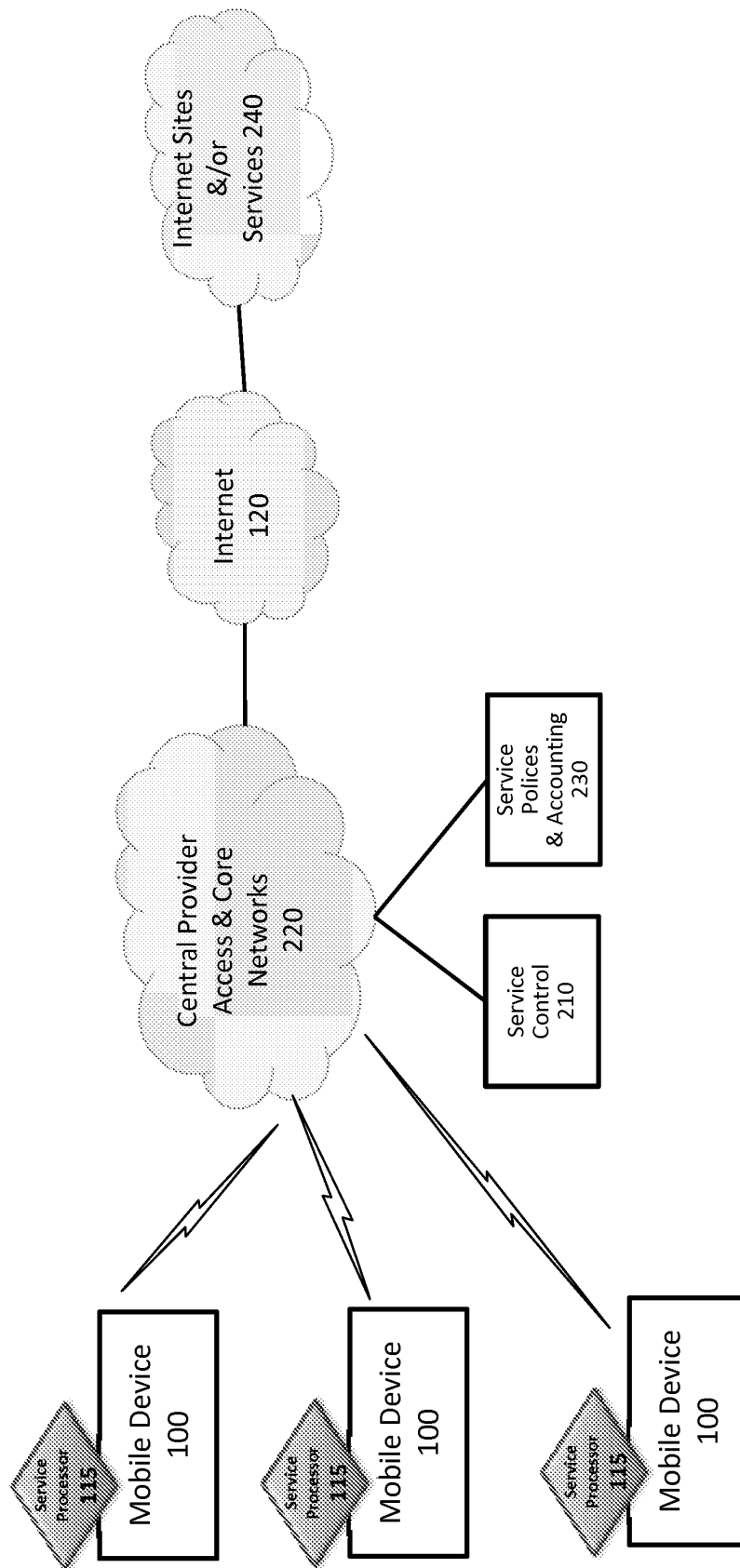


Figure 2

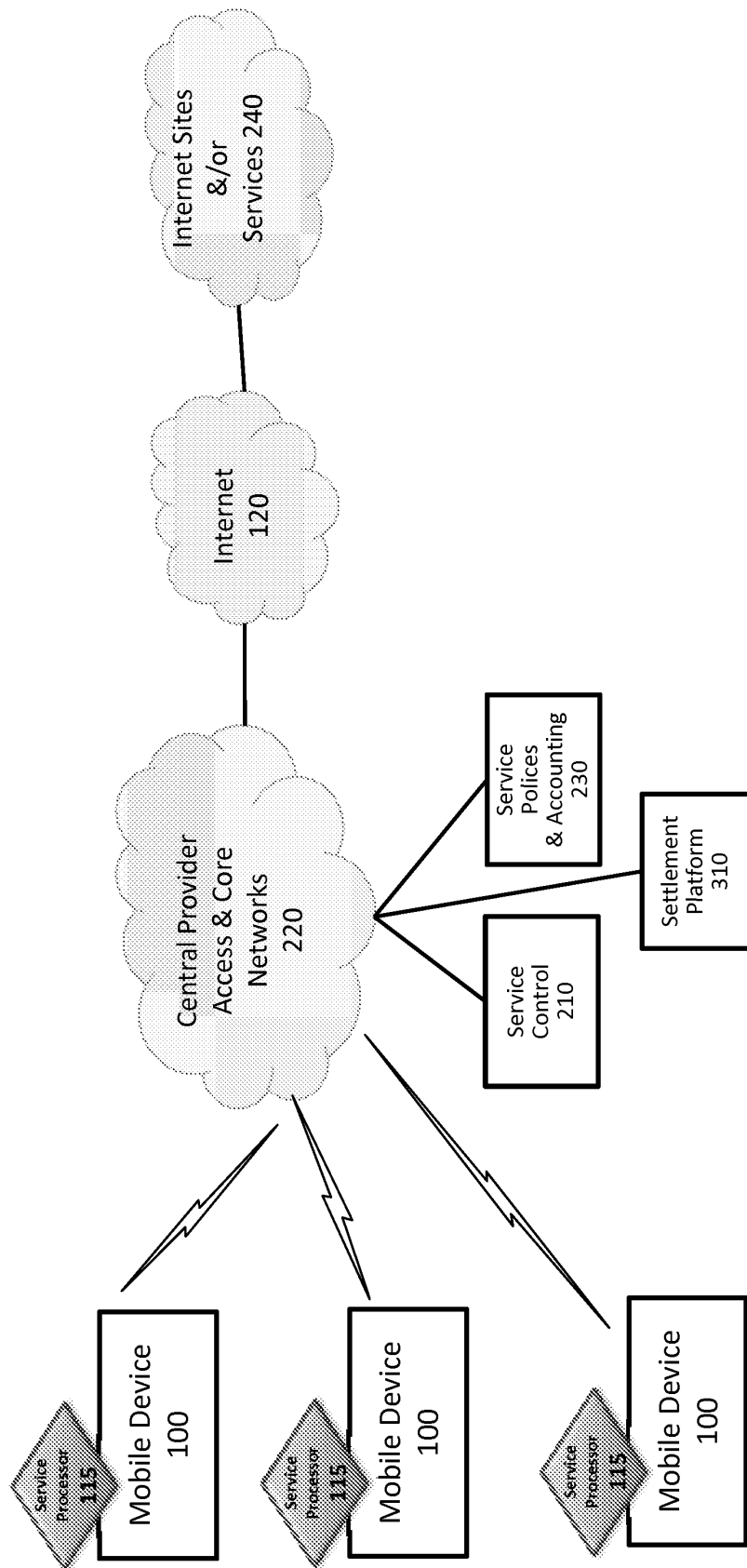


Figure 3

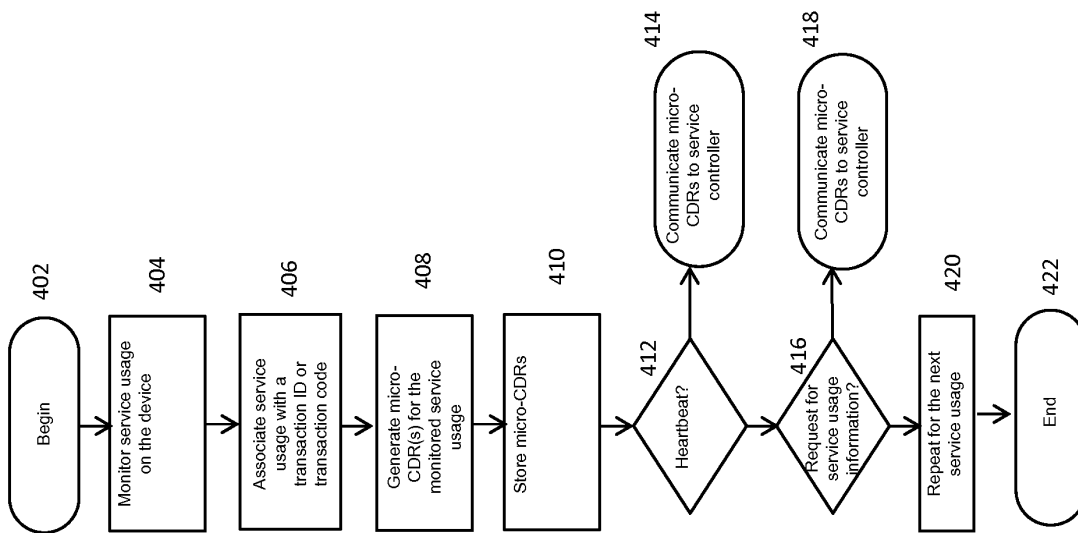


Figure 4

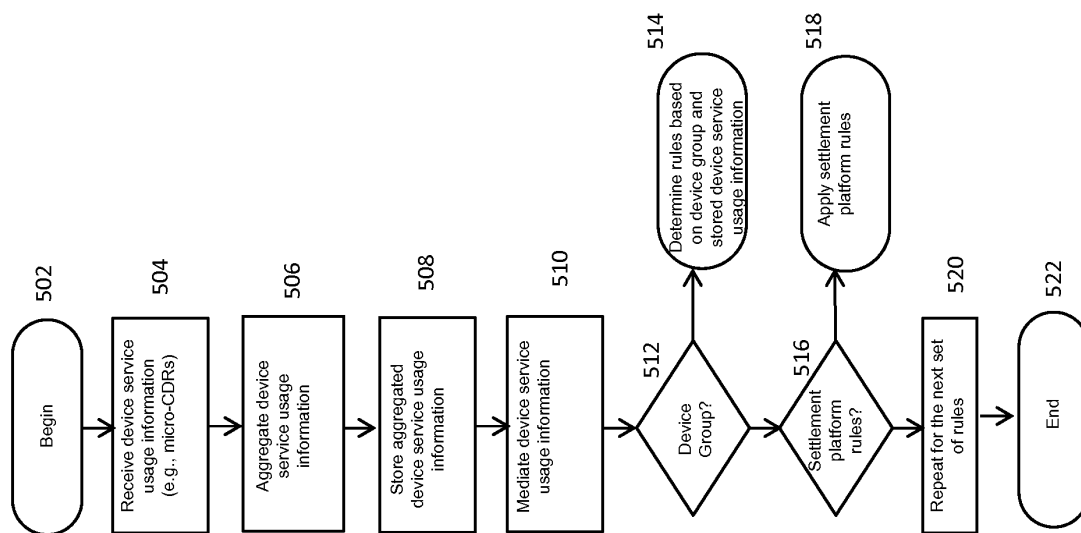


Figure 5

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Inventor(s)

Inventor 1

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Title of Invention

DEVICE GROUP PARTITIONS AND SETTLEMENT PLATFORM

Attorney Docket Number (if applicable)

RALEP026+

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21912

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.

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Applicant claims small entity status under 37 CFR 1.27

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First Name	Michael	Last Name	Schallop	Registration Number (If appropriate)	44319

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First Named Inventor/Applicant Name:		Gregory G. Raleigh		
Filer:		Michael J. Schallop		
Attorney Docket Number:		RALEP026+		
Filed as Large Entity				
Provisional Filing Fees				
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Total in USD (\$)				220

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First Named Inventor/Applicant Name:	Gregory G. Raleigh
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Filer:	Michael J. Schallop
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