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(54) **HOTSPOT COMMUNICATION LIMITER**

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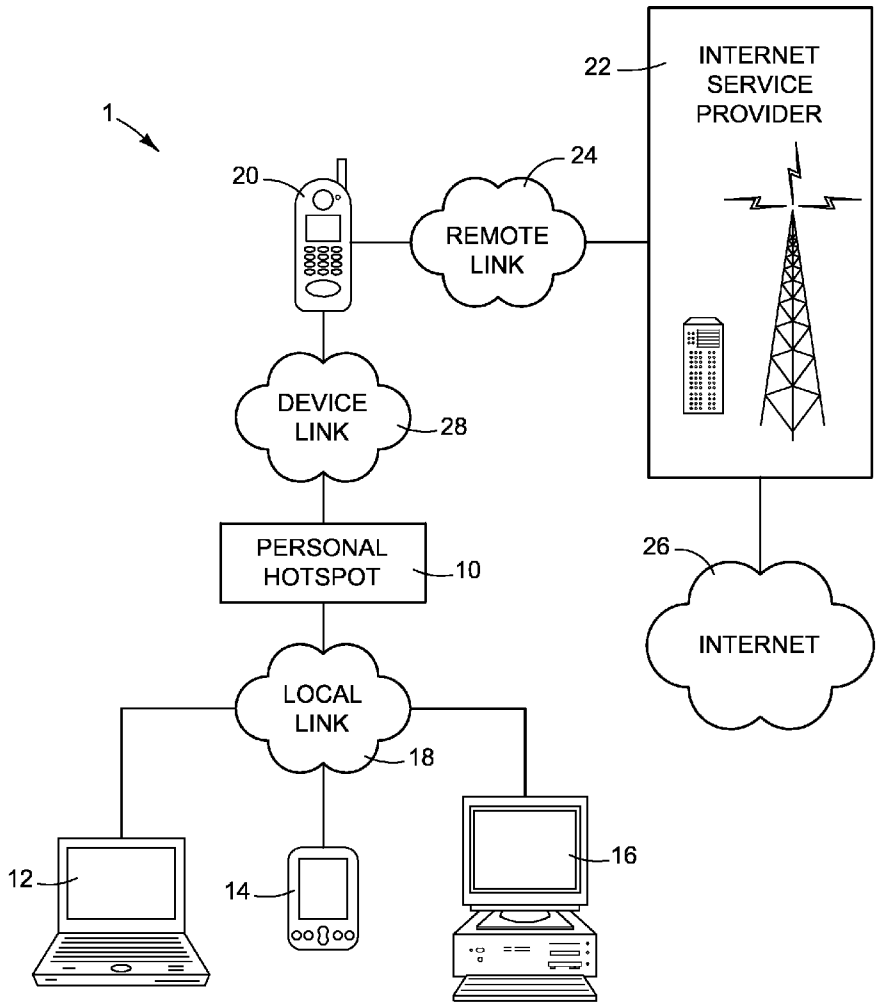
(52) **U.S. Cl.** **455/445**

(57) **ABSTRACT**

An embodiment is directed to a method for limiting network communications. The method is implemented at a device through which communications can be routed between client devices and the internet. The method includes receiving a routable communication. A communication type for the routable communication is identified. The communication type may be owner, authorized, or anonymous. Access rules for the identified communication type are identified. The routing of the communication is limited according to the identified access rules.



GOOGLE EXHIBIT 1006

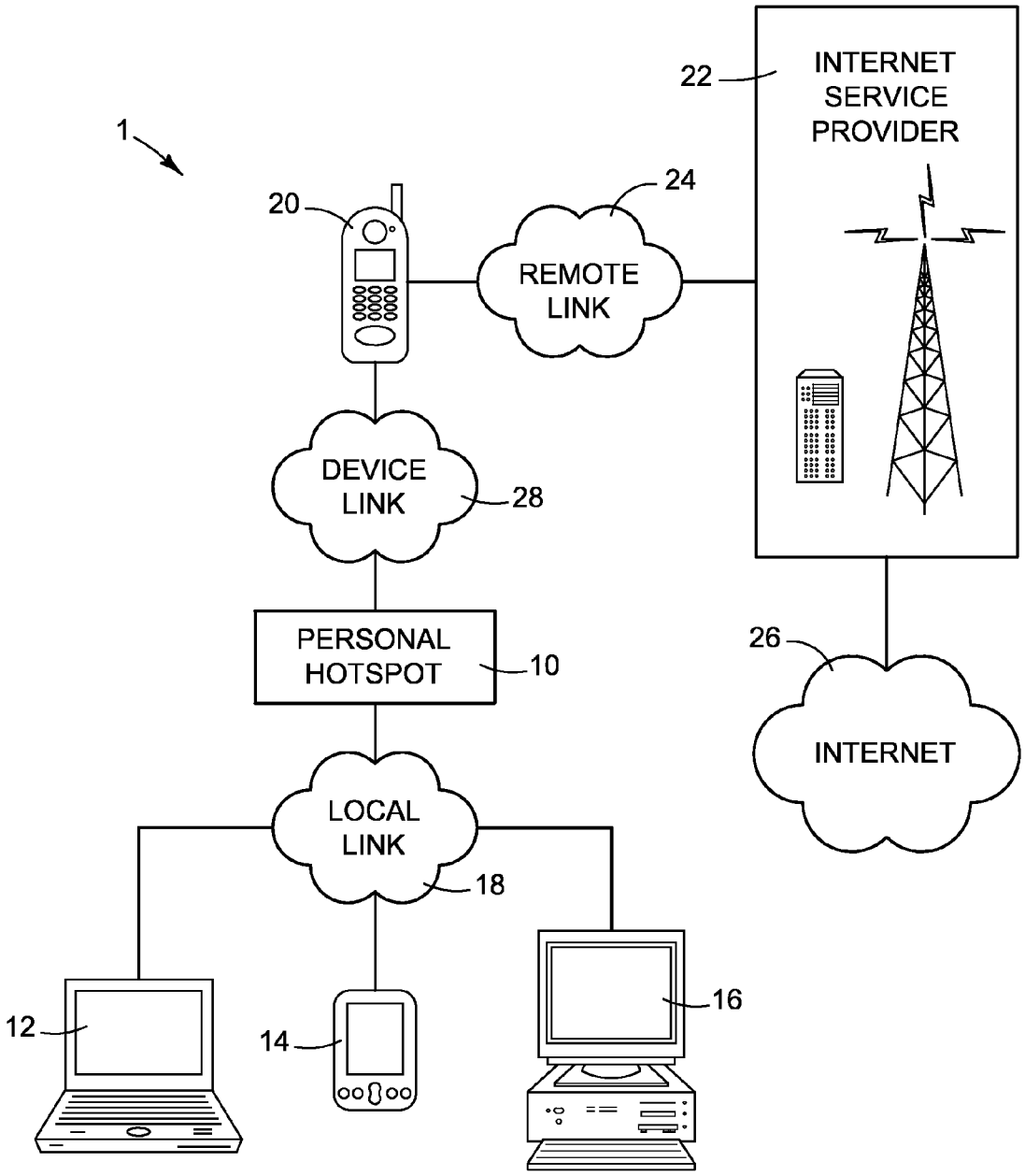

1
20
24
REMOTE LINK
22
INTERNET SERVICE PROVIDER
DEVICE LINK
28
PERSONAL HOTSPOT
10
26
INTERNET
LOCAL LINK
18
12
14
16

FIG. 1

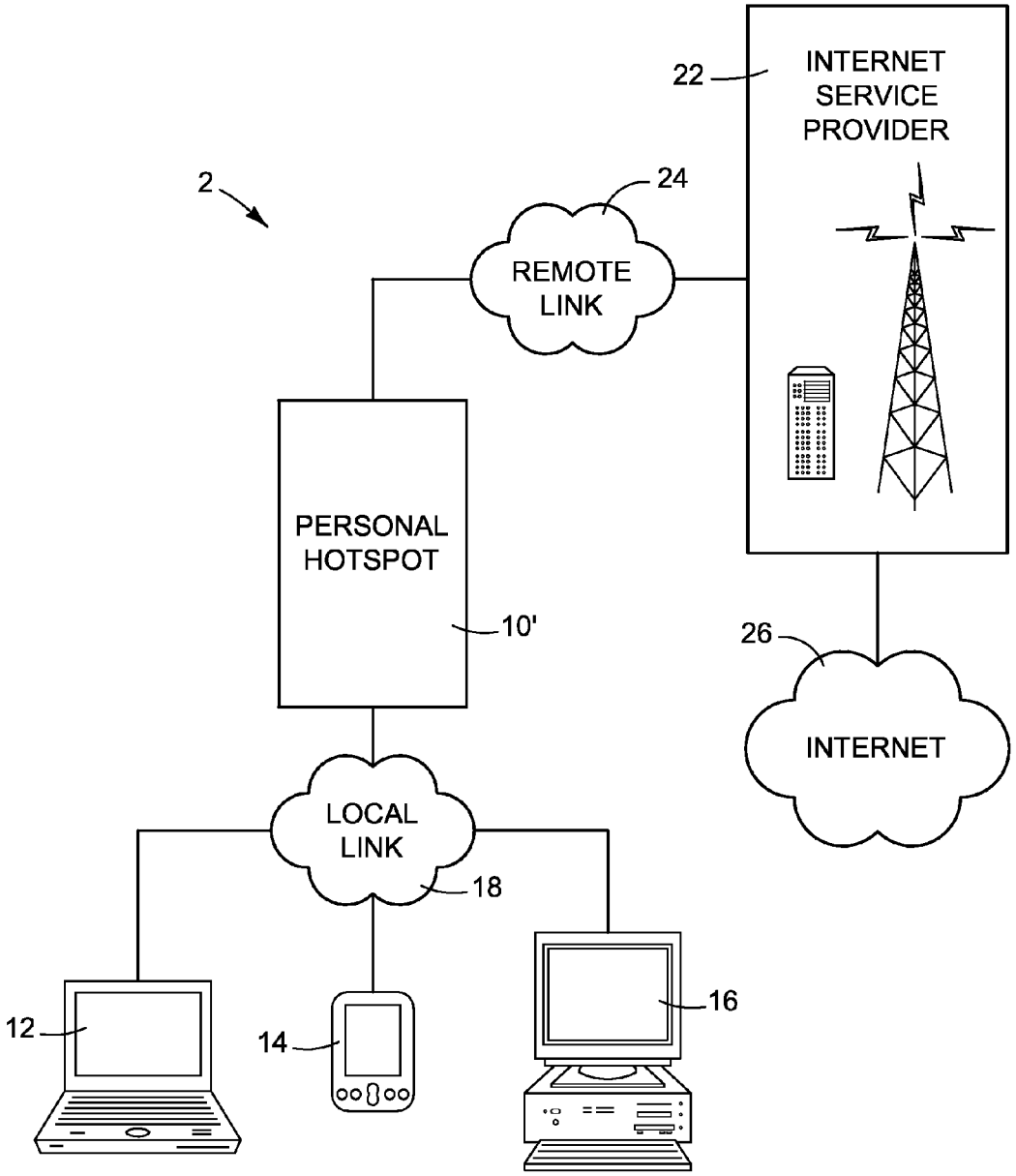

2
22
INTERNET
SERVICE
PROVIDER
24
REMOTE
LINK
PERSONAL
HOTSPOT
10'
26
INTERNET
LOCAL
LINK
18
12
14
16

FIG. 2

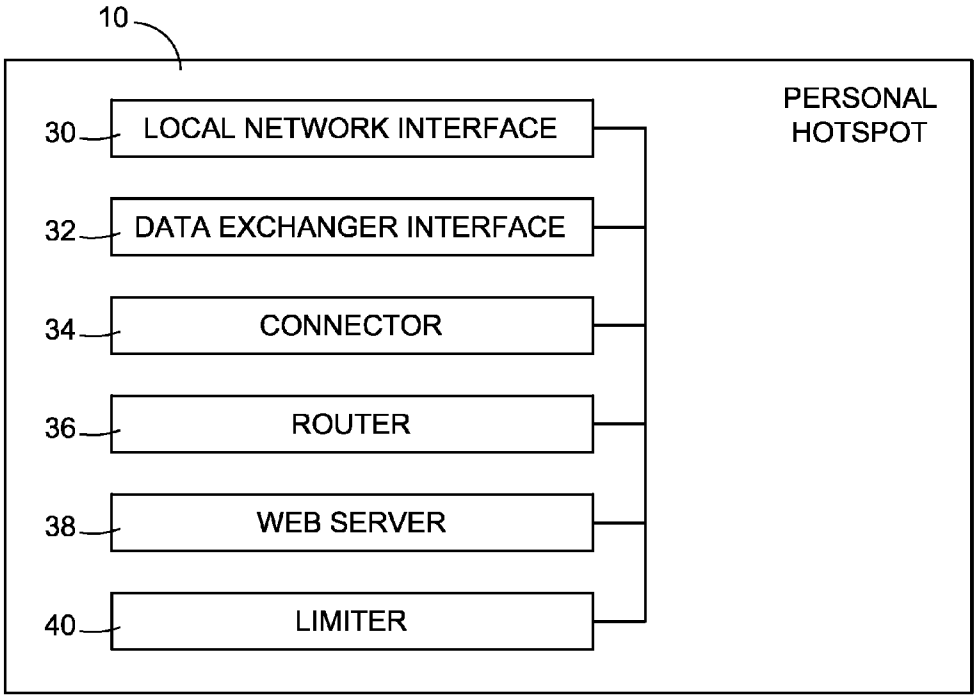

10
PERSONAL HOTSPOT
30
LOCAL NETWORK INTERFACE
32
DATA EXCHANGER INTERFACE
34
CONNECTOR
36
ROUTER
38
WEB SERVER
40
LIMITER

FIG. 3

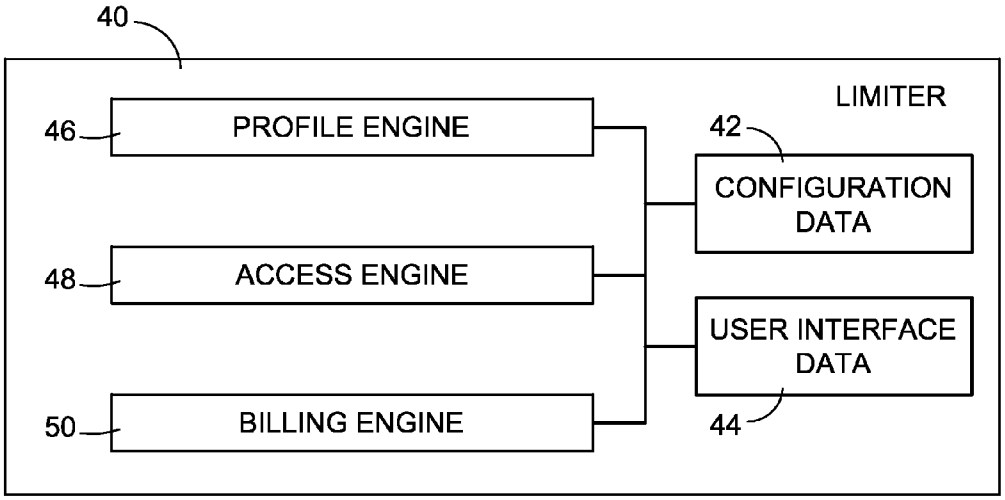

40
LIMITER
46
PROFILE ENGINE
48
ACCESS ENGINE
50
BILLING ENGINE
42
CONFIGURATION DATA
USER INTERFACE DATA
44

FIG. 4

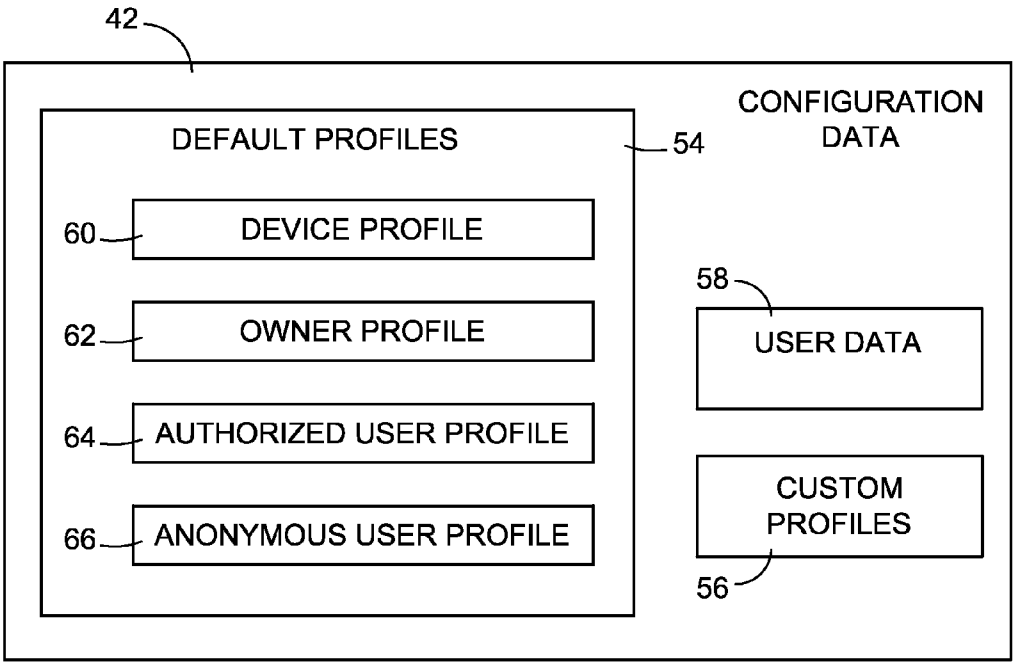

42
CONFIGURATION DATA
DEFAULT PROFILES
54
60
DEVICE PROFILE
62
OWNER PROFILE
64
AUTHORIZED USER PROFILE
66
ANONYMOUS USER PROFILE
58
USER DATA
CUSTOM PROFILES
56

FIG. 5

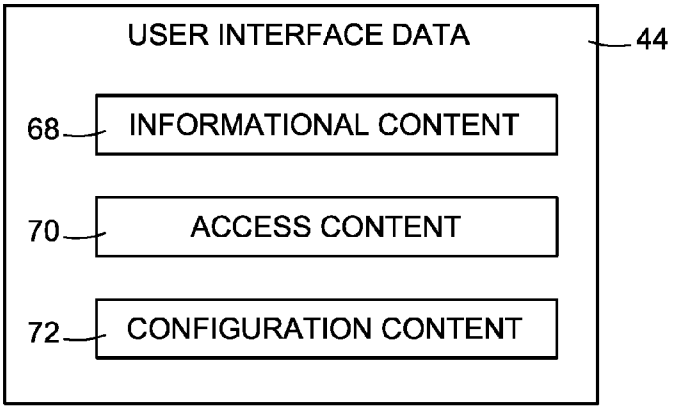

USER INTERFACE DATA
44
68
INFORMATIONAL CONTENT
70
ACCESS CONTENT
72
CONFIGURATION CONTENT

FIG. 6

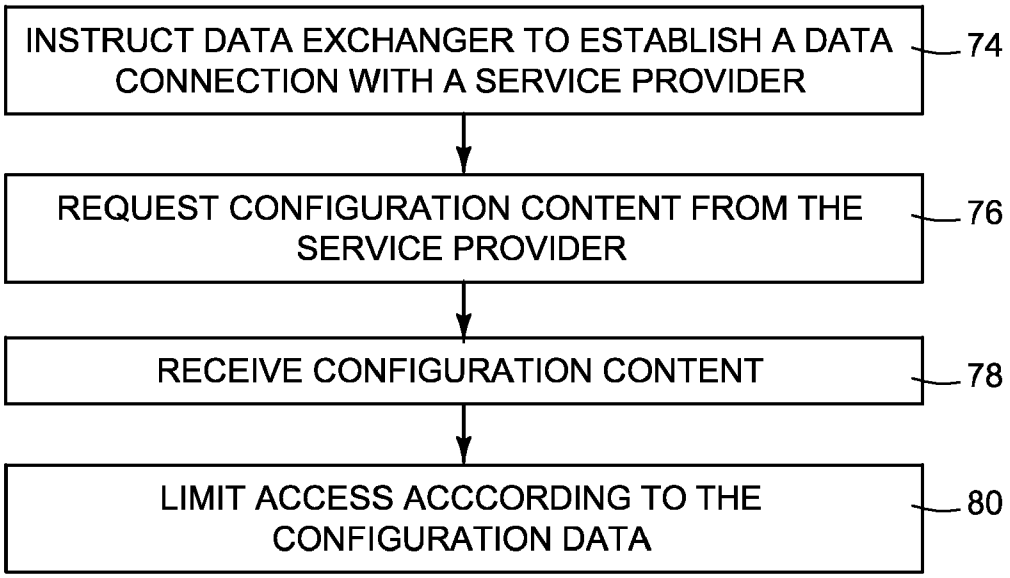

INSTRUCT DATA EXCHANGER TO ESTABLISH A DATA CONNECTION WITH A SERVICE PROVIDER
74
REQUEST CONFIGURATION CONTENT FROM THE SERVICE PROVIDER
76
RECEIVE CONFIGURATION CONTENT
78
LIMIT ACCESS ACCCORDING TO THE CONFIGURATION DATA
80

FIG. 7

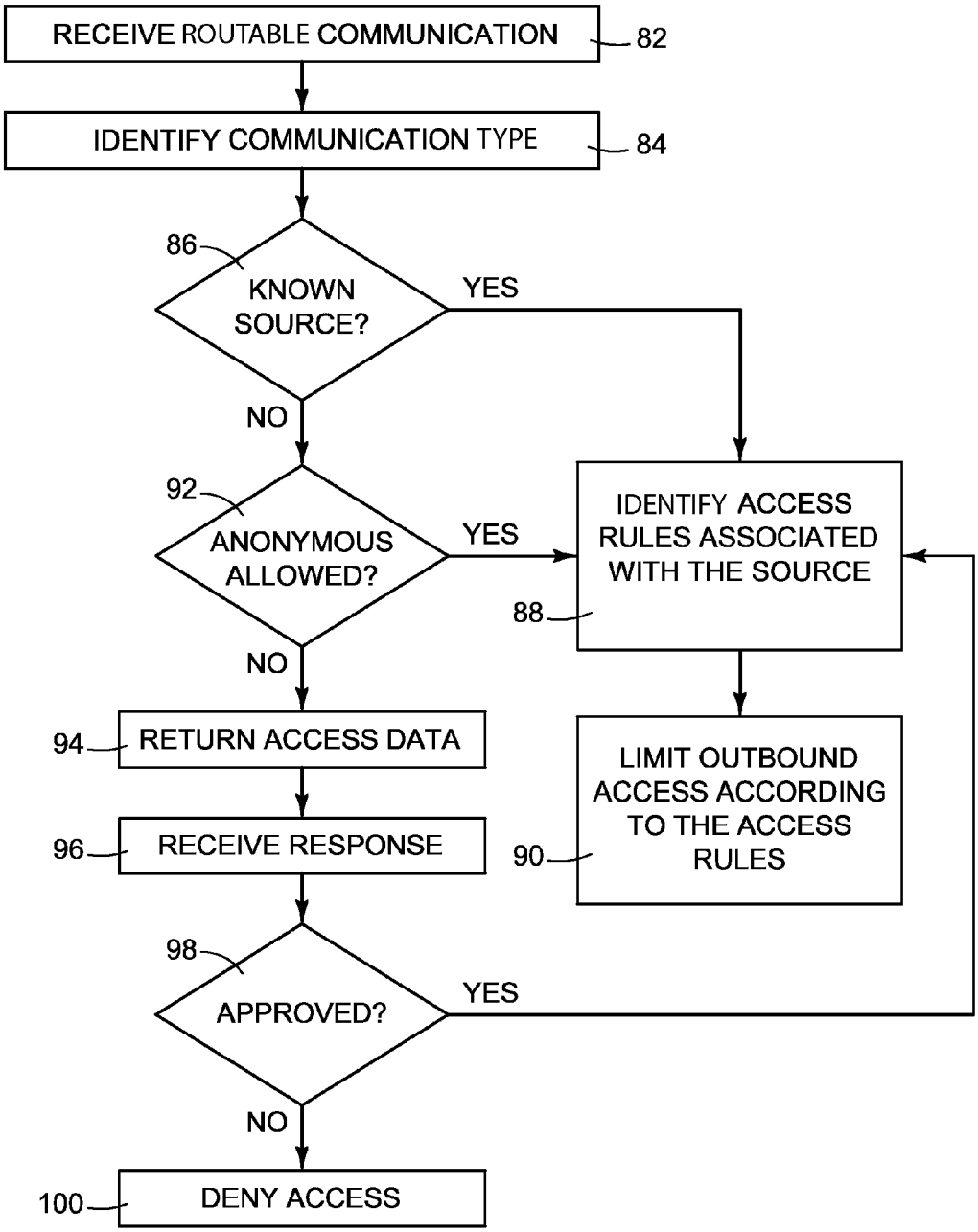

RECEIVE ROUTABLE COMMUNICATION
82
IDENTIFY COMMUNICATION TYPE
84
86
KNOWN SOURCE?
YES
NO
92
ANONYMOUS ALLOWED?
YES
IDENTIFY ACCESS RULES ASSOCIATED WITH THE SOURCE
88
NO
94
RETURN ACCESS DATA
LIMIT OUTBOUND ACCESS ACCORDING TO THE ACCESS RULES
96
RECEIVE RESPONSE
90
98
APPROVED?
YES
NO
100
DENY ACCESS

FIG. 8

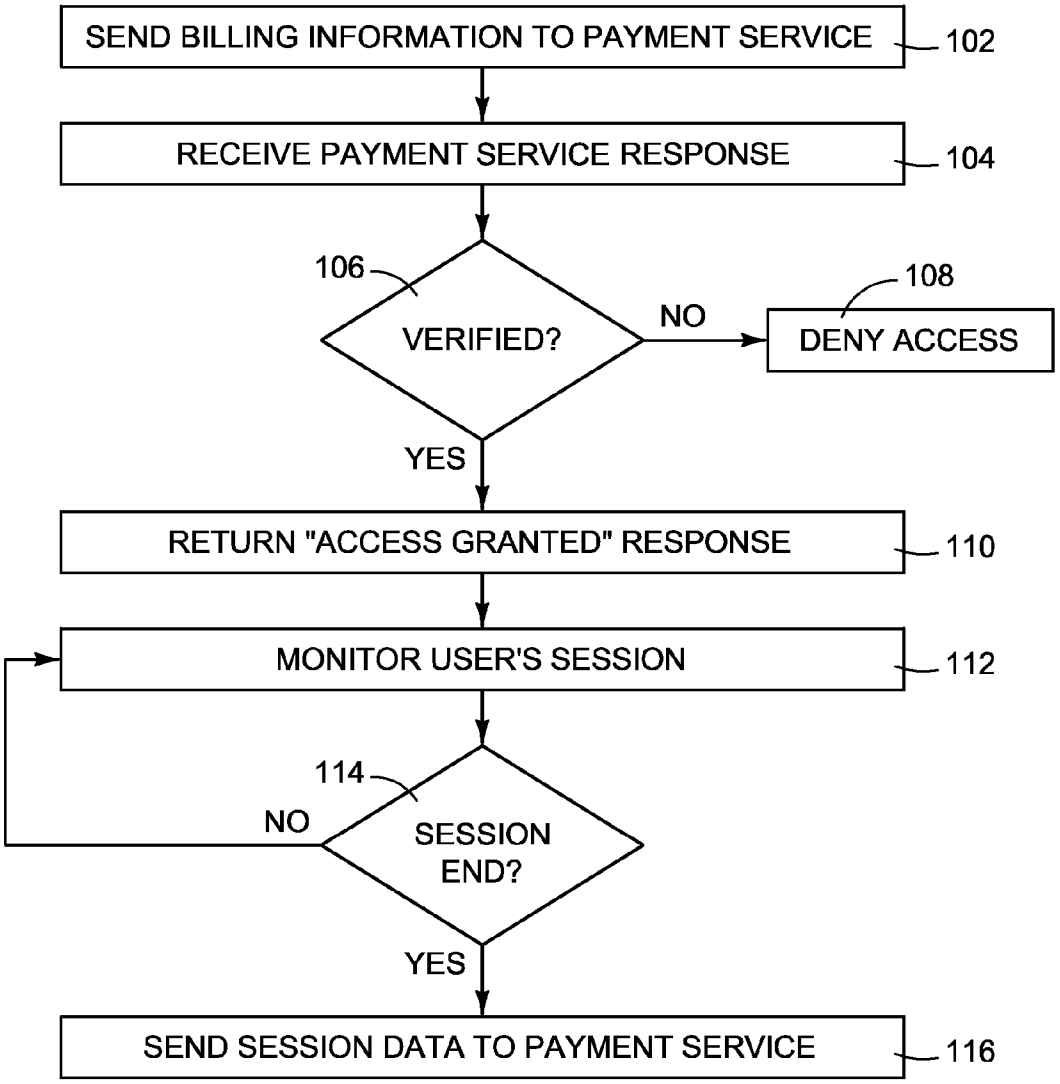

SEND BILLING INFORMATION TO PAYMENT SERVICE
102
RECEIVE PAYMENT SERVICE RESPONSE
104
106
VERIFIED?
NO
108
DENY ACCESS
YES
RETURN "ACCESS GRANTED" RESPONSE
110
MONITOR USER'S SESSION
112
114
NO
SESSION END?
YES
SEND SESSION DATA TO PAYMENT SERVICE
116

FIG. 9

HOTSPOT COMMUNICATION LIMITER

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the priority of provisional applications 60/772,777 entitled Metered Services filed Feb. 13, 2006 and hereby incorporated by reference. Application 60/722,777 is incorporated herein by reference. This application is a continuation in part of application Ser. No. 10/936,124 entitled Device Cradle filed Sep. 8, 2004. Application Ser. No. 10/936,124 is incorporated herein by reference.

BACKGROUND

[0002] Cellular service providers sell data plans to customers. To ensure that the costs of operating the cellular data network are matched to the income from selling data plans, network operators often impose use limitations on each subscriber. These limitations include constraining: available time of day/week; total time connected; quantity of data moved through the network; accessible portions of the network and so forth.

[0003] This business model assumes each account is matched to a single-user network. For example, a cellular telephone may be coupled via a USB cable to a personal computer creating a single user network. Through this connection, the personal computer can gain internet access via the data capabilities of the cellular telephone. Various embodiments allow for a multiple user network in which each user accesses the internet via a single cellular telephone. There is currently no practical way for cellular service providers to distinguish between different users in such a network.

DESCRIPTION OF THE DRAWINGS

[0004] FIGS. **1** and **2** illustrate an exemplary block diagrams of environments in which embodiments of the present invention can be implemented.

[0005] FIGS. **3-6** are block diagrams showing physical and logical components of a personal hotspot according to an embodiment of the present invention.

[0006] FIGS. **7-9** are exemplary flow diagram illustrating steps taken in performance of various embodiments of the present invention.

DETAILED DESCRIPTION

[0007] INTRODUCTION: Embodiments of the present invention allow a user to connect to the internet using a device such as an internet enabled cellular telephone. With a personal hotspot, multiple users of computing devices such as lap top computers, desktop computers, and personal digital assistants (PDAs) can access the internet simultaneously through the data capabilities of that cellular telephone. The combination of the personal hotspot and the internet enabled cellular telephone can provide an internet-connected wireless network anywhere that there is cellular data coverage.

[0008] Various embodiments described below operate to selectively limit the use of a personal hotspot. For example, certain limitations may apply to the personal hotspot itself and thus apply to all users. Some limitations may apply to the owner of the personal hotspot. Other limitations may apply to users authorized by the owner. Yet other limitations may apply to anonymous users. In this manner, the personal hotspot distinguishes between a variety of different users and user types.

[0009] ENVIRONMENT: FIG. **1** illustrates exemplary environment **1** in which various embodiments of the present invention may be implemented. Environment **1** includes personal hotspot **10** and client devices **12**, **14**, and **16** and local link **18**. Personal hotspot **10**, discussed in more detail later, represents generally a device capable or routing network communications between client devices **12**, **14**, and **16** and internet **26** via a data exchanger **20**. Client devices **12**, **14**, and **16** represent generally any computing devices capable of communicating with personal hotspot **10**.

[0010] Local link **18** interconnects personal hotspot **10** and client devices **12**, **14**, **16**. Local link **18** represents generally a cable, wireless, or remote link via a telecommunication link, an infrared link, a radio frequency link, or any other connector or system that provides electronic communication between devices **10**, **12**, **14**, and **16**. The path followed by link **18** between devices **10**, **12**, **14**, and **16** in the schematic view of FIG. **1** represents the logical communication path between these devices, not necessarily the physical path between the devices. Devices **10**, **12**, **14**, and **16** can be connected at any point and the appropriate communication path established logically between the devices.

[0011] Environment **1** also includes data exchanger **20** and service provider **22**. Data exchanger (**20**) represents generally and combination of hardware and/or programming that can be utilized by personal hotspot **10** to connect to a remote network such as the internet. While illustrated as an internet enabled cellular telephone, data exchanger **20** is not so limited. For example, data exchanger **20** may be a PCMCIA card or other device capable of cellular data communication. Internet enabled cellular telephones and other devices that are capable of data communications over a cellular network are referred to herein as data capable cellular devices. Other examples for data exchanger **20** include but are not limited to DSL modems and cable modems.

[0012] Service provider **22** represents generally any infrastructure configured to provide internet related data services to subscribers such as an owner of data exchanger **20**. For example, where data exchanger **20** is an data capable cellular devices, service provider **22** may be a cellular telephone service provider capable of providing voice and data services to subscribers allowing access to internet **26**. Where data exchanger **22** is a DSL or cable modem, service provider **22** may be a more traditional internet service provider (ISP) providing data access to internet **26**.

[0013] Remote link **24** interconnects data exchanger **20** and service provider **22** and represents generally any combination of a cable, wireless, or remote connection via a telecommunication link, an infrared link, a radio frequency link, or any other connector or system that provides electronic communication between data exchanger **20** and service provider **22**. Remote link **30** may represent an intranet, an internet, or a combination of both.

[0014] In the embodiment illustrated in environment **1**, device link **28** interconnects personal hotspot **10** and data exchanger **20**. Device link **28** represents generally any

combination of a cable, wireless, or remote connection via a telecommunication link, an infrared link, a radio frequency link, or any other connector or system that provides electronic communication between devices **10** and **20**. As examples, device link **28** may incorporate a physical USB cable or radio waves carrying Bluetooth communications.

[**0015**] Communication between client devices **12**, **14**, and **16** and internet **26** is dependent upon personal hotspot **10**. Personal hotspot **10**, as discussed below with respect to FIGS. **3-6**, includes components capable of distinguishing among the user's of client devices **12**, **14**, and **16**, and applying different internet access rules for different users.

[**0016**] FIG. **2** illustrates another exemplary environment **2** in which various embodiments of the present invention may be implemented. In the example of FIG. **2**, data exchanger **20** (not shown) and personal hotspot **10** are incorporated within the same device. Device link **32** (shown in FIG. **1**) is eliminated and replaced with internal connections. In such a scenario, data exchanger may take the form of a PCMCIA card or any other device that can be inserter into a slot or otherwise coupled to personal hotspot **10**. Alternatively, data exchanger **20** may be fully integrated into personal hotspot **10**

[**0017**] PERSONAL HOTSPOT: FIG. **3** is a block diagram illustrating physical and logical components of personal hotspot **10**. As described above, personal hotspot **10** represents generally any combination of hardware and/or programming capable functioning as a router for directing network communications between client devices and the internet via a data exchanger such as a data capable cellular device, DSL modem, or cable modem.

[**0018**] In the example of FIG. **3** personal hotspot **10** includes local network interface **30** and data exchanger interface **32**. Local network interface **30** represents generally any combination of hardware and/or program instructions capable of supplying a communication interface between personal hotspot **10** and client devices **12**, **14**, and **16** shown in FIGS. **1** and **2**. Data exchanger interface **32** represents any combination of hardware and/or programming enabling data to be communicated between personal hotspot **10** and a data exchanger **20** shown in FIG. **1**. For example, interfaces **30** and **32** may include a transceiver operable to exchange network communications utilizing a wireless protocol such as ultrawideband (UWB), Bluetooth, or 802.11. Alternatively, interfaces **30** and **32** may include physical ports or other physical connection points enabling wired communication.

[**0019**] Personal hotspot **10** also includes connector **50**, router **36**, web server **38**, and limiter **40**. Connector **34** represents generally any combination of hardware and/or programming for sending a signal to data exchanger **20** to connect to establish a data connection with service provider **22** so that access can be made to internet **26**. For example, where a data exchanger **20** is a data capable cellular device, connector **34** may send a signal causing the data capable cellular device to establish such a data link with service provider **22**.

[**0020**] Router **36** represents generally any combination of hardware and/or programming for routing network communication received through network interface **30** to be transmitted by data exchanger **20** to internet **26**. Router **36** is also responsible for routing inbound network communications received from internet **26** and directed via network interface **30** to a specified client device **12**, **14**, or **16**. Outbound and inbound network communications, for example can be an IP (internet Protocol) packets directed to a target on internet **26** or to a particular network device **12**, **14**, or **16** on a local area network.

[**0021**] Web server **38** represents generally any combination of hardware and/or programming capable of serving interfaces such as web pages to client devices **12**, **14**, and **16**. Such web pages may include web pages that when displayed by a network device allows a user to provide or otherwise select settings related to the operation of personal hotspot **10**.

[**0022**] Limiter **40**, discussed in more detail below with respect to FIG. **4**, represents generally any combination of hardware and/or programming capable of distinguishing among the users of devices such as client devices **12**, **14**, and **16**, and applying different internet access rules for different users. For example, certain internet access rules may apply to the owner of personal hotspot **10**. In this context, the term owner refers to an individual or entity that is a subscriber with respect to a service provider such as service provider **22** shown in FIGS. **1** and **2**. The owner typically has physical possession or otherwise has control of personal hotspot **10**. Other internet access rules can apply to users authorized by the owner. Yet other internet access rules apply to anonymous users. Where network interface **30** provides for a wireless connection with client devices, a user of a particular client device might not be known by the owner. As such, internet access rules for such users may be quite limiting.

[**0023**] FIG. **4** is a block diagram illustrating physical and logical components of limiter **40**. In this example, limiter is shown to include configuration data **42**, user interface data **44**, profile engine **46**, access engine **48**, and billing engine **50**. Configuration data **42**, discussed in more detail below with respect to FIG. **5**, represents generally a collection of information including access rules for personal hotspot **10**. As discussed above, different access rules can be associated with different users such an owner, a user authorized by the owner, and an anonymous user. User interface data **44**, discussed in more detail below with respect to FIG. **6**, represents data used to present a client device with user interfaces such as web pages or other content that can be served to a client device. Such user interfaces can be informational, they can provide controls for supplying identifying information such as a user name and password as well as any payment information needed to access personal hotspot **10**.

[**0024**] Profile engine **46** represents generally any combination of hardware and/or programming capable of maintaining configuration data **42**. In one example, an owner of personal hotspot **10** sends a communication from a client device for a web page for updating configuration data **42**. Router **36** passes the communication to limiter **40**. Profile engine **46** causes web server **38** to access user interface data **44** and return a user interface having controls for updating configuration data. The owner's selections are returned to profile engine **46** which then updates configuration data **42**.

[**0025**] In another example, configuration data may be provided by service provider **22** shown in FIGS. **1** and **2**. In this way, access rules defined by configuration data **42** can

be customized based on a subscription plan paid for by the owner of data exchanger **20**. A basic subscription package might then have more stringent access rules than a premium subscription package. In this example, when personal hotspot **10** is connected to data exchanger **20**, connector **34** causes data exchanger **20** to establish a data connection to service provider **22**. As part of the negotiations, personal hotspot **10** requests configuration data, data exchanger **20** communicates the request to service provider **22**. Service provider **22** returns configuration data **42** or a portion thereof for use by limiter **40**. The configuration data **42** returned by service provider **22** or portions thereof may or may not be updateable by the owner of personal hotspot **10**.

[**0026**] Access engine **48** represents generally any combination of hardware and/or programming capable of limiting the routing of communications according to configuration data **42**. Referring back to FIG. **1** for an example, a user of a client device **12**, **14**, or **16**, sends a request for content from internet **26**. That communication hits personal hotspot **10**. Before router **36** routes the communication, access engine **48** applies access rules obtained from configuration data **42**. The configuration data may indicate that the source of the communication is not an owner and is not authorized by the owner to access personal hotspot **10**. Where configuration data **42** indicates that such anonymous communications are to be blocked, access engine **48** prevents the communication from being routed to internet **26**. Other access rules might limit a user's duration of use, limit bandwidth available to a given user, or limit the amount of data a particular user or type of user can download in a given time period. In such situations, access engine **48** is responsible for blocking communications from and even to a user once that user's has reached a duration, download, or bandwidth limit.

[**0027**] When access engine **48** blocks communications, it may cause web server **38** to access user interface data **44** and return a communication to the source of the communication. That communication may explain why the communication was blocked and provide instructions, if any, for gaining access to personal hotspot **10**.

[**0028**] Billing engine **50** represents generally any combination of hardware and/or programming capable of interacting with an internet payment service. As an example, configuration data **42** may indicate that paid access is allowed. When an anonymous user first attempts to access the internet via personal hotspot **10**, access engine **48** blocks the communication, and billing engine **50** causes web server **38** to access user interface data **44** and return a user interface having controls for supplying payment information to a payment service on internet **26**. Payment information may include credentials for accessing an existing account with the payment service. Payment information may also include information needed to establish such an account.

[**0029**] After the anonymous user submits payment information to the payment service, the payment service verifies the information and informs billing engine **50** that the anonymous user is now authorized. The newly authorized user may be paying for a time block or may be being charged based on use. For Example, the user may purchase a set amount of time such as an hour or the user may be paying a certain amount per minute, hour, or other unit of time.

[**0030**] Where the user is paying per unit of time, billing agent may be responsible for periodically communicating with or otherwise checking in with the payment service. When the user logs out, billing engine **50** notifies the payment service to stop billing the user. Also, if personal hotspot **10** loses a connection to internet **26**, the payment service would notice that billing engine **50** had stopped checking in and would stop billing the customer.

[**0031**] The payment service could by a single billing service such as PAYPAL®. Payment service may be a combination of a collection service and a billing service. For example, the owner of personal hotspot **10** may subscribe to an internet based collection service capable of communicating with a billing service and receiving payment from the billing service on behalf of the owner. The anonymous user submits payment information to the billing service. The billing service verifies the payment information and communicates approval to the collection service. Billing engine **50** periodically checks in with the collection service and is informed that the user is now authorized. Billing engine **50** updates configuration data **42** to indicate that the anonymous user has access to personal hotspot **10**.

[**0032**] Billing engine **50** continues to check in with the collection service. when the anonymous user logs out, billing engine **50** notifies collection service so that the collection service can instruct the billing service to stop billing the user. Also, if personal hotspot **10** loses a connection to internet **26**, the collection service would notice that billing engine **50** had stopped checking in and would instruct the billing service to stop billing the anonymous user.

[**0033**] FIG. **5** is a block diagram illustrating the logical elements of configuration data **42**. In the example of FIG. **5**, configuration data **42** includes default profiles **54**, custom profiles **56**, and user data **58**. Utilizing these three elements, access engine **48** determines whether or not the communication will be blocked.

[**0034**] Default profiles **60** include device profile **60**, owner profile **62**, authorized user profile **64**, and anonymous user profile **66**. Device profile **60** represents access rules applies to all users of personal hotspot **10**. Such device access rules may specify upload and download bandwidth limits. The device access rules may limit the amount of data transfer allowed in a given time period. The device access rules may limit the number of simultaneous users or sessions supported by personal hotspot. As noted above, the nature of the device access rules may be dependent upon the nature of the data subscription package the owner of data exchanger **20** has with service provider **22**. A premium package may have less stringent limitations than a basic subscription package.

[**0035**] Where configuration data **42** is supplied by service provider **22** as discussed above, device profile **60** may not be editable by the owner of personal hotspot **10**. As an example, when supplying configuration data **42**, the service provider **22** may supply only device profile **60**. The remainder of configuration data **42** may be editable and data installed by the manufacturer or reseller of personal hotspot **10**.

[**0036**] Owner profile **62** represents access rules for the owner of personal hotspot **10**. Authorized user profile **62** represents access rules for user's authorized by the owner. Anonymous user profile **66** represents access rules for anonymous users of personal hotspot **10**. Such access rules may specify upload and download bandwidth limits. The access rules may limit the amount of data transfer allowed

in a given time period. Typically, anonymous user access rules will be more limiting than authorized user access rules, and authorized user access rule will be more limiting than owner access rules. Moreover, anonymous user profile **64** may indicate anonymous user are to be blocked or it may indicate that payment is required.

[**0037**] Custom profiles **56** represents a collection of owner specified access rules for specified users. For example, the owner may desire to provided customized access rules for a particular user. For example, the owner may desire to provide a spouse or personal friend with less limited access than other authorized users. That same owner may desire to provide a child with more limited access.

[**0038**] User data **58** represents data associating a particular user with a profile. The owner of personal hotspot **10** is associated with owner profile **62**. An authorized user may be associated with authorized user profile **64** or one of custom profiles **56**. User data **58**, for example, may be a table having a series of records, one for the owner and one for each authorized user. Each record will have a field containing data for identifying the particular user and another field containing data identifying the profile associated with that user. The data identifying the user, for example could be a user name password combination, a cookie value, or a hardware address of the user's client device. Each record may also contain usage data and expiration data for a particular user. Usage data may reflect the amount of data uploaded or downloaded in a particular time frame and any expiration data. The expiration data may indicate a time that particular record is to be deleted de-authorizing that particular user.

[**0039**] When determining if a particular communication is to be blocked, access engine **48** identifies a communication type. The type is an indicator of the nature of the particular user from or to which the communication is to be routed. To do so, access engine **48** may analyze the communication to identify the hardware address of the source client device, or access engine **48** may identify a cookie value contained in the communication. Alternatively, access engine may cause web server **38** to access user interface data **44** and return a user interface having controls for supplying credentials such as a user name and password. Using the identifying information, access engine **48** identifies a profile associated with the user in user data **58**. Access engine **48** then examines the user's usage data, accesses the profile and determines whether or not to block the communication. If the user cannot be identified in user data **58**, access engine **48** uses anonymous user profile **66** in making the determination as to whether or not to block the communication.

[**0040**] FIG. **6** is a block diagram illustrating the logical elements of user interface data **44**. In the example of FIG. **6**, user interface data includes informational content **68**, access content **70**, and configuration content **72**. Informational content **68** represents web pages or other content that can identify personal hotspot **10** and its owner. It can include content that explains why a communication is being blocked and provide guidance as how to attain access.

[**0041**] Access content **70** represents web pages or other content used to supply credentials for accessing personal hotspot such as a user name and password. Access content can also include web pages for supplying payment information to a payment service. Configuration content **72** represents web pages or other content used to update configuration data **42**.

[**0042**] OPERATION: The operation of embodiments of the present invention will now be described with reference to FIGS. **7-9**. FIG. **7** is an exemplary flow diagram that helps illustrate actions taken to obtain configuration data from a service provider. FIG. **8** is an exemplary flow diagram that helps illustrate actions taken by personal hotspot **10** to limit communications. FIG. **9** is an exemplary flow diagram that helps illustrate actions taken by personal hotspot **10** related to billing.

[**0043**] Starting with FIG. **7** and with reference to FIG. **1**, personal hotspot **10** instructs data exchanger **20** to establish a data connection to internet **26** via service provider **22** (step **74**). In the Example of FIG. **1**, personal hotspot **10** couples to data exchanger **20** via device link **32**. Device link **32** may be a wired link utilizing a protocol such as USB or a wireless link utilizing a protocol such as Bluetooth. Personal hotspot **10** and data exchanger **20** negotiate a link according the particular protocol in use. As part of that negotiation, connector **34** (FIG. **3**) instructs data exchanger **20** to negotiate a connection to internet **26** via service provider **22**.

[**0044**] Configuration content is requested from the service provider (step **76**). Continuing with the above example, step **76** may be accomplished in a number of fashions. Connector **34** or some other component of personal hotspot **10** may request the configuration content or data exchanger **20** may request the configuration content. Such requests may be active or passive. An active request is a direct request made to service provider **22**. An HTTP GET request is an example of an active request. A passive request, for example can occur by providing some form of identifying information to service provider **22**. Identifying information may be information identifying the existence of personal hotspot **10** and a version of the configuration data currently stored on personal hotspot **10**. The service provider **22** processes this information to determine if and/or what configuration data is to be returned. The identifying information may identify the owner of data exchanger **20** and/or the owner of personal hotspot **10**. Using this information, service provider **22** can identify a data subscription plan paid for by the owner. Service provider **22** can then identify and return the appropriate configuration data. Personal hotspot **10** receives the requested configuration data (step **78**) and limits access according to the configuration data (step **80**).

[**0045**] The configuration data requested and received in steps **76** and **78** may be a subset of configuration data **42** shown in FIG. **5**. As noted earlier, the configuration data received may include default profiles **54** or simply include device profile **60**. In this manner, the owner of personal hotspot **10** can select settings for the remainder of configuration data **42** as desired. Alternatively, the owner may be allowed to select settings for all of configuration data **42**.

[**0046**] Moving to FIG. **8**, personal hotspot **10** receives a routable communication (step **82**). As noted, a routable communication is a network communication that if not blocked will be routed from a client device **12**, **14**, or **16** to internet **26** or from internet **26** to a client device **12**, **14**, or **16**. For example, step **82** may occur when a user of a client device **12**, **14**, or **16** selects a link on a web page, manually enters an URL (Uniform Resource Locator) in a browser, or when a web site responds.

[**0047**] Personal hotspot **10** identifies the communication type (step **84**). A communication type may be "owner" if the

communication originated from or is directed to an owner of personal hotspot **10**. A communication type may be "authorized" if the communication originated from or is directed to an authorized user. A communication type may be "anonymous" if the communication originated from or is directed to an anonymous user. Step **84** may, for example, be accomplished by examining the communication to recognize information such as a hardware address identifying the client device from which the communication originated or is directed to. It is then determined based on the identified communication type if the source of the communication is known to personal hotspot **10**. In the example of FIGS. **4** and **5**, access engine **48** may recognize the identifying information and determine if that information can be found in user data **58**. If present, the source is known to personal hotspot **10**. If not found, the source is not known.

[**0048**] If the source of the communication is known to personal hotspot **10**, access rules associated with the source are identified (step **88**). Continuing with the example above, step **88** may be accomplished by access engine **48**. In accomplishing this task, access engine **48** parses configuration data **42** and identifies a profile associated with the information identifying the source of the communication found in user data **58**. Depending on the known source, the profile may be authorized user profile **64**, owner profile **62**, or one of custom profiles **56**.

[**0049**] From the identified profile, access engine **48** extrapolates the access rules for the source and limits access to personal hotspot **10** according to those access rules (**90**). Step **90** can involve blocking the routable communication received in step **82** or allowing the communication to be routed to its intended destination. For example, it is determined if routing the communication to its intended destination will contravene the access rules. The communication is routed only if the access rules will not be contravened. Where the access rules limit the available bandwidth or amount of data that can be uploaded or downloaded, the routable communication can be blocked when access engine **48** determines that such a limit has or will be exceeded. Where access rules limit the number of simultaneous connections to the internet using personal hotspot **10**, the communication can be blocked when access engine **48** determines that the limit has or will be exceeded. Where access rules limit the term, the routable communication can be blocked when access engine **48** determines that the term has not expired or is otherwise active. A term is a time period for which access is allowed. For example, a user may be given access for a fixed time frame of an hour, a day, a week, or some other period. That period may or may not repeat. For example, a user may be given access during a particular time period each day.

[**0050**] Moving back to step **86**, if the source of the communication is not known to personal hotspot **86**, it is determined if anonymous communications are allowed (step **92**). Access engine **48** may make the determination of step **92** by accessing anonymous user profile **66**. If anonymous communications are allowed, the process continues with step **88**. Continuing with the example, access engine **48** would then access anonymous user profile **66**, extrapolate access rules for the anonymous user (step **88**) and limit access accordingly (Step **90**).

[**0051**] If anonymous communications are not allowed, access data for personal hotspot **10** is returned to the source of the communication received in step **82** (step **94**). Access data, for example, may be a web page informing a user how to contact the owner of personal hotspot **10** to request to become an authorized user. Access data may be a web page for providing payment information to a payment service as described above. The access data may provide instructions for manually approaching the owner of personal hotspot **10** and verbally requesting access. The access data may be a web page having instructions for sending an electronic request such as an electronic mail or text message to the owner. Step **94** may be accomplished as access engine **48** causes web server **38** to access user interface data **44** and return an appropriate user interface to the source of the communication.

[**0052**] A response to the access request is received (step **96**). The nature of the response is determined (step **98**). If the response indicates that access to personal hotspot **10** is not approved, access is denied (step **100**). Otherwise, the process skips back to step **88**. A response can take a number of forms. For example, a non-response can indicate that access is to be denied. A response verifying payment information might come from a payment service. A response may come from the owner of personal hotspot **10** after receiving a verbal or electronic request. When access is approved, configuration data **42** is updated to include user data **58** for the source of the request. That user data **58** associates the source with either a default profile **54** or a custom profile **56**. Access to personal hotspot **10** is then limited in step **90** according to the particular profile associated with that user data **58**.

[**0053**] As discussed above, personal hotspot **10** may require payment for access. FIG. **9** is an exemplary flow diagram that helps illustrate actions taken by personal hotspot **10** related to billing. In step **94** above, personal hotspot **10** returned access data to a user of a client device. In this example, the access data is a web page for providing payment information to a payment service accessed via the internet. The payment information is routed to the payment service (step **102**). A response is received from the payment service (step **104**).

[**0054**] It is determined if the payment information was verified by the payment service (step **106**). If not, access to personal hotspot **10** is denied (step **108**). If the payment information is verified, personal hotspot **10** returns an "access granted" response to the user (step **110**). Once access has been granted, personal hotspot **10** maintains configuration data **42** related to that user. As discussed, this configuration data **42** can include user data **58** identifying the user and associating the user with an authorized user profile. As such subsequent communications from that source will be identified as authorized communications to be routed to their intended destinations.

[**0055**] The user's session with personal hotspot **10** is monitored (step **112**) to determine if that session has ended (step **114**). As an example, user data **58** for the particular user may be present in configuration data **42** as long as the user's session is active. When the user's session ends, billing engine **50** may delete or otherwise inactivate the user data **58** for the user. The user's session may end when the user manually logs out or otherwise disconnects from personal hotspot **10**. The user's session can also end when personal hotspot **10** loses a connection to the internet.

[**0056**] When the session ends, session data is sent to the payment service (step **116**). In performing step **116**, billing engine **50**, for example, may send the payment service an

indication that the user's session with personal hotspot **10** has ended. Payment service then bills the user accordingly. Billing engine **50** may also periodically "check-in" with the payment service indicating to the payment service that the personal hotspot **10** has an active connection to the internet. When billing service misses one or more scheduled "check-ins," the payment service can presume that the personal hotspot **10** has lost a connection to the internet and the session has ended.

[**0057**] CONCLUSION: The schematic diagrams of FIGS. **1** and **2** illustrate exemplary environments in which embodiments of the present invention may be implemented. Implementation, however, is not limited to these environments. The diagrams of FIGS. **3-6** show the architecture, functionality, and operation of various embodiments of the present invention. A number of the blocks are defined as programs. Each of those blocks may represent in whole or in part a module, segment, or portion of code that comprises one or more executable instructions to implement the specified logical function(s). Each block may represent a circuit or a number of interconnected circuits to implement the specified logical function(s).

[**0058**] Also, the present invention can be embodied in any computer-readable media for use by or in connection with an instruction execution system such as a computer/processor based system or an ASIC (Application Specific Integrated Circuit) or other system that can fetch or obtain the logic from computer-readable media and execute the instructions contained therein. "Computer-readable media" can be any media that can contain, store, or maintain programs and data for use by or in connection with the instruction execution system. Computer readable media can comprise any one of many physical media such as, for example, electronic, magnetic, optical, electromagnetic, or semiconductor media. More specific examples of suitable computer-readable media include, but are not limited to, a portable magnetic computer diskette such as floppy diskettes or hard drives, a random access memory (RAM), a read-only memory (ROM), an erasable programmable read-only memory, or a portable compact disc.

[**0059**] Although the flow diagrams of FIGS. **7-9** show specific orders of execution, the orders of execution may differ from that which is depicted. For example, the order of execution of two or more blocks may be scrambled relative to the order shown. Also, two or more blocks shown in succession may be executed concurrently or with partial concurrence. All such variations are within the scope of the present invention.

[**0060**] The present invention has been shown and described with reference to the foregoing exemplary embodiments. It is to be understood, however, that other forms, details and embodiments may be made without departing from the spirit and scope of the invention that is defined in the following claims.

What is claimed is:

1. A method for limiting network communications, the method being implemented at a device through which communications can be routed between client devices and the internet, the method comprising:

receiving a routable communication;

identifying a communication type for the routable communication, the communication type being owner, authorized, or anonymous;

identifying access rules for the identified communication type;

limiting the routing of the communication according to the identified access rules.

2. The method of claim 1, wherein limiting comprises determining if routing the communication to its intended destination will contravene the access rules and routing the communication to its intended destination only if it is determined that the access rules will not be contravened.

3. The method of claim 2, wherein identifying access rules comprise identifying one or more of a term limit, a session limit, a bandwidth limit, and a data transfer limit.

4. The method of claim 1, further comprising obtaining configuration data and wherein identifying access rules comprises parsing the configuration data to identify the access rules for the identified communication type.

5. The method of claim 4, wherein the device connects to the internet via a data exchanger and wherein obtaining comprises obtaining the configuration data from a service provider for the data exchanger.

6. The method of claim 5, wherein the data exchanger is a data capable cellular device and wherein obtaining comprises causing the data exchanger to establish a data connection with the service provider and receiving the configuration data from the service provider via the data connection.

7. The method of claim 1, wherein identifying a communication type comprises identifying the communication type as anonymous, and limiting the routing of the communication comprises:

allowing the communication to be routed if the identified access rules indicate that anonymous communications are allowed; and

preventing the communication from being routed and causing access data to be communicated to the source of the communication if the identified access rules indicate that anonymous communications are not allowed.

8. The method of claim 7, wherein causing access data to be communicated comprises causing a user interface for entering payment information to be communicated to the source, the payment information to be communicated to a payment service.

9. The method of claim 8, further comprising receiving a verification response from the payment service and if the verification response verifies the payment information, identifying subsequent communications from the source as authorized communications to be routed to their intended destinations.

10. The method of claim 9, wherein if the verification response indicates that the payment information is verified, monitoring a session corresponding to the source of the communication and communicating session data to the payment service.

11. A computer readable medium having computer executable instructions for:

receiving a routable communication;

identifying a communication type for the routable communication, the communication type being owner, authorized, or anonymous;

identifying access rules for the identified communication type;

limiting the routing of the communication according to the identified access rules.

12. The medium of claim 11, wherein the instructions for limiting include instructions for determining if routing the communication to its intended destination will contravene the access rules and routing the communication to its intended destination only if it is determined that the access rules will not be contravened.

13. The medium of claim 12, wherein the instructions for identifying access rules comprise identifying one or more of a term limit, a session limit, a bandwidth limit, and a data transfer limit.

14. The medium of claim 11, having further instructions for obtaining configuration data and wherein the instructions for identifying access rules include instructions for parsing the configuration data to identify the access rules for the identified communication type.

15. The medium of claim 14, wherein the instructions are executed by a device through which communications can be routed between client devices and the internet via a data exchanger and wherein the instructions for obtaining include instructions for obtaining the configuration data from a service provider for the data exchanger.

16. The medium of claim 15, wherein the instructions for the data exchanger is a data capable cellular device and wherein the instructions for obtaining include instructions for causing the data exchanger to establish a data connection with the service provider and receiving the configuration data from the service provider via the data connection.

17. The medium of claim 11, wherein the instructions for identifying a communication type include instructions for identifying the communication type as anonymous, and limiting the routing of the communication include instructions for:

allowing the communication to be routed if the identified access rules indicate that anonymous communications are allowed; and

preventing the communication from being routed and causing access data to be communicated to the source of the communication if the identified access rules indicate that anonymous communications are not allowed.

18. The medium of claim 17, wherein the instructions for causing access data to be communicated include instructions for causing a user interface for entering payment information to be communicated to the source, the payment information to be communicated to a payment service.

19. The medium of claim 18, having further instructions for receiving a verification response from the payment service and if the verification response verifies the payment information, identifying subsequent communications from the source as authorized communications to be routed to their intended destinations.

20. The medium of claim 19, having further instructions for monitoring a session corresponding to the source of the communication and communicating session data to the payment service if the verification response indicates that the payment information is verified.

21. A device for routing communications between client devices and the internet comprising:

a router operable to receive a routable communication and to route the communication to an intended destination; and

a limiter operable to:

receiving a routable communication;

identifying a communication type for the routable communication, the communication type being owner, authorized, or anonymous;

identifying access rules for the identified communication type;

limiting the routing of the communication by the router according to the identified access rules.

22. The device of claim 21, wherein the limiter is operable to determine if routing the communication to its intended destination will contravene the access rules and route the communication to its intended destination only if it is determined that the access rules will not be contravened.

23. The device of claim 22, wherein the limiter is operable to identify access rules that include one or more of a term limit, a session limit, a bandwidth limit, and a data transfer limit.

24. The device of claim 21, wherein the limiter is operable to obtain configuration data and identify access by parsing the configuration data to identify the access rules for the identified communication type.

25. The device of claim 24, wherein the device connects to the internet via a data exchanger and wherein the limiter is operable to obtain the configuration data from a service provider for the data exchanger.

26. The device of claim 25, wherein:

the data exchanger is a data capable cellular device;

the device comprises a connector operable to cause the data exchanger to establish a data connection with the service provider; and

the limiter is operable to obtain the configuration data from the service provider via the data connection.

27. The device of claim 21, wherein the limiter is operable to identify the communication type as anonymous, and limit the routing of the communication by:

allowing the communication to be routed if the identified access rules indicate that anonymous communications are allowed; and

preventing the communication from being routed and causing access data to be communicated to the source of the communication if the identified access rules indicate that anonymous communications are not allowed.

28. The device of claim 27, wherein the limiter is operable to cause access data to be communicated by causing a user interface for entering payment information to be communicated to the source, the payment information to be communicated to a payment service.

29. The device of claim 28, wherein the limiter is operable to receive a verification response from the payment service and, if the verification response verifies the payment information, to identify subsequent communications from the source as authorized communications to be routed to their intended destinations.

30. The device of claim 29, wherein the limiter is operable to monitor a session corresponding to the source of the communication and communicate session data to the payment service if the verification response indicates that the payment information is verified.

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