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(54) Title: INTERMEDIARY, SOURCE AND METHODS FOR SHARING CONTENT

(57) Abstract: A method for sharing content includes an intermediary receiving a source reference identifying content stored by the source, and thereafter receiving one or more requests for the content, the request(s) including a first request identifying the content by an intermediary reference. The intermediary can also receive the content from the source. In response to the request(s), the intermediary can provide the requested content to the respective destination(s). The intermediary can receive the first request before receiving the content from the source. In such instances, the method can further include the intermediary requesting the content from the source based upon the source reference and in response to the request from the destination. The intermediary can then receive the content in response to the request from the intermediary, and provide the requested content to the destination in response to the request from the destination.



WO 2007/057777 A2

INTERMEDIARY, SOURCE AND METHODS FOR SHARING CONTENT

FIELD OF THE INVENTION

The present invention generally relates to systems and methods of sharing content and, more particularly, relates to systems and methods for sharing content of a mobile terminal with reduced resource requirements.

5

BACKGROUND OF THE INVENTION

Where mobile terminals and other wireless devices were perhaps viewed by many as a luxury when first introduced into the marketplace, they are today viewed by our society as very important, convenient, and useful tools. A great number of people now carry their mobile devices with them wherever they go. This popularity of wireless communication has spawned a multitude of new wireless systems, devices, protocols, etc. Consumer demand for advanced wireless functions and capabilities has also fueled a wide range of technological advances in the utility and capabilities of wireless devices. Wireless/mobile devices not only allow voice communication, but also facilitate messaging, multimedia communications, e-mail, Internet browsing, blogging, and access to a wide range of wireless applications and services.

A blog (also known as a web log or weblog) can be defined as a frequent, chronological publication of personal thoughts and Web links. A blog is often a mixture of what is occurring in a person's life and what is occurring on the Web. It is a living journal, an online chronicle of personal, creative and organizational life. It functions as a type of hybrid diary/guide site and can therefore be just as unique as its individual creator, i.e., blogger. In this regard, bloggers often have a strong desire to express themselves in many different ways on the Web, and wireless devices provide a new method to publish and update blogs easily. One of the features that contribute to the popularity of blogs is that they are easily

updatable, i.e., new information can be published frequently, which makes blogs “alive.”

Modern wireless devices, such as cellular telephones, generate, collect and maintain a considerable amount of content that may be published to a blog. This
5 content can include, for example, call logs (e.g., when and to where a call was made, how long the call lasted, the occurrence of incoming and missed calls, etc.), records of text messages that are sent and received, calendar-related information, images taken with an integral camera or otherwise received, or the like.

Thus, while access to this plethora of information is exciting, storing the
10 desired information and utilizing the various access techniques for transferring, or more particularly uploading, the desired information can become burdensome to the casual mobile device user or blogger. In this regard, the increase in the quantity of information that is and will be accessible to and/or stored by mobile devices can place heavy resource and/or cost burdens on such mobile devices and
15 their users. To relieve at least a portion of these burdens, techniques have been developed whereby mobile users and bloggers are capable of transferring, or uploading, content from their mobile devices to servers or the like with increased storage capacity and accessibility to those who frequent the respective user’s blog. As will be appreciated, however, such techniques can also have drawbacks.

20 Whereas conventional techniques for uploading content are adequate, such techniques have a drawback in that they are limited in the amount of available control over the uploading of content. According to conventional uploading techniques, control over the uploading of content is typically limited. In this regard, conventional uploading techniques typically allow only very limited
25 control over the time and manner of uploading content. For example, conventional techniques typically do not permit terminal users to tailor content uploading according to anticipated requests from other users for such content. It would therefore be advantageous to have even more robust forms of upload control, especially for content that may take a while to upload and which senders and/or
30 recipients might therefore want to be careful about transmitting and/or receiving, respectively, if the only available channel is an expensive channel.

SUMMARY OF THE INVENTION

In light of the foregoing background, exemplary embodiments of the present invention provide an improved intermediary, source and methods for sharing content. In accordance with exemplary embodiments of the present invention, a source (e.g., mobile terminal) is capable of uploading content to an intermediary (e.g., computing system, origin server, etc.) for providing the uploaded content to one or more destinations (e.g., terminals, computing systems, origin servers, etc.). In this regard, the source uploading content to the intermediary can include the source uploading, to the intermediary, a reference to the content stored by the source such that the intermediary can immediately indicate the availability of the content to one or more destinations without first receiving the content. In response to the intermediary receiving a first request for the content, provided the intermediary hasn't in the interim received the content from the source, the intermediary can request and receive the content from the source based upon the reference to the content. The intermediary can then provide the requested content, and can store a copy of the requested content such that future requests for the content can be fulfilled from local content storage of the intermediary.

As the wireless channel by which the content is uploaded to the intermediary 74 may place undesirable resource and/or cost burdens on the terminal, first providing the reference to content in lieu of the content may permit the terminal to delay (if not reduce or otherwise eliminate) that burden until such time as a destination actually requests the content. Thus, if a destination does not request the content, the terminal may avoid the resource and/or cost burden of uploading the content to the intermediary to make the content available for downloading to a destination. Further, if in the interim of indicating the availability of the content but before receiving a request for the content, a less burdensome manner of uploading the content becomes available, the terminal can upload the content to the intermediary in the less burdensome manner. Upon receiving a request for the content, then, the intermediary can provide the uploaded content to the destination, thereby permitting the terminal to share the content without uploading the content across the more burdensome network.

According to one aspect of the present invention, a method is provided for sharing content. The method can include an intermediary, located across a network from a source of content, receiving a source reference identifying content stored by the source. After receiving the source reference, the intermediary can
5 indicate the availability of the content from the intermediary via an intermediary reference identifying the content at the intermediary. Also after receiving the source reference, such as after indicating the availability of the content, the intermediary can receive one or more requests for the content from one or more destinations, where the request(s) include a first request identifying the content by
10 an intermediary reference. Before, after or as the intermediary receives the request(s) for the content, the intermediary can receive the content from the source. In response to the request(s), the intermediary can provide the requested content to the respective destination(s).

In accordance with exemplary embodiments of the present invention, the
15 intermediary is capable of receiving the first request before receiving the content from the source. In such instances, the method can further include the intermediary requesting the content from the source based upon the source reference and in response to the request from the destination. The intermediary can then receive the content in response to the request from the intermediary, and
20 provide the requested content to the destination in response to the request from the destination. In various instances, however, the intermediary can receive the content from the source before receiving the first request. For example, the intermediary can receive the source reference from the source across a first network, and in response to the source moving from the first network to a second
25 network, receive the content across the second network before receiving the first request.

Upon receiving the content from the source, the intermediary can store the content in content storage of the intermediary, where the content is stored such that the intermediary reference identifies the content in content storage of the
30 intermediary. In such instances, the requests received by the intermediary can include at least one request subsequent to the first request. Instead of again receiving the content from the source to provide to the destination in response to

the subsequent requests, then, the intermediary can be capable of providing the requested content from content storage of the intermediary independent of the source.

5 According to other aspects of the present invention, an intermediary and a source are provided for sharing content. Exemplary embodiments of the present invention therefore provide an improved intermediary, source and method for sharing content. And as indicated above and explained in greater detail below, the intermediary, source and method of exemplary embodiments of the present invention may solve the problems identified by prior techniques and may provide
10 additional advantages.

BRIEF DESCRIPTION OF THE DRAWINGS

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

FIG. 1 is a block diagram of one type of terminal and system that would benefit from embodiments of the present invention;

FIG. 2 is a schematic block diagram of an entity capable of operating as a terminal, computing system and/or origin server, in accordance with exemplary
20 embodiments of the present invention;

FIG. 3 is a schematic block diagram of a terminal comprising a mobile station, in accordance with one exemplary embodiment of the present invention;

FIG. 4 is a functional block diagram of a source of content sharing that content, in accordance with one exemplary embodiment of the present invention;
25 and

FIGS. 5 and 6 are flowcharts illustrating various steps in methods of sharing content, in accordance with exemplary embodiments of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different
5 forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout.

Referring to FIG. 1, an illustration of one type of terminal and system that
10 would benefit from the present invention is provided. The system, method and computer program product of embodiments of the present invention will be primarily described in conjunction with mobile communications applications. It should be understood, however, that the system, method and computer program product of embodiments of the present invention can be utilized in conjunction
15 with a variety of other applications, both in the mobile communications industries and outside of the mobile communications industries. For example, the system, method and computer program product of embodiments of the present invention can be utilized in conjunction with wireline and/or wireless network (e.g., Internet) applications.

20 As shown, one or more terminals **10** may each include an antenna **12** for transmitting signals to and for receiving signals from a base site or base station (BS) **14**. The base station is a part of one or more cellular or mobile networks each of which includes elements required to operate the network, such as a mobile switching center (MSC) **16**. As well known to those skilled in the art, the mobile
25 network may also be referred to as a Base Station/MSC/Interworking function (BMI). In operation, the MSC is capable of routing calls to and from the terminal when the terminal is making and receiving calls. The MSC can also provide a connection to landline trunks when the terminal is involved in a call. In addition, the MSC can be capable of controlling the forwarding of messages to and from the
30 terminal, and can also control the forwarding of messages for the terminal to and from a messaging center.

The MSC 16 can be coupled to a data network, such as a local area network (LAN), a metropolitan area network (MAN), and/or a wide area network (WAN). The MSC can be directly coupled to the data network. In one typical embodiment, however, the MSC is coupled to a GTW 18, and the GTW is coupled to a WAN, such as the Internet 20. In turn, devices such as processing elements (e.g., personal computers, server computers or the like) can be coupled to the terminal 10 via the Internet. For example, as explained below, the processing elements can include one or more processing elements associated with a computing system 22 (two shown in FIG. 1), origin server 24 (one shown in FIG. 1) or the like, as described below.

The BS 14 can also be coupled to a signaling GPRS (General Packet Radio Service) support node (SGSN) 26. As known to those skilled in the art, the SGSN is typically capable of performing functions similar to the MSC 16 for packet switched services. The SGSN, like the MSC, can be coupled to a data network, such as the Internet 20. The SGSN can be directly coupled to the data network. In a more typical embodiment, however, the SGSN is coupled to a packet-switched core network, such as a GPRS core network 28. The packet-switched core network is then coupled to another GTW, such as a GTW GPRS support node (GGSN) 30, and the GGSN is coupled to the Internet. In addition to the GGSN, the packet-switched core network can also be coupled to a GTW 18. Also, the GGSN can be coupled to a messaging center. In this regard, the GGSN and the SGSN, like the MSC, can be capable of controlling the forwarding of messages, such as MMS messages. The GGSN and SGSN can also be capable of controlling the forwarding of messages for the terminal to and from the messaging center.

In addition, by coupling the SGSN 26 to the GPRS core network 28 and the GGSN 30, devices such as a computing system 22 and/or origin server 24 can be coupled to the terminal 10 via the Internet 20, SGSN and GGSN. In this regard, devices such as a computing system and/or origin server can communicate with the terminal across the SGSN, GPRS and GGSN. By directly or indirectly connecting the terminals and the other devices (e.g., computing system, origin server, etc.) to the Internet, the terminals can communicate with the other devices and with one

another, such as according to the Hypertext Transfer Protocol (HTTP), to thereby carry out various functions of the terminal.

Although not every element of every possible mobile network is shown and described herein, it should be appreciated that the terminal **10** can be coupled to
5 one or more of any of a number of different networks through the BS **14**. In this regard, the network(s) can be capable of supporting communication in accordance with any one or more of a number of first-generation (1G), second-generation (2G), 2.5G and/or third-generation (3G) mobile communication protocols or the like. For example, one or more of the network(s) can be capable of supporting
10 communication in accordance with 2G wireless communication protocols IS-136 (TDMA), GSM, and IS-95 (CDMA). Also, for example, one or more of the network(s) can be capable of supporting communication in accordance with 2.5G wireless communication protocols GPRS, Enhanced Data GSM Environment (EDGE), or the like. Further, for example, one or more of the network(s) can be
15 capable of supporting communication in accordance with 3G wireless communication protocols such as Universal Mobile Telephone System (UMTS) network employing Wideband Code Division Multiple Access (WCDMA) radio access technology. Some narrow-band AMPS (NAMPS), as well as TACS, network(s) may also benefit from embodiments of the present invention, as should
20 dual or higher mode mobile stations (e.g., digital/analog or TDMA/CDMA/analog phones).

The terminal **10** can further be coupled to one or more wireless access points (APs) **32**. The APs can comprise access points configured to communicate with the terminal in accordance with techniques such as, for example, radio
25 frequency (RF), Bluetooth (BT), infrared (IrDA) or any of a number of different wireless networking techniques, including wireless LAN (WLAN) techniques such as IEEE 802.11 (e.g., 802.11a, 802.11b, 802.11g, 802.11n, etc.), WiMAX techniques such as IEEE 802.16, and/or ultra wideband (UWB) techniques such as IEEE 802.15 or the like. The APs may be coupled to the Internet **20**. Like with
30 the MSC **16**, the APs can be directly coupled to the Internet. In one embodiment, however, the APs are indirectly coupled to the Internet via a GTW **18**. As will be appreciated, by directly or indirectly connecting the terminals and the computing

system **22**, origin server **24**, and/or any of a number of other devices, to the Internet, the terminals can communicate with one another, the computing system, etc., to thereby carry out various functions of the terminal, such as to transmit data, content or the like to, and/or receive content, data or the like from, the computing
5 system. As used herein, the terms “data,” “content,” “information” and similar terms may be used interchangeably to refer to data capable of being transmitted, received and/or stored in accordance with embodiments of the present invention. Thus, use of any such terms should not be taken to limit the spirit and scope of the present invention.

10 Although not shown in FIG. 1, in addition to or in lieu of coupling the terminal **10** to computing systems **22** across the Internet **20**, the terminal and computing system can be coupled to one another and communicate in accordance with, for example, RF, BT, IrDA or any of a number of different wireline or wireless communication techniques, including LAN, WLAN, WiMAX and/or
15 UWB techniques. One or more of the computing systems can additionally, or alternatively, include a removable memory capable of storing content, which can thereafter be transferred to the terminal. Further, the terminal **10** can be coupled to one or more electronic devices, such as printers, digital projectors and/or other multimedia capturing, producing and/or storing devices (e.g., other terminals).
20 Like with the computing systems **22**, the terminal can be configured to communicate with the portable electronic devices in accordance with techniques such as, for example, RF, BT, IrDA or any of a number of different wireline or wireless communication techniques, including USB, LAN, WLAN, WiMAX and/or UWB techniques.

25 Referring now to FIG. 2, a block diagram of an entity capable of operating as a terminal **10**, computing system **22** and/or origin server **24**, is shown in accordance with one embodiment of the present invention. Although shown as separate entities, in some embodiments, one or more entities may support one or more of a terminal, origin server and/or computing system, logically separated but
30 co-located within the entity(ies). For example, a single entity may support a logically separate, but co-located, computing system and origin server. Also, for example, a single entity may support a logically separate, but co-located terminal

and computing system. Further, for example, a single entity may support a logically separate, but co-located terminal and origin server.

The entity capable of operating as a terminal **10**, computing system **22** and/or origin server **24** includes various means for performing one or more
5 functions in accordance with exemplary embodiments of the present invention, including those more particularly shown and described herein. It should be understood, however, that one or more of the entities may include alternative means for performing one or more like functions, without departing from the spirit and scope of the present invention. More particularly, for example, as shown in
10 FIG. 2, the entity can include a processor **34** connected to a memory **36**. The memory can comprise volatile and/or non-volatile memory, and typically stores content, data or the like. For example, the memory typically stores content transmitted from, and/or received by, the entity. Also for example, the memory typically stores client applications, instructions or the like for the processor to
15 perform steps associated with operation of the entity in accordance with embodiments of the present invention. As explained below, for example, the memory can store client application(s).

As described herein, the client application(s) may each comprise software operated by the respective entities. It should be understood, however, that any one
20 or more of the client applications described herein can alternatively comprise firmware or hardware, without departing from the spirit and scope of the present invention. Generally, then, the terminal **10**, computing system **22** and/or origin server **24** can include one or more logic elements for performing various functions of one or more client application(s). As will be appreciated, the logic elements can
25 be embodied in any of a number of different manners. In this regard, the logic elements performing the functions of one or more client applications can be embodied in an integrated circuit assembly including one or more integrated circuits integral or otherwise in communication with a respective network entity (i.e., terminal, computing system, origin server, etc.) or more particularly, for
30 example, a processor **34** of the respective network entity. The design of integrated circuits is by and large a highly automated process. In this regard, complex and powerful software tools are available for converting a logic level design into a

semiconductor circuit design ready to be etched and formed on a semiconductor substrate. These software tools automatically route conductors and locate components on a semiconductor chip using well established rules of design as well as huge libraries of pre-stored design modules. Once the design for a
5 semiconductor circuit has been completed, the resultant design, in a standardized electronic format (e.g., Opus, GDSII, or the like) may be transmitted to a semiconductor fabrication facility or "fab" for fabrication.

In addition to the memory **36**, the processor **34** can also be connected to at least one interface or other means for displaying, transmitting and/or receiving
10 data, content or the like. In this regard, the interface(s) can include at least one communication interface **38** or other means for transmitting and/or receiving data, content or the like. For example, the communication interface(s) can include a first communication interface for connecting to a first network, and a second communication interface for connecting to a second network. In addition to the
15 communication interface(s), the interface(s) can also include at least one user interface that can include one or more earphones and/or speakers, a display **40**, and/or a user input interface **42**. The user input interface, in turn, can comprise any of a number of devices allowing the entity to receive data from a user, such as a microphone, a keypad, a touch display, a joystick, image capture device (e.g.,
20 digital camera) or other input device.

Reference is now made to FIG. 3, which illustrates one type of terminal **10** that would benefit from embodiments of the present invention. It should be understood, however, that the terminal illustrated and hereinafter described is merely illustrative of one type of terminal that would benefit from the present
25 invention and, therefore, should not be taken to limit the scope of the present invention. While several embodiments of the terminal are illustrated and will be hereinafter described for purposes of example, other types of terminals, such as portable digital assistants (PDAs), pagers, laptop computers and other types of electronic systems, can readily employ the present invention.

30 The terminal **10** includes various means for performing one or more functions in accordance with exemplary embodiments of the present invention, including those more particularly shown and described herein. It should be

understood, however, that the terminal may include alternative means for performing one or more like functions, without departing from the spirit and scope of the present invention. More particularly, for example, as shown in FIG. 3, in addition to an antenna **12**, the terminal **10** includes a transmitter **44**, a receiver **46**,
5 and a controller **48** that provides signals to and receives signals from the transmitter and receiver, respectively. These signals include signaling information in accordance with the air interface standard of the applicable cellular system, and also user speech and/or user generated data. In this regard, the terminal can be capable of operating with one or more air interface standards, communication
10 protocols, modulation types, and access types. More particularly, the terminal can be capable of operating in accordance with any of a number of first generation (1G), second generation (2G), 2.5G and/or third-generation (3G) communication protocols or the like. For example, the terminal may be capable of operating in accordance with 2G wireless communication protocols IS-136 (TDMA), GSM, and
15 IS-95 (CDMA). Also, for example, the terminal may be capable of operating in accordance with 2.5G wireless communication protocols GPRS, Enhanced Data GSM Environment (EDGE), or the like. Further, for example, the terminal may be capable of operating in accordance with 3G wireless communication protocols such as Universal Mobile Telephone System (UMTS) network employing
20 Wideband Code Division Multiple Access (WCDMA) radio access technology. Some narrow-band AMPS (NAMPS), as well as TACS, mobile terminals may also benefit from the teaching of this invention, as should dual or higher mode phones (e.g., digital/analog or TDMA/CDMA/analog phones).

It is understood that the controller **48** includes the circuitry required for
25 implementing the audio and logic functions of the terminal **10**. For example, the controller may be comprised of a digital signal processor device, a microprocessor device, and various analog-to-digital converters, digital-to-analog converters, and other support circuits. The control and signal processing functions of the terminal are allocated between these devices according to their respective capabilities. The
30 controller can additionally include an internal voice coder (VC), and may include an internal data modem (DM). Further, the controller may include the functionality to operate one or more software programs, which may be stored in

memory (described below). For example, the controller may be capable of operating a connectivity program, such as a conventional Web browser. The connectivity program may then allow the terminal to transmit and receive Web content, such as according to HTTP and/or the Wireless Application Protocol (WAP), for example.

The terminal **10** also comprises a user interface including one or more earphones and/or speakers **50**, a ringer **52**, a display **54**, and a user input interface, all of which are coupled to the controller **48**. The user input interface, which allows the terminal to receive data, can comprise any of a number of devices allowing the terminal to receive data, such as a microphone **56**, a keypad **58**, a touch display and/or other input device. In embodiments including a keypad, the keypad includes the conventional numeric (0-9) and related keys (#, *), and other keys used for operating the terminal. Although not shown, the terminal can include a battery, such as a vibrating battery pack, for powering the various circuits that are required to operate the terminal, as well as optionally providing mechanical vibration as a detectable output.

The terminal **10** can also include one or more means for sharing and/or obtaining data. For example, the terminal can include a short-range radio frequency (RF) transceiver or interrogator **60** so that data can be shared with and/or obtained from electronic devices in accordance with RF techniques. The terminal can additionally, or alternatively, include other short-range transceivers, such as, for example an infrared (IR) transceiver **62**, and/or a Bluetooth (BT) transceiver **64** operating using Bluetooth brand wireless technology developed by the Bluetooth Special Interest Group. The terminal can therefore additionally or alternatively be capable of transmitting data to and/or receiving data from electronic devices in accordance with such techniques. In addition, the terminal can include an image capture element **65**, such as a digital camera, charge coupled device (CCD), optical scanner or the like, such that the terminal can obtain image data in accordance with any of a number of different electronic imaging techniques. Although not shown, the terminal can additionally or alternatively be capable of transmitting and/or receiving data from electronic devices according to a number of different wireless networking techniques, including WLAN, WiMAX, UWB techniques or the like.

The terminal **10** can further include memory, such as a subscriber identity module (SIM) **66**, a removable user identity module (R-UIM) or the like, which typically stores information elements related to a mobile subscriber. In addition to the SIM, the terminal can include other removable and/or fixed memory. In this
5 regard, the terminal can include volatile memory **68**, such as volatile Random Access Memory (RAM) including a cache area for the temporary storage of data. The terminal can also include other non-volatile memory **70**, which can be embedded and/or may be removable. The non-volatile memory can additionally or alternatively comprise an EEPROM, flash memory or the like. The memories can
10 store any of a number of pieces of information, and data, used by the terminal to implement the functions of the terminal. For example, the memories can store an identifier, such as an international mobile equipment identification (IMEI) code, international mobile subscriber identification (IMSI) code, mobile station integrated services digital network (MSISDN) code (mobile telephone number),
15 Session Initiation Protocol (SIP) address or the like, capable of uniquely identifying the mobile station, such as to the MSC **16**. In addition, the memories can store one or more client applications capable of operating on the terminal.

As explained in the background section, to relieve at least a portion of the resource and/or cost burdens on terminals, terminals are typically capable of
20 transferring, or uploading, content to an intermediary, such as an origin server **24**, that may have storage capacity and accessibility to those who may desire to receive, and consume (if so desired), such content. Conventional techniques, however, typically do not allow much control over the time and/or manner of uploading content. Exemplary embodiments of the present invention are therefore
25 capable of controlling the time and/or manner of uploading content from a terminal to an origin server to thereby make that content available for downloading from the origin server to one or more destinations.

In accordance with exemplary embodiments of the present invention, a source **72**, such as a terminal **10**, is capable of uploading content to an intermediary
30 **74**, such as a computing system **22**, origin server **24** or the like, for providing the uploaded content to one or more destinations **76**, such as one or more terminals, computing systems and/or origin servers. In this regard, the intermediary can

comprise, for example, a network entity in the possession of or otherwise under the control of the source user, a network entity of a third party providing a service to the source user, or the like. Uploading content can include the source 72 uploading, to the intermediary 74, a reference to the content stored by the source.

5 The intermediary can then immediately indicate the availability of the content to one or more destinations 76, which can then request the content from the intermediary. In response to a first request for the content, the intermediary can request and thereafter receive the content from the source based upon the reference to the content, provided the content has not been uploaded to the intermediary

10 between indicating the availability of the content and receiving the request for the content. The intermediary can then provide the requested content to the destination. In addition, the intermediary can store a copy of the requested content such that, in response to additional requests for the content, the intermediary can provide the stored copy in lieu of repeatedly requesting/receiving the content from

15 the source.

In instances where the source 72 comprises a terminal 10, by providing the intermediary with a reference to content stored by the terminal, the terminal can make the content immediately available for downloading by one or more destinations 76. As the wireless channel by which the content is uploaded to the

20 intermediary 74 may place undesirable resource and/or cost burdens on the terminal, the terminal may delay (if not reduce or otherwise eliminate) that burden until such time as a destination actually requests the content. Thus, if a destination does not request the content, the terminal may avoid the resource and/or cost burden of uploading the content to the intermediary to make the content available

25 for downloading to a destination. Further, if in the interim of indicating the availability of the content but before receiving a request for the content, a less burdensome manner of uploading the content becomes available, the terminal can upload the content to the intermediary in the less burdensome manner. For example, if in the interim of indicating the availability of the content the terminal

30 moves from a GPRS network to a less-costly network, such as a WLAN, universal serial bus (USB) personal area network (PAN), Bluetooth PAN or the like, the terminal can upload the content to the intermediary across the

WLAN/USB/Bluetooth network. Upon receiving a request for the content, then, the intermediary can provide the uploaded content to the destination, thereby permitting the terminal to share the content without uploading the content across the GPRS network.

5 Reference is now drawn to FIG. 4, which illustrates a functional block diagram of a source **72** (e.g., terminal **10**) uploading a reference to content, and/or the content itself, to an intermediary **74** (e.g., computing system **22**, origin server **24**, etc.). As shown, the source is capable of operating an application, such as an upload agent **78**, which is capable of uploading, to the intermediary, a reference to
10 one or more piece(s) of content stored in a content storage **80** in memory (e.g., non-volatile memory **70**) of the source. Additionally, at some point subsequent to uploading the reference to content, the upload agent is capable of uploading the content itself to the intermediary. The intermediary, in turn, is capable of operating a content manager **82**, which is capable of receiving the reference to
15 content and thereafter, such as immediately thereafter, indicating the availability of the content to one or more destinations **76**. Then, at some point after indicating the availability of the content, the terminal can upload the content to the intermediary such that the content can be downloaded from the intermediary to the destination(s). For example, in response to receiving a first request for the content,
20 the content manager can request and thereafter receive the content from the source based upon the reference to the content. Alternatively, for example, the terminal can move from a first network to a second, less burdensome (e.g., less resource and/or cost burdensome) network such that the terminal can upload the content to the intermediary across the less burdensome network.

25 Irrespective of exactly when the content manager **82** of the intermediary **74** receives the content from the upload agent **78** of the source **72**, the content manager can store a copy of the requested content in a content storage **84** in memory of the intermediary. Additionally, the content manager can provide the content to one or more destinations, such as in response to requests for the content
30 from those destinations. The destinations can then respond to receipt of the content in any of a number of different manners, such as by storing and/or consuming the content.

As shown and described herein, the upload agent **78** and content manager **82** comprise software operated by the source **72** and intermediary **74**, respectively. It should be understood, however, that the upload agent and/or content manager can alternatively comprise firmware or hardware, without departing from the spirit and scope of the present invention. Also, although the upload agent is shown and described as being local to the source, the upload agent can alternatively be distributed from, and in communication with, the source, such as by implementing the upload agent in a mobile web server in communication with the source across the Internet **20**. Likewise, the content manager can be located local to or distributed from the intermediary. Further, as shown and described herein, content may be uploaded, downloaded, exchanged or otherwise transferred from one entity to another entity. It should be understood, however, that the terms “uploading,” “downloading,” “providing,” “exchanging” and “transferring” can be used herein interchangeably, and that uploading, downloading, providing, exchanging or transferring content can include, for example, moving or copying content, without departing from the spirit and scope of the present invention.

Reference is now drawn to FIG. 5, which illustrates a flowchart including various steps in a method of sharing content of a source **72** (e.g., terminal **10**), in accordance with exemplary embodiments of the present invention. For purposes of illustration and without loss of generality, exemplary embodiments of the present invention may be described with reference to a terminal source capable of communicating across a GPRS network (i.e., first network). It should be understood, however, that the source may be equally capable of communicating across any of a number of other networks without departing from the spirit and scope of the present invention. Similarly, exemplary embodiments of the present invention may be described with reference to one or more destinations (e.g., terminal, computing system, origin server, etc.) capable of communicating across the Internet **20**. It should be understood, however, that the destination(s) may be equally capable of communicating across any of a number of other networks without departing from the spirit and scope of the present invention.

Now, as shown in block **90** of FIG. 5, a method according to one exemplary embodiment of the present invention includes an intermediary **74**, or more

particularly a content manager **82** of an intermediary, receiving a reference to content stored by a source **72**, the reference being received from an upload agent **78** of the source. For example, the intermediary can receive a reference comprising an address, such as a uniform resource identifier (URI), identifying the content in content storage **80** of the source. In addition to receiving the reference, the intermediary can receive any of a number of different pieces of information related to the content, such as a notification to share the content, and/or a summary or shortened form of the content. The reference can be received by the intermediary in any of a number of different manners. For example, presume that a source acquires or is otherwise provided with content, such as an image, that the source user desires to share. In this regard, the source user may manually direct the source to share the content, or the source may be configured to automatically share the content. In either instance of the source being triggered to share the content, the source can thereafter form a reference to the content stored in the content storage, and send the reference to the intermediary along with a notification to share the content and a thumbnail of the content (particularly when the content comprises an image). Thus, in instances in which the network across which the source communicates can place undesirable resource and/or cost burdens on the terminal sending the content itself, such as in the case of a number of GPRS networks, sending the reference may reduce those burdens as the resource and other related information may be smaller than, and thus require less time to send, the content itself.

Irrespective of exactly how the content manager **82** receives the reference to content stored by the source **72**, the intermediary can thereafter indicate the availability of the content from the intermediary, as shown in block **92**. In this regard, upon receiving the reference to the content stored in content storage **80** of the source, the content manager can associate the reference (e.g., URI) identifying the content stored by the source (i.e., source reference), with a reference (e.g., URI) identifying the content at the intermediary (i.e., intermediary reference). The intermediary can then indicate the availability of the content from the intermediary via the intermediary reference, although at this point the content can be maintained in content storage of the source. The intermediary can indicate the availability of

content in any of a number of different manners. For example, the intermediary can send, to one or more destinations **76**, the intermediary reference to the content along with a notification of the availability of the content and, if so desired, one or more of the pieces of information related to the content (e.g., thumbnail of the content). Additionally or alternatively, or example, the intermediary can make the intermediary reference available (alone or along with the notification and/or other related pieces of information) for retrieval by one or more destinations, such as via a blog of the source user hosted by the intermediary. The intermediary may therefore immediately indicate the availability of content before receiving the content from the source, or more particularly the upload agent **78** of the source.

After the content manager **82** of the intermediary **74** indicates the availability of the content at the intermediary, but stored in content storage **80** of the source **72**, the content manager can receive a first request (e.g., HTTP GET request) for the content from a destination **76**, as shown in block **94**. In this regard, although the content manager may receive the request in any of a number of different manners, the intermediary of one exemplary embodiment can receive a request identifying the content by the intermediary reference. In response to the destination request for the content, and recognizing that the intermediary reference for the content is associated with a source reference, or that the content is otherwise not in content storage **84** of the intermediary, the content manager can request the content from the source, or more particularly the upload agent **78** of the source. In this regard, the content manager can send a request to the upload agent identifying the content by the source reference. In response to receiving the intermediary request, the upload agent can identify the content in content storage via the source reference, and send the content to the content manager. In turn, the content manager can store a copy of the requested content in content storage **84** of the intermediary, as shown in block **98**. The content manager can store a copy of the content in a number of different manners including, for example, such that the intermediate reference identifies the content in content storage of the intermediary. Before, after or as the content manager stores a copy of the requested content, the content manager can send the content to the destination that requested the respective content, as shown in block **100**.

By storing a copy of the requested content in content storage **84** of the intermediary **74**, the content manager **82** can thereafter fulfill subsequent requests for the same content from the local content storage without repeatedly requesting the content from the upload agent **78** of the source **72**. Thus, after locally storing a
5 copy of the requested content, the content manager may receive one or more subsequent requests for the same content, as shown in block **102**. Similar to the first request, the content manager may receive subsequent requests identifying the content by the intermediary reference. In response to the subsequent requests, and now recognizing that the intermediary reference identifies content in content
10 storage **84** of the intermediary, the content manager can identify the content in content storage via the intermediary reference, and send the content to the destinations that requested the respective content, as again shown in block **100**. Again in instances in which the network across which the source communicates can place undesirable resource and/or cost burdens on the terminal sending the
15 content itself (e.g., GPRS networks), then, fulfilling requests from content stored locally at the intermediary may eliminate those burdens for subsequent requests for the content as the intermediary may be capable of sending the content independent of the respective network.

As indicated above, in various instances before the content manager **82** of
20 the intermediary **74** receives a request for content indicated to be available from the intermediary, the source **72** may move from a first network (e.g., GPRS network) to a less burdensome, second network (e.g., WLAN, USB, Bluetooth, etc.). In such instances, the upload agent **78** of the source may be configured to automatically, or may be manually directed to, upload the content to the
25 intermediary for storing in content storage **84** of the intermediary. To further explain this exemplary embodiment of the present invention, reference is now made to FIG. 6, which illustrates a flowchart including various steps in another method of sharing content of a source. As shown in blocks **104** and **106**, the method can include the intermediary receiving a source reference to content, and
30 indicating the availability of the content, such as in the same manner explained above. Before receiving a first request for the content, however, the source can move from a first network to a second network, as shown in block **108**. Directly or

indirectly in response to moving to the second network, the upload agent 78 can upload the content across the second network from content storage 80 of the source to content storage 84 of the intermediary where the content may be stored such as in the same manner explained above with respect to a copy of the content, as
5 shown in block 110. Similar to before, content manager can store the content in a number of different manners including, for example, such that an intermediate reference to the content identifies the content in content storage of the intermediary.

After the content is stored in content storage 84 of the intermediary 74, the
10 content manager 82 may receive one or more requests for the content, including a first request and possibly one or more subsequent requests, as shown in blocks 112 and 116. For the first and any subsequent requests, the requests may identify the content by the intermediary reference. In response to the requests, and recognizing that the intermediary reference identifies content in content storage 84 of the
15 intermediary, the content manager can identify the content in content storage via the intermediary reference, and send the content to the destinations that requested the respective content, as again shown in block 114. Similar to before, fulfilling requests from local content storage 84 of the intermediary may eliminate those burdens for requests for the content as the intermediary may be capable of sending
20 the content independent of the respective network. Further, uploading the content across a second, less-burdensome network may eliminate the burdens of uploading the content from the source 72 to the destination altogether.

To further illustrate benefits of exemplary embodiments of the present invention, and particularly the benefits of the embodiment shown in FIG. 5,
25 consider for example a mobile blogger operating a terminal source 72 to upload an image acquired by the terminal to a blog maintained by an origin server. In this scenario, the terminal user can acquire an image, "image1.jpg," via an image capture device 65 of the terminal, and store the image in content storage 80 of the terminal source. Upon storing the image, the upload agent 78 of the terminal
30 source can form a source reference, such as "http://phoneaddress.operator.com/image1.jpg," identifying the image in content storage of the source. The upload agent can then send the source reference and a

thumbnail of the image to the content manager **82** of an origin server intermediary **74** maintaining a blog of the source user. In such instances, the blog may be formatted in a number of different manners, such as, for example, in a RDF (Resource Description Framework) Site Summary (RSS) feed or file.

5 Upon receiving the source reference to the image (<http://phoneaddress.operator.com/image1.jpg>), the content manager **82** of the intermediary **74** can indicate the availability of the image by updating the RSS file to include an intermediary reference to the image. In this regard, the content manager can associate the source reference with an intermediary reference, such as
10 “<http://home.isp.com/image1.jpg>,” identifying the content at the intermediary. After updating the RSS file to include the intermediary reference, a computing system destination **76** can access the updated RSS file including the intermediary reference, and can request the image from the intermediary by identifying the intermediary reference for the image (<http://home.isp.com/image1.jpg>). In
15 response to the destination request for the content, the content manager can request and receive the content from the source, or more particularly the upload agent **78** of the source, based upon the source reference for the image (<http://phoneaddress.operator.com/image1.jpg>). After receiving the image from the source, the content manager can store a copy of the image in content storage **84**
20 of the intermediary such that the intermediary reference (<http://home.isp.com/image1.jpg>) identifies the image therein, and can send the content to the computing system destination that requested the respective image. Then, upon receiving subsequent requests for the image (identifying the image by <http://home.isp.com/image1.jpg>), the content manager of the intermediary can
25 fulfill those requests from the local content storage **84** without repeatedly requesting/receiving the content from the upload agent **78** of the source **72**.

 As explained above, in response to a destination request for content, and recognizing that the intermediary reference for the content is associated with a source reference, or that the content is otherwise not in content storage **84** of the
30 intermediary **74**, the content manager **82** can request and receive the content from the source, or more particularly the upload agent **78** of the source **72**. In various instances, however, the system may not otherwise be configured for the

intermediary to directly communicate with the source, such as when the source is in a different domain than the intermediary and separated therefrom by a network address translator (NAT) and/or firewall. In such instances, the source and/or intermediary may be alternatively configured to enable communication
5 therebetween to effectuate exemplary embodiments of the present invention. For example, to enable the content manager to initiate communication with the source, or upload agent of the source, the source may establish and maintain a communication tunnel with the content manager, such as in accordance with a virtual private networking (VPN) technique, HTTP tunnelling technique or the
10 like. The content manager can then communicate with the upload agent across the tunnel to effectuate exemplary embodiments of the present invention.

According to one aspect of the present invention, the functions performed by one or more of the entities of the system, such as the source **72** (e.g., terminal **10**), intermediary (e.g., computing system **22**, origin server **24**, etc.) and/or
15 destination(s) (e.g., terminal, computing system, origin server, etc.) may be performed by various means, such as hardware and/or firmware, including those described above, alone and/or under control of a computer program product (e.g., upload agent **78**, content manager **82**, etc.). The computer program product for performing one or more functions of embodiments of the present invention
20 includes a computer-readable storage medium, such as the non-volatile storage medium, and software including computer-readable program code portions, such as a series of computer instructions, embodied in the computer-readable storage medium.

In this regard, FIGS. 5 and 6 are flowcharts of methods, systems and
25 program products according to the invention. It will be understood that each block or step of the flowcharts, and combinations of blocks in the flowcharts, can be implemented by various means, such as hardware, firmware, and/or software including one or more computer program instructions. As will be appreciated, any such computer program instructions may be loaded onto a computer or other
30 programmable apparatus (i.e., hardware) to produce a machine, such that the instructions which execute on the computer or other programmable apparatus create means for implementing the functions specified in the flowcharts' block(s)

or step(s). These computer program instructions may also be stored in a computer-readable memory that can direct a computer or other programmable apparatus to function in a particular manner, such that the instructions stored in the computer-readable memory produce an article of manufacture including instruction means
5 which implement the function specified in the flowcharts' block(s) or step(s). The computer program instructions may also be loaded onto a computer or other programmable apparatus to cause a series of operational steps to be performed on the computer or other programmable apparatus to produce a computer-
10 implemented process such that the instructions which execute on the computer or other programmable apparatus provide steps for implementing the functions specified in the flowcharts' block(s) or step(s).

Accordingly, blocks or steps of the flowcharts support combinations of means for performing the specified functions, combinations of steps for performing the specified functions and program instruction means for performing the specified
15 functions. It will also be understood that one or more blocks or steps of the flowcharts, and combinations of blocks or steps in the flowcharts, can be implemented by special purpose hardware-based computer systems which perform the specified functions or steps, or combinations of special purpose hardware and computer instructions.

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

WHAT IS CLAIMED IS:

1. An intermediary for sharing content, the intermediary comprising:
a content manager capable of receiving a source reference identifying
content stored by a source of the content, the source reference being received from
5 the source located across a network from the intermediary,
wherein the content manager is capable of receiving at least one request for
the content from at least one destination, the at least one request including a first
request identifying the content by an intermediary reference identifying the content
at the intermediary,
10 wherein the content manager is capable of receiving the content from the
source, and capable of providing the requested content to the respective destination
from the intermediary in response to the at least one request, and
wherein the content manager is capable of receiving the first request before
receiving the content from the source such that, when the content manager receives
15 the first request before receiving the content from the source, the content manager
is further capable of requesting the content from the source based upon the source
reference and in response to the request from the destination, and capable of
receiving the content in response to the request from the content manager.
- 20 2. An intermediary according to Claim 1, wherein the content manager
is further capable of indicating the availability of the content before receiving the
at least one request, the availability being indicated via the intermediary reference.
3. An intermediary according to Claim 1, wherein the content manager
25 is capable of receiving the source reference across a first network, and
wherein the content manager is capable of receiving the content across a
second network before receiving the first request, the content being received in
response to the source moving from the first network to the second network.
- 30 4. An intermediary according to Claim 1, wherein the content manager
is further capable of storing the content in content storage of the intermediary

receiving the content from the source, the content being stored such that the intermediary reference identifies the content in content storage of the intermediary.

5 5. An intermediary according to Claim 4, wherein the content manager
is capable of receiving at least one request further including at least one request
subsequent to the first request, and

 wherein the content manager is capable of providing the requested content
in response to the at least one subsequent request from content storage of the
intermediary independent of the source.

10

6. A source for sharing content, the source comprising:

 an upload agent capable of sending a source reference identifying content
stored by the source, the source reference being sent to an intermediary located
across a network from the source,

15 wherein the upload agent is capable of sending the source reference such
that the intermediary is capable of receiving at least one request for the content
from at least one destination, the at least one request including a first request
identifying the content by an intermediary reference identifying the content at the
intermediary; and

20 wherein the upload agent is capable of sending the content to the
intermediary,

 wherein the upload agent is capable of sending the content such that the
intermediary provides the requested content to the respective destination in
response to the at least one request, and

25 wherein the upload agent is capable of sending the source reference such
that the intermediary is capable of receiving the first request before the upload
agent sends the content to the intermediary, and such that when the intermediary
receives the first request before the upload agent sends the content to the
intermediary, the upload agent is further capable of receiving a request for the
30 content from the intermediary based upon the source reference and in response to
the request from the destination, and capable of sending the content in response to
the request from the intermediary.

7. A source according to Claim 6, wherein the upload agent is capable of sending the source reference such that the intermediary indicates the availability of the content before receiving the at least one request, the availability being
5 indicated via the intermediary reference.

8. A source according to Claim 6, wherein the upload agent is capable of sending the source reference across a first network, and
wherein the upload agent is capable of sending the content across a second
10 network before receiving the first request, the content being sent in response to the source moving from the first network to the second network.

9. A source according to Claim 6, wherein the upload agent is capable of sending the content such that the intermediary stores the content in content
15 storage of the intermediary after being sent from the source, the content being stored such that the intermediary reference identifies the content in content storage of the intermediary.

10. A source according to Claim 9, wherein the upload agent is capable
20 of sending the source reference such that the intermediary receives at least one request further including at least one request subsequent to the first request, and
wherein the upload agent is capable of sending the content such that the intermediary provides the requested content in response to the at least one
subsequent request from content storage of the intermediary independent of the
25 source.

11. A method for sharing content, the method comprising:
receiving a source reference identifying content stored by a source of the
content, the source reference being received by an intermediary from the source
30 located across a network from the intermediary;
receiving, at the intermediary, at least one request for the content from at
least one destination, the at least one request including a first request identifying

the content by an intermediary reference identifying the content at the intermediary;

receiving, at the intermediary, the content from the source; and
providing the requested content to the respective destination from the

5 intermediary in response to the at least one request,

wherein the receiving at least one request step comprises receiving at least one request such that the intermediary is capable of receiving the first request before receiving the content from the source, and such that when the intermediary receives the first request before receiving the content from the source, the method
10 further comprises the intermediary requesting the content from the source based upon the source reference and in response to the request from the destination, and receiving the content comprises receiving the content in response to the request from the intermediary.

15 12. A method according to Claim 11 further comprising:
indicating the availability of the content from the intermediary before receiving the at least one request, the availability being indicated via the intermediary reference.

20 13. A method according to Claim 11, wherein the receiving a source reference comprises receiving a source reference across a first network, and
wherein the receiving the content step comprises receiving the content across a second network before receiving the first request, the content being received in response to the source moving from the first network to the second
25 network.

14. A method according to Claim 11 further comprising:
storing the content in content storage of the intermediary after being received from the source, the content being stored such that the intermediary
30 reference identifies the content in content storage of the intermediary.

15. A method according to Claim 14, wherein receiving at least one request further includes receiving at least one request subsequent to the first request, and

5 wherein providing the requested content in response to the at least one subsequent request comprises providing the requested content from content storage of the intermediary independent of the source.

16. A method for sharing content, the method comprising:

10 sending a source reference identifying content stored by a source of the content, the source reference being sent by the source and received by an intermediary located across a network from the source,

15 wherein the sending a source reference step comprises sending the source reference such that the intermediary receives at least one request for the content from at least one destination, the at least one request including a first request identifying the content by an intermediary reference identifying the content at the intermediary; and

sending the content from the source to the intermediary,

20 wherein the sending the content step comprises sending the content such that the intermediary provides the requested content to the respective destination in response to the at least one request, and

25 wherein the sending a source reference step comprises sending the source reference such that the intermediary is capable of receiving the first request before the source sends the content to the intermediary, and such that when the intermediary receives the first request before the source sends the content to the intermediary, the method further comprises the source receiving a request for the content from the intermediary based upon the source reference and in response to the request from the destination, and sending the content comprises sending the content in response to the request from the intermediary.

30 17. A method according to Claim 16, wherein the sending a source reference step comprises sending the source reference such that the intermediary

indicates the availability of the content before receiving the at least one request, the availability being indicated via the intermediary reference.

5 18. A method according to Claim 16, wherein the sending a source reference comprises sending a source reference across a first network, and wherein the sending the content step comprises sending the content across a second network before receiving the first request, the content being sent in response to the source moving from the first network to the second network.

10 19. A method according to Claim 16, wherein the sending the content step comprises sending the content such that the intermediary stores the content in content storage of the intermediary after being sent from the source, the content being stored such that the intermediary reference identifies the content in content storage of the intermediary.

15 20. A method according to Claim 19, wherein the sending a source reference step comprises sending the source reference such that the intermediary receives at least one request further including at least one request subsequent to the first request, and
20 wherein the sending the content step comprises sending the content such that the intermediary provides the requested content in response to the at least one subsequent request from content storage of the intermediary independent of the source.

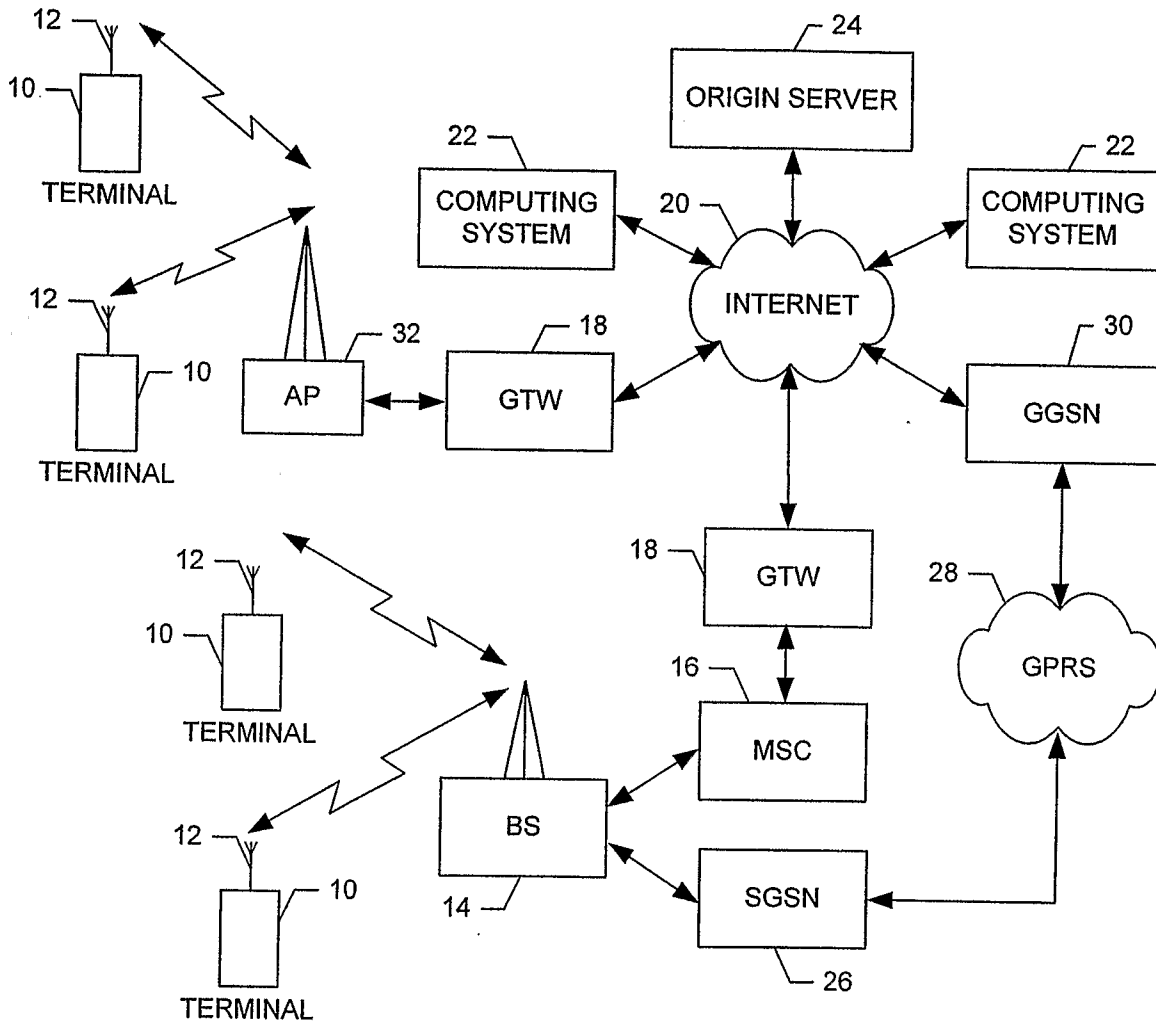


FIG. 1.

2/5

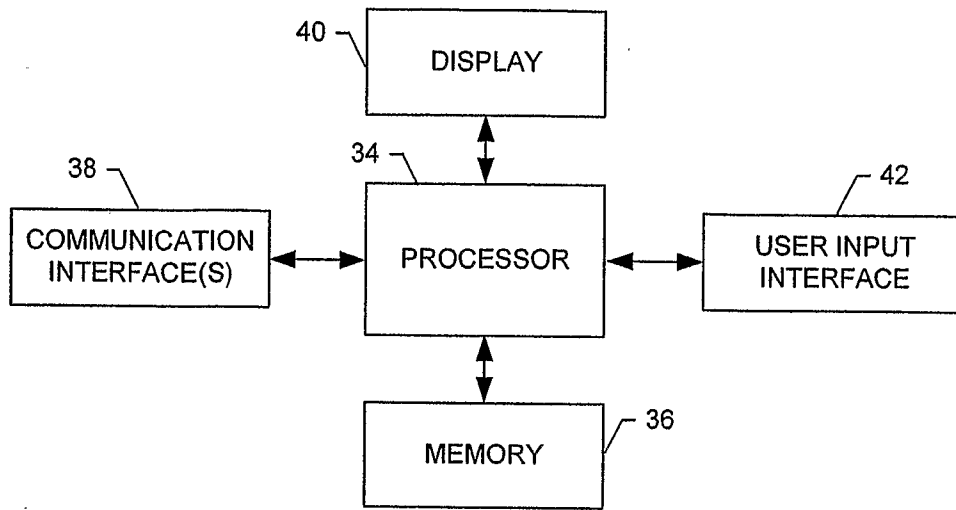


FIG. 2.

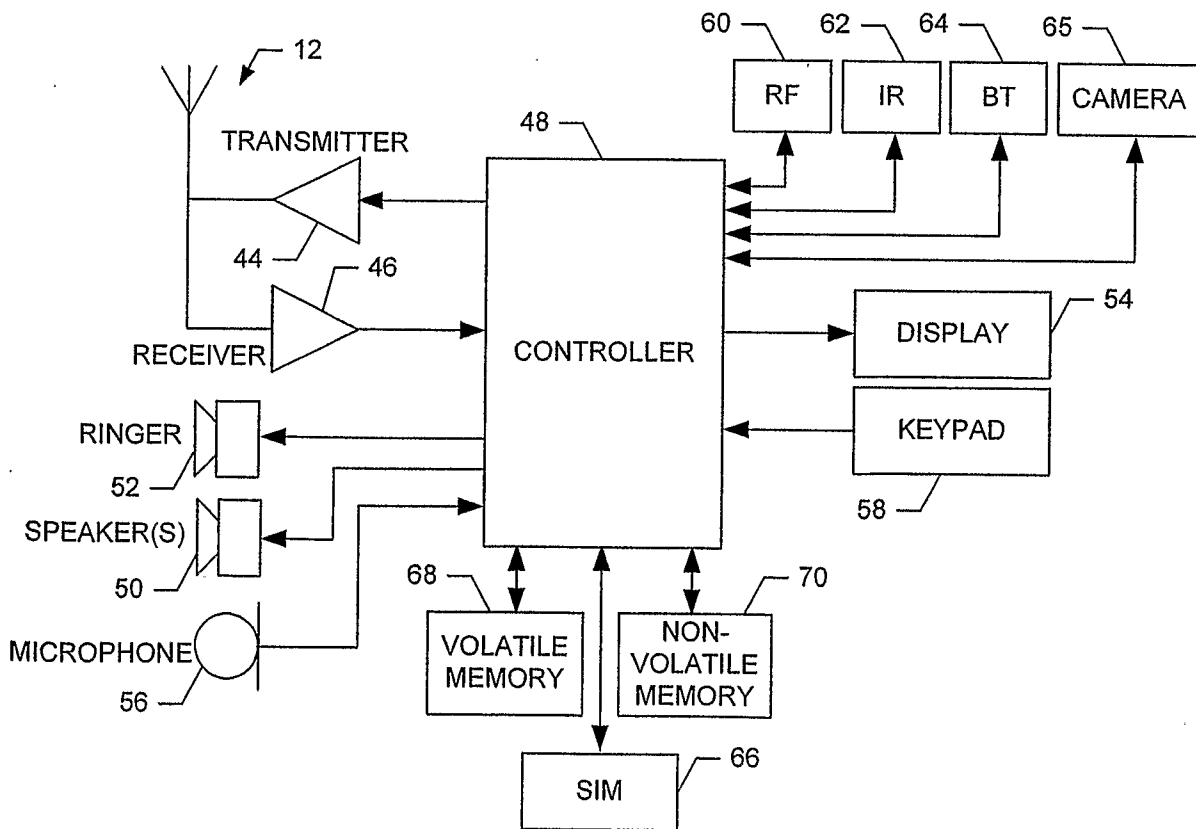


FIG. 3.

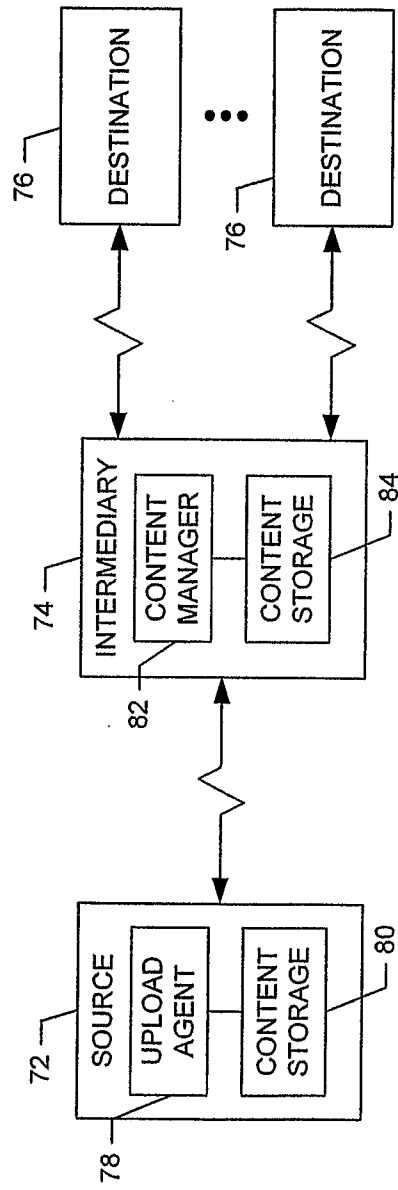


FIG. 4.

4/5

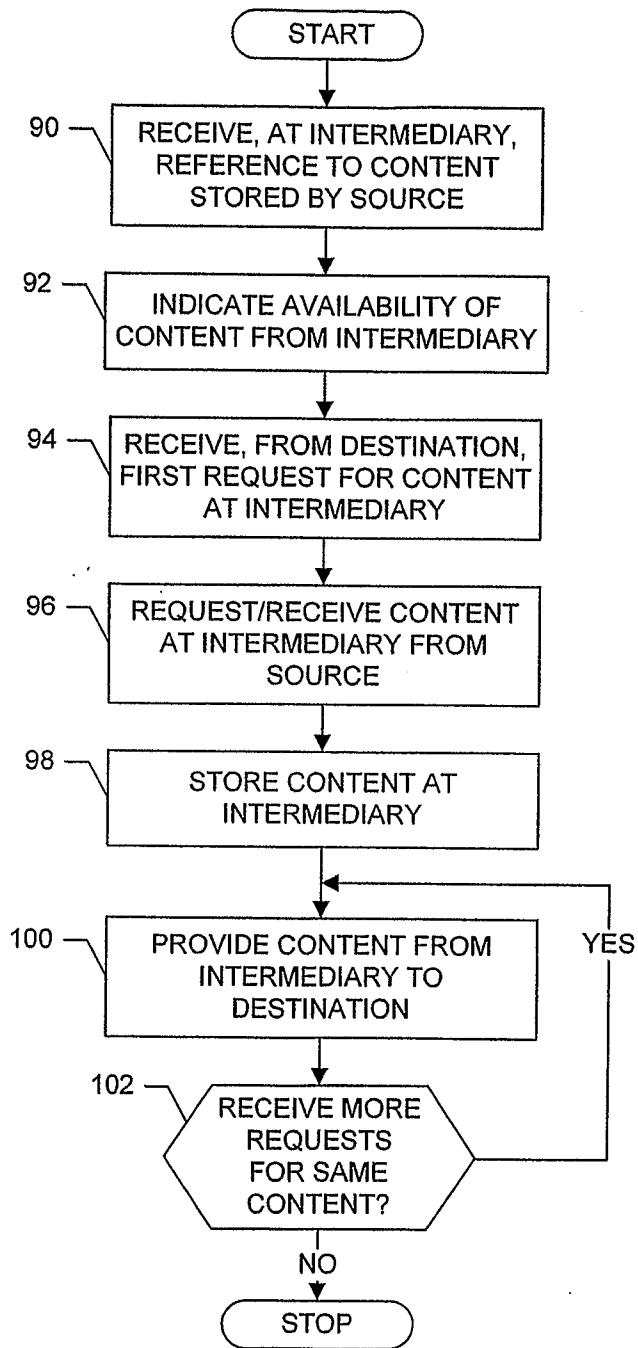


FIG. 5.

5/5

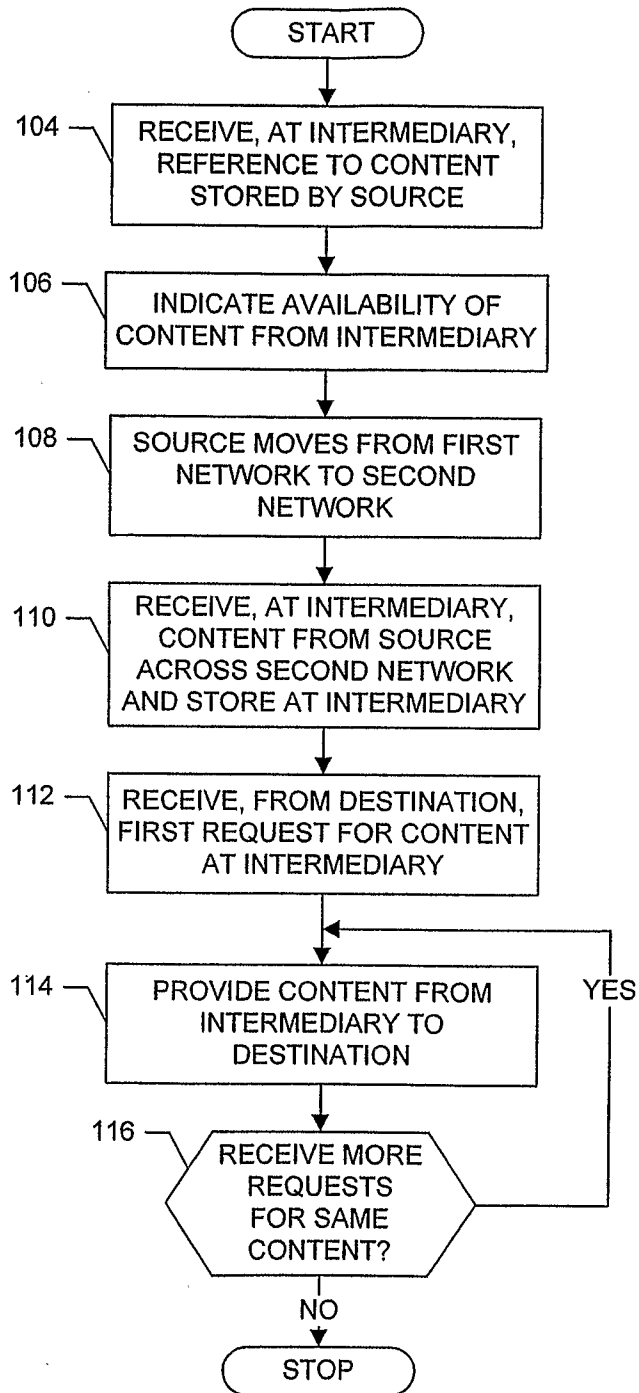


FIG. 6.