US 20060034202A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2006/0034202 A1

Kuure et al. (43) Pub. Date: Feb. 16, 2006

(54) TRANSMITTING DATA TO A GROUP OF RECEIVING DEVICES

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(21) Appl. No.: **10/965,258**

(22) Filed: **Oct. 15, 2004**

(30) **Foreign Application Priority Data**

Aug. 12, 2004 (FI)..... 20041075

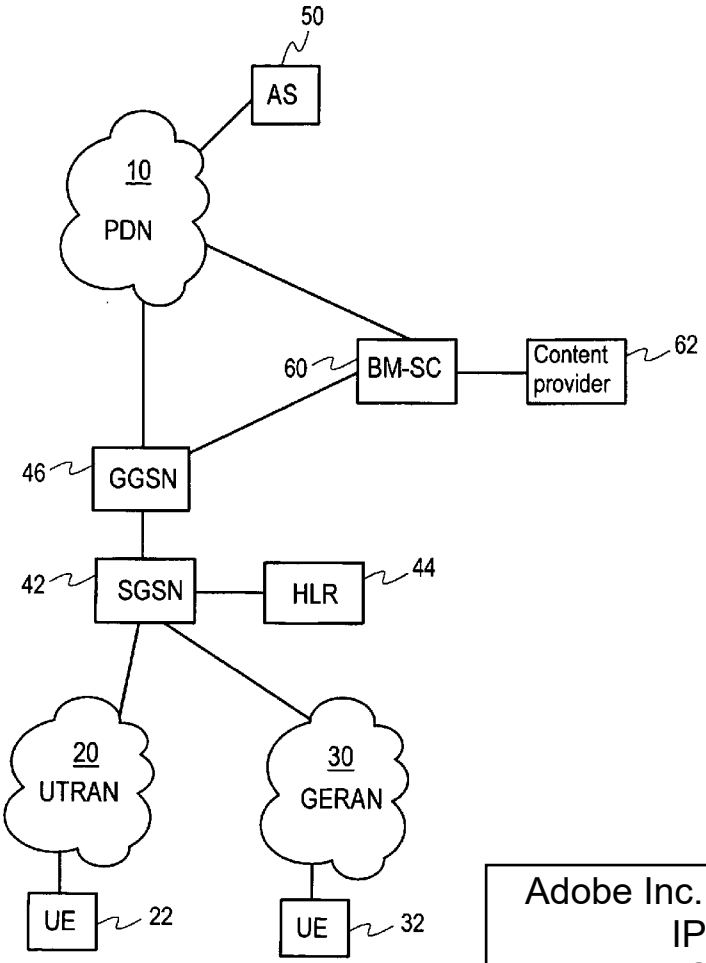
Publication Classification

(51) **Int. Cl.**
H04Q 7/20 (2006.01)

(52) **U.S. Cl.** **370/312**

(57) **ABSTRACT**

A data transmission method transmits data to a group of receiving communication devices in a communication system comprising at least one cellular network. The method includes defining, by an application server situated beyond a cellular network, a group of receiving communication devices in the cellular network, the application server having no visibility to locations of receiving devices in the cellular network. The method also includes receiving, in a broadcast/multicast network entity configured to provide broadcast and multicast services in the cellular network, data to be transmitted from the application server to the group. The method also includes transmitting the data from the broadcast/multicast network entity to the group using broadcast and/or multicast transmission. Furthermore, a network entity in a cellular network and a communication system are provided configured to implement the method.



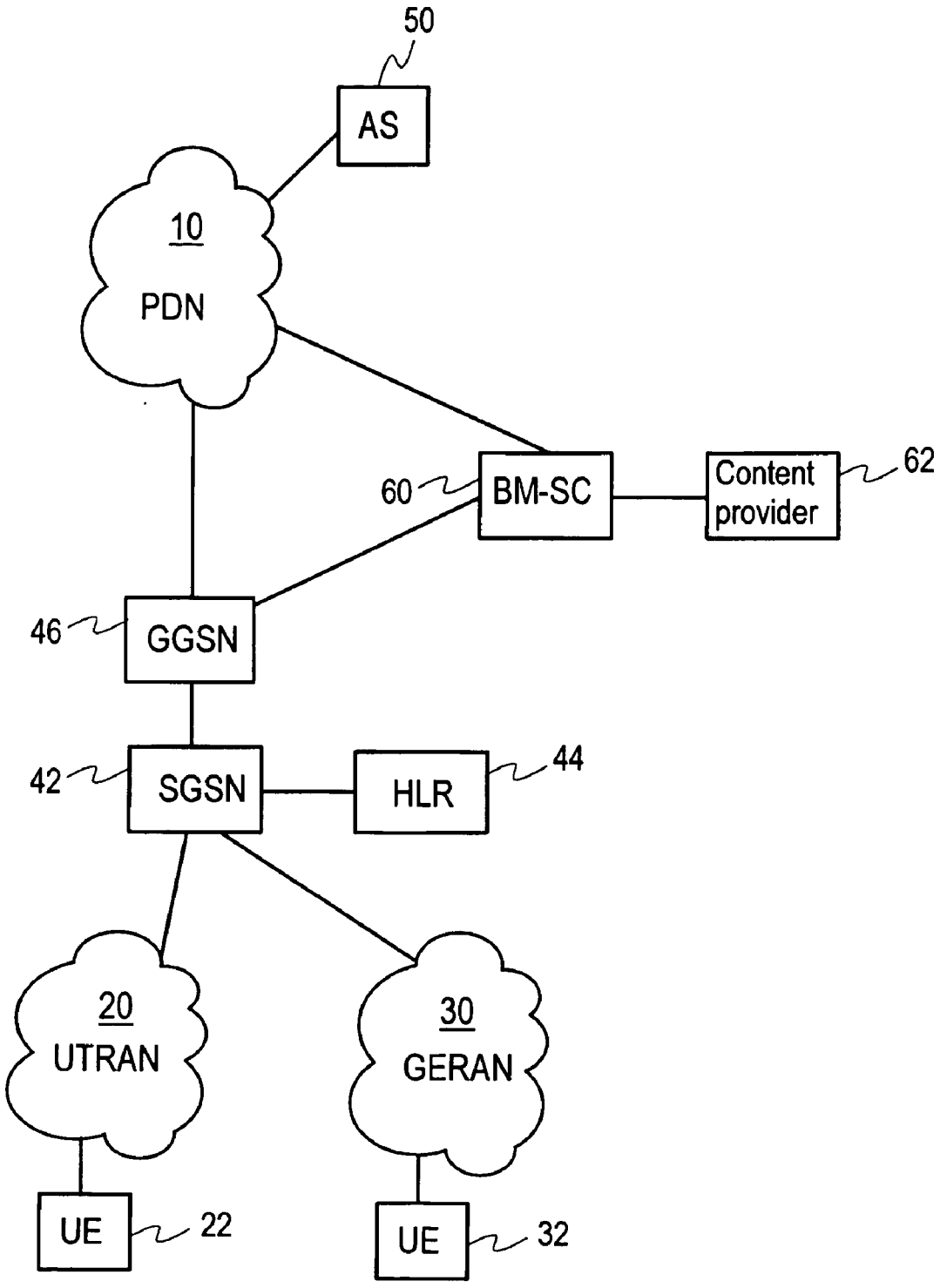


Fig. 1

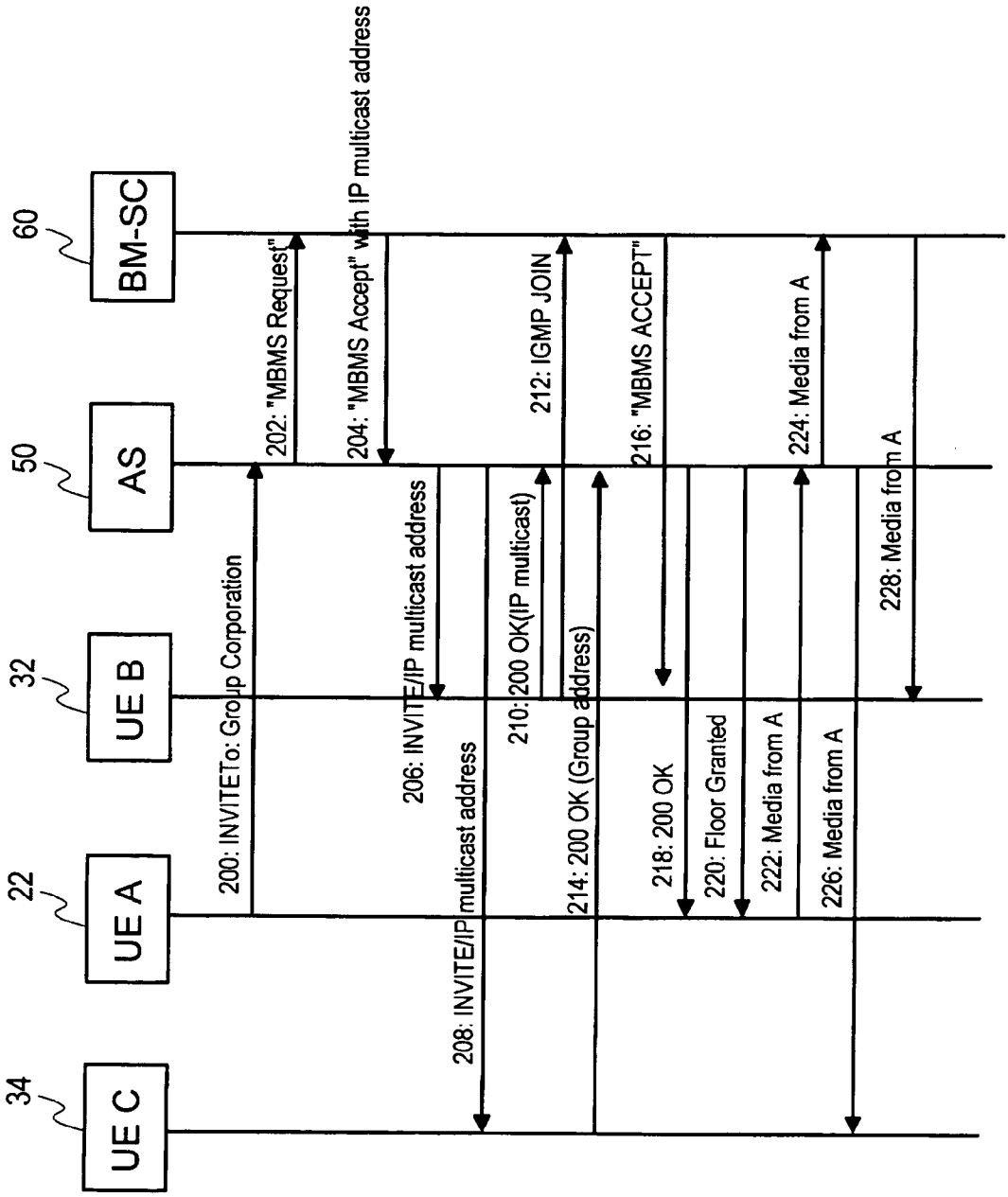


Fig. 2

TRANSMITTING DATA TO A GROUP OF RECEIVING DEVICES

FIELD OF THE INVENTION

[0001] The invention relates to communication systems, and more particularly to transmitting data to a group of receiving communication devices in a cellular network of a communication system.

BACKGROUND OF THE INVENTION

[0002] A communication system can be seen as a facility that enables communication sessions between two or more entities such as a communication device and/or other nodes associated with the communication system. Subscribers, such as the users or end-users, to a communication system may be offered and provided numerous services, such as two-way or multi-way calls, data communication or multimedia services or simply an access to a network, such as the Internet. The services may be offered by an operator of a network of the communication system or by an external service provider.

[0003] Examples of communication systems may include fixed line communication systems, such as a public switched telephone network (PSTN), wireless communication systems, such as a public land mobile network (PLMN), e.g. global system for mobile communications (GSM), general packet radio service (GPRS), universal mobile telecommunications system (UMTS), other wireless networks, such as a wireless local area network (WLAN), and so on, and/or other communication networks, such as an Internet Protocol (IP) network and/or other packet switched data networks. Various communication systems may simultaneously be concerned in a connection.

[0004] Any appropriate communication device may be used for accessing a communication system. Examples of communication devices may comprise, but are not limited to, wireless devices, e.g. user equipment (UE), a mobile station (MS), a cellular phone, a personal digital assistant (PDA) or the like, or other terminals, such as a personal computer (PC), or any other equipment operable according to a suitable network protocol, such as a wireless applications protocol (WAP) or a hypertext transfer protocol (HTTP). The communication device may support, in addition to call and network access functions, other services, such as short message service (SMS), multimedia message service (MMS), electronic mail (email), Web service interface (WSI) messaging and voice mail.

[0005] A user of a wireless communication device may access a communication network via a radio access network (RAN), which is typically controlled by an appropriate controller network element, such as radio network controller (RNC). Examples of radio access networks may comprise the UMTS terrestrial radio access network (UTRAN) and the GSM/EDGE radio access network (GERAN).

[0006] Application servers operating beyond the Gi interface may provide data transfer services to an individual as point-to-point or one-to-one services or group(s) of individuals as point-to-multipoint or one-to-many services. Such groups may be large in number of individuals comprised in [illegible] and an external public data network (PDN), such as the Internet. Thus, the application server operates beyond cellular networks and has no visibility to cellular specific addressing. An application server may use Uniform Resource Identifiers (URIs) and IP addresses to address members of a group. When distributing a data stream to a group, an application server may multiply the incoming data stream to obtain copies of the data stream for each member of the group. The application server may then send the copies of the data stream via the Gi interface to a cellular network and leave a responsibility of the data transfer thereafter to the cellular network.

[0007] The solution described above may work well when groups are relatively small or physically scattered. However, as a size of the group becomes greater or when a lot of members are located in a small geographical area, problems may arise. It is then more likely that too many members are located in close proximity with each other and might have to be served by a single transceiver network element using the same physical radio resources for many members of the group. A particular cell may be congested and data may not be delivered to all members. In addition to congestion problem in some particular cells, also other problems may be faced as many identical data streams are conveyed to many recipients within a single cellular network.

[0008] The way of transferring group data described above may not be efficient from a system resource point of view. In particular, with a great number of participants it may also appear to be impossible.

[0009] A direct one-to-one and one-to-many voice communication system named as Push to talk over Cellular (PoC) has been developed. The PoC service is based on half-duplex Voice over IP (VoIP) technology in cellular networks, e.g. the GSM/GPRS network. The PoC uses an "always-on" connection, which allows a subscriber to have a direct access to the service after the subscription to the service without additional measures, such as dial-up. The PoC enables a subscriber to listen to group traffic. Call can be started to both individuals and groups with a simple action, such as a push of a key. The call connection is established automatically and the receiver does not need to answer the call. In the network, a controlling server takes care of session management and floor control, such as multiplying the speech (i.e. the VoIP) for all members of a group.

[0010] Furthermore, a cellular system may include a multimedia broadcastlmulticast service (MBMS) server, which is able to broadcast or multicast information to multiple participants over a geographical area. An MBMS server is not able to form groups, but provides information of different multicasting groups to participants. It is a responsibility of the participants to subscribe and join to a multicast service in order to receive the data. A reference architecture to support MBMS is defined by the Third Generation Partnership Project (3GPP) in TS 23.246 V.6.3.0 (2004-06) "Technical Specification Group services and System Aspects; Multimedia Broadcast/Multicast Service (MBMS); architecture and functional description (Release 6)", **FIG. 1**.

[0011] It might be desired to distribute data to a number of participants within an environment that comprises both [illegible]

However, linking the application servers situated beyond the cellular network and the MBMS servers situated in the cellular network may be difficult.

[0012] It shall be appreciated that these issues are not limited to any particular communication environment, but may occur in any appropriate communication system.

SUMMARY OF THE INVENTION

[0013] Embodiments of the invention aim to address one or several of the above problems or issues.

[0014] In accordance with an aspect of the invention, there is provided a method for transmitting data to a group of receiving communication devices in a communication system comprising at least one cellular network. The method comprises defining, by an application server situated beyond a cellular network, a group of receiving communication devices in the cellular network, the application server having no visibility to locations of receiving devices in the cellular network. The method further comprises receiving, in a broadcast/multicast network entity configured to provide broadcast and multicast services in the cellular network, data to be transmitted from the application server to the group. The method further comprises transmitting the data from the broadcast/multicast network entity to the group using broadcast and/or multicast transmission.

[0015] In accordance with another aspect of the invention, there is provided a broadcast/multicast network entity in a cellular network. The network entity is configured to receive data to be transmitted from an application server situated beyond the cellular network and having no visibility to locations of receiving devices in the cellular network. The network entity is also configured to transmit the data to a group of communication devices in the cellular network using broadcast and/or multicast transmission, the group being defined by the application server.

[0016] In accordance with another aspect of the invention, there is provided a communication system. The communication system comprises an application server situated beyond a cellular network and having no visibility to locations of receiving devices in the cellular network, the application server configured to define a group of receiving devices in the cellular network. The communication system further comprises a broadcast/multicast network entity in the cellular network, the broadcastlmulticast network entity configured to receive data to be transmitted from the application server and to transmit the data to communication devices in the cellular network using broadcast and/or multicast transmission.

[0017] Various other aspects and embodiments shall be described in the following detailed description and in the attached claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The invention will now be described in further detail, by way of example only, with reference to the following examples and accompanying drawings, in which:

[0019] **FIG. 1** shows an example of an arrangement in

[0020] **FIG. 2** shows a signaling chart illustrating an embodiment of the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0021] Reference is made to **FIG. 1** showing an example of a network architecture in which the embodiments of the invention may be implemented. In **FIG. 1**, a public data network (PDN) **10** is provided for offering data services. An example of the PDN **10** may comprise, but is not limited to, the Internet Protocol (IP) Multimedia Subsystem (IMS). The IMS uses the Session Initiation Protocol (SIP), which is an application layer control protocol defined by the Internet Engineering Task Force (IETF) for creating, modifying and terminating sessions with one or more participants. The SIP is defined in the document RFC 3261 "SIP: Session Initiation Protocol". The embodiments are mainly described referring to the IMS, but the same idea may be implemented with other communication systems as well.

[0022] In a SIP-controlled network, Uniform Resource Identifiers (URIs) are used to identify different types of actors in the network. Typically a URI points to a registered user identity of an individual user. A URI may identify also services, such as voicemail server or conference factory URI, conferencing instances, such as chat rooms or voice-over-IP (VOIP) conferencing instances, or other types of resources. In addition, a URI may point to a resource list, which may be a list of individual URIs, or in other words, a group of URIs. A URI pointing to a resource list shall be called in this specification also a group URI. Resource lists may be used in many applications, such as for one-to-many messaging, and so on. For example, a server in a network may maintain resource lists of e.g. one operator. A request addressed to such a resource list may be routed to the server, which may forward the request to individual contacts behind the resource list.

[0023] Data services, such as IMS services, can be provided with mobile communication devices via a mobile communication system. A mobile communication system is typically arranged to serve a plurality of mobile communication devices usually via a wireless interface between the communication device and at least one transceiver network element of the communication system, such as a base transceiver station (BTS) or a Node B. The mobile communication system may logically be divided between a radio access network (RAN) and a core network (CN).

[0024] In the arrangement of **FIG. 1**, a communication device **22** is arranged to access the core network via the UTRAN **20** as an access network. The communication device **22** is arranged to transmit signals to and receive signals from a transceiver network element (not shown) via a wireless interface between the communication device and the transceiver network element of the radio access network. Correspondingly, the transceiver network element is able to transmit signals to and receive signals from the communication device via the wireless interface. In the arrangement of **FIG. 1**, the communication device **32** is shown to access the core network via the access network GERAN **30**.

[0025] It shall be appreciated that, although for clarity reasons **FIG. 1** shows only two exemplifying radio access

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