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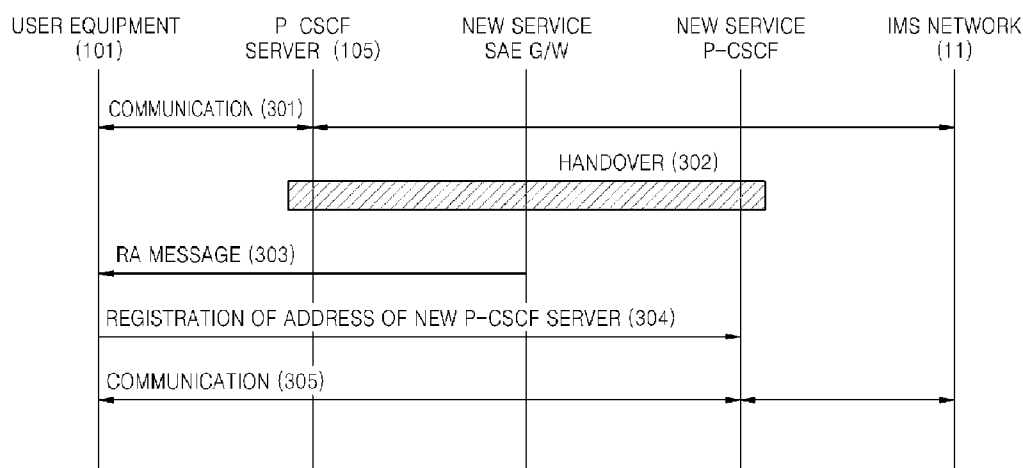
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(54) Title: LOCATION REGISTERING METHOD AND SYSTEM OF 3GE USER EQUIPMENT FOR IMS SERVICE, AND METHOD OF HANDOVER BETWEEN NETWORKS

FIG. 3



(57) Abstract: Provided are location registering method and system of third generation evolution (3GE) equipment for an IP multimedia subsystem (IMS) service. The method of registering user equipment, when the user equipment is handed over from a first network, which interworks with an IP multimedia subsystem (IMS) network that provides an IMS service, to a second network, the method comprising: transferring an address of a server that interworks with the IMS network in the second network to the user equipment; when the address of the received server is a new address, the user equipment transferring a registration request message to the IMS network via the server; and registering the user equipment in response to the registration request message in the IMS network.



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Description

LOCATION REGISTERING Method and system of 3GE user equipment for IMS service, and method of handover between networks

- [1] This application claims the benefit of Korean Patent Application No. 10-2007-00109612, filed on October 30, 2007 in the Korean Intellectual Property Office, the disclosure of which is incorporated herein in its entirety by reference.

Technical Field

- [2] The present invention relates to a location registering method and system of third generation evolution (3GE) equipment for an IP multimedia subsystem (IMS) service, and more particularly, to a location registering method and system of 3GE equipment between 3GE and IMS networks when the 3GE equipment is moving between domains.
- [3] This work was partly supported by the IT R&D program of MIC/IITA [2005-S-404-33, Research & development on Mobile Terminal Technology based on 3G Evolution].

Background Art

- [4] IP multimedia subsystem (IMS) technology is an open architecture that enables an IP multimedia service in mobile, wired, and convergence environments, and is based on session initiation protocol (SIP) signaling. IMS is being recognized as a core technology for providing new services in a next-generation all-IP-based communication system.
- [5] In IMS architecture, applications can be generated, controlled, and modified, regardless of types of networks or platforms, and multimedia communication of images or large capacity data can be efficiently realized. For example, in an IMS based communication system, services such as a real-time one-to-many telephone conversation, two-way mobile games, and a real-time instant messaging service are possible. IMS has been suggested in a process to provide a standard for wireless networks for interworking and compatibility between different service networks in an IP based 3G mobile communication system; however, IMS is now widely applied as a core technology supporting not only mobile communication but also next-generation supplementary communication services based on IP networks and integration of wired and wireless communication systems.
- [6] IMS usually includes three layers: a session control layer, a gateway layer, and an application layer. The session control layer includes servers that enable SIP services, and includes a call session control function (CSCF) and a home subscriber server (HSS). A

CSCF registers user equipment and routes an SIP signal to an appropriate server. An HSS is developed from a home location register (HLR) of mobile communication, and is a centralized database that controls user information. An HSS has functions of controlling user registration and modification, authentication, authorization, location, session routing, charging, etc. A gateway layer connects an IMS network to other IMS networks with a public switched telephone network (PSTN), or other previous networks. An application layer provides SIP-based applications such as game, video, or group chatting, and includes user service logic.

- [7] In order to interwork with the IMS network in a 3GE system, an IMS domain and an SIP message need to be capable of being exchanged, and to this end, a proxy (P)-CSCF that performs an interworking function between networks is defined for use. Meanwhile, when equipment is handovered to a network, for which a new P-CSCF is serviced, the address of the equipment does not change in a system using a mobile IP (MIP), but a P-CSCF server, which is an essential node for network interworking, may be changed. In such a case, a home domain of an IMS network that performs services of the corresponding equipment may not recognize that the address of the P-CSCF server is changed and thus may transfer messages regarding the corresponding equipment to the previous P-CSCF server. That is, the address of equipment that uses an MIP is not changed during a handover, and thus the binding information of the equipment does not change to an IMS domain, and thus services cannot be provided. As the P-CSCF of the handovered network is not registered, policy negotiation about quality of service (QoS) is not conducted between P-CSCF and public data network (PDN) service architecture evolution (SAE) gateway (GW), which usually accompanies a handover, and thus the corresponding services cannot be executed continuously. Thus, in order to solve this problem, even when the address of the equipment is not changed but the address of the P-CSCF server is, information on the address of the P-CSCF server needs to be provided to the equipment in the IMS network so that the equipment can register the information on the address of the P-CSCF server to the IMS network to inform the IMS network that the P-CSCF server corresponding to the equipment has changed.

Disclosure of Invention

Technical Problem

- [8] The present invention provides a location registration method and system of third generation evolution (3GE) user equipment for an IP multimedia subsystem (IMS) service, for transferring an address of a proxy call session control function (P-CSCF) server periodically to user equipment, the user equipment comparing the received address of the P-CSCF server with an address of a previous P-CSCF server to

determine whether a handover having the P-CSCF be changed occurs, and registering the corresponding user equipment to an IMS domain through a new P-CSCF server.

- [9] The present invention also provides a handover method between networks.

Technical Solution

- [10] According to an aspect of the present invention, there is provided a method of registering user equipment, when the user equipment is handed over from a first network, which interworks with an IP multimedia subsystem (IMS) network that provides an IMS service, to a second network, the method comprising: transferring an address of a server that interworks with the IMS network in the second network to the user equipment; when the address of the received server is a new address, the user equipment transferring a registration request message to the IMS network via the server; and registering the user equipment in response to the registration request message in the IMS network.
- [11] According to another aspect of the present invention, there is provided a system of registering user equipment, when the user equipment is handed over from a first network, which interworks with an IP multimedia subsystem (IMS) network that provides an IMS service, to a second network, the system comprising: a first server located in the second network and interworking with the IMS network; a second server transferring an address of the first server to the user equipment; and a third server registering the user equipment in the IMS network in response to a registration request message, wherein the user equipment transfers the registration request message via the first server to the IMS network, when the received address of the first server is a new address.
- [12] According to another aspect of the present invention, there is provided a method of handover of user equipment between networks, the method comprising: moving the user equipment from a first network, which interworks with an IP multimedia subsystem (IMS) service, to a second network; informing the user equipment of an address of a first server that interworks with the IMS network in the second network; the user equipment comparing the address of the first server with an address of a second server that interworks with the IMS network in the first network; when the addresses of the first server and the second server are not identical, the user equipment transferring a registration request message to the IMS network via the first server; and registering the user equipment in response to the registration request message by using the IMS network.

Advantageous Effects

- [13] According to the present invention, in a wireless broadband (WiBro) system, user equipment is informed of an address of a new P-CSCF server when the user equipment

is handed over in an IMS network, and thus a re-registration process can be performed to an IMS domain. Accordingly, IMS services can be provided more efficiently.

Description of Drawings

- [14] The above and other features and advantages of the present invention will become more apparent by describing in detail exemplary embodiments thereof with reference to the attached drawings in which:
- [15] FIG. 1 is a schematic view showing interworking between third generation evolution (3GE) networks and an IP multimedia subsystem (IMS) network;
- [16] FIG. 2 illustrates a router advertisement (RA) message format according to an embodiment of the present invention; and
- [17] FIG. 3 is a flowchart showing a method of registering an address of a new proxy-call session control function (P-CSCF) server when a handover occurs between networks, according to an embodiment of the present invention.

Mode for Invention

- [18] The present invention will now be described more fully with reference to the accompanying drawings, in which exemplary embodiments of the invention are shown.
- [19] FIG. 1 is a schematic view showing interworking between third generation evolution (3GE) networks and an IP multimedia subsystem (IMS) network. Referring to FIG. 1, user equipment 101 belonging to a 3GE network 10 can access another 3GE network 12 through an IMS network 11.
- [20] The 3GE network 10 includes the user equipment 101, a radio access station 102, a service architecture evolution (SAE) gateway 103, a public data network (PDN) SAE gateway 104, and a proxy-cell session control function (P-CSCF) server 105.
- [21] The radio access station 102 performs a base station function, and the service SAE gateway 103 performs packet access routing and local mobility functions. The PDN SAE gateway 104 has the functions of policy execution and packet filtering, and the P-CSCF server 105 functions as an initial access point for the user equipment 101 to access the IMS network 11.
- [22] The 3GE network 10 interworks with the IMS network 11 through the P-CSCF server 105, and uses a session initiation protocol (SIP) protocol, which is an Internet engineering task force (IETF) standard protocol, for interactive communication. The IMS network 11 is a next-generation Internet protocol that provides various services using the SIP protocol, and includes various services such as voice over Internet protocol (VoIP), messenger service, etc.
- [23] The IMS network 11 includes a serving (S)-CSCF 111. The S-CSCF 111 registers an SIP of the user equipment 101, controls services while managing state conditions like session setting and cancellation regarding the registered user equipment 101, and

provides service resource-related information to the user equipment 101.

- [24] In the case of an address allocation policy based on mobile IP (MIP), the address allocated for the user equipment 101 is not changed even when the user equipment 101 is handed off. However, in a SIP message based service process such as VoIP, the user equipment 101 has to be registered again when the P-CSCF server is changed. To this end, according to the current embodiment of the present invention, the address of the P-CSCF server is included in an option field of a router advertisement (RA) message, which is periodically transferred to the user equipment 101, and the user equipment 101 compares addresses of the existing P-CSCF server and a new P-CSCF server to identify a change of the address of the P-CSCF server.
- [25] FIG. 2 illustrates an RA message format according to an embodiment of the present invention. Referring to FIG. 2, a Type field is a 1-byte field, having a value for identifying a type of a message. An RA message has a value of 134. A Code field is an unused field and has a value of 0. A Checksum field is a 2-byte field and has a checksum value regarding a header. A Cur Hop Limit field is a 1-byte field, requesting servers of the 3GE network 10 a hop limit field value. M and O are respectively 1-bit flags indicating how to perform autoconfiguration for the 3GE network 10.
- [26] A Router Lifetime field is a 2-byte field, indicating for how many seconds the servers of the 3GE network 10 receive the RA message. A Reachable Time field is a 4-byte field, and indicates for how many milliseconds the servers of the 3GE network 10 can access neighboring servers. A Retrans Timer field is a 4-byte field, and indicates at how many millisecond intervals it re-transfers the RA message. An option field may include information to be added to the RA message.
- [27] According to the current embodiment of the present invention, an address of the P-CSCF server is included in an Option field in the RA message in order to inform the user equipment 101 of an address of the P-CSCF server of a newly entered network.
- [28] FIG. 3 is a flowchart illustrating a method of registering an address of a new P-CSCF server during a handover between networks, according to an embodiment of the present invention.
- [29] While the user equipment 101 transmits or receives a signal message through an IMS network 11 in the current 3GE network 10 in operation 301, when a handover to another 3GE network occurs in operation 302, an RA message is received from a new service SAE gateway of another network in operation 303. The user equipment 101 reads an address of a new P-CSCF server in an option field of the received RA message, compares the address of the new P-CSCF server with the address of the existing P-CSCF server 105 to identify a new address. The user equipment 101 transfers an SIP registration request message to the S-CSCF server 111 of the IMS network 11 through the new P-CSCF server, and the S-CSCF server 111 binds a

location and an SIP address of the user equipment 101 together so as to register the bound result again, in operation 304. Afterwards, the user equipment 101 transmits or receives a signal message from another 3GE network through the IMS network 11, in operation 305.

[30] The invention can also be embodied as computer readable codes on a computer readable recording medium. The computer readable recording medium is any data storage device that can store data which can be thereafter read by a computer system. Examples of the computer readable recording medium include read-only memory (ROM), random-access memory (RAM), CD-ROMs, magnetic tapes, floppy disks, optical data storage devices, and carrier waves such as data transmission through the Internet. The computer readable recording medium can also be distributed over network coupled computer systems so that the computer readable code is stored and executed in a distributed fashion.

[31] Illustrative embodiments of the present invention have been disclosed herein and, although specific terms are employed, they are used and are to be interpreted in a generic and descriptive sense only and not for purpose of limitation. Accordingly, it will be understood by those of ordinary skill in the art that various changes in form and details may be made without departing from the spirit and scope of the present invention as set forth in the following claims.

Claims

- [1] A method of registering user equipment, when the user equipment is handed over from a first network, which interworks with an IP multimedia subsystem (IMS) network that provides an IMS service, to a second network, the method comprising:
transferring an address of a server that interworks with the IMS network in the second network to the user equipment;
when the address of the received server is a new address, the user equipment transferring a registration request message to the IMS network via the server; and
registering the user equipment in response to the registration request message in the IMS network.
- [2] The method of claim 1, wherein the address of the server is periodically transferred to the user equipment.
- [3] The method of claim 1, wherein the address of the server is transferred to the user equipment by being inserted into a message that is periodically transferred to the user equipment.
- [4] The method of claim 1, wherein the address of the server is inserted into an option field of a router advertisement (RA) message to be periodically transferred to the user equipment.
- [5] The method of claim 1, wherein in the registering of the user equipment, information in which a location of the user equipment and a session initiation protocol (SIP) address are bound together is registered.
- [6] A system of registering user equipment, when the user equipment is handed over from a first network, which interworks with an IP multimedia subsystem (IMS) network that provides an IMS service, to a second network, the system comprising:
a first server located in the second network and interworking with the IMS network;
a second server transferring an address of the first server to the user equipment; and
a third server registering the user equipment in the IMS network in response to a registration request message,
wherein the user equipment transfers the registration request message via the first server to the IMS network, when the received address of the first server is a new address.
- [7] The system of claim 6, wherein the second server transfers the address of the first server by inserting the address of the first server into a message that is peri-

odically transferred to the user equipment.

- [8] The system of claim 6, wherein the second server transfers the address of the first server by inserting the address of the first server into an option field of an RA message that is periodically transferred to the user equipment.
- [9] The system of claim 6, wherein the third server binds together the location and an SIP address of the user equipment and registers the same.
- [10] A method of handover of user equipment between networks, the method comprising:
moving the user equipment from a first network, which interworks with an IP multimedia subsystem (IMS) service, to a second network;
informing the user equipment of an address of a first server that interworks with the IMS network in the second network;
the user equipment comparing the address of the first server with an address of a second server that interworks with the IMS network in the first network;
when the addresses of the first server and the second server are not identical, the user equipment transferring a registration request message to the IMS network via the first server; and
registering the user equipment in response to the registration request message by using the IMS network.
- [11] The method of claim 10, wherein the address of the first server is transferred to the user equipment by being inserted into a message that is periodically transferred to the user equipment.
- [12] The method of claim 10, wherein the address of the first server is transferred to the user equipment by being inserted into an option field of an RA message that is periodically transferred to the user equipment.

FIG. 1

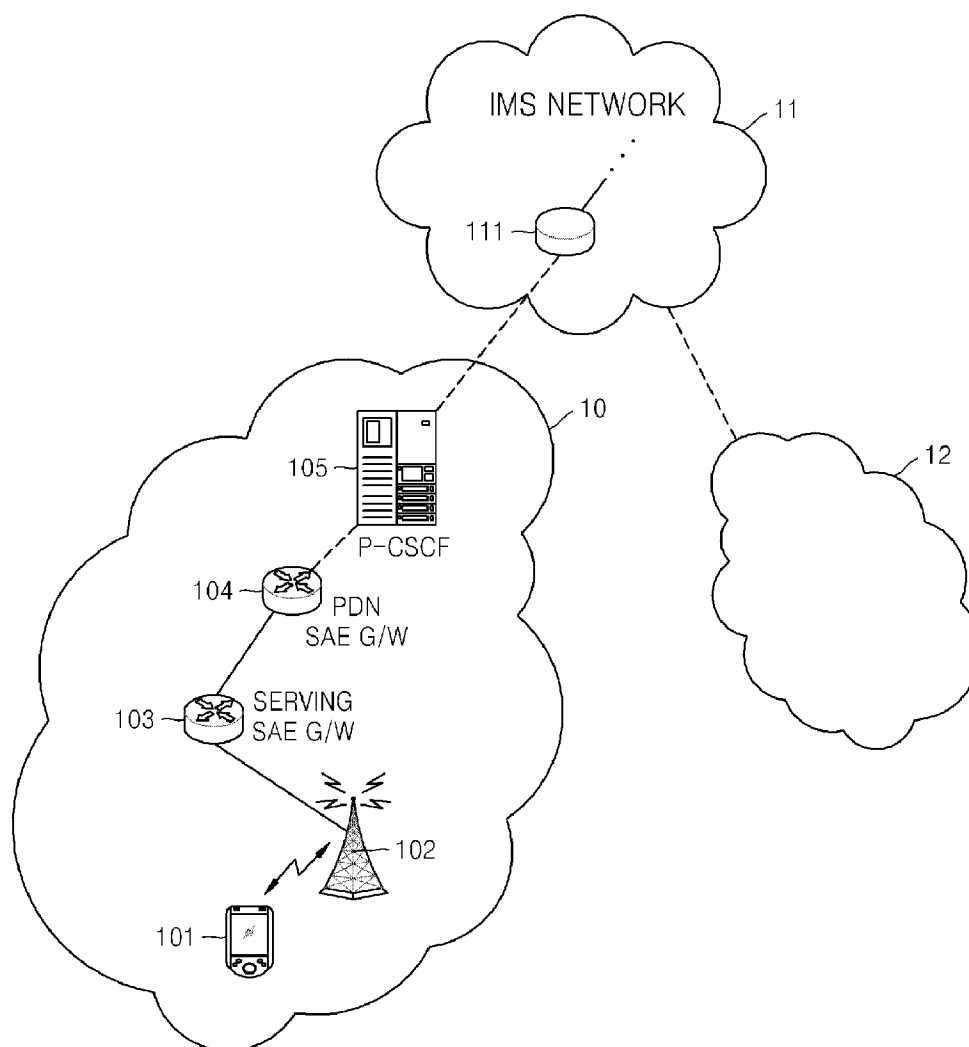
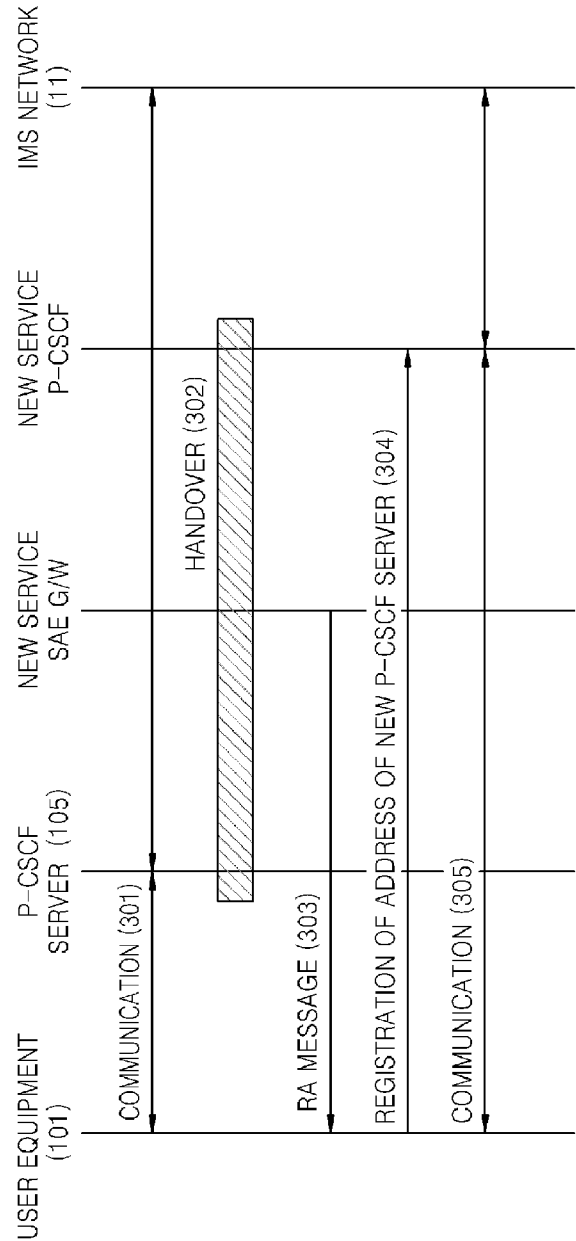


FIG. 2

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31								
Type																Code				Checksum																			
Cur Hop Limit																M		O		Reserved				Router Lifetime															
Reachable Time																																							
Retrans Timer																																							
Options																																							

FIG. 3



A. CLASSIFICATION OF SUBJECT MATTER***H04L 12/46(2006.01)i, H04L 12/28(2006.01)i, H04L 29/06(2006.01)i, H04B 7/26(2006.01)i***

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC H04L, H04B

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

Korean Utility models and applications for Utility models since 1975

Japanese Utility models and applications for Utility models since 1975

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

eKIPASS(KIPO internal) & keywords: IMS, handoff, handover

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 10-0756977 B1 (ETRI & SAMSUNG ELECTRONICS CO.,LTD) 2007.09.07 See page, 6 paragraph 39 - page 7 paragraph 42; figures 1 and 4.	1 - 12
A	WO 2006/100459 A2 (ORANGE SA) 2006.09.28 See abstract; pages 2 - 5; and figures 2,3, and 5.	1 - 12
A	KR 10-2006-0021467 A (SK TELECOM CO., LTD) 2006.03.08 See abstract; figures 1, 4-7.	1 - 12
A	US 2006/0120287 A1 (GEORGE FOTI et al.) 2006.06.08 See abstract	1 - 12



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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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