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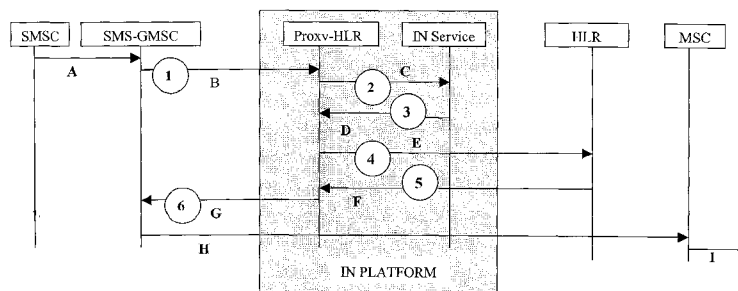
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(54) Title: A METHOD FOR THE FORWARDING OF SMS IN A MOBILE COMMUNICATION SYSTEM



- A - Short Message
- B - Routing Information
- C - Request for new forwarding number
- D - Forwarding number if exists or original number
- E - New number to HLR
- F - Acknowledgement from HLR
- G - New number
- H - Message & Routing information sent to the MSC
- I - Send information to VLR

Figure 2 - SMS-MT Forwarding

(57) Abstract: Method of forwarding short messages to a predefined number registered by an end subscriber by intercepting routing information of the message exchanged between a SMSC and an HLR, and sending said information to a proxy HLR which determines the forwarded number by interrogating an Intelligent Network Service.

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Title

A method for the forwarding of SMS in a mobile communication system

5 Background of the Invention

The present invention relates to a mobile communication system and in particular to a system for forwarding SMS messages to a predefined subscriber in a mobile communication system. In GSM (Global System for Mobile Communication) specification call forwarding is well defined. However, there is no supplementary service, which can modify or supplement a basic telecommunication service defined for SMS-forwarding.

Consequently it cannot be offered together or in association with a basic telecommunication service. The same supplementary service may be applicable to a number of telecommunication services. SMS forwarding is a service by which if a subscriber B has activated forwarding for SMS to subscriber C, when subscriber A sends a short message to Subscriber B that short message will be delivered to subscriber C.

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Summary of the Invention

The present invention relates to a method of unconditional forwarding of Short Messages (SMS) to a predefined number registered by the end subscriber using an Intelligent Network (IN) based solution without modifying the existing GSM (Global System for Mobile communication) architecture or any existing protocol stack. The present invention introduces a proxy-HLR (Home Location Register), which is an IN based service with a Mobile Application Protocol (MAP) interface between Short Messaging Service Centre (SMSC) and Home Location Register (HLR). The Proxy-

HLR which interrogates with another IN (Intelligent Network) based service called the IN_FORWARDING_SERVICE responsible for managing forwarding details of the subscribers to retrieve the forwarded number, if any, registered by the subscriber. The routing information request message "SendRoutingInfoForShortMsg" sent from the SMSC (Short Messaging Service Centre) to the HLR (Home Location Register) of original recipient is intercepted by the proxy-HLR (Home Location Register). The proxy-HLR (Home Location Register) determines the forwarded number by interrogating with the IN-FORWARDING_SERVICE and routes the "SendRoutingInfoForShortMsg" to HLR (Home Location Register) of new recipient corresponding to the forwarded number.

The invention proposes a method for forwarding message to a predefined subscriber number in a mobile communication network, such messages being originally sent from a transmitting terminal to a receiving terminal, said receiving terminal being configured in such a manner that received messages be forwarded to a forward terminal identified by said predefined subscriber number, the transmitting terminal being connected to a message service centre and a home location register in said mobile communication network, the method comprising the steps of :

- intercepting the routing information of the message using standard protocols from the message service centre to the home location register and
- sending the intercepted routing information to the desired New- Home Location Register.

25 **Brief Description Of The Drawings**

Figure 1 illustrates the structure of SMS-MT (Short Messaging Service - Mobile Terminating) and the transfer of information

Figure 2 illustrates the structure of SMS-MT (Short Messaging Service - Mobile Terminating) with proxy-HLR (Home Location Register). It depicts the interrogation between the proxy-HLR (Home Location Register) and the IN (Intelligent Network) – service.

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Detailed Description Of The Drawings

The present invention relates to a system for forwarding SMS message to a predefined subscriber in a mobile communication system.

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Figure 1 illustrates the process involved in sending SMS from one mobile subscriber to another in a GSM network. The message to be sent is submitted to the SMS-GMSC (Gateway MSC for Short Message Service), which interacts with the HLR to obtain the routing information request message
15 (“SendRoutingInfoForShortMsg”).

The SMS-GMSC is a function of an MSC (Mobile Switching Centre) capable of

- receiving a short message from a SMSC interrogating an HLR for routing information and SMS info, and
- 20 - delivering the short message to the Visited Mobile Switching Centre (VMSC) of the recipient MS.

VMSC is the MSC that is serving a mobile in the VPLMN (Visited Public Land Mobile Network). On receiving the routing information the SMS-GMSC forwards the message to the MSC. The MSC interacts with the VLR (Visiting Location Register) to
25 pass the message to the destination MS (Mobile Station). Once the message transfer is complete a delivery report is sent back to the SMS-GMSC, it is forwarded to the SMS source location as status report.

The invention provides a method for forwarding of short messages to a predefined subscriber number in a mobile communication network by intercepting the routing information for the message from the SMS-GMSC to the HLR with the help of a proxy-HLR. A proxy-HLR is an IN based service having interfaces with SMSC, HLR and IN_FORWARDING_SERVICE with the help of MAP and TCP/IP protocols. The new routing information obtained is sent to the New HLR which is the conventional HLR It is referred to as "New" as this HLR corresponds to the final recipient or the forwarded number if it exists else it is the original number. The proxy-HLR interrogates with the SMSC and HLR using MAP protocol. It interrogates with the IN_FORWARDING_SERVICE using Implementation dependent TCP/IP interface.

The IN (Intelligent Network) is a network-architecture for both fixed and mobile telecommunication networks. It allows operators to differentiate themselves by providing value added service in addition to the standard telecom services such as GSM services on mobile phones. It can also be regarded as an overlay on the core network.

In the present invention, in reference to figure 2, an IN-service is introduced before the HLR, which will act as a proxy-HLR for sending the "SendRoutingInfoForShortMsg" information. The SMS-GMSC interacts with the proxy-HLR using the MAP protocol. The Proxy-HLR obtains the forwarding number by interrogating with the IN-FORWARDING_SERVICE (3) using an implementation dependent (TCP/IP or any other interface) protocol if the SMS-forwarding service is activated or else the original destination number is returned. The proxy-HLR service then sends the "SendRoutingInfoForShortMsg" to the HLR (new HLR – HLR of forwarded party) (4) corresponding to the number provided by the IN-service. The HLR responds to the proxy-HLR by sending "SendRoutingInfoForShortMsgAck" (5) and the MSC (Mobile Switching Centre) location and IMSI (International Mobile

Subscriber Identity) of the new number. The proxy-HLR returns the MSC location and IMSI of the forwarded number received to the SMSC via "SendRoutingInfoForShortMsgAck" (6).

- 5 The IN_FORWARDING_SERVICE is an IN based service which manages the forwarded numbers registered by mobile subscriber. The mobile subscriber registers the number with this service via Interactive Voice Response (IVR) menu or by calling customer care. On receiving request from proxy-HLR service this service returns forwarded number if a forwarded is registered for the mobile number received in
- 10 request if no forward number is registered.

We claim:

1. A method for forwarding message to a predefined subscriber number in a mobile communication network, such messages being originally sent from a transmitting terminal to a receiving terminal, said receiving being configured in such a manner that received messages be forwarded to a forward terminal identified by said predefined subscriber number, the transmitting terminal being connected to a message service centre and a home location register in said mobile communication network, the method comprising the steps of :
- 5
- 10 - intercepting the routing information of the message using standard protocols from the message service centre to the home location register and
 - sending the intercepted routing information to the desired New- Home Location Register.
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2. A method for forwarding message as claimed in claim 1 wherein the said proxy- Home Location Register interrogates with the Intelligent Network-service using the Mobile Application Part protocol and the TCP/IP protocol to determine the new Short Message Service routing information.

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We claim:

1. A method for forwarding a message to a predefined subscriber number in a mobile communication network, such messages being originally sent from a transmitting terminal to a receiving terminal, said receiving terminal being configured in such a manner that received messages can be forwarded to a forward terminal identified by said predefined subscriber number, the transmitting terminal being connected to a message service centre and a home location register in said mobile communication network, the method comprising the steps of :
 - intercepting the routing information of the message, using standard protocols, from the message service centre to the home location register
 - requesting the predefined subscriber number
 - sending the intercepted routing information with said predefined subscriber number to the New- Home Location Register of the desired receiving terminal
 - sending said message and routing information to the desired receiving terminal.
2. A method for forwarding message according to claim 1, wherein the routing information is intercepted by a proxy- Home Location Register, which requests the predefined subscriber number to an Intelligent Network-service using the Mobile Application Part protocol and the TCP/IP protocol.
3. A system for forwarding a message to a predefined subscriber number in a mobile communication network, such messages being originally sent from a transmitting terminal to a receiving terminal, said receiving terminal being configured in such a manner that received messages can be forwarded to a forward terminal identified by said predefined subscriber number, the transmitting terminal being connected to a message service centre and a home location register in said mobile communication network, wherein:

- a proxy- Home Location Register is introduced before the home location register for intercepting the routing information of the message, between the message service center and the home location register
- 5 - an Intelligent Network Service for storing the forwarded number is introduced before said home location register

said proxy- Home Location Register having means for requesting said forwarded number and sending it to the corresponding New- Home Location Register.

Statement under Article 19(1)

In view of examiner objections, the applicant hereby files a new set of claims, wherein,

Claims 1 and 2 have been clarified and a new claim 3 has been introduced.

All new claims are supported by the description and the drawings.

As recognized by the examiner, new claim 1 is new over cited document D1. In addition it satisfies the inventive step criteria for the following reasons:

In D1, the initial message routing information is anyway sent to the initial HLR (i.e. the HLR of the initial recipient); the new number (i.e. the number of the new recipient to which the message shall be forwarded) is searched for only thereafter.

Whereas in the present claimed invention, the routing information is not sent to the initial HLR. Once the routing information is intercepted, the new number (forwarded number) is retrieved. Then the routing information is provided with the new number to the new HLR (i.e. the HLR of the new recipient to which the message shall be forwarded - please see our description explaining clearly the new HLR).

The presently claimed solution is simpler as compared to D1:

there are more flows in D1 as explained above which requires in particular a proxy MSC to be developed in addition to proxy HLR.

Therefore, nothing in D1 would suggest to man skilled in the art the present claimed solution, which in particular solves the above-mentioned problem, among others.

Therefore claim 1 - as well as depending claim 2- is patentable over D1.

Same reasoning is to be applied re new claim 3

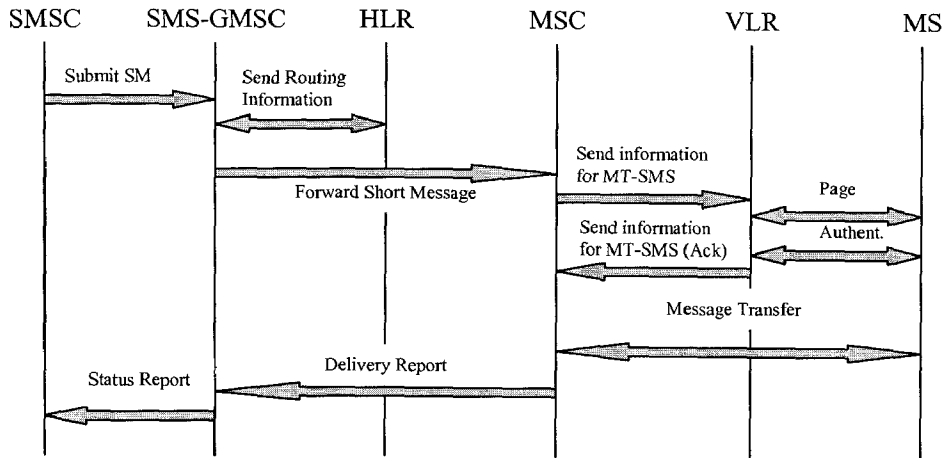
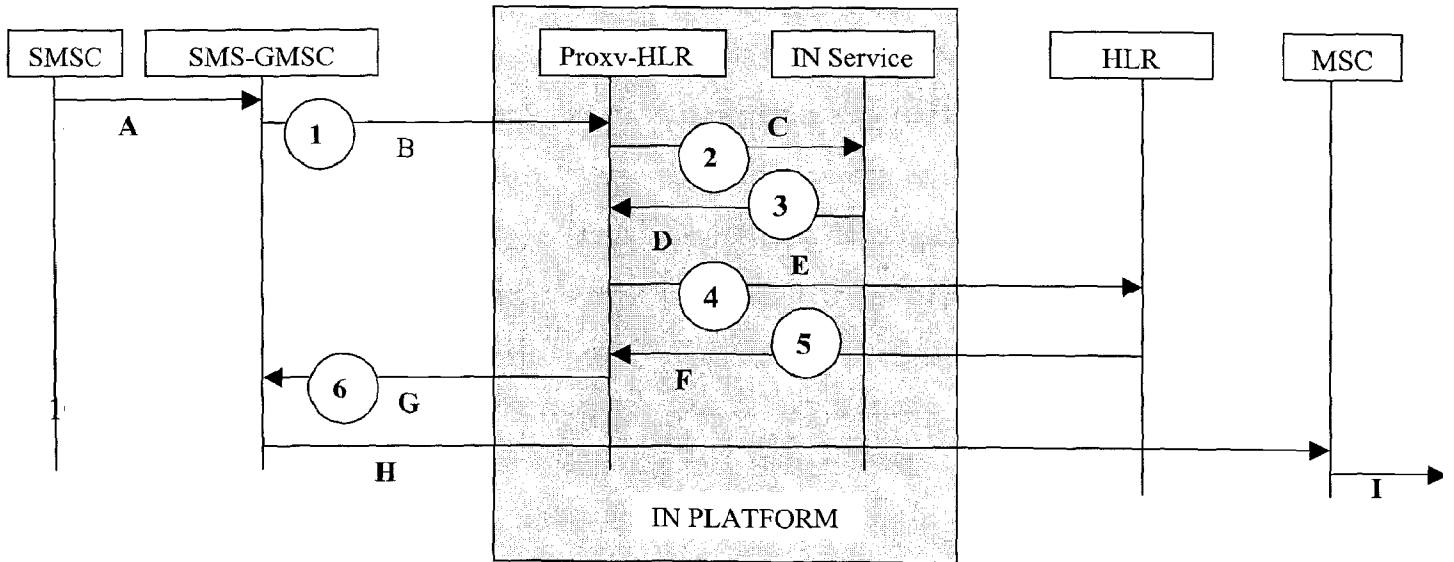


Figure 1 – SMS-MT



- A - Short Message
- B - Routing Information
- C - Request for new forwarding number
- D - Forwarding number if exists or original number
- E - New number to HLR
- F - Acknowledgement from HLR
- G - New number
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Figure 2 – SMS-MT Forwarding

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2007/052719

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04Q7/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04Q

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 613 102 A (BMD WIRELESS AG [CH]) 4 January 2006 (2006-01-04) abstract paragraphs [0043] - [0047]	1,2
A	WO 2006/056791 A (INTELLPROP LTD; WILSON JEFFREY [GB]) 1 June 2006 (2006-06-01) abstract page 2, line 22 - page 4, line 24 page 8, line 12 - page 9, line 13 page 12, line 29 - page 13, line 27	1,2
A	EP 1 626 590 A (TELSIS HOLDINGS LTD [GB]) 15 February 2006 (2006-02-15) abstract paragraphs [0008] - [0019], [0024], [0025]	1,2

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *Z* document member of the same patent family

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