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- (71) **Applicant (for all designated States except US):** **TEK-ELEC** [US/US]; 5200 Paramount Parkway, Morrisville, NC 27560 (US).
- (72) **Inventor; and**
- (75) **Inventor/Applicant (for US only):** **NOOREN, Eloy Johan, Lambertus** [NIVNL]; Haagweg 416, NL-4813 XG Breda (NL).
- (74) **Agent:** **HUNT, Gregory, A.; Jenkins, Wilson, Taylor & Hunt, P.A.,** Suite 1200, University Tower, 3100 Tower Boulevard, Durham, NC 27707 (US).

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(54) **Title:** METHODS, SYSTEMS, AND COMPUTER READABLE MEDIA FOR SHORT MESSAGE SERVICE (SMS) FORWARDING

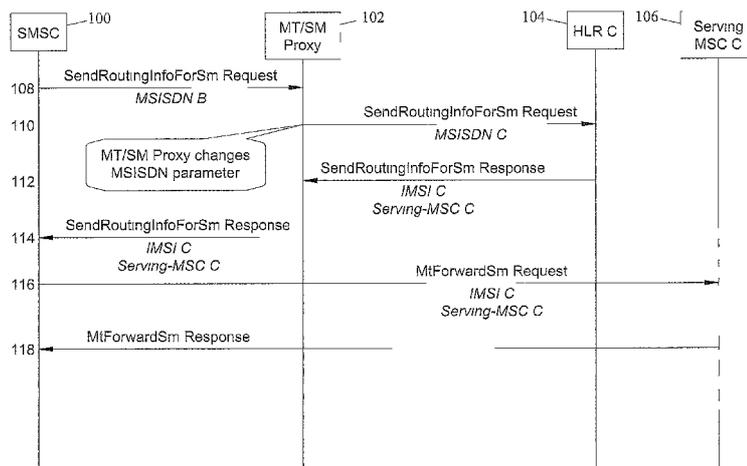


FIG 1

(57) **Abstract:** Methods, systems, and computer readable media for SMS forwarding are disclosed. One method includes performing steps at a message service message proxy separate from a short message service center and implemented on a computing platform including at least one processor. The steps include receiving a message service message routing information response message containing message service message routing information for a first destination. The response message is modified to direct a mobile terminated message service message intended for the first destination to the message service message proxy. The mobile terminated message service message is then received at the message service message proxy and the message service message proxy determines whether a message service message forwarding feature is enabled for the first destination. In response to determining that a message service message forwarding feature is enabled for the first destination, it is determined whether the mobile terminated message service message is eligible for forwarding to a second destination. In response to determining the mobile terminated message service message is eligible for forwarding, signaling is initiated to forward the mobile terminated message service message to the second destination.



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DESCRIPTION

METHODS, SYSTEMS, AND COMPUTER READABLE MEDIA FOR
SHORT MESSAGE SERVICE (SMS) FORWARDING

5

PRIORITY CLAIM

This application claims the benefit of U.S. Provisional Patent Application Serial No. 61/159,337 filed on March 11, 2009; the disclosure of which is incorporated herein by reference in its entirety.

10

TECHNICAL FIELD

The subject matter described herein relates to delivering SMS messages. More specifically, the subject matter relates to methods, systems, and computer readable media for providing SMS message
15 forwarding.

BACKGROUND

Today, it is possible to setup forwarding for calls (hereinafter, "call forwarding"). Call forwarding is a feature that allows an incoming call to a
20 called party to be redirected to another telephone number of the called party's choosing. Two different types of call forwarding may exist. The first type of call forwarding is called unconditional forwarding and may include automatically forwarding all calls from a first telephone number to a second telephone number, regardless of any conditions. For example, if subscriber
25 B has setup unconditional forwarding to C, all calls to B will be redirected to C. The second type of call forwarding is called conditional forwarding and may include initially trying to reach the called party at a first number, and if the called party is unavailable (i.e., the condition), forwarding the call to a second number. For example, if subscriber B has setup conditional
30 forwarding to C, all calls to B will first be tried on B and when B is not available, the call will be redirected to C.

In contrast to forwarding services provided for calls, no such service is available for forwarding SMS messages. In other words, present SMS

message delivery systems do not provide for forwarding SMS messages, either conditionally or unconditionally, as is provided for calls.

Accordingly, in light of these difficulties, a need exists for improved methods, systems, and computer readable media for SMS message
5 delivery.

SUMMARY

Methods, systems, and computer readable media for SMS forwarding are disclosed. One method includes performing steps by a message service
10 message proxy separate from a short message service center and implemented on a computing platform including at least one processor. The steps include receiving a message service message routing information response message containing message service message routing information for a first destination. The response message is modified to direct a mobile
15 terminated message service message intended for the first destination to the message service message proxy. The mobile terminated message service message is then received at the message service message proxy and the message service message proxy determines whether a message service message forwarding feature is enabled for the first destination. In response
20 to determining that a message service message forwarding feature is enabled for the first destination, it is determined whether the mobile terminated message service message is eligible for forwarding to a second destination. In response to determining the mobile terminated message service message is eligible for forwarding, signaling is initiated to forward the
25 mobile terminated message service message to the second destination.

A system for providing SMS forwarding is also disclosed. The system includes a message service message proxy for receiving a message service message routing information response message containing message service message routing information for a first destination. The response message
30 is modified by the message service message proxy to direct a mobile terminated message service message intended for the first destination to the message service message proxy. The mobile terminated message service message is then received at the message service message proxy and the

message service message proxy determines whether a message service message forwarding feature is enabled for the first destination. In response to determining that a message service message forwarding feature is enabled for the first destination, the message service message proxy
5 determines whether the mobile terminated message service message is eligible for forwarding to a second destination. In response to determining the mobile terminated message service message is eligible for forwarding, the message service message proxy initiates signaling to forward the mobile terminated message service message to the second destination.

10 The subject matter described herein for providing SMS forwarding may be implemented using a non-transitory computer readable medium to having stored thereon executable instructions that when executed by the processor of a computer control the processor to perform steps. Exemplary non-transitory computer readable media suitable for implementing the
15 subject matter described herein include chip memory devices or disk memory devices accessible by a processor, programmable logic devices, and application specific integrated circuits. In addition, a computer readable medium that implements the subject matter described herein may be located on a single computing platform or may be distributed across plural
20 computing platforms.

BRIEF DESCRIPTION OF THE DRAWINGS

The subject matter described herein will now be explained with reference to the accompanying drawings of which:

25 Figure 1 is a message flow diagram illustrating an exemplary basic unconditional SMS forwarding scenario according to an embodiment of the subject matter described herein;

Figure 2 is a message flow diagram illustrating an exemplary enhanced unconditional SMS forwarding scenario according to an
30 embodiment of the subject matter described herein;

Figure 3 is a message flow diagram illustrating an exemplary conditional SMS forwarding scenario according to an embodiment of the subject matter described herein;

Figure 4 is a message flow diagram illustrating an exemplary conditional SMS forwarding scenario according to an embodiment of the subject matter described herein;

5 Figure 5 is a message flow diagram illustrating an exemplary conditional SMS forwarding scenario according to an embodiment of the subject matter described herein;

Figure 6 is a message flow diagram illustrating an exemplary SMS forwarding scenario including lawful surveillance and intercept functionality according to an embodiment of the subject matter described herein;

10 Figure 7 is a flow chart showing exemplary steps for providing SMS forwarding according to an embodiment of the subject matter described herein; and

Figure 8 is a block diagram of an exemplary system for providing SMS forwarding according to an embodiment of the subject matter described
15 herein.

DETAILED DESCRIPTION

The subject matter described herein includes methods and systems for providing SMS forwarding. Specifically, a new network element for providing conditional and/or unconditional SMS Forwarding service is
20 disclosed. When a global system for mobile communications (GSM) subscriber registers with the SMS Forwarding service described herein, it may be desirable for all of its mobile terminated short messages (MT/SMS) to be subject to the SMS forwarding service. However, a conventional short
25 message service centre (SMSC) may not be the best network element to perform SMS forwarding because not all MT/SMS for a given GSM subscriber flow through its own SMSC. For example, in conventional SMS messaging, a GSM subscriber always submits a mobile originated short message (MO/SM) to its home SMSC and a GSM SMSC always delivers the
30 MT/SM directly. SMS messages do not flow between SMSCs. Therefore, if a mobile operator implements SMS forwarding service in its SMSC, the service would only affect the SMS messages *submitted* by its own subscribers, which may be undesirable. Instead, it may be more desirable

for any SMS forwarding service to affect the short messages *delivered* to its subscribers. Due to the limitations of conventional SMSCs and their operations, the SMS forwarding service described herein may be implemented by a new network element. This network element, which may hereinafter be referred to as a "message service message proxy server" or "MTYSM proxy", should receive all MT/SMS of any subscriber that registers with the SMS forwarding service. The message service message proxy may be separate from the SMSC and may be implemented on a computing platform having one or more processors.

Figure 1 is a message flow diagram illustrating an exemplary basic unconditional SMS forwarding scenario according to an embodiment of the subject matter described herein. It may be appreciated that basic unconditional SMS forwarding may be the simplest method to implement unconditional forwarding by intercepting the `SendRoutingInfoForSm` request from the SMSC, changing the mobile station international subscriber directory number (MSISDN) parameter, and relaying the request to the home location register (HLR).

Referring to Figure 1, network components may include SMSC 100, MT/SM proxy 102, HLR C 104, and serving mobile switching center (MSC) C 106. SMSC 100 may be responsible for relaying and store-and-forwarding of short messages between a short messaging entity (SME) and mobile station. An SME is an entity that may receive or send short messages. The SME may be located in the fixed network, a mobile station, or another service center. MT/SM proxy 102 may be responsible for providing SMS forwarding service to subscribers. HLR C 104 is a database that contains details of each mobile phone subscriber that is authorized to use the GSM core network. It is appreciated that there can be several logical and/or physical HLRs per public land mobile network (PLMN). MSC C 106 may process requests for service connections from mobile devices and land line callers and route calls between base stations and the public switched telephone network (PSTN). MSC C 106 may also receive dialed digits, create and interpret call processing tones, and route call paths.

In Figure 1, subscriber B is the intended recipient of the MT/SM and has set up unconditional forwarding to C. For example, in step 108, SMSC 100 may begin by sending a SendRoutingInfoForSm Request message for MSISDN B to MT/SM proxy 102. In step 110, MT/SM proxy 102 may modify the MSISDN parameter from B to C, and forward a SendRoutingInfoForSm Request message including MSISDN C to HLR C 104. In response, HLR C 104 may return a SendRoutingInfoForSm Response message including message parameters for international mobile subscriber identity (IMSI) C and serving MSC C 106 in step 112. MT/SM proxy 102 may then receive and forward the SendRoutingInfoForSm Response message, unmodified, to SMSC 100 in step 114. In step 116, SMSC 100 may send an MtForwardSm Request message including IMSI C and an identifier for serving MSC C to serving MSC C 106. Serving MSC C 106 may then return MtForwardSm Response message in step 118.

The basic unconditional forwarding described above may have some drawbacks. For example, it may be difficult to detect (and break) forwarding loops. A simple forwarding loop is a case where B has setup forwarding to C and C to B. Using basic unconditional forwarding, however, if B and C are subscribers of different mobile networks, a loop might result in SendRoutingInfoForSm requests bouncing between B's network and C's network. Another drawback to basic unconditional SMS forwarding is that while some MT/SM types may be eligible for forwarding, others may not. Exemplary MT/SM types that should not be forwarded may include a subscriber identify module (SIM) data download message and a GSM status report message. With a SIM data download message, a mobile operator provisions settings on a mobile. With a GSM status report message, an SMSC informs the sender of an SMS about the delivery result of the SMS (e.g. successful, failed, expired). In order to overcome the drawbacks of basic unconditional SMS forwarding, a method for enhanced unconditional forwarding will now be described below with respect to Figure 2.

Figure 2 is a message flow diagram illustrating an exemplary enhanced unconditional SMS forwarding scenario according to an embodiment of the subject matter described herein. In contrast to the basic

unconditional forwarding method described above with respect to Figure 1, the enhanced unconditional forwarding method may transparently relay the SendRoutingInfoForSm request to the HLR and modify the SendRoutingInfoForSm response in such a way that the MtForwardSm request is routed to the MT/SM Proxy. Upon receipt of the MtForwardSm request, MT/SM Proxy 102 may check whether the MT/SM is eligible for forwarding. If the MT/SM is eligible for forwarding, MT/SM Proxy 102 may issue a SendRoutingInfoForSm and a MtForwardSm for the forwarding destination.

10 In Figure 2, subscriber B is the MT/SM's recipient and has set up unconditional forwarding to C. In addition to the network components shown in Figure 1, Figure 2 includes HLR B 200 that is the HLR for B. In step 202, SMSC 100 may begin by sending a SendRoutingInfoForSm Request message to MT/SM proxy 102. In step 204, MT/SM proxy 102 may forward
15 the SendRoutingInfoForSm Request message, unmodified, to HLR B 200. HLR B 200 may return a SendRoutingInfoForSm Response message including IMSI B and an identifier for serving MSC B (not shown) to MT/SM proxy 102 in step 206. In step 208, MT/SM proxy 102 may manipulate the IMSI and serving MSC parameters to enforce termination of MtForwardSm
20 on MT/SM proxy 102 with the possibility to correlate SendRoutingInfoForSm and MtForwardSm requests. Therefore, MT/SM proxy 102 may send SendRoutingInfoForSm Response message including IMSI B' and serving MSC B' parameters to SMSC 100 in step 208. In response, SMSC 100 may send a MtForwardSm Request message including parameters for IMSI B' and serving MSC B' to MT/SM proxy 102 in step 210.

Also in step 210, MT/SM proxy 102 may determine whether the MtForwardSm Request is eligible for SMS forwarding service. In this case, MtForwardSm Request is eligible, and therefore, in step 212, MT/SM proxy 102 may send SendRoutingInfoForSm Request message including MSISDN
30 C for HLR C 104. In step 214, HLR C 104 may return a SendRoutingInfoForSm Response message to MT/SM proxy 102. In step 216, MT/SM proxy 102 may then generate and send a MtForwardSm Request message including parameters for IMSI C and serving MSC C to

serving MSC C 106. Serving MSC C 106 may return a MtForwardSm response message to MT/SM proxy 102 in step 218 and MT/SM proxy 102 may forward the MtForwardSm response message to SMSC 100 in step 220.

5 Figure 3-5 illustrate message flows for conditional SMS forwarding. Conditional forwarding works similar to the enhanced conditional forwarding, however, before querying the HLR for the forward destination, MT/SM Proxy 102 may attempt to deliver the MT/SM to the original recipient. If delivery fails (e.g., an Absent Subscriber error), then MT/SM proxy 102 may attempt
10 to deliver the MT/SM to the designated forward destination. In Figures 3-5, subscriber B is the MT/SM's recipient and has setup conditional forwarding to C. It is appreciated that Figures 3-5 do not display the SendRoutingInfoForSm dialogue for B as this dialogue is the same as for the enhanced unconditional forwarding scenario described above with respect to
15 Figure 2. Figures 3-5 illustrate three different conditional forwarding scenarios. In Figure 3, B is available. In Figure 4, B is unavailable and C is available. In Figure 5, B and C are both unavailable.

Figure 3 is a message flow diagram illustrating an exemplary conditional SMS forwarding scenario according to an embodiment of the
20 subject matter described herein. Referring to Figure 3, in addition to the network components shown in Figures 1 and 2, serving MSC B 300 is shown. In step 302, SMSC 100 may send MtForwardSm Request message including message parameters for IMSI B' and serving MSC B' to MT/SM proxy 102. In step 304, MT/SM proxy 102 may modify the message
25 parameters to refer to IMSI B and serving MSC B and send the modified MtForwardSm Request message to serving MSC B 300. In response, serving MSC B 300 may return a MtForwardSm Response message to MT/SM proxy 102 in step 306. Finally, in step 308, MT/SM proxy 102 may forward the MtForwardSm response message to SMSC 100.

30 Figure 4 is a message flow diagram illustrating an exemplary conditional SMS forwarding scenario according to an embodiment of the subject matter described herein. Referring to Figure 4, in step 400, SMSC 100 may send MtForwardSm Request message including message

parameters for IMSI B' and serving MSC B' to MT/SM proxy 102. In step 402, MT/SM proxy 102 may modify the message parameters to refer to IMSI B and serving MSC B and send the modified MtForwardSm Request message to serving MSC B 300. In response, serving MSC B 300 may return a MtForwardSm Response message to MT/SM proxy 102 indicating that subscriber B is not available (e.g., absent subscriber error) in step 404. In step 406, MT/SM proxy 102 may send a SendRoutingInfoForSm Request message including MSISDN C to HLR C 104. HLR C 104 may respond by returning a SendRoutingInfoForSm Response message to MT/SM proxy 102 in step 408. In step 410, MT/SM proxy 102 may send a MtForwardSm Request message including IMSI C and serving MSC C to serving MSC C 106. If delivery to C was successful, serving MSC C 106 may return a MtForwardSm response message indicating success to MT/SM proxy 102 in step 412. In step 414, MT/SM proxy 102 may forward the MtForwardSm response message indicating success to SMSC 100.

Figure 5 is a message flow diagram illustrating an exemplary conditional SMS forwarding scenario according to an embodiment of the subject matter described herein. Referring to Figure 5, in step 500, SMSC 100 may send MtForwardSm Request message including message parameters for IMSI B' and serving MSC B' to MT/SM proxy 102. In step 502, MT/SM proxy 102 may modify the message parameters to refer to IMSI B and serving MSC B and send the modified MtForwardSm Request message to serving MSC B 300. In response, serving MSC B 300 may return a MtForwardSm Response message to MT/SM proxy 102 indicating that subscriber B is not available (e.g., absent subscriber error) in step 504. In step 506, MT/SM proxy 102 may send a SendRoutingInfoForSm Request message including MSISDN C to HLR C 104. HLR C 104 may respond by returning a SendRoutingInfoForSm Response message to MT/SM proxy 102 in step 508. In step 510, MT/SM proxy 102 may send a MtForwardSm Request message including IMSI C and serving MSC C to serving MSC C 106. In contrast to Figure 4, C is not available and therefore delivery will not be successful. Thus, serving MSC C 106 may return a MtForwardSm response message indicating that subscriber C is also not available (e.g.,

absent subscriber error) to MT/SM proxy **102** in step **512**. In step **514**, MT/SM proxy **102** may forward the MtForwardSm response message including the error to SMSC **100**.

5

Preventing Forwarding Loops

A simple approach for preventing forwarding loops may include denying SMS forwarding service to subscribers of other mobile networks. For example, if B has set up SMS forwarding to C, MT/SM Proxy **102** would only forward to C if B and C belong to the same mobile network.

10

A more enhanced method to prevent forwarding loops may be to add a marker to MtForwardSm requests for the forwarding destination. While 3rd Generation Partnership Project (3GPP) technical specification (TS) 23.040, which is incorporated by reference herein, does not define a specific forwarding marker, it does however allow a vendor to define its own information elements in the user data header. A specific range for information element identifier has been allocated for this purpose. MT/SM proxy **102** may add a vendor-specific information element for messages to forwarded messages. Thus, an enhanced method to prevent forwarding loops may be that whenever MT/SM Proxy **102** receives an MtForwardSm request, MT/SM Proxy **102** may check whether the vendor-specific information element for forwarding is present. If the information is present, MT/SM Proxy **102** may inspect the data of the information element to determine whether the MtForwardSm can be forwarded. It is appreciated that adding a vendor-specific information element may cause the User Data parameter of an MtForwardSM to be extended. International Patent No. WO 2005/101872 entitled, "Method for Preventing the Delivery of Short Message Service Message Spam" describes one method for extending the User Data parameter and enforcing the MtForwardSm to the MT/SM proxy and is incorporated by reference herein.

25
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Figure 6 is a message flow diagram illustrating an exemplary SMS forwarding scenario including lawful surveillance and intercept functionality according to an embodiment of the subject matter described herein. Shown in Figure 6 is an embodiment of the subject matter described herein that

includes call detail record generation function / lawful surveillance (CDR/LS) function 600 which is associated with MT/SM proxy 102. According to one aspect, CDR/LS 600 function may be adapted to generate and store a record that documents the forwarding of a message service message from an original called subscriber / B-party to a forward-to called subscriber / B-party. The CDR/LS record may include a complete copy of the forwarded messaging service message (e.g., routing layer info + payload info), or may alternatively contain a portion of the information in the forwarded message service message. Exemplary message parameters stored in the record may include, but are not limited to, originating SMSC identifier, calling subscriber / A-party, called party / B-party, originating point code (OPC), destination point code (DPC), global title address (GTA), signaling connection control part (SCCP) layer information, TCAP layer information, MAP layer information. In session initiation protocol (SIP) messaging embodiments, the CDR/LS record may contain some, or all, of the messaging service message (e.g., header information, payload). The record may also include date and timestamp information.

The CDR/LS record may include sufficient information to associate the original messaging service message with the forwarded-to message because such provide information may be useful in tracing the delivery process associated with a messaging service message that has been forwarded.

CDR/LS 600 may store or cache CDR/LS records in a database co-located with MT/SM proxy 102. In an alternate embodiment, CDR/LS 600 may generate records and transmit these records to a remote application / storage facility (not shown) via a local area network (LAN), wide area network (WAN), or other network connection.

In another embodiment, CDR/LS function 600 may include, or have access to, a list of subscriber identifiers that have been placed under lawful surveillance (i.e., watched entities). CDR/LS function 600 may be adapted to check the forwarded-to subscriber identifier and determine if the forwarded to subscriber is a watched entity. If the forwarded-to subscriber is a watched entity, then CDR/LS 600 may generate a record of the forwarding

event (as described above). The record may be stored or relayed to a surveillance authority. An exemplary lawful surveillance scenario is described below.

Referring to Figure 6, in step 602, SMSC 100 may send a
5 SendRoutingInfoForSm request message including MSISDN B to MT/SM proxy 102. MT/SM proxy 102 may modify the MSISDN parameter to include MSISDN C and, in step 604, may forward modified SendRoutingInfoForSm request message to HLR C 104. In step 606, HLR C 104 may return a SendRoutingInfoForSm response message including message parameters
10 IMSI C and serving MSC C. In step 608, MT/SM proxy 102 may forward the SendRoutingInfoForSm message to SMSC 100. In response, in step 610, SMSC 100 may send a MtForwardSm request message including message parameters IMSI C and serving MSC C to serving MSC C 106. Finally, in step 612, serving MSC C 106 may return a MtForwardSm response
15 message to SMSC 100.

Figure 7 is a flow chart showing exemplary steps for providing SMS forwarding according to an embodiment of the subject matter described herein. Referring to Figure 7, in step 700, a message service message routing information response message may be received, where the response
20 message contains routing information for a first destination. For example, a SendRoutingInfoForSm response message for MSISDN B that includes IMSI B and serving MSC B may be received by an MT/SM proxy from the HLR of B.

In step 702, the response message may be modified to direct a
25 MT/SM that was intended for the first destination to a MT/SM proxy instead. For example, the MSISDN included in the SendRoutingInfoForSm Request message may be modified from MSISDN B to MSISDN B'.

In step 704, the MT/SM may be received by the MT/SM proxy. For example, an MtForwardSm request message including IMSI B' and serving
30 MSC B' may be received by the MT/SM proxy 102 from originating SMSC 100.

In step 706, it may be determined whether a message service forwarding feature is enabled for the first destination. For example, MT/SM

proxy 102 may consult a list of subscriber identifiers associated with the SMS forwarding service in order to determine whether subscriber B has enabled SMS forwarding service.

If SMS forwarding service has not been enabled for the first
5 destination, then control may proceed to step 708 where conventional message delivery may be performed. For example, conventional message delivery may include when an VMSC/SGSN indicates a short message delivery failure, the SMSC may send a message to the HLR using the MAP_REPORT_SM_DELIVERY_STATUS procedure. During the
10 MAP_REPORT_SM_DELIVERY_STATUS procedure, the SMSC may indicate the reason for the delivery failure and request that the SMSC be put on a list of SMSCs wanting to be notified when the destination party becomes available again. The HLR may set a flag against the destination account, indicating that it is unavailable for short message delivery, and
15 store the SMSCs address in a message waiting data (MWD) list for the destination party. Valid flags may include Mobile Not Reachable Flag (MNRF), Memory Capacity Exceeded Flag (MCEF) and Mobile Not Reachable for GPRS (MNRG). The HLR may then start responding to SRI-for-SM requests with a failure, indicating the failure reason, and
20 automatically adding the requesting SMSCs address to the MWD list for the destination party.

The HLR may be informed of a subscriber becoming available for short message delivery in several ways. First, where the subscriber has been detached from the network, a reattach may trigger a Location Update
25 to the HLR. Second, where the subscriber has been out of coverage, but not fully detached from the network, upon coming back into coverage the subscriber will respond to page requests from the Visitor Location Register (VLR) and the VLR may then send a Ready-for-SM (mobile present) message to the HLR. Third, where the MS formerly had its memory full, but
30 now it does not (e.g., the subscriber deletes some texts), a Ready-for-SM (memory available) message may be sent from the VMSC/VLR to the HLR. Upon receipt of an indication that the destination party is now ready to receive short messages, the HLR may send an AlertSC mobile application

part (MAP) message to each of the SMSCs registered in the MWD list for the subscriber, causing the SMSC to start the short message delivery process again.

5 Additionally, the SMSC may go into a retry schedule, attempting to periodically deliver the SM at certain time intervals, without getting an alert. The retry schedule interval may depend on the original failure cause so that transient network failures may result in a short retry schedule, while out-of-coverage network failures may result in a longer retry schedule.

10 If SMS forwarding service is enabled for the first destination, it may be determined in step 710 whether the MT/SM is eligible for forwarding to a second destination. For example, the MT/SM may determine whether forwarded-to destination C is eligible for forwarding by consulting a list of subscriber identifiers associated with the SMS forwarding service. Like above, if SMS forwarding service is not enabled for the second destination,
15 control may proceed to step 708 where conventional message delivery may be performed.

If SMS forwarding service is enabled for the second destination, in step 712, signaling may be initiated to forward the MT/SM to the second destination. For example, the MT/SM may send a SendRoutingInfoForSm
20 request message for MSISDN C to the HLR for C. After receiving a SendRoutingInfoForSm response message from HLR C, the MT/SM may send a MtForwardSm request for IMSI C to serving MSC C. The MtForwardSm response message received from serving MSC C may be forwarded by the MT/SM to the originating SMSC.

25 Figure 8 is a block diagram of an exemplary system for providing SMS forwarding according to an embodiment of the subject matter described herein. Referring to Figure 8, message service message proxy 102 may be separate from an SMSC and may be implemented on a computing platform including at least one processor (not shown). Message service message
30 proxy 102 may include network interface 800 and message service message forwarding module 802. Network interface 800 may receive a message service message routing information response message containing message service message routing information for a first destination. Message service

message forwarding module 802 may modify the response message to direct a mobile terminated message service message intended for the first destination to message service message proxy 102. Message service message forwarding module 802 may receive the mobile terminated message service message and determine whether a message service message forwarding feature is enabled for the first destination. In response to determining that a message service message forwarding feature is enabled for the first destination, message service message forwarding module 802 may determine whether the mobile terminated message service message is eligible for forwarding to a second destination and, in response to determining the mobile terminated message service message is eligible for forwarding, message service message forwarding module 802 may initiate signaling to forward the mobile terminated message service message to the second destination.

It will be understood that various details of the subject matter described herein may be changed without departing from the scope of the subject matter described herein. Furthermore, the foregoing description is for the purpose of illustration only, and not for the purpose of limitation, as the subject matter described herein is defined by the claims as set forth hereinafter.

CLAIMS

What is claimed is:

1. A method for forwarding message service messages in a communications network, the method comprising:
 - 5 at a message service message proxy separate from a short message service center (SMSC) and implemented on a computing platform including at least one processor:
 - receiving message service message routing information response message containing message service message routing information for a first destination;
 - 10 modifying the response message to direct a mobile terminated message service message intended for the first destination to the proxy;
 - receiving the mobile terminated message service message;
 - 15 determining whether a message service message forwarding feature is enabled for the first destination;
 - in response to determining that a message service message forwarding feature is enabled for the first destination, determining whether the mobile terminated message service message is eligible for forwarding to a second destination; and
 - 20 in response to determining the mobile terminated message service message is eligible for forwarding, initiating signaling to forward the mobile terminated message service message to the second destination.
2. The method of claim 1 wherein determining whether the mobile terminated message service message is eligible for forwarding includes determining whether at least one parameter indicates the presence of looping.
- 30 3. The method of claim 1 wherein determining whether the mobile terminated message service message is eligible for forwarding includes determining whether the mobile terminated message service message is of a type that should not be forwarded.

4. The method of claim 1 comprising generating a message detail record (MDR) based on the forwarding of the mobile terminated message service message.
5. The method of claim 4 comprising:
 - 5 accessing a list of subscriber identifier associated with subscribers that have been placed under lawful surveillance;
determining whether the destination subscriber identifier has been placed under lawful surveillance; and
in response to determining that the destination subscriber has
10 been placed under lawful surveillance, relaying the MDR to a surveillance authority.
6. A method for routing messaging service messages in a communications network, the method comprising:
 - 15 at a message service message proxy separate from a short message service center (SMSC) and implemented on a computing platform including at least one processor:
 - 20 receiving a mobility management query message associated with the delivery of a messaging service message, where the query message includes a first message recipient identifier;
determining a second message recipient identifier to which the message should be forwarded;
inserting the second message recipient identifier into the query message; and
25 routing the query message to a mobile location register associated with the second message recipient identifier.
7. A system for forwarding message service messages in a communications network, the system comprising:
 - 30 a message service message proxy separate from a short message service center (SMSC) and implemented on a computing platform including at least one processor, the message service message proxy including:
 - a network interface for:

receiving message service message routing information
response message containing message service message
routing information for a first destination; and

a message service message forwarding module for:

5 modifying the response message to direct a
mobile terminated message service message intended
for the first destination to the proxy;

receiving the mobile terminated message service
message;

10 determining whether a message service message
forwarding feature is enabled for the first destination;

in response to determining that a message
service message forwarding feature is enabled for the
first destination, determining whether the mobile
15 terminated message service message is eligible for
forwarding to a second destination; and

in response to determining the mobile terminated
message service message is eligible for forwarding,
initiating signaling to forward the mobile terminated
20 message service message to the second destination.

8. The system of claim 7 wherein the message service message
forwarding module is configured to determine whether the mobile
terminated message service message is eligible for forwarding
includes determining whether at least one parameter indicates the
25 presence of looping.

9. The system of claim 7 wherein the message service message
forwarding module is configured to determine whether the mobile
terminated message service message is eligible for forwarding by
determining whether the mobile terminated message service
30 message is of a type that should not be forwarded.

10. The system of claim 7 comprising a call detail record generation /
lawful surveillance module (CDR/LS) being associated with the
message service message proxy for generating a message detail

record (MDR) based on the forwarding of the mobile terminated message service message.

11. The system of claim 10 wherein the CDR/LS module transmits the records to a remote application or storage facility.
- 5 12. The system of claim 10 comprising a database being co-located with the MT/SM proxy, wherein the CDR/LS module stores or caches the records in the database.
13. The system of claim 10 wherein the CDR/LS module:
 - 10 accesses a list of subscriber identifier associated with subscribers that have been placed under lawful surveillance;
 - determines whether the destination subscriber identifier has been placed under lawful surveillance; and
 - in response to determining that the destination subscriber has been placed under lawful surveillance, relays the MDR to a surveillance authority.
- 15 14. A non-transitory computer readable medium comprising computer executable instructions embodied in a tangible computer readable medium and when executed by a processor of a computer performs steps comprising:
 - 20 at a message service message proxy separate from a short message service center (SMSC) and implemented on a computing platform including at least one processor:
 - receiving message service message routing information response message containing message service message routing information for a first destination;
 - 25 modifying the response message to direct a mobile terminated message service message intended for the first destination to the proxy;
 - receiving the mobile terminated message service message;
 - 30 determining whether a message service message forwarding feature is enabled for the first destination;

in response to determining that a message service message forwarding feature is enabled for the first destination, determining whether the mobile terminated message service message is eligible for forwarding to a second destination; and

5 in response to determining the mobile terminated message service message is eligible for forwarding, initiating signaling to forward the mobile terminated message service message to the second destination.

15. A non-transitory computer readable medium comprising computer
10 executable instructions embodied in a tangible computer readable medium and when executed by a processor of a computer performs steps comprising:

at a message service message proxy separate from a short message service center (SMSC) and implemented on a computing
15 platform including at least one processor:

receiving a mobility management query message associated with the delivery of a messaging service message, where the query message includes a first message recipient identifier;

20 determining a second message recipient identifier to which the message should be forwarded;

inserting the second message recipient identifier into the query message; and

25 routing the query message to a mobile location register associated with the second message recipient identifier.

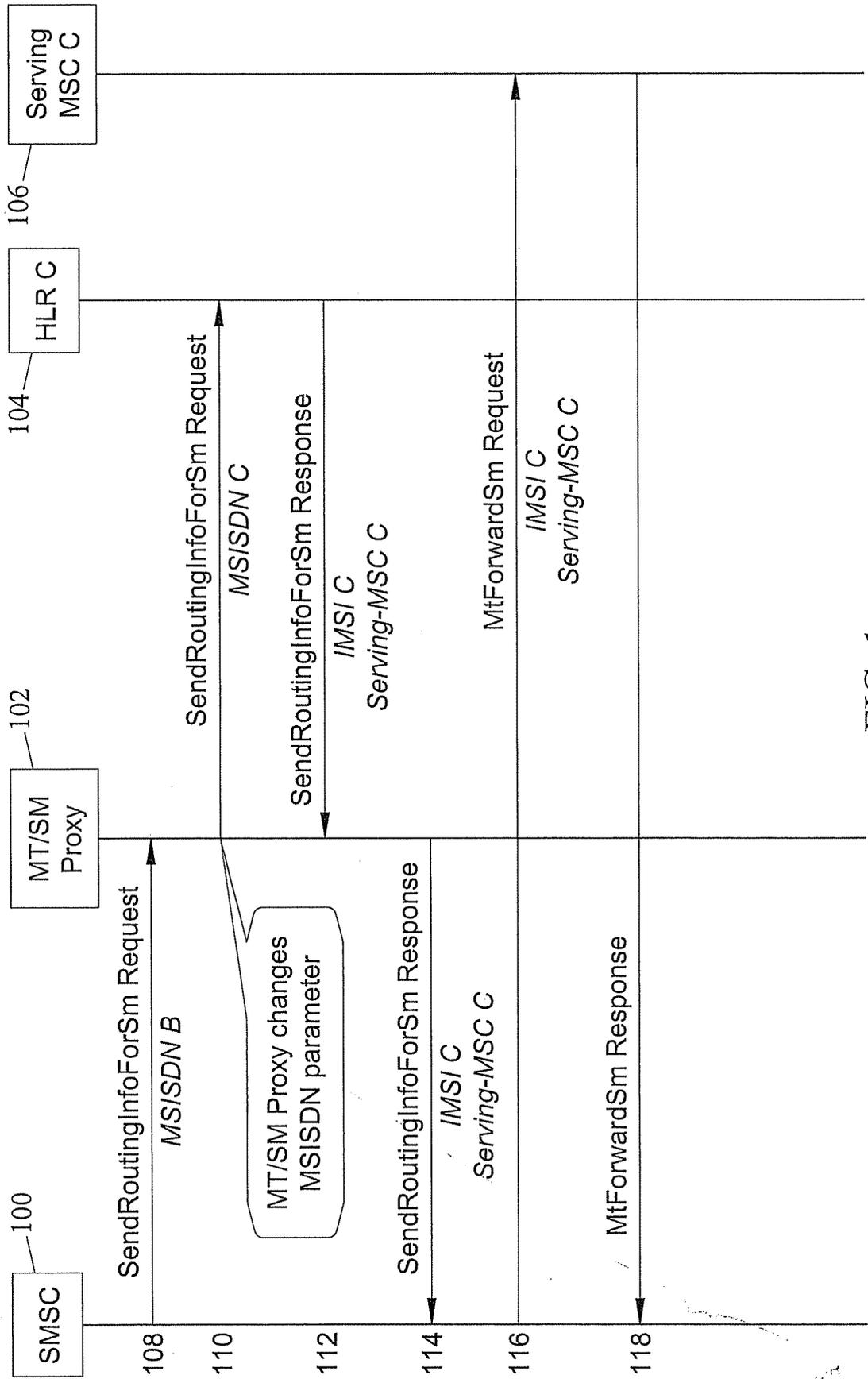


FIG. 1

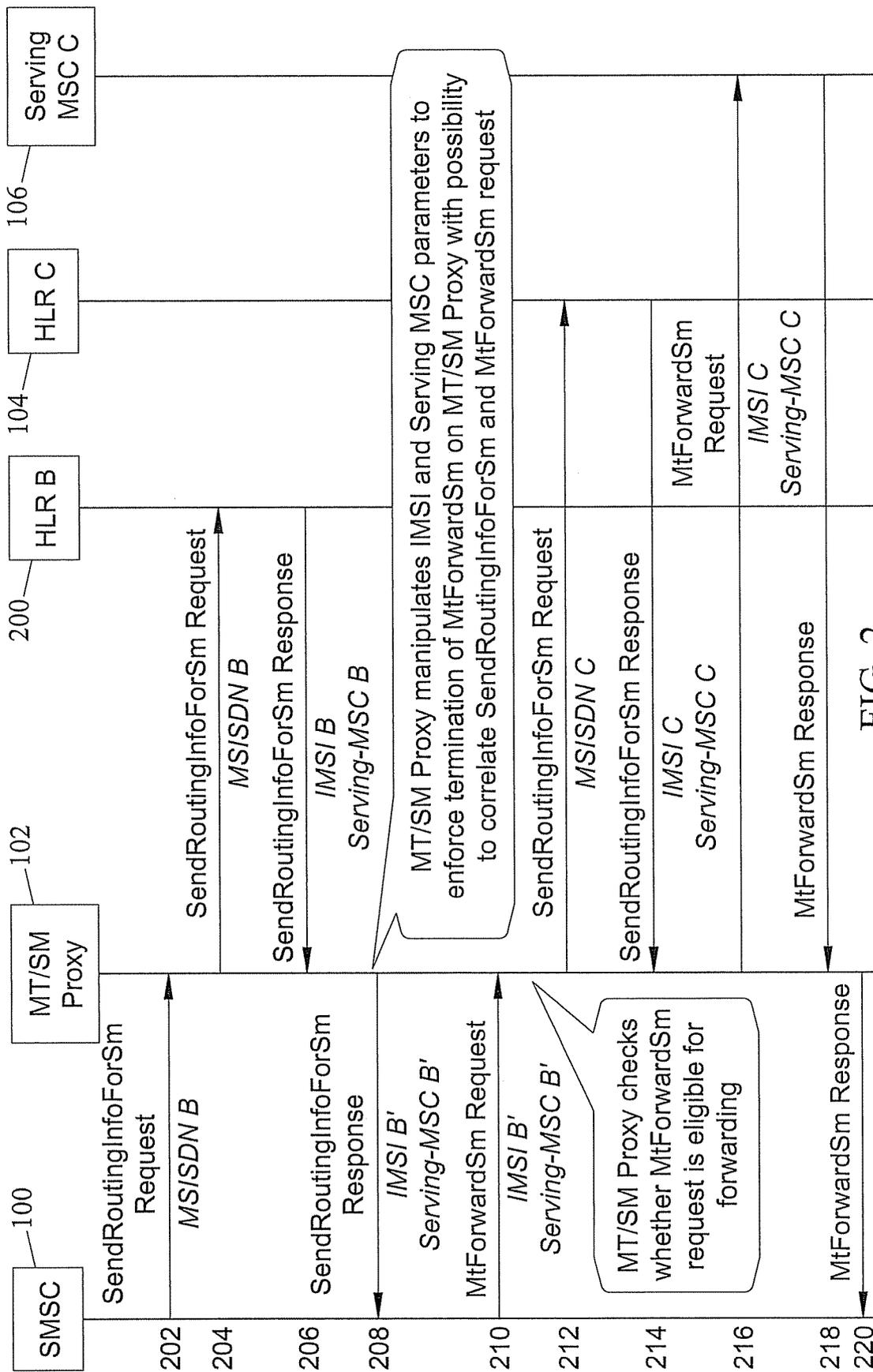


FIG. 2

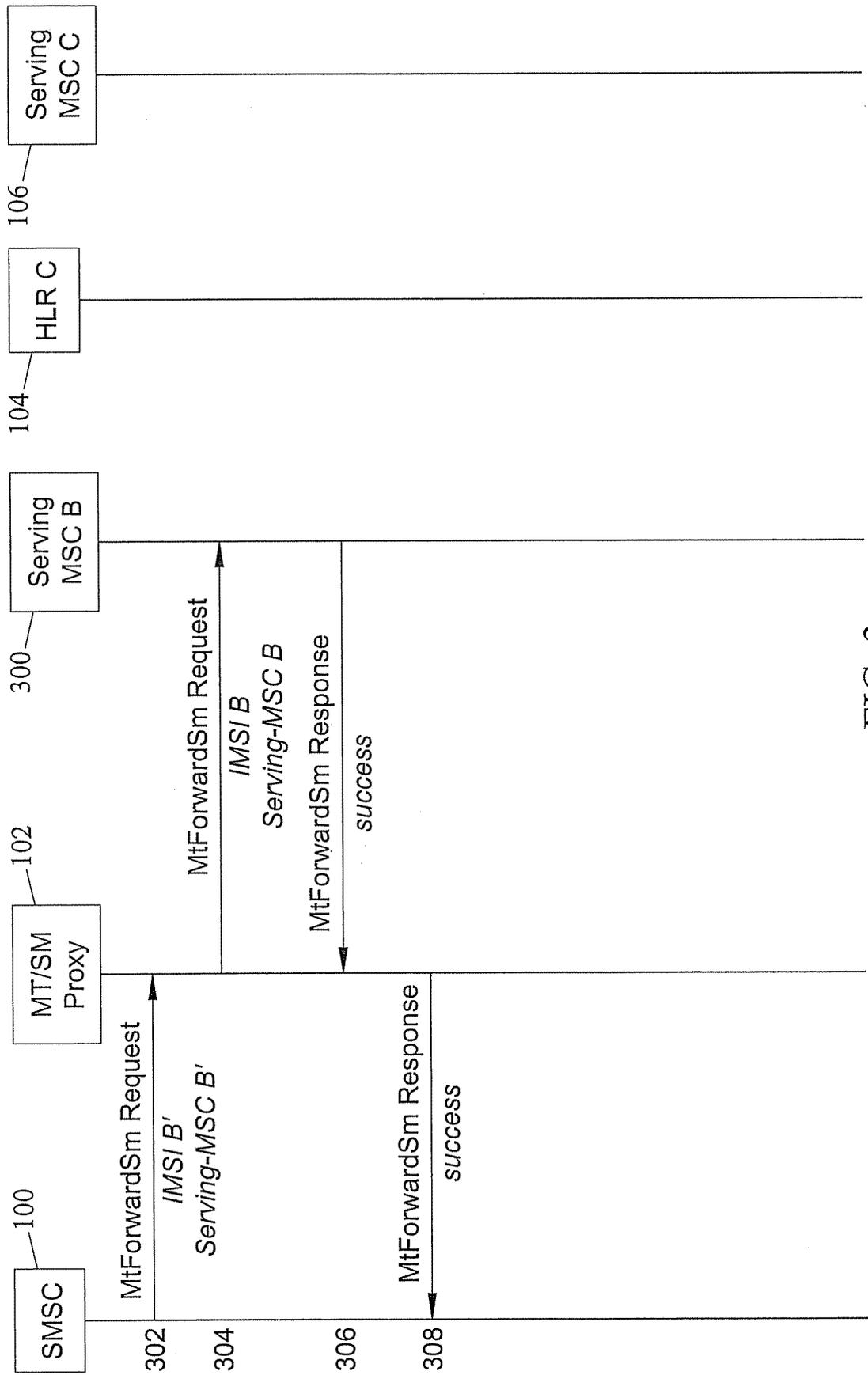


FIG. 3

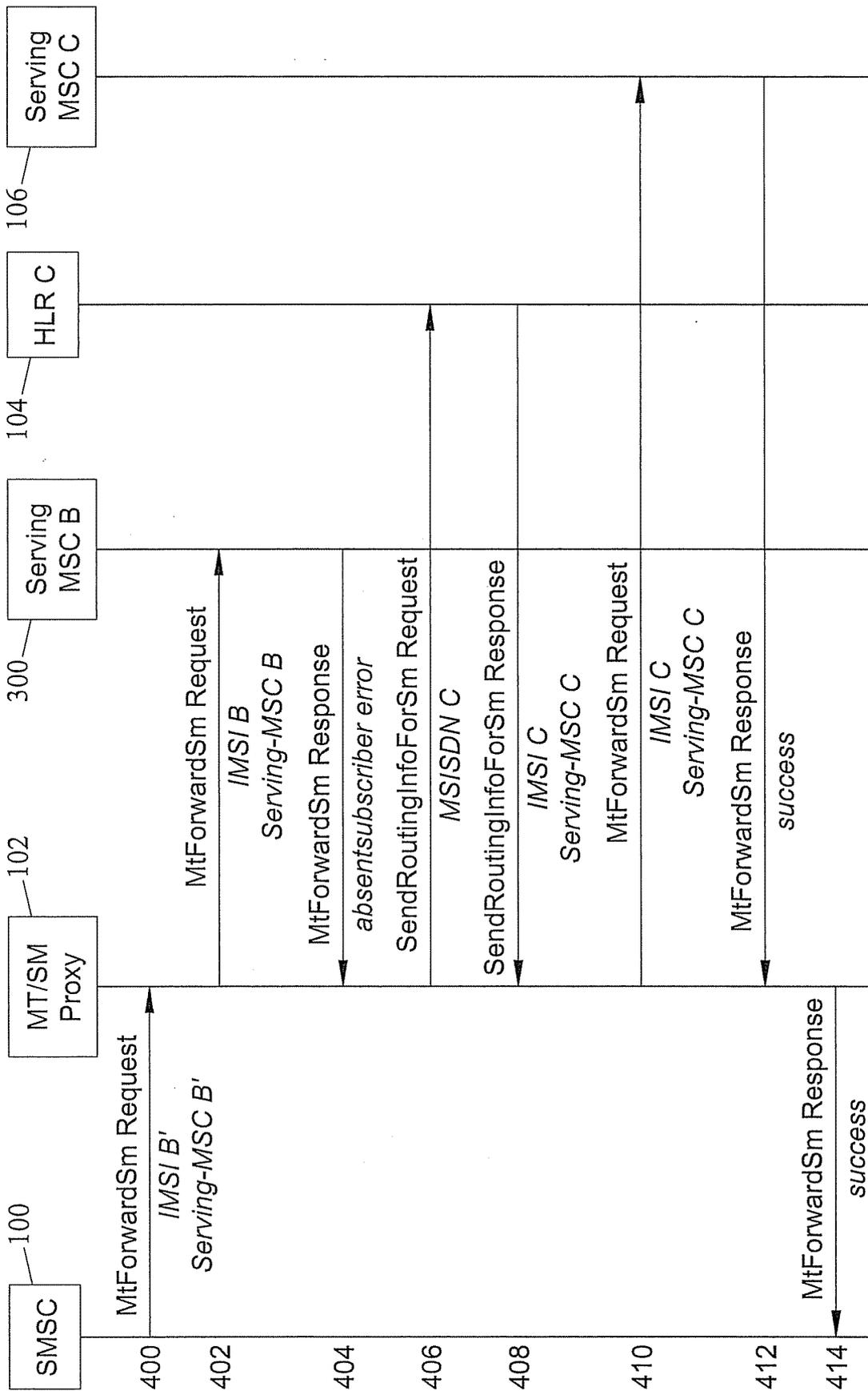


FIG. 4

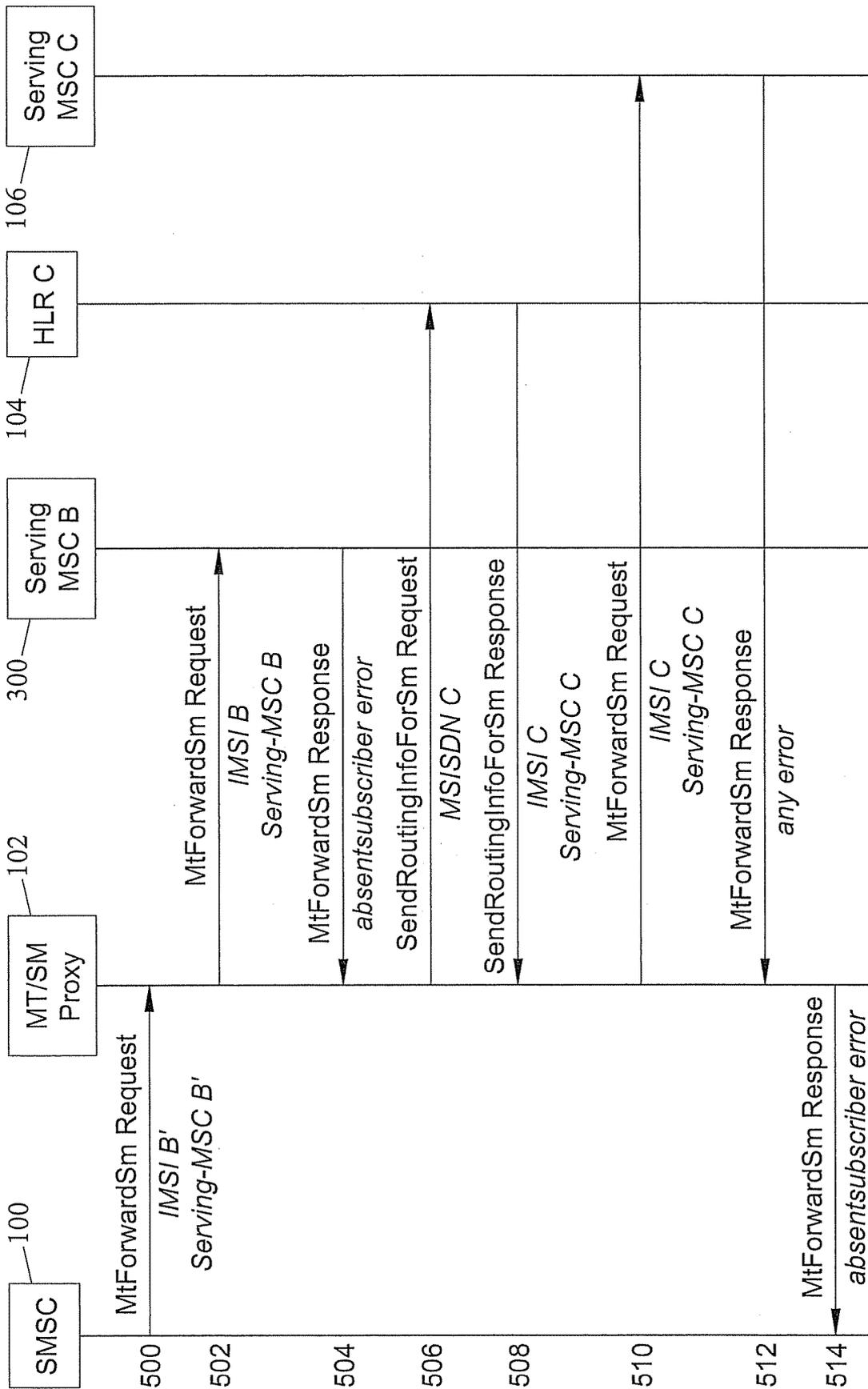


FIG. 5

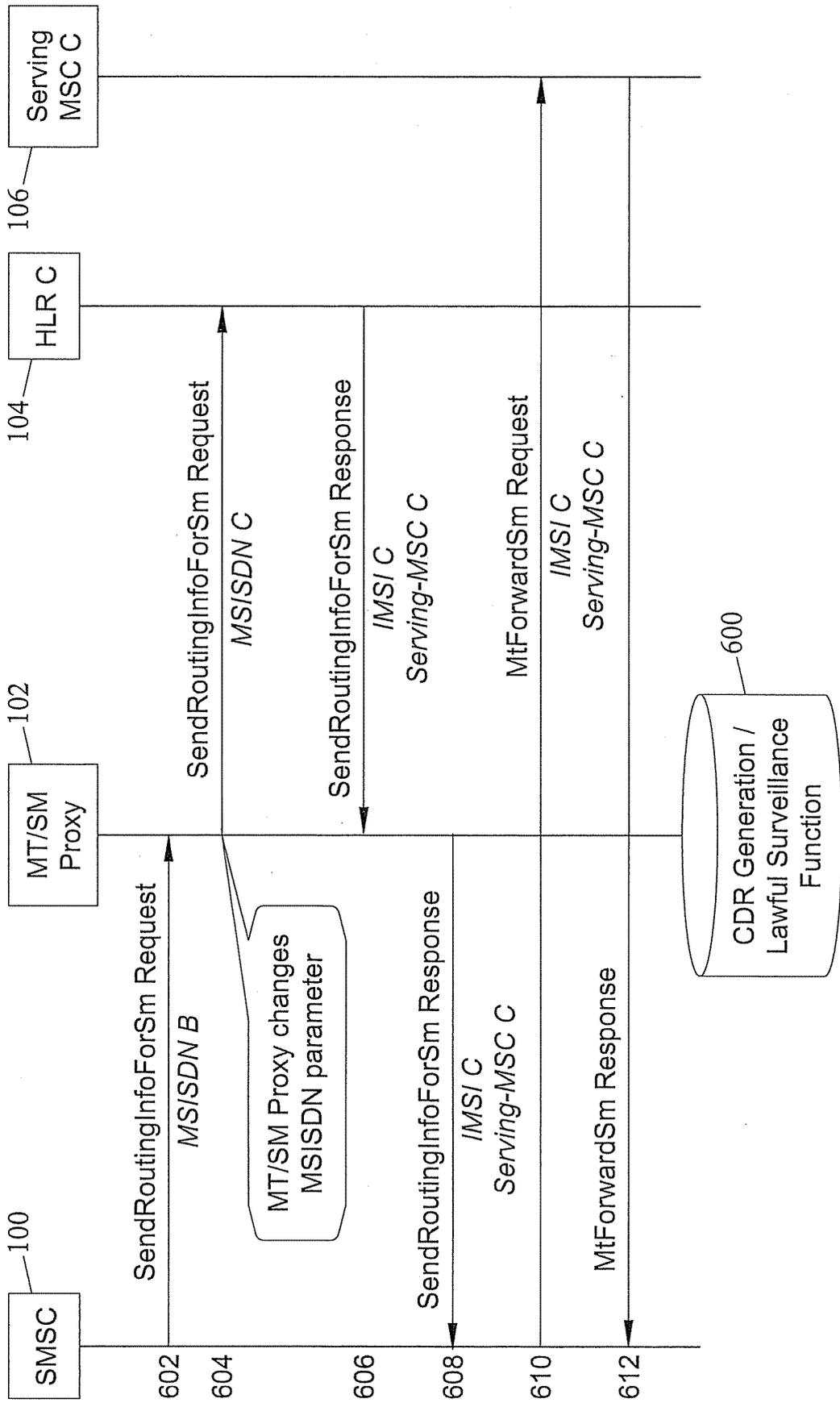


FIG. 6

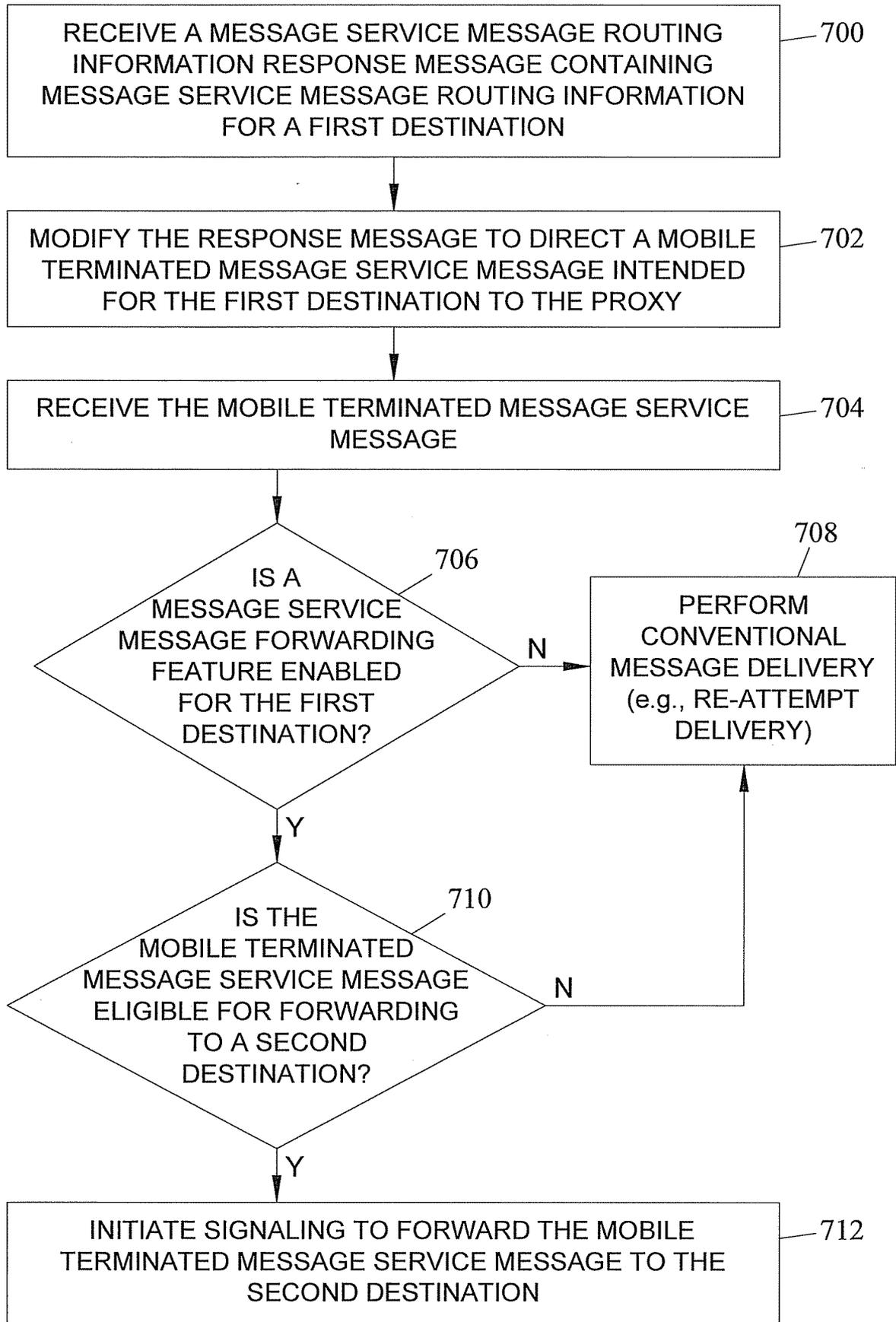


FIG. 7

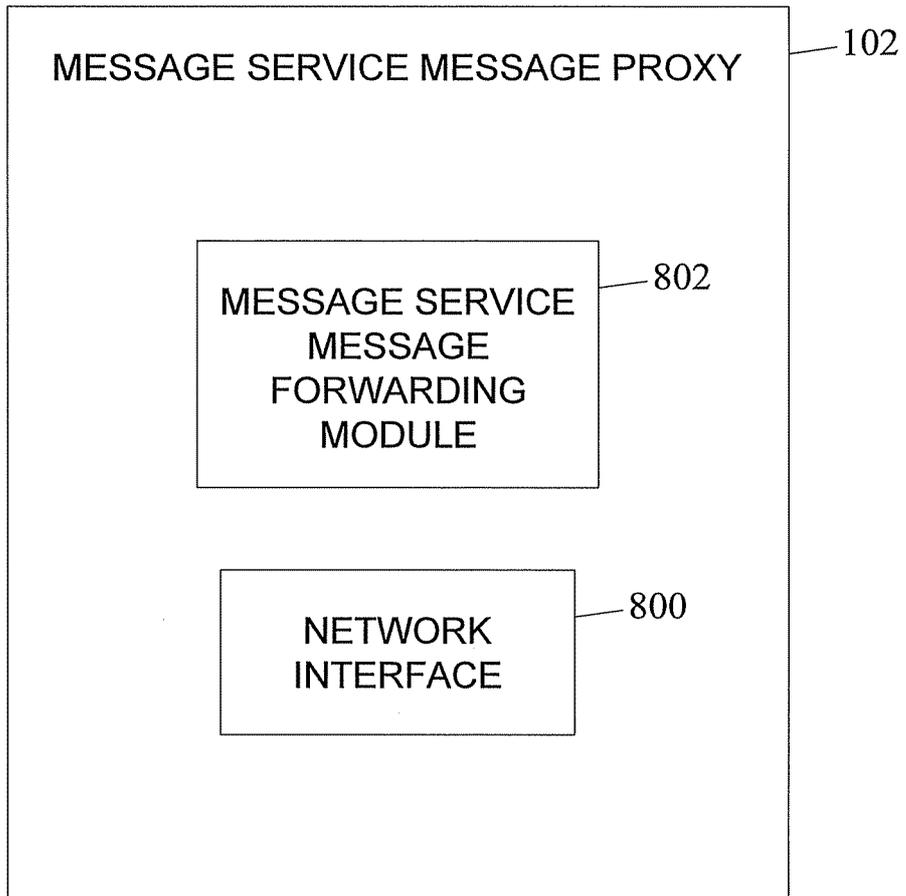


FIG. 8