

(51) International Patent Classification:
H04W 4/14 (2009.01) **H04L 12/58** (2006.01)(21) International Application Number:
PCT/EP2008/063632(22) International Filing Date:
10 October 2008 (10.10.2008)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant (for all designated States except US): **NOKIA SIEMENS NETWORKS OY** [FI/FI]; Karaportti 3, FI-02610 Espoo (FI).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **FARKAS, Lorant** [HU/HU]; Bocskai ut 82, 3. 3m. 2, H-1113 Budapest (HU). **JANOSI, Laszlo** [HU/HU]; Csiksomlyo Street 7, H-1048 Budapest (HU). **LUKA, Amalia** [HU/HU]; Gyermek ter 5/c 337., H-1131 Budapest (HU). **MOLNAR, Attila** [HU/HU]; Göd Kálmán u. 30, H-2132 God (HU). **SPRINGER, Robert** [HU/HU]; Egyetem ter 5., H-1053 Budapest (HU).(74) Agents: **BÖCKELEN, Rainer** et al.; Bavariaring 4-6, 80336 Munich (DE).

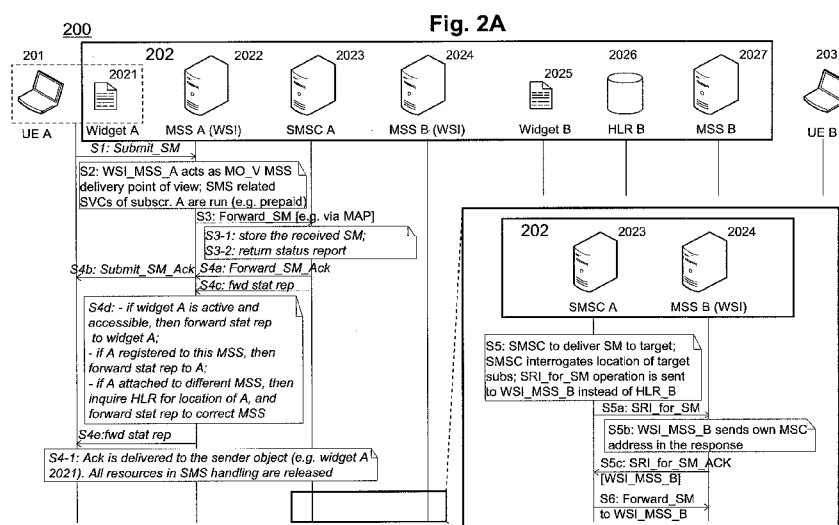
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: METHODS, APPARATUSES, SYSTEM AND RELATED COMPUTER PROGRAM PRODUCT FOR MESSAGE DELIVERY



(57) Abstract: It is disclosed a method (and apparatus) comprising transmitting, from a first network switching entity serving a source terminal, a message intended for a target terminal to a network message management entity; a method (and apparatus) comprising transmitting, from the network message management entity, the message to a network switching entity related to the target terminal being a target of the message; and method (and apparatus) comprising transmitting, from another first network switching entity configured for network services, a received message to one of i) the target terminal intended for receiving the message and ii) a second network switching entity related to the target terminal based on whether the target terminal is attached to one of the another first network switching entity and another network switching different from the first network switching entity.

TITLE OF THE INVENTION

METHODS, APPARATUSES, SYSTEM AND RELATED COMPUTER PROGRAM
PRODUCT FOR MESSAGE DELIVERY

FIELD OF THE INVENTION

[0001] The present invention relates message delivery. More specifically, the present invention relates to methods, apparatuses, a system and a related computer program product for message delivery. Examples of the present invention may be applicable e.g. in mobile circuit switched (CS) networks employing a web services (WS) compatible interface (WSI).

BACKGROUND

[0002] Mobile Circuit Switched (CS) core networks (CNs) form the basis of voice and multimedia mobile communication nowadays worldwide. Besides voice communication, another application is short message service (SMS), with which users can send short textual messages to each other.

[0003] Fig. 1 shows an example for message delivery of such short messages (SMs). As shown in Fig. 1, a communication network 100 comprises a source user equipment (UE) A 101, a core network 102 and a target UE B 103. In turn, the core network 102 comprises a mobile originating visited (MO_V) mobile switching center server (MSS) 1021, a home location register (HLR) A 1022, an SMS center (SMSC) 1023, a HLR B 1024 and an MSS B 1025.

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[0004] The MSS 1021, together with a multimedia gateway (MGW), provides a separation of the control plane (related to signaling) and the user plane (constituting the bearer). Furthermore, the MSS 1021 provides support of internet protocol (IP) and asynchronous transfer mode (ATM) bearers to transfer CS voice and data. Thus, the MSS 1021 assists to operators in saving operational expenditure (OPEX).

[0005] The SMSC 1023 provides the gateway functionality in delivering a message from UE A 101 to UE B 103 and taking care of storing the messages for a given period of time in case the message cannot be delivered to the target UE B 103 (e.g. because the terminal of the subscriber is switched off).

[0006] When the sending UE A 101 initiates message sending, UE A 101 can request report about successful delivery. So, as soon as the SMSC 1023 can deliver the message, a report will be sent to the source UE A 101 about this event. The report is actually a network originated SM with special content for the original sending UE A 101.

[0007] As shown in steps S1-0 to S22-0 in Figs. 1A and 1B, when a SM is mobile originated (S1-0), the SM enters the MSS 1021 in a visited public land mobile network (VPLMN) or home PLMN (HPLMN) (depending on the subscriber's roaming status) first. The MO_V MSS 1021 may then execute the SMS related services (e.g. barring, prepaid) of the originating UE 101 upon receiving the SM (S2-0), and then the SM is forwarded to the SMSC 1023 of the originating subscriber over mobile application part (MAP) interface (S3-0). When the SMSC 1023 receives the SM, the SMSC 1023 stores the SM (S4-0) and returns a

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status report through the MO_V MSS 1021 (S5-0) which indicates to the originating user that the SMS has reached the SMSC 1023. At this point the stateful mechanism of the originating side is stopped and resources released (S6-0, S7-0).

[0008] The SMSC 1023 then tries to deliver the SMS to the target UE B 103 (S8-0). First, the SMSC 1023 interrogates the HLR B 1024 of the target UE 103 to obtain the target subscriber's location (S9-0). In the interrogation response, the SMSC 1023 receives the address of the MSS B 1025, where the UE B 103 is located (S10-0, S11-0). The MSS B 1025 plays the role of a mobile terminated visited (MT_V) MSS. The SMSC 1023 then forwards the SM over MAP interface to the MT_V MSS 1025 (S12-0, S13-0) even when the MT_V MSS 1025 is not in the same network (that is, HPLMN of the sending subscriber is not the same where the target user roams). The MT_V MSS 1025 executes the target UE's 103 SMS related services (if any) and pages the target mobile (S14-0). If the target UE 103 is found, the SMS is delivered to the UE 103 (S15-0). If the target UE 103 is not found or any other problem is faced, then the SMSC 1023 is notified correspondingly, and the SMSC 1023 may try the delivery again at a later stage. If delivery is successful, then the SMSC 1023 is notified correspondingly (S16-0, S17-0).

[0009] Independently from the success of delivery, the stateful mechanism of the terminating side is stopped and the resources are released after the notification is sent to the SMSC 1023.

[0010] If the SMSC 1023 receives a positive acknowledgement about SM delivery and the originating user has requested a delivery report (S18-0), the SMSC

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1023 creates a special type of SM for report purpose and sends the SM to UE A 101. The target user of this SMS (i.e. UE A 101) will be the originating party of the original SM. The report SM is delivered on the same way as the original SM was: the SMSC 1023 queries the HLR A 1022 of the originating UE A 101 for subscriber's location (S19-0, S20-0) and delivers the report SM to the MT_V MSS 1021 of which address is received from HLR A 1022 (S21-0, S22-0).

[0011] The MSS 1021 may be equipped with the web services (WS) compatible interface (WSI) based on simple object access protocol (SOAP) or representational state transfer (REST). The purpose of WSI is to open the MSS 1021 for web and service oriented architecture (SOA) based services.

[0012] However, during the implementation, the services may be implemented, so that the services can be provided also to CS mobile subscribers. The MSS 1021 assumes that on a given level, the existing call and non-call related event handler architecture of the MSS 1021 may be re-used. If WSI is available, the MSS 1021 can be instructed over WSI e.g. to play the role of 3rd party call control and connect two or more users in a call. Alternatively, a subscriber can use PC based tools, e.g. web browser or widget (after proper authentication) to instruct the MSS 1021 to send an SM to another subscriber (e.g. UE B 103).

[0013] WSI based services are run in the home network (e.g. HPLMN) of the UE 101. That is, even if UE A 101 roams in a foreign network (e.g. VPLMN) when UE A 101 logs into the web portal and starts using any service on the VPLMN, the service execution request is always sent

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to an MSS 1021 in the HPLMN.

[0014] However, if UE 101 uses web based tools to initiate calls or to send SMSs, the natural expectation of the user of the UE 101 is that he/she feels the same experience as if he/she was using His/her mobile phone to perform the given action. That is, when an SM is sent, the user shall be able to configure the same settings which are available on the mobile phone and to request delivery notification.

[0015] Furthermore, the MSS 1021 with WSI is always in the HPLMN, while in a normal SM delivery to a mobile phone, no home MSS is involved, if the user roams in a VPLMN.

[0016] Still further, in the above report delivery to a mobile phone 103, no home MSS is involved if the user roams in a VPLMN.

[0017] In consideration of the above, it is an object of examples of the present invention to overcome one or more of the above drawbacks. In particular, the present invention provides methods, apparatuses, a system and a related computer program product for message delivery.

[0018] According to an example of the present invention, in a first aspect, this object is for example achieved by **a method** comprising:

transmitting, from a first network switching entity serving a source terminal, a message intended for a target terminal to a network message management entity.

[0019] According to further refinements of the example of the present invention as defined under the above first

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aspect,

- the method further comprises receiving, prior to the transmitting, the message via network services;
- the method further comprises obtaining information on a source terminal being a source of the message, if the source terminal is not attached to the network switching entity;
- the method further comprises receiving, from the network message management entity, a status report indicating successful receipt of the message;
- the status report is forwarded to a web client, if the source terminal is configured for network services;
- the status report is forwarded to the web client, if the web client is started and accessible from the first network switching entity;
- the method further comprises transmitting, from the first network switching entity, the status report to one of i) the source terminal being a source of the message and ii) a second network switching entity related to the source terminal based on whether the source terminal is registered at one of the first network switching entity and another network switching different from the first network switching entity;
- the method further comprises receiving another message including a status report or another status report from the network message management entity;
- the method further comprises transmitting, from the network switching entity configured for network services, the received another message to one of i) the source terminal and ii) a second network switching entity related to the source terminal based on whether the source terminal is attached to one of the first network switching entity and another network switching different from the first network switching entity;
- the method further comprises notifying the another

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message to a web client related to the source terminal, if the source terminal is configured for the network services;

- the method further comprises obtaining, prior to the transmitting, an address of the second network switching entity.

[0020] According to an example of the present invention, in a second aspect, this object is for example achieved by **a method** comprising:

- transmitting, from a network message management entity, a message to a network switching entity related to a target terminal being a target of the message.

[0021] According to further refinements of the example of the present invention as defined under the above second aspect,

- the method further comprises receiving, in response to the transmitting, a network address of the network switching entity;

- the method further comprises forwarding, responsive to the receiving, the message to the network switching entity based on the received address;

- the transmitting is based on mobile application part;

- the method further comprises transmitting, to the network switching entity, a status report indicating successful receipt of the message;

- the method further comprises receiving, after the forwarding, an acknowledgement indicating receipt of the message by the target terminal, judging whether a source terminal requested a status report on receipt of the message, and forwarding, based on a result of judging, another message including the status report to a network switching entity related to the source terminal;

- the method further comprises obtaining, prior to the

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forwarding, a network address of the network switching entity related to the source terminal.

[0022] According to an example of the present invention, in a third aspect, this object is for example achieved by **a method** comprising:

transmitting, from a first network switching entity configured for network services, a received message to one of

i) a target terminal intended for receiving the message and

ii) a second network switching entity related to the target terminal

based on whether the target terminal is attached to one of the first network switching entity and another network switching different from the first network switching entity.

[0023] According to further refinements of the example of the present invention as defined under the above third aspect,

- the method further comprises forwarding the message to a web client related to the target terminal, if the target terminal is configured for the network services;

- the method further comprises obtaining, prior to the transmitting, an address of the second network switching entity;

- the method further comprises receiving an acknowledgment of receipt of the message from the one of the target terminal and the second network switching entity;

- the method further comprises forwarding the received acknowledgement to a network message management entity.

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[0024] According to an example of the present invention, in a fourth aspect, this object is for example achieved by an apparatus comprising:

means for transmitting, from the apparatus serving a source terminal, a message intended for a target terminal to a network message management entity.

[0025] According to further refinements of the example of the present invention as defined under the above fourth aspect,

- the apparatus further comprises means for receiving, prior to the transmitting performed by the means for transmitting, the message via network services;

- the apparatus further comprises means for obtaining information on the source terminal being a source of the message, if the source terminal is not attached to the network switching entity;

- the apparatus further comprises means for receiving, from the network message management entity, a status report indicating successful receipt of the message;

- the apparatus further comprises means for forwarding the status report to a web client, if the source terminal is configured for network services;

- the means for forwarding is configured to forward the status report to the web client, if the web client is started and accessible from the first network switching entity;

- the means for transmitting is further configured to transmit, from the first network switching entity, the status report to one of i) the source terminal being a source of the message and ii) a second network switching entity related to the source terminal based on whether the source terminal is registered at one of the first network switching entity and another network switching different from the first network switching entity;

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- the apparatus further comprises means for receiving another message including a status report or another status report from the network message management entity;
- the means for transmitting is further configured to transmit, from the apparatus being configured for network services, the received another message to one of i) the source terminal and ii) a second network switching entity related to the source terminal based on whether the source terminal is attached to one of the first network switching entity and another network switching different from the first network switching entity;
- the apparatus further comprises means for notifying the another message to a web client related to the source terminal, if the source terminal is configured for the network services;
- the apparatus further comprises means for obtaining, prior to the transmitting performed by the means for transmitting, an address of the second network switching entity;
- the apparatus is constituted by a first mobile switching center server configured for a web services compatible interface.

[0026] According to an example of the present invention, in a fifth aspect, this object is for example achieved by **an apparatus** comprising:

means for transmitting, from the apparatus being constituted by a network message management entity, a message to a network switching entity related to a target terminal being a target of the message.

[0027] According to further refinements of the example of the present invention as defined under the above fifth aspect,

- the apparatus further comprises means for receiving,

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in response to the transmitting performed by the means for transmitting, a network address of the network switching entity;

- the apparatus further comprises means for forwarding, responsive to the receiving performed by the means for receiving, the message to the network switching entity based on the received address;

- the transmitting is based on mobile application part;

- the means for transmitting is further configured to transmit, to the network switching entity, a status report indicating successful receipt of the message;

- the means for receiving is further configured to receive, after the forwarding performed by the means for forwarding, an acknowledgement indicating receipt of the message by the target terminal, the apparatus further comprising means for judging whether a source terminal requested a status report on receipt of the message, wherein the means for forwarding is further configured to forward, based on a result of judging, another message including the status report to a network switching entity related to the source terminal;

- the apparatus further comprises means for obtaining, prior to the forwarding performed by the means for forwarding, a network address of the network switching entity related to the source terminal;

- the apparatus is constituted by a short message service center.

[0028] According to an example of the present invention, in a sixth aspect, this object is for example achieved by **an apparatus** comprising:

means for transmitting, from the apparatus being constituted by a first network switching entity configured for network services, a received message to one of

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i) a target terminal intended for receiving the message and

ii) a second network switching entity related to the target terminal

based on whether the target terminal is attached to one of the first network switching entity and another network switching different from the first network switching entity.

[0029] According to further refinements of the example of the present invention as defined under the above sixth aspect,

- the apparatus further comprises means for forwarding the message to a web client related to the target terminal, if the target terminal is configured for the network services;

- the apparatus further comprises means for obtaining, prior to the transmitting performed by the means for transmitting, an address of the second network switching entity;

- the apparatus further comprises means for receiving an acknowledgment of receipt of the message from the one of the target terminal and the second network switching entity;

- the means for forwarding is further configured to forward the received acknowledgement to a network message management entity;

- the apparatus is constituted by a second mobile switching center server configured for a web services compatible interface.

[0030] According to further refinements of the example of the present invention as defined under the fourth to sixth aspects,

- the first and second mobile switching center servers

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are comprised in a single mobile switching center server;
- at least one, or more of means for transmitting, means for receiving, means for obtaining, means for notifying, means for forwarding, means for judging and the apparatus is implemented as a chipset or module.

[0031] According to an example of the present invention, in a seventh aspect, this object is for example achieved by an apparatus comprising:

a transmitter configured to transmit, from the apparatus serving a source terminal, a message intended for a target terminal to a network message management entity.

[0032] According to further refinements of the example of the present invention as defined under the above seventh aspect,

- the apparatus further comprises a receiver configured to receive, prior to the transmitting performed by the transmitter, the message via network services;

- the apparatus further comprises an obtainer configured to obtain information on the source terminal being a source of the message, if the source terminal is not attached to the network switching entity;

- the apparatus further comprises a receiver configured to receive, from the network message management entity, a status report indicating successful receipt of the message;

- the apparatus further comprises a forwarder configured to forward the status report to a web client, if the source terminal is configured for network services;

- the forwarder is configured to forward the status report to the web client, if the web client is started and accessible from the first network switching entity;

- the transmitter is further configured to transmit,

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from the first network switching entity, the status report to one of i) the source terminal being a source of the message and ii) a second network switching entity related to the source terminal based on whether the source terminal is registered at one of the first network switching entity and another network switching different from the first network switching entity;

- the apparatus further comprises a receiver configured to receive another message including a status report or another status report from the network message management entity;

- the transmitter is further configured to transmit, from the apparatus being configured for network services, the received another message to one of i) the source terminal and ii) a second network switching entity related to the source terminal based on whether the source terminal is attached to one of the first network switching entity and another network switching different from the first network switching entity;

- the apparatus further comprises a notifier configured to notify the another message to a web client related to the source terminal, if the source terminal is configured for the network services;

- the apparatus further comprises an obtainer configured to obtain, prior to the transmitting performed by the transmitter, an address of the second network switching entity;

- the apparatus is constituted by a first mobile switching center server configured for a web services compatible interface.

[0033] According to an example of the present invention, in an eighth aspect, this object is for example achieved by an apparatus comprising:

- a transmitter configured to transmit, from the

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apparatus being constituted by a network message management entity, a message to a network switching entity related to a target terminal being a target of the message.

[0034] According to further refinements of the example of the present invention as defined under the above eighth aspect,

- the apparatus further comprises a receiver configured to receive, in response to the transmitting performed by the transmitter, a network address of the network switching entity;

- the apparatus further comprises a forwarder configured to forward, responsive to the receiving performed by the receiver, the message to the network switching entity based on the received address;

- the transmitter is based on mobile application part;

- the transmitter is further configured to transmit, to the network switching entity, a status report indicating successful receipt of the message;

- the receiver is further configured to receive, after the forwarding performed by the forwarder, an acknowledgement indicating receipt of the message by the target terminal, the apparatus further comprising a judger configured to judge whether a source terminal requested a status report on receipt of the message, wherein the forwarder is further configured to forward, based on a result of judging, another message including the status report to a network switching entity related to the source terminal;

- the apparatus further comprises an obtainer configured to obtain, prior to the forwarding performed by the forwarder, a network address of the network switching entity related to the source terminal;

- the apparatus is constituted by a short message

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service center.

[0035] According to an example of the present invention, in a ninth aspect, this object is for example achieved by **an apparatus** comprising:

a transmitter configured to transmit, from the apparatus being constituted by a first network switching entity configured for network services, a received message to one of

i) a target terminal intended for receiving the message and

ii) a second network switching entity related to the target terminal

based on whether the target terminal is attached to one of the first network switching entity and another network switching different from the first network switching entity.

[0036] According to further refinements of the example of the present invention as defined under the above ninth aspect,

- the apparatus further comprises a forwarder configured to forward the message to a web client related to the target terminal, if the target terminal is configured for the network services;

- the apparatus further comprises an obtainer configured to obtain, prior to the transmitting performed by the transmitter, an address of the second network switching entity;

- the apparatus further comprises a receiver configured to receive an acknowledgment of receipt of the message from the one of the target terminal and the second network switching entity;

- the forwarder is further configured to forward the received acknowledgement to a network message management

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entity;

- the apparatus is constituted by a second mobile switching center server configured for a web services compatible interface.

[0037] According to further refinements of the example of the present invention as defined under the seventh to ninth aspects,

- the first and second mobile switching center servers are comprised in a single mobile switching center server;
- at least one, or more of a transmitter, a receiver, an obtainer, a notifier, a forwarder, a judger and the apparatus is implemented as a chipset or module.

[0038] According to an example of the present invention, in a tenth aspect, this object is for example achieved by **a system** comprising:

- a source terminal configured to send a message and to receive a status report;

- a first mobile switching center server according to the above fourth or seventh aspects;

- a short message service center according to the above fifth or eighth aspects;

- a second mobile switching center server according to the above sixth or ninth aspects; and

- a target terminal configured to receive the message and to return an acknowledgement of receipt.

[0039] According to an example of the present invention, in an eleventh aspect, this object is for example achieved by **a computer program product** comprising code means for performing method steps of a method according to any one of the above first to third aspects, when run on a processing means or module.

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[0040] According to an example of the present invention, in a twelfth aspect, this object is for example achieved by a computer program product comprising code means for performing method steps of a method comprising:

transmitting, from a first network switching entity serving a source terminal, a message intended for a target terminal to a network message management entity.

[0041] According to an example of the present invention, in a thirteenth aspect, this object is for example achieved by a computer program product comprising code means for performing method steps of a method comprising:

transmitting, from a network message management entity, a message to a network switching entity related to a target terminal being a target of the message.

[0042] According to an example of the present invention, in a fourteenth aspect, this object is for example achieved by a computer program product comprising code means for performing method steps of a method comprising:

transmitting, from a first network switching entity configured for network services, a received message to one of

i) a target terminal intended for receiving the message and

ii) a second network switching entity related to the target terminal

based on whether the target terminal is attached to one of the first network switching entity and another network switching different from the first network switching entity.

[0043] In this connection, it has to be pointed out that examples of the present invention enable one or more of the following:

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- Avoiding usage of short message peer-to-peer (SMPP), computer interface to machine distribution v. 2 (CIMD2) or universal computer protocol (UCP) based interface of the SMSC for sending an SM and for receiving delivery reports.
- Providing the MO_V MSS functionality in the message delivery chain;
- Allowing implementation based on the MSS's architecture, i.e. the MSS shall be able to respond e.g. by send routing information for short message (SRI_for_SM) over MAP and shall be able to download subscriber data from a repository without cancelling the subscriber's current location. The MSS shall be able to play a "transit-node" role in SMS delivery;
- Seamless running of SMS related services, since the MSS roles (e.g. MO_V and MT_V) are involved in SMS delivery;
- Notifying a web based application about SMS related events, since the home-based WSI-MSS is involved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0044] Examples of the present invention are described herein below with reference to the accompanying drawings, in which:

[0045] Figs. 1A and 1B show the above-described example for message delivery;

[0046] Figs. 2A to 2C show methods according to an example of the present invention for message delivery; and

[0047] Figs. 3A to 3C show apparatuses (e.g. WSI MSS A 2022, SMSC 2023 and WSI MSS B 2024) for message delivery

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according to an example of the present invention.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

[0048] Examples of the present invention are described herein below by way of example with reference to the accompanying drawings.

[0049] It is to be noted that for this description, the terms "CN; WSI MSS A and WSI MSS B; MO_V MSS; SM; UE A; UE B; SMSC; WSI; MSS A and MSS B; and MAP" are examples for "network; network switching entities configured for network services; mobile originated visited mobile switching center server; message and another message; source terminal; target terminal; network message management entity; network services; network switching entities related to the source and target terminals; and mobile application part", respectively, without restricting the latter-named terms to the special technical or implementation details imposed to the first-named terms.

[0050] Figs. 2A to 2C show methods for message delivery according to an example of the present invention. Signaling between elements is indicated in horizontal direction, while time aspects between signaling may be reflected in the vertical arrangement of the signaling sequence as well as in the sequence numbers. It is to be noted that the time aspects indicated in Figs. 2A to 2C do not necessarily restrict any one of the method steps shown to the step sequence outlined. This applies in particular to method steps that are functionally disjunctive with each other. Within Figs. 2A to 2C, for ease of description, means or portions which may provide main functionalities are depicted with solid functional

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blocks or arrows and/or a normal font, while means or portions which may provide optional functions are depicted with dashed functional blocks or arrows and/or an italic font.

[0051] As shown in Figs. 2A to 2C, a communication system 200 may comprise a UE A 201, a core network 202 and a UE B 203. The core network 202 in turn may comprise a web application (or widget A hereinafter) 2021, a WSI MSS A 2022, an SMSC 2023, a WSI MSS B 2024, a web client (or widget B hereinafter) 2025, a HLR B 2026 and a MSS B 2027. As indicated by a dashed box surrounding the pictograms of UE A 201 and widget A 2021, the widget A 2021 may also be a part of the UE A 201. The same applies to UE B 203 and widget B 2025. In the following example according to the present invention, "MSS" (or occasionally MSC) represents every possible CS mobile core switch.

[0052] In an optional preparatory step S1, e.g. WSI MSS A 2022 may perform receiving a message e.g. via network services e.g. from UE A 201.

[0053] Then, in steps S2 and S3, e.g. the WSI MSS A 2022 may perform transmitting, from a first network switching entity (i.e. the WSI MSS A 2022) serving a source terminal (e.g. UE A 201), the message (e.g. SM) intended for a target terminal (e.g. UE B 203) to a network message management entity (e.g. SMSC 2023). It is to be noted that the term "serving" may include the case that the first network switching entity is configured to act as a mobile originated visited mobile switching center server (MO_V MSS).

Furthermore, "V_MSS" may relate to the MSS that is serving a UE in the VPLMN (Visited Public Land Mobile

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Network). "MO" may mean that the V_MSS concerned is configured to serve e.g. UE A. In addition, "MO MSS" may designate a case where UE A is e.g. not roaming. Optionally, the WSI MSS A 2022 may also perform obtaining information on the source terminal (e.g. UE A 201) being a source of the message, if the source terminal is not attached to the network switching entity (e.g. WSI MSS A 2022).

[0054] In an optional step S3-1, when the SMSC 2023 receives the message (e.g. SM), the SMSC 2023 may perform storing the message (e.g. SM), and may perform, in an optional step S4a, returning a status report (S4a), e.g. via the WSI MSS A 2022 in an optional step S4b, the status report indicating to UE A 201 that the message (e.g. SM) has reached the SMSC 2023. At this point, in an optional step S4-1, the stateful mechanism of the originating side is stopped and resources released.

[0055] In detail, e.g. the WSI MSS A 2022 may perform forwarding the status report to a web client (e.g. widget A 2021) related to the target terminal (e.g. UE B 203), if UE A 201 is configured for the network services, e.g. the widget A 2021 is started and still accessible from WSI MSS A. There are several ways how this may be implemented, such as:

i) synchronous interface: the web client 2021 may send e.g. a GET request over HTTP and the MSS may reply in a delayed fashion over the same transfer control protocol (TCP) connection when there is an event. If web client closes connection, that may mean that the web client is inaccessible from the server, since the web server may not be configured to open e.g. socket connections, so the status report may not be delivered to it, even though the web client could be still running;

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ii) asynchronous interface: the web client 2021 may ask e.g. for SM delivery e.g. as a SOAP request. MSS may reply OK, and may return its resource ID. Then, the web client may disconnect, and may poll periodically e.g. via SOAP requests using this resource ID. Once the MSS has new information, the MSS may report to the client. Now, the client might stop polling for some reason and then MSS is not able to report, even though the web client could be still running.

[0056] Alternatively or additionally, the WSI MSS A 2022 may perform transmitting the status report to i) the source terminal (e.g. UE A 201) if the source terminal is registered to the WSI MSS A 2022 or ii) a second network switching entity (another MSS A, not shown) related to the source terminal (e.g. UE A 201) based on whether the source terminal is attached to WS MSS A 2022 or another MSS A.

[0057] Then, in step S5, the SMSC 2023 may perform delivering the message (e.g. SM) to a target terminal (e.g. UE B 203).

[0058] To this end, in step S5a e.g. the SMSC 2023 may perform transmitting, from a network message management entity (i.e. the SMSC 2023), the message (e.g. SM) to another network switching entity (e.g. WSI MSS B 2024) related to a target terminal (e.g. UE B 203) being a target of the message. The transmitting may be based on mobile application part (MAP).

[0059] In an optional step S5c, e.g. the SMSC 2023 may perform receiving, in response to the transmitting, a network address of the network switching entity (e.g. WSI MSS B 2024). Furthermore, in an optional step S6, e.g.

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the SMSC 2023 may perform forwarding, responsive to the receiving, the message to the network switching entity (e.g. WSI MSS B 2024) based on the received address.

[0060] Furthermore, in steps S7, S7a and S7b, e.g. the WSI MSS B 2024 may perform transmitting, from a first network switching entity (i.e. the WSI MSS B 2024) configured for network services (e.g. WSI), the received message (e.g. SM) to i) the target terminal (e.g. UE B 203) intended for receiving the message or ii) a second network switching entity (e.g. MSS B 2027) related to the target terminal (e.g. UE B 203) based on whether the target terminal is attached to one of the first network switching entity and another network switching entity different from the first network switching entity.

[0061] In detail, in step S7, e.g. the WSI MSS B 2024 may perform forwarding the message to a web client (e.g. widget B 2025) related to the target terminal (e.g. UE B 203), if the target terminal is configured for the network services. Furthermore, in steps S7b1 and S7b3, e.g. the WSI MSS B2024 may perform obtaining, prior to the transmitting, an address of the second network switching entity (e.g. MSS B 2027) e.g. from the HLR B 2026. Still further, in steps S7a3 or S7b8 and S7b9, e.g. the WSI MSS B 2024 may perform receiving an acknowledgment of receipt of the message from the target terminal (e.g. UE B 203) or the second network switching entity (e.g. MSS B 2027).

[0062] In optional steps S7a4 or S7b10 (based on whether UE B 203 is attached to WSI MSS B 2024 or not), e.g. the WSI MSS B 2024 may perform forwarding the received acknowledgement to a network message management entity (e.g. SMSC 2023), which forwarded acknowledgement may be

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received e.g. by the SMSC 2023.

[0063] Then, in optional step S8a, e.g. the SMSC 2023 may perform judging whether the source terminal (e.g. UE A 201) requested a status report on receipt of the message, and may perform, in optional step S8e, forwarding, based on a result of judging, another message including the status report to a network switching entity (e.g. WSI MSS A 2022) related to the source terminal (e.g. UE A 201).

[0064] Optionally, in steps S8b to S8d, e.g. the SMSC 2023 may perform obtaining, prior to the forwarding, a network address of the network switching entity (e.g. WSI MSS A 2022) related to the source terminal (e.g. UE A 201).

[0065] Then, in an optional step S8e, e.g. the WSI MSS A 2022 (not HLR-A) may perform receiving the another message including the status report from the network message management entity (e.g. SMSC 2023).

[0066] In optional steps S8f and S8g, e.g. the WSI MSS A 2022 may perform transmitting, from the network switching entity (i.e. WSI MSS A 2022) configured for network services (e.g. WSI), the received another message (e.g. status report) to i) the source terminal (e.g. UE A 201) or ii) the second network switching entity (MSS A (not shown)) related to the source terminal (e.g. UE A 201) based on whether the source terminal is attached to the first network switching entity (e.g. WSI MSS A 2022) or another network switching different from the first network switching entity. In detail, in optional step S8g, the WSI MSS A 2022 may perform notifying the another message to a web client (e.g. widget A) related to the source terminal (e.g. UE A 201), if the source terminal

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is configured for the network services (e.g. WSI).

[0067] Finally, as an option in step S8f, e.g. the WSI MSS A 2022 may perform obtaining, prior to the transmitting, an address of the second network switching entity (e.g. MSS A (not shown)).

[0068] Figs. 3A to 3C show apparatuses (e.g. WSI MSS A 2022, SMSC 2023 and WSI MSS B 2024) for message delivery according to an example of the present invention. Within Figs. 3A to 3C, for ease of description, means or portions which may provide main functionalities are depicted with solid functional blocks or arrows and/or a normal font, while means or portions which may provide optional functions are depicted with dashed functional blocks or arrows and/or an italic font.

[0069] The UE A 201 may comprise a CPU (or core functionality CF) 2011, a memory 2012, an optional transmitter (or means for transmitting) 2013 and an optional receiver (or means for receiving) 2014. Alternatively, UE A 101 may also comprise the widget A 2021.

[0070] The WSI MSS A 2022 may comprise a CPU (or core functionality CF) 20221, a memory 20222, a transmitter (or means for transmitting) 20223 and an optional receiver (or means for receiving) 20224.

[0071] The SMSC 2023 may comprise a CPU (or core functionality CF) 20231, a memory 20232, a transmitter (or means for transmitting) 20233 and an optional receiver (or means for receiving) 20234.

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[0072] The WSI MSS B 2024 may comprise a CPU (or core functionality CF) 20241, a memory 20242, a transmitter (or means for transmitting) 20243 and an optional receiver (or means for receiving) 20244.

[0073] The optional HLR B 2026 may comprise a CPU (or core functionality CF) 20261, a memory 20262, an optional transmitter (or means for transmitting) 20263 and an optional receiver (or means for receiving) 20264.

[0074] The MSS B 2027 may comprise a CPU (or core functionality CF) 20271, a memory 20272, a transmitter (or means for transmitting) 20273 and an optional receiver (or means for receiving) 20274.

[0075] Finally, UE B 203 may comprise a CPU (or core functionality CF) 2031, a memory 2032, an optional transmitter (or means for transmitting) 2033 and an optional receiver (or means for receiving) 2034.

[0076] As indicated by the bold-printed functionalities of the CPUs 20221; 20231; 20241, means for obtaining and means for notifying of the WSI MSS A 2022, means for forwarding, means for judging and means for obtaining of the SMSC 2023 and means for forwarding and means for obtaining of the WSI MSS B 2024 may be constituted by respective combinations of the CPUs 20221; 20231; 20241, the means for transmitting 20223; 20233; 20243 and the means for receiving 20224; 20234; 20244 (as shown in Figs. 3A to 3C), or may alternatively be separate functional entities or means (not shown).

[0077] The CPUs 20x1 (wherein x = 1, 3, 22, 23, 24, 26 and 27) may respectively be configured to process various data inputs and to control the functions of the memories

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20x2, the means for transmitting 202x3 and the means for receiving 20x4 (as well as the means for obtaining and means for notifying of the WSI MSS A 2022, means for forwarding, means for judging and means for obtaining of the SMSC 2023 and means for forwarding and means for obtaining of the WSI MSS B 2024). The memories 20x2 may serve e.g. for storing code means for carrying out e.g. the methods according to the example of the present invention, when run e.g. on the CPUs 20x1. It is to be noted that the means for transmitting 20x3 and the means for receiving 20x4 may alternatively be provided as respective integral transceivers (see e.g. transceiver 20243/20244 of WSI MSS B 2024 in Fig. 3B). It is further to be noted that the transmitters/receivers may be implemented i) as physical transmitters/receivers for transceiving e.g. via the air interface (e.g. in case of transmitting between the UE 201 and the WSI MSS A 2022), ii) as routing entities e.g. for transmitting/receiving data packets e.g. in a PS (packet switched) or switching circuits in a CS (circuit switched) network (e.g. between the WSI MSS A 2022, SMSC 2023 and WSI MSS B 2023 when disposed as separate network entities, as shown in Figs. 3A to 3C), iii) as functionalities for writing/reading information into/from a given memory area (e.g. in case of the WSI MSS A 2022, SMSC 2023 and WSI MSS B 2023 when disposed as an integral network entity (not shown)), or iv) as any suitable combination of i) to iii).

[0078] Optionally, e.g. the means for receiving 20224 of the WSI MSS A 2022 may perform receiving a message e.g. via network services e.g. from UE A 201.

[0079] Then, e.g. the means for transmitting 20223 of the WSI MSS A 2022 may perform transmitting, from a first network switching entity (i.e. the WSI MSS A 2022)

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serving a source terminal (e.g. UE A 201), the message (e.g. SM) intended for a target terminal (e.g. UE B 203) to a network message management entity (e.g. SMSC 2023). Optionally, e.g. the means for obtaining (i.e. CPU 20221, means for transmitting 20223 and means for receiving 20224) of the WSI MSS A 2022 may also perform obtaining information on the source terminal (e.g. UE A 201) being a source of the message, if the source terminal is not attached to the network switching entity (e.g. WSI MSS A 2023).

[0080] Optionally, e.g. the means for receiving 20234 of the SMSC 2023 may perform receiving the message (e.g. SM), the means for storing 20232 of the SMSC 2023 may perform storing the message (e.g. SM), and means for forwarding (i.e. the CPU 20231 and the means for transmitting 20233) may perform forwarding a status report, e.g. via the WSI MSS A 2022, the status report indicating to UE A 201 that the message (e.g. SM) has reached the SMSC 2023. At this point, the stateful mechanism of the originating side is stopped and resources released.

[0081] In detail, e.g. the means for forwarding (i.e. CPU 20221 and the means for transmitting 20223) of the WSI MSS A 2022 may perform transmitting the status report to a web client (e.g. widget A 2021) related to the target terminal (e.g. UE B 203), e.g. if UE A 201 is configured for the network services, e.g. the widget A 2021 is started and still accessible from WSI MSS A. Alternatively or additionally, the means for transmitting 20223 of the WSI MSS A 2022 may perform transmitting the status report to i) the source terminal (e.g. UE A 201) if the source terminal is registered to the WSI MSS A 2022 or ii) a second network switching entity (another

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MSS A, not shown) related to the source terminal (e.g. UE A 201) based on whether the source terminal is attached to WS MSS A 2022 or another MSS A.

[0082] Then, the SMSC 2023 may perform delivering the message (e.g. SM) to a target terminal (e.g. UE B 203).

[0083] To this end, e.g. the means for transmitting 20233 of the SMSC 2023 may perform transmitting, from a network message management entity (i.e. the SMSC 2023), the message (e.g. SM) to another network switching entity (e.g. WSI MSS B 2024) related to a target terminal (e.g. UE B 203) being a target of the message. The transmitting may be based on mobile application part (MAP).

[0084] Optionally, e.g. the means for receiving 20234 of the SMSC 2023 may perform receiving, in response to the transmitting performed by the means for transmitting 20233, a network address of the network switching entity (e.g. WSI MSS B 2024). Also optionally, e.g. the means for forwarding (i.e. CPU 20231 and means for transmitting 20233) of the SMSC 2023 may perform forwarding, responsive to the receiving performed by the means for receiving 20234, the message to the network switching entity (e.g. WSI MSS B 2024) based on the received address.

[0085] Furthermore, e.g. the means for transmitting 20243 of the WSI MSS B 2024 may perform transmitting, from a first network switching entity (i.e. the WSI MSS B 2024) configured for network services (e.g. WSI), the received message (e.g. SM) to i) the target terminal (e.g. UE B 203) intended for receiving the message or ii) the second network switching entity (e.g. MSS B 2027) related to the target terminal (e.g. UE B 203) based on whether the

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target terminal is attached to the first network switching entity or another network switching different from the first network switching entity.

[0086] In detail, e.g. the means for forwarding (i.e. CPU 20241 and means for transmitting 20243) of the WSI MSS B 2024 may perform forwarding the message to a web client (e.g. widget B 2025) related to the target terminal (e.g. UE B 203), if the target terminal is configured for the network services. Furthermore, e.g. the means for obtaining (i.e. CPU 20241, means for transmitting 20243 and means for receiving 20244) of the WSI MSS B 2024 may perform obtaining, prior to the transmitting performed by the means for transmitting, an address of the second network switching entity (e.g. MSS B 2027) e.g. from the HLR B 2026. Still further, e.g. the means for receiving 20244 of the WSI MSS B 2024 may perform receiving an acknowledgment of receipt of the message from the target terminal (e.g. UE B 203) or the second network switching entity (e.g. MSS B 2027).

[0087] Optionally, (based on whether UE B 203 is attached to WSI MSS B 2024 or not), e.g. the means for forwarding (i.e. CPU 20241 and means for transmitting 20243) of the WSI MSS B 2024 may perform forwarding the received acknowledgement to a network message management entity (e.g. SMSC 2023), which forwarded acknowledgement may be received e.g. by the means for receiving 20234 of the SMSC 2023.

[0088] Optionally, e.g. the means for judging (i.e. CPU 20231) of the SMSC 2023 may perform judging whether the source terminal (e.g. UE A 201) requested a status report on receipt of the message. The means for forwarding (i.e. CPU 20231 and means for transmitting 20233) may perform

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forwarding, based on a result of judging, another message including the status report to a network switching entity (e.g. WSI MSS A 2022) related to the source terminal (e.g. UE A 201).

[0089] Optionally, e.g. the means for obtaining (i.e. CPU 20231, means for transmitting 20233 and means for receiving 20234) of the SMSC 2023 may perform obtaining, prior to the forwarding performed by the means for forwarding, a network address of the network switching entity (e.g. WSI MSS A 2022) related to the source terminal (e.g. UE A 201).

[0090] Then, e.g. the means for receiving 20224 of the WSI MSS A 2022 may perform receiving the another message including the status report from the network message management entity (e.g. SMSC 2023).

[0091] E.g. the means for transmitting 20223 of the WSI MSS A 2022 may perform transmitting, from the network switching entity (i.e. WSI MSS A 2022) configured for network services (e.g. WSI), the received another message (e.g. SM) to i) the source terminal (e.g. UE A 201) or ii) the second network switching entity (MSS A (not shown)) related to the source terminal (e.g. UE A 201) based on whether the source terminal is attached to the first network switching entity (e.g. WSI MSS A 2022) or another network switching different from the first network switching entity. In detail, e.g. the means for notifying (i.e. CPU 20221 and means for transmitting 20223) of the WSI MSS A 2022 may perform notifying the another message to a web client (e.g. widget A) 2021 related to the source terminal (e.g. UE A 201), if the source terminal is configured for the network services

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(e.g. WSI).

[0092] Finally, e.g. the means for obtaining (i.e. CPU 20221, the means for transmitting 20223 and means for receiving 20224) of the WSI MSS A 2022 may perform obtaining, prior to the transmitting, an address of the second network switching entity (e.g. MSS A).

[0093] Furthermore, at least one of, or more of means for transmitting 2013, 20223, 20233, 20243, 20263, 20273; means for receiving 2014, 20224, 20234, 20244, 20264, 20274; means for obtaining; means for notifying; means for forwarding; means for judging and/or the WSI MSS A 2022, SMSC 2023 and WSI MSS B 2023, or the respective functionalities carried out, may be implemented as a chipset or module.

[0094] The present invention also relates to a system which may comprise a source terminal (e.g. UE A 201) configured to send a message and to receive a status report, the above-defined WSI MSS A 2022, the above-defined SMSC 2023, the above-defined WSI MSS B 2024, and a target terminal configured to receive the message and to return an acknowledgement of receipt. Alternatively, the WSI MSS A 2022 and the WSI MSS B 2024 may also be constituted by a single MSS.

[0095] Without being restricted to the details following in this section, an example of the present invention may be summarized as follows:

A way of delivering SMS from any interface is provided such that the existing services can run and existing SMS delivery paths are utilized as much as possible. Additionally, for home based services (e.g. WSI based), the SMS delivery related information will be available.

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The delivery of an SMS received over WSI may be the following:

1. SMS is received in MSS over WSI (or any other, non-usual interface)

2. The MSS with WSI plays the role of MO_V MSS. That is, e.g. the originating user's services related to SMS are run. If the subscriber is not CS attached to this MSS then subscriber data is downloaded from repository (HLR) without cancelling the subscriber's current location information.

3. MO_V MSS forwards the SMS to SMSC (e.g. over MAP)

4. SMSC acknowledges the SMS, notification is sent over WSI from MO_V MSS to the web application. Resources related to this SMS are released at this point in the MSS and in web application. The SMS may be stored in a database attached to the web application.

5. SMSC tries to deliver the SMS to the target subscriber. SMSC sends the query for target subscriber's location to an MSS with WSI over MAP (SRI_for_SM operation) instead of HLR. It assumes GT address analysis configuration in SMSC. The WSI-MSS is in the HPLMN of the target subscriber. There are two alternatives then:

- 5a. The WSI-MSS responds to SRI_for_SM and sends its own MSC Address in the response.

- 5b. The WSI-MSS checks the subscriber data. If the data is not available it is downloaded from a repository (e.g. HLR) without cancelling the target subscriber's location. If the subscriber has WSI service then MSS sends its own MSC address in the response. If the subscriber does not have WSI service then MSS relays SRI_for_SM to HLR, SCCP level calling party address (CgPA) is the address of SMSC. In this latter case, the SMSC will receive the MSC address of the MSS where the target party is attached.

6. SMSC forwards the SMS to the WSI-MSS based on the received MSC address.

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7. When WSI-MSS receives the SMS it checks whether the subscriber is under its own location area

7a. If the subscriber is attached to this MSS then the SMS is delivered to the subscriber's mobile over A/Iu interface. Moreover, if the subscriber has WSI service the SMS is sent to the web client over WSI. Then the WSI-MSS sends the acknowledgement to the SMSC and releases every SMS related resources.

7b. If the subscriber is not attached to this MSS then subscriber data is downloaded from repository (HLR) and WSI-MSS checks whether the subscriber has WSI service. If the subscriber has WSI service the SMS is forwarded to the web client over WSI. Then WSI-MSS sends SRI_for_SM to HLR and in the response it receives the address of MT_V MSC. The MSS forwards the SMS to the MT_V MSC. When a response is received from MT_V MSC, the WSI-MSS relays that to the SMSC and releases every resource that is related to the SMS delivery.

8. When SMSC is to send delivery report to the originating user it will initiate a special SMS in which the target user is the original originating user. The delivery of the report is the same as described above in items 5-7. In that way, the home-based WSI service can be notified about the delivery because a WSI-MSS in the HPLMN of the originating party is involved.

The WSI of MSS must be capable of receiving the same parameters together with the SMS which are received over A/Iu interface when the SMS is sent from a mobile phone.

The services which run in mobile originated SMS case (e.g. barring: call barring, operator determined barring; prepaid; charging: premium rate, personal discount, location dependent discount, reverse charging) shall be run when SMS is originated over the WSI.

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In order to do this, subscriber data shall be downloaded to the MSS which receives the SMS sending request over WSI from repository (HLR) without cancelling the user's current location.

If the target subscriber has a web based service subscribed, then the SMS shall be delivered to a web based server over WSI so the target user can read the SMS in a web based tool, too. In order to do this, an MSS with WSI shall be involved in the sending path of the SMS towards the target user.

The delivery report SMS if requested by the originating user shall be delivered to the web tool through which the subscriber has initiated the SMS sending. In order to achieve this, an MSS with WSI shall be involved in the report delivery path.

[0096] [Further examples]

[0097] For the purpose of the present invention as described herein above, it should be noted that

- an access technology may be any technology by means of which a user equipment can access an access network (or base station, respectively). Any present or future technology, such as WiMAX (Worldwide Interoperability for Microwave Access) or WLAN (Wireless Local Access Network), Bluetooth, Infrared, and the like may be used; although the above technologies are mostly wireless access technologies, e.g. in different radio spectra, access technology in the sense of the present invention may also imply wirebound technologies, e.g. IP based access technologies like cable networks or fixed line.

- a network may be any device, unit or means by which a

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station entity or other user equipment may connect to and/or utilize services offered by the access network; such services include, among others, data and/or (audio-) visual communication, data download etc.;

- generally, the present invention may be applicable in those network/user equipment environments relying on a data packet based transmission scheme according to which data are transmitted in data packets and which are, for example, based on the Internet Protocol IP. The present invention is, however, not limited thereto, and any other present or future IP or mobile IP (MIP) version, or, more generally, a protocol following similar principles as (M)IPv4/6, is also applicable;

- a user equipment may be any device, unit or means by which a system user may experience services from an access network;

- method steps likely to be implemented as software code portions and being run using a processor at a network element or terminal (as examples of devices, apparatuses and/or modules thereof, or as examples of entities including apparatuses and/or modules therefore), are software code independent and can be specified using any known or future developed programming language as long as the functionality defined by the method steps is preserved;

- generally, any method step is suitable to be implemented as software or by hardware without changing the idea of the invention in terms of the functionality implemented;

- method steps and/or devices, units or means likely to be implemented as hardware components at the WSI MSS A 2022, the SMSC 2023 and/or the WSI MSS B 2024, or any module(s) thereof, are hardware independent and can be implemented using any known or future developed hardware technology or any hybrids of these, such as MOS (Metal

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Oxide Semiconductor), CMOS (Complementary MOS), BiMOS (Bipolar MOS), BiCMOS (Bipolar CMOS), ECL (Emitter Coupled Logic), TTL (Transistor-Transistor Logic), etc., using for example ASIC (Application Specific IC (Integrated Circuit)) components, FPGA (Field-programmable Gate Arrays) components, CPLD (Complex Programmable Logic Device) components or DSP (Digital Signal Processor) components; in addition, any method steps and/or devices, units or means likely to be implemented as software components may alternatively be based on any security architecture capable e.g. of authentication, authorization, keying and/or traffic protection;

- devices, units or means (e.g. WSI, MSS, A/B or SMSC, or any one of their respective means) can be implemented as individual devices, units or means, but this does not exclude that they are implemented in a distributed fashion throughout the system, as long as the functionality of the device, unit or means is preserved;
- an apparatus may be represented by a semiconductor chip, a chipset, or a (hardware) module comprising such chip or chipset; this, however, does not exclude the possibility that a functionality of an apparatus or module, instead of being hardware implemented, be implemented as software in a (software) module such as a computer program or a computer program product comprising executable software code portions for execution/being run on a processor;
- a device may be regarded as an apparatus or as an assembly of more than one apparatus, whether functionally in cooperation with each other or functionally independently of each other but in a same device housing, for example.

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[0098] Although the present invention has been described herein before with reference to particular embodiments thereof, the present invention is not limited thereto and various modification can be made thereto.

CLAIMS:

1. A method, comprising:
transmitting, from a first network switching entity serving a source terminal, a message intended for a target terminal to a network message management entity.
2. The method according to claim 1, further comprising receiving, prior to the transmitting, the message via network services.
3. The method according to claims 1 or 2, further comprising obtaining information on a source terminal being a source of the message, if the source terminal is not attached to the network switching entity.
4. The method according to any one of claims 1 to 3, further comprising receiving, from the network message management entity, a status report indicating successful receipt of the message.
5. The method according to claim 4, wherein the status report is forwarded to a web client, if the source terminal is configured for network services.
6. The method according to claim 5, wherein the status report is forwarded to the web client, if the web client is started and accessible from the first network switching entity.
7. The method according to any one of claims 4 to 6, further comprising:
transmitting, from the first network switching entity, the status report to one of

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i) the source terminal being a source of the message and

ii) a second network switching entity related to the source terminal

based on whether the source terminal is registered at one of the first network switching entity and another network switching different from the first network switching entity.

8. The method according to any one of claims 1 to 7, further comprising receiving another message including a status report or another status report from the network message management entity.

9. The method according to claim 8, further comprising transmitting, from the network switching entity configured for network services, the received another message to one of

i) the source terminal and

ii) a second network switching entity related to the source terminal

based on whether the source terminal is attached to one of the first network switching entity and another network switching different from the first network switching entity.

10. The method according to claim 9, further comprising notifying the another message to a web client related to the source terminal, if the source terminal is configured for the network services.

11. The method according to claims 9 or 10, further comprising obtaining, prior to the transmitting, an address of the second network switching entity.

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12. A method, comprising:

transmitting, from a network message management entity, a message to a network switching entity related to a target terminal being a target of the message.

13. The method according to claim 12, further comprising receiving, in response to the transmitting, a network address of the network switching entity.

14. The method according to claim 13, further comprising forwarding, responsive to the receiving, the message to the network switching entity based on the received address.

15. The method according to any one of claims 12 to 14, wherein the transmitting is based on mobile application part.

16. The method according to any one of claims 12 to 15, further comprising transmitting, to the network switching entity, a status report indicating successful receipt of the message.

17. The method according to any one of claims 12 to 16, further comprising:

receiving, after the forwarding, an acknowledgement indicating receipt of the message by the target terminal;

judging whether a source terminal requested a status report on receipt of the message; and

forwarding, based on a result of judging, another message including the status report to a network switching entity related to the source terminal.

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18. The method according to claim 17, further comprising obtaining, prior to the forwarding, a network address of the network switching entity related to the source terminal.

19. A method, comprising:

transmitting, from a first network switching entity configured for network services, a received message to one of

i) a target terminal intended for receiving the message and

ii) a second network switching entity related to the target terminal

based on whether the target terminal is attached to one of the first network switching entity and another network switching different from the first network switching entity.

20. The method according to claim 19, further comprising forwarding the message to a web client related to the target terminal, if the target terminal is configured for the network services.

21. The method according to claims 19 or 20, further comprising obtaining, prior to the transmitting, an address of the second network switching entity.

22. The method according to any one of claims 19 to 21, further comprising receiving an acknowledgment of receipt of the message from the one of the target terminal and the second network switching entity.

23. The method according to claim 22, further comprising forwarding the received acknowledgement to a network message management entity.

24. An apparatus, comprising:

means for transmitting, from the apparatus serving a source terminal, a message intended for a target terminal to a network message management entity.

25. The apparatus according to claim 24, further comprising means for receiving, prior to the transmitting performed by the means for transmitting, the message via network services.

26. The apparatus according to claims 24 or 25, further comprising means for obtaining information on the source terminal being a source of the message, if the source terminal is not attached to the network switching entity.

27. The apparatus according to any one of claims 24 to 26, further comprising means for receiving, from the network message management entity, a status report indicating successful receipt of the message.

28. The apparatus according to claim 27, further comprising means for forwarding the status report to a web client, if the source terminal is configured for network services.

29. The apparatus according to claim 28, wherein the means for forwarding is configured to forward the status report to the web client, if the web client is started and accessible from the first network switching entity.

30. The apparatus according to any one of claims 27 to 29, wherein the means for transmitting is further configured to transmit, from the first network switching entity, the status report to one of

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i) the source terminal being a source of the message and

ii) a second network switching entity related to the source terminal

based on whether the source terminal is registered at one of the first network switching entity and another network switching different from the first network switching entity.

31. The apparatus according to any one of claims 24 to 30, further comprising means for receiving another message including a status report or another status report from the network message management entity.

32. The apparatus according to claim 31, wherein the means for transmitting is further configured to transmit, from the apparatus being configured for network services, the received another message to one of

i) the source terminal and

ii) a second network switching entity related to the source terminal

based on whether the source terminal is attached to one of the first network switching entity and another network switching different from the first network switching entity.

33. The apparatus according to claim 32, further comprising means for notifying the another message to a web client related to the source terminal, if the source terminal is configured for the network services.

34. The apparatus according to claims 32 or 33, further comprising means for obtaining, prior to the transmitting performed by the means for transmitting, an address of the second network switching entity.

35. An apparatus, comprising:

means for transmitting, from the apparatus being constituted by a network message management entity, a message to a network switching entity related to a target terminal being a target of the message.

36. The apparatus according to claim 35, further comprising means for receiving, in response to the transmitting performed by the means for transmitting, a network address of the network switching entity.

37. The apparatus according to claim 36, further comprising means for forwarding, responsive to the receiving performed by the means for receiving, the message to the network switching entity based on the received address.

38. The apparatus according to any one of claims 35 to 37, wherein the transmitting is based on mobile application part.

39. The apparatus according to any one of claims 35 to 38, wherein the means for transmitting is further configured to transmit, to the network switching entity, a status report indicating successful receipt of the message.

40. The apparatus according to any one of claims 35 to 38, wherein the means for receiving is further configured to receive, after the forwarding performed by the means for forwarding, an acknowledgement indicating receipt of the message by the target terminal, the apparatus further comprising:

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means for judging whether a source terminal requested a status report on receipt of the message, wherein

the means for forwarding is further configured to forward, based on a result of judging, another message including the status report to a network switching entity related to the source terminal.

41. The apparatus according to claim 40, further comprising means for obtaining, prior to the forwarding performed by the means for forwarding, a network address of the network switching entity related to the source terminal.

42. An apparatus, comprising:

means for transmitting, from the apparatus being constituted by a first network switching entity configured for network services, a received message to one of

i) a target terminal intended for receiving the message and

ii) a second network switching entity related to the target terminal

based on whether the target terminal is attached to one of the first network switching entity and another network switching different from the first network switching entity.

43. The apparatus according to claim 42, further comprising means for forwarding the message to a web client related to the target terminal, if the target terminal is configured for the network services.

44. The apparatus according to claims 41 or 42, further comprising means for obtaining, prior to the transmitting

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performed by the means for transmitting, an address of the second network switching entity.

45. The apparatus according to any one of claims 42 to 44, further comprising means for receiving an acknowledgment of receipt of the message from the one of the target terminal and the second network switching entity.

46. The apparatus according to claim 45, wherein the means for forwarding is further configured to forward the received acknowledgement to a network message management entity.

47. The apparatus according to any one of claims 24 to 34, wherein the apparatus is constituted by a first mobile switching center server configured for a web services compatible interface.

48. The apparatus according to any one of claims 42 to 46, wherein the apparatus is constituted by a second mobile switching center server configured for a web services compatible interface.

49. The apparatus according to claims 47 and 48, wherein the first and second mobile switching center servers are comprised in a single mobile switching center server.

50. The apparatus according to any one of claims 35 to 41, wherein the apparatus is constituted by a short message service center.

51. The apparatus according to any one of claims 24 to 50, wherein at least one, or more of means for transmitting, means for receiving, means for obtaining,

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means for notifying, means for forwarding, means for judging and the apparatus is implemented as a chipset or module.

52. A system, comprising:

- a source terminal configured to send a message and to receive a status report;

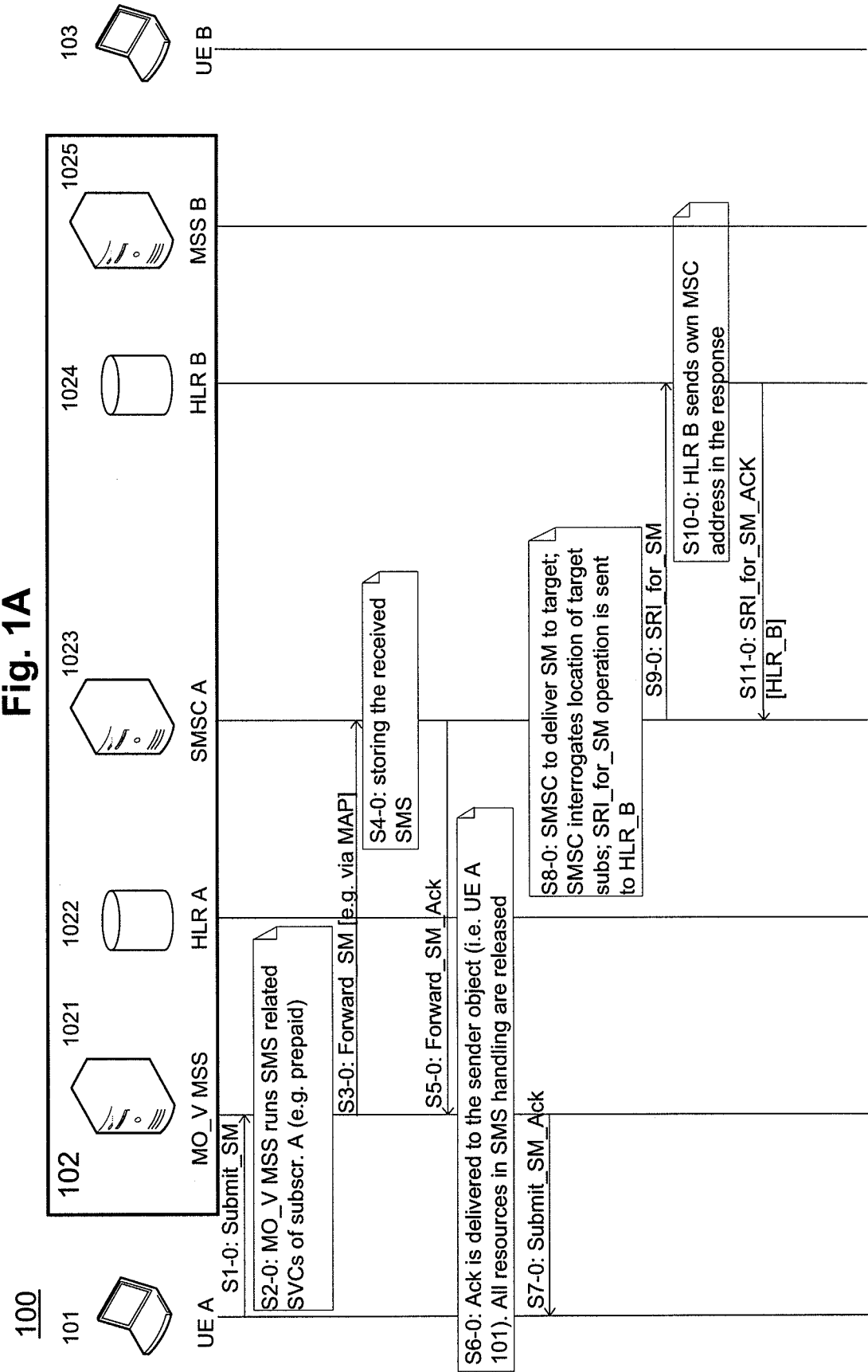
- a first mobile switching center server according to any one of claims 24 to 34 or claim 50;

- a short message service center according to any one of claims 35 to 41;

- a second mobile switching center server according to any one of claims 42 to 46 or claim 50; and

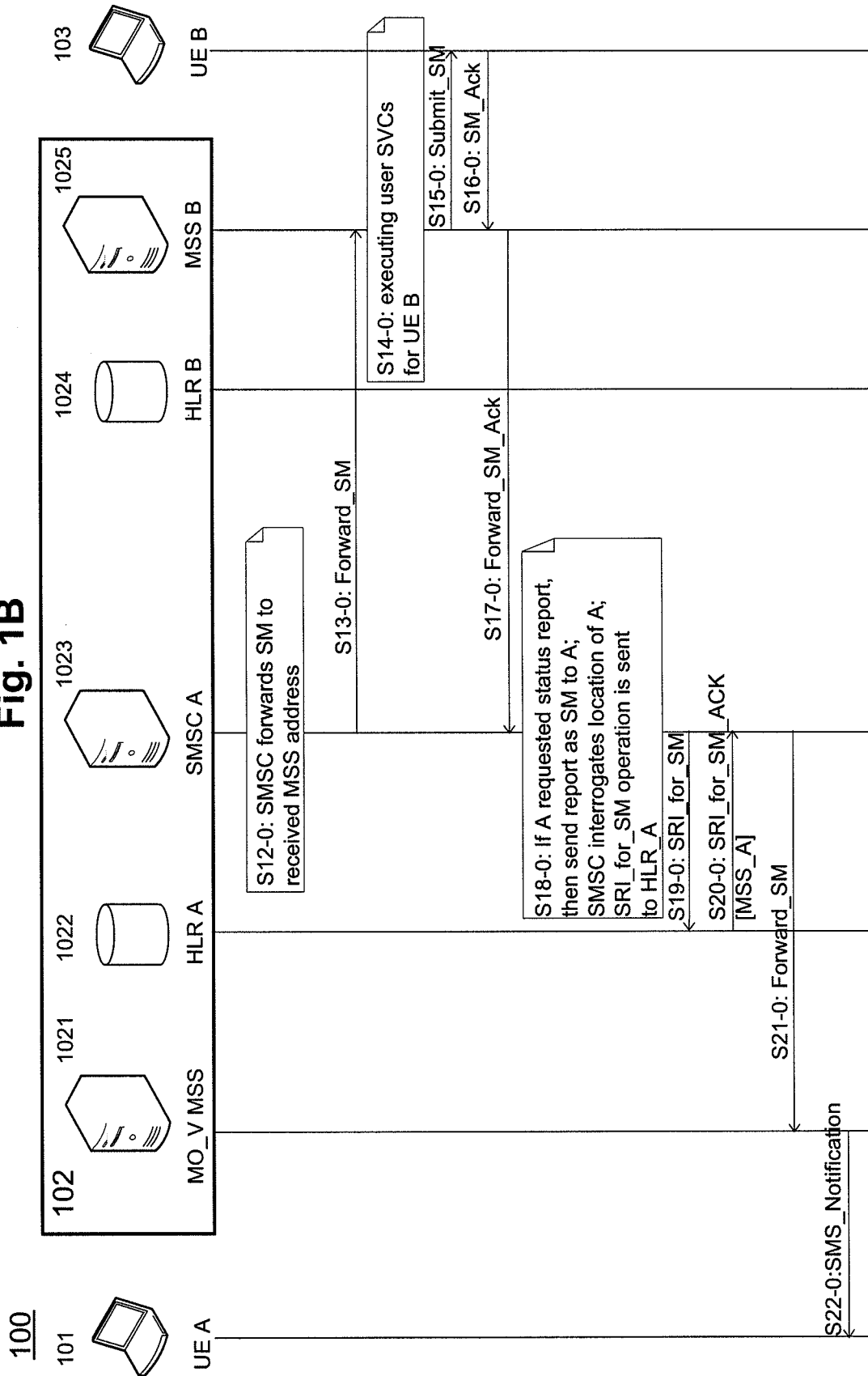
- a target terminal configured to receive the message and to return an acknowledgement of receipt.

53. A computer program product comprising code means for performing method steps of a method according to any one of claims 1 to 23, when run on a processing means or module.



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Fig. 1B



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Fig. 2A

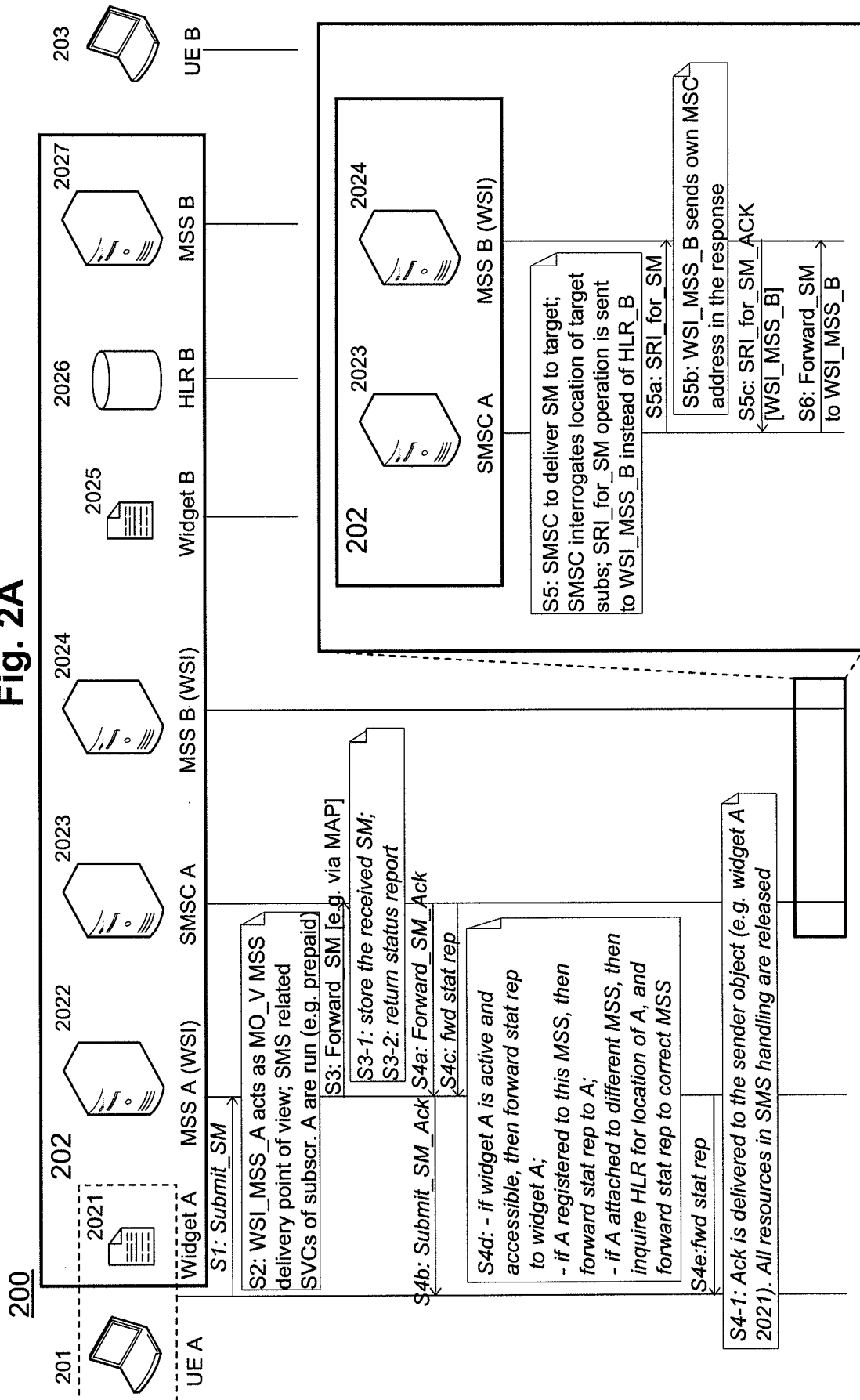
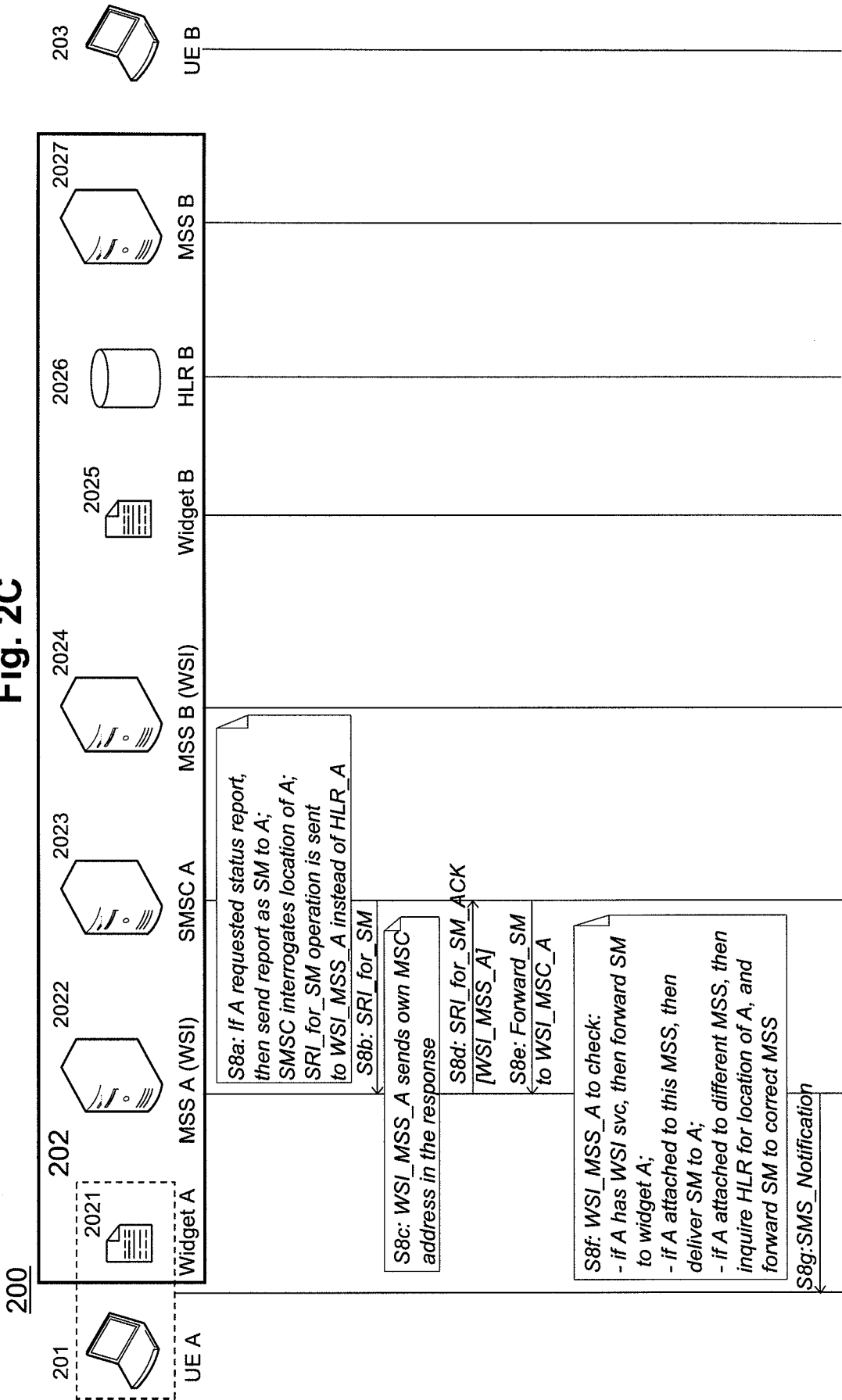
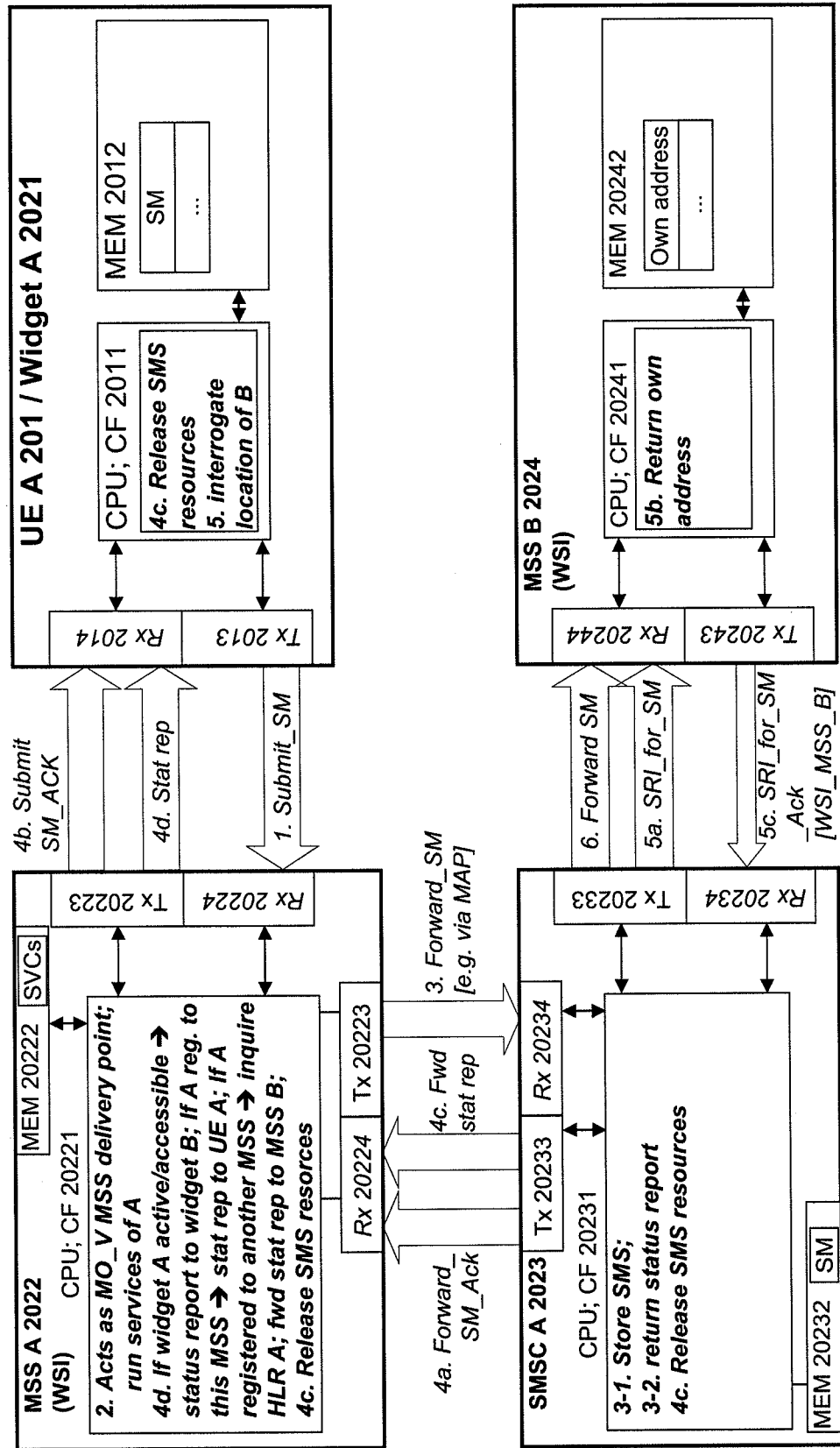


Fig. 2C



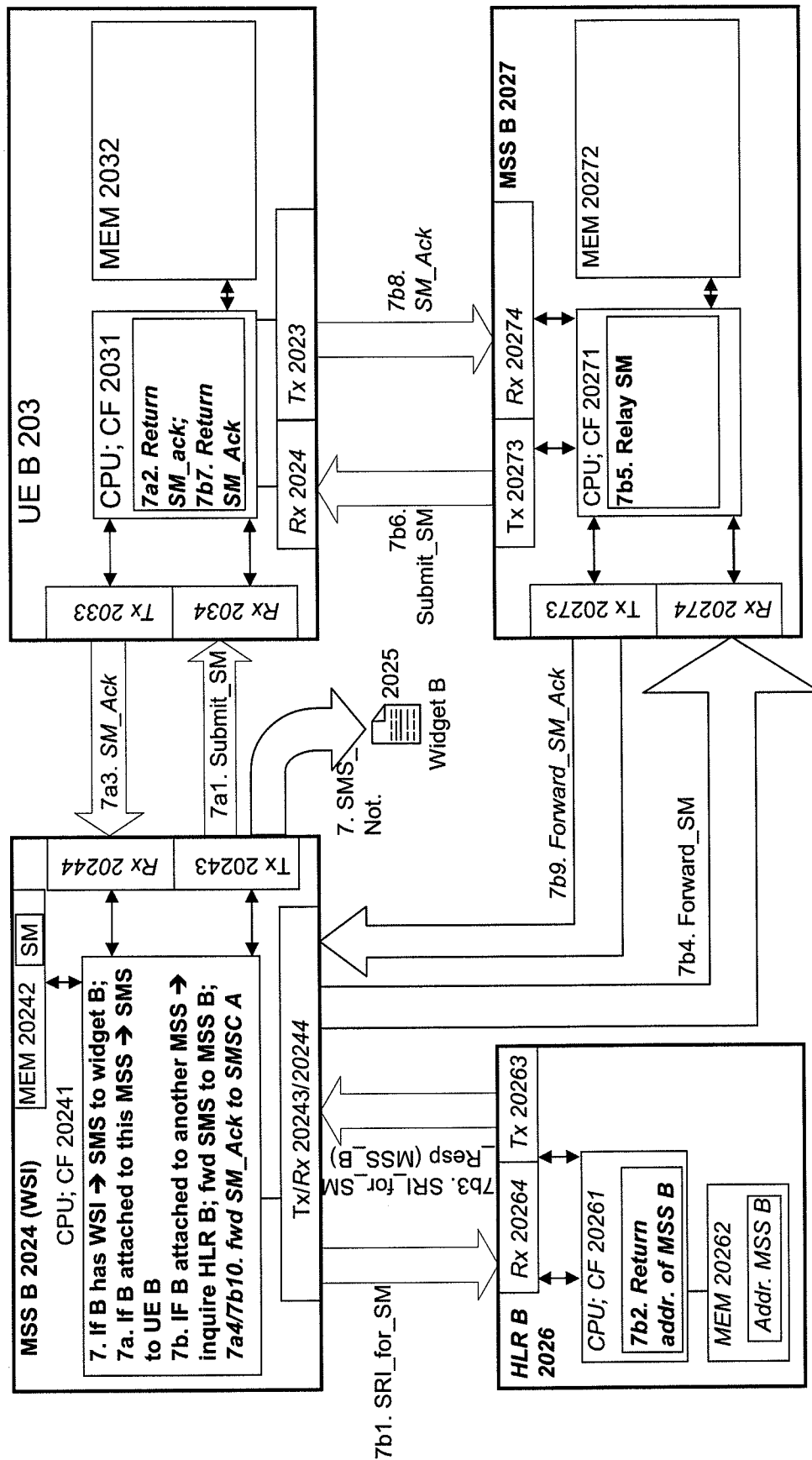
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Fig. 3A



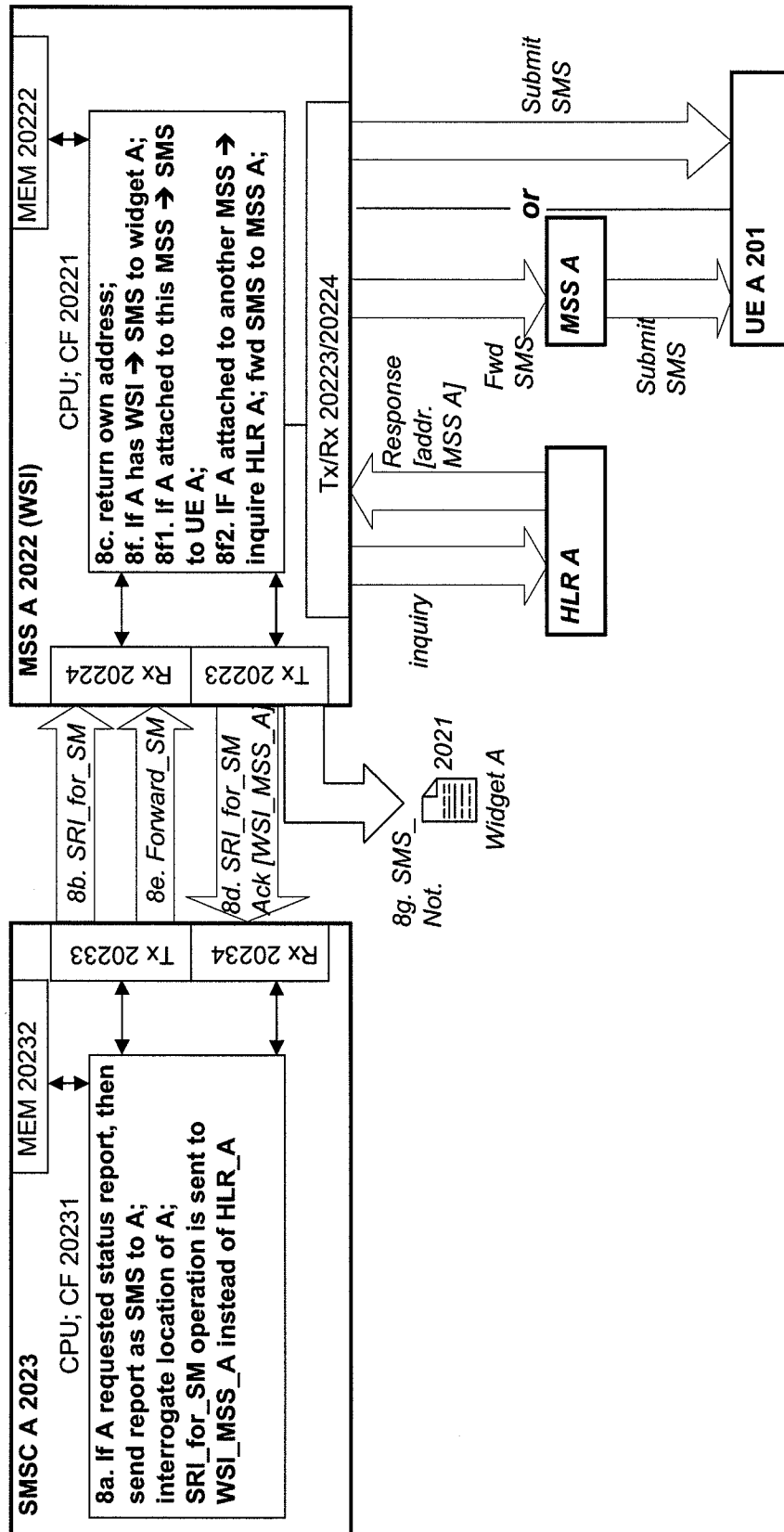
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Fig. 3B



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Fig. 3C



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2008/063632

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04W4/14 H04L12/58

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)
H04W H04L

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, IBM-TDB, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 863 299 A (ESERVGLOBAL UK LTD [GB]) 5 December 2007 (2007-12-05) abstract paragraph [0001] - paragraph [0162] figures 1-12	1-53
X	US 2004/259531 A1 (WOOD IAN [GB] ET AL) 23 December 2004 (2004-12-23) abstract paragraph [0001] - paragraph [0216] figures 1-15	1-53
X	WO 2005/114912 A (EMPOWER INTERACTIVE GROUP LTD [GB]; HIRANI DEEPA [GB]) 1 December 2005 (2005-12-01) abstract page 8, line 13 - page 26, line 22 figures 1-7	1-53
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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search

7 August 2009

Date of mailing of the international search report

18/08/2009

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Körbler, Günther

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2008/063632

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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Information on patent family members

International application No

PCT/EP2008/063632

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