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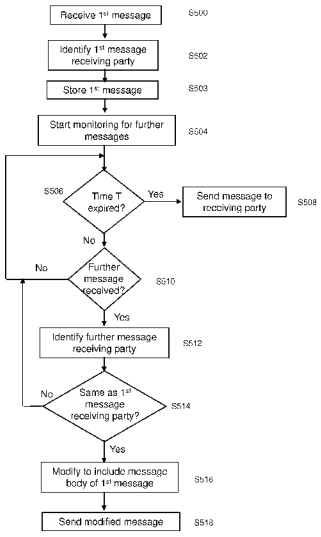
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(54) Title: MESSAGE MODIFICATION APPARATUS AND METHOD



(57) Abstract: The present invention relates to a method of, and apparatus for, performing message modification. In existing methods in which messages such as SMS messages which have a maximum size per message are sent, messages of much smaller than this size are sent separately, leading to inefficiency. Embodiments of the invention provide a method and apparatus for modifying a message for transmission in a data communications network, in which the message body of one message is appended to a further message, the combined message then being sent to a specified recipient. This provides an efficient, cost effective method of transmitting messages.

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Message Modification Apparatus and Method

Field of the Invention

The present invention relates to methods of, and systems for, performing message modification. The present invention is particularly, but not exclusively, suited to arrangements in which message modification is performed on the basis of group membership of the sender and/or recipient of the message.

Background of the Invention

As is well known, communications networks provide a means for users to communicate with one or more other users. Users of a communication system are typically provided with numerous services, such as calls, data communication such as messaging and/or multimedia services, or simply provide users with a gateway to another network, such as the Internet. In relation to any one service, various communication systems, such as public switched telephone networks (PSTN), wireless communication systems, e.g. global system for mobile communications (GSM), general packet radio service (GPRS), universal mobile telecommunications system (UMTS), wireless local area network (WLAN) and so on, and/or other communication networks, such as an Internet Protocol (IP) network, may simultaneously be concerned in providing a connection. In addition communications systems can include broadcast networks such as Digital Video Broadcasting for Handheld (DVB-H), Digital Audio Broadcasting (DAB), and Digitam Multimedia Broadcast (DMB). An end-user may access a communication network by means of any appropriate communication device, such as user equipment (UE), a mobile station (MS), a cellular phone, a personal digital assistant (PDA), a personal computer (PC), or any other equipment operable according to a suitable network protocol, such as a Session Initiation Protocol (SIP) or a wireless applications protocol (WAP) or a hypertext transfer protocol (HTTP). The user equipment may support, in addition to call and network access functions, other services, such as short message service (SMS), multimedia message service (MMS), electronic mail

(email), Web service interface (WSI) messaging and voice mail and one-way messages such as WAP PUSH messages.

Communications sessions involving more than two users are commonly referred to as virtual, online or group communications, and can be facilitated by services including the "push-to-talk over cellular" (PoC) service also known as the PTT (push-to-talk service), the instant messaging (IM) service, IRC ("Internet Relay Chat"), and the ICQ ("I Seek You") service. In the case of the IM service, users are allowed to send messages to one or more in a list of predetermined users (a so-called “private list”) in a conversational mode, and because they are transmitted “instantly”, the transfer of messages back and forth is fast enough for participants to maintain an interactive conversation. The IRC service is a system for chatting that involves a set of rules and conventions and is implemented via client/server software. An IRC client can be downloaded to a user's computer, and the client is then used to connect to an IRC server in an IRC network to start or join an IRC chat group. The fourth group messaging application, ICQ ("I Seek You"), is a client application that provides information as to which “friends” and “contacts” are also online on the Internet, pages them, and operates so as to coordinate a “chat” session with them. The IM system is similarly arranged to generate alerts whenever a member of a given private list is online.

These virtual communities are becoming increasingly important vehicles of communication and dissemination of new ideas in the online world; such communities are used not only to develop and discuss ideas voluntarily within specific interest groups but they also are of increasing value for a advertisers: in essence they are word-of-mouth marketing and endorsement networks from one member to another member, and are increasingly perceived as the strongest method of marketing. Most online applications also utilize, consciously or unconsciously, the viral effects generated within these social networks and between the networks in their marketing.

In addition to virtual communities, real communities such as educational clubs, book clubs, music clubs, sports clubs, professional communities etc.

provide a forum for discussion and interaction. Many such real communities have web pages to share information within their community, and access to these data is often controlled by means of membership criteria (user ID and password) for privacy reasons. Thus virtual and real communities are interrelated in so far as both require some sort of web authentication method in order to authenticate members.

Advertisers can be attracted by the ready-made and apparently auto-profiled set of recipients offered by groups, so as to share, at least in part, the costs associated with communications between the group members; however the advertisers require a degree of comfort that their targeted messages (i.e. messages containing information that matches the characteristics of the group) are reaching persons who are indeed members of a given group – essentially to ensure that the recipients match the characteristics of the targeted messages.

Summary of the Invention

According to a first aspect of the invention, there is provided a method of transmitting a message in a data communications network, said method comprising:

receiving a first message from a first sending party, said first message comprising a first identifier and a message body, said first identifier identifying a first receiving party of said first message and said message body being at least partly specified by said sending party;

receiving a second message, said second message comprising a second identifier identifying a receiving party thereof;

responsive to identification that a receiving party of the second message corresponds to said first receiving party, appending said message body to said second message so as to generate a modified second message; and

sending said modified second message to said first receiving party.

Thus, in contrast to prior art methods in which messages are sent independently of one another, the present invention provides a method in which the content of a first message is added to the content of a second message for

sending. This is especially advantageous when the messages have a maximum size per message (as is the case with, for example, SMS messages) since it allows the content of two messages of small size to be combined and sent as a single message, increasing efficiency and cost-effectiveness.

In some arrangements, the first message is sent independently if no suitable second message is received within a predetermined time. This feature ensures that, for example, urgent messages are received before too great a time period has elapsed.

In some arrangements, the first message is only appended to the second message if the sending party and/or receiving party is a member of a predetermined group. In some cases, it is advantageous to use the method only with parties that are, for example, subscribers to a service.

According to a further aspect of the invention there is provided apparatus for modifying a message for transmission through a data communications network, the message including transmission data identifying a sending party and a recipient of said message and a message body identifying content thereof, at least part of which is specified by the sending party, the apparatus comprising data processing means arranged to:

identify membership of a group in relation to a sending party and a recipient of a said message;

identify an action in dependence on concordance between respective group memberships;

modify the message on the basis of the identified action; and

transmit the modified message to the recipient in accordance with the transmission data.

Embodiments of the invention provide message modification on the basis of group membership, and essentially provide a means of selecting tags to add to a message on the basis of identified group membership. Conveniently the apparatus can comprise a storage system arranged to store a plurality of tags and index data corresponding thereto, each index data item comprising data indicative of a group membership configuration corresponding to the sending

party of a message and the recipient of a message. For example: a first tag might be associated with a configuration in which the sending party and recipient are members of the same group; a second tag might be associated with a configuration in which the sending party is a member of a group but the recipient is not a member of any group; a third tag might be associated with a configuration in which the recipient is a member of a group but the sending party is not a member of any group; and a fourth tag might be associated with a configuration in which the recipient is a member of a group and the sending party is a member of a different group. In at least some arrangements the data processing means can be arranged to send a message containing the selected tag to the sending party.

Most preferably the tag includes a field in which the name of an entity, such as a sponsor of a group, is inserted once the or each group membership corresponding to the sending party/recipient has been identified. In the case of the sending party and recipient each being members of different groups, messages can be modified on the basis of a set of precedence rules which specify which of the groups should form the basis for the tag selection and message modification.

In preferred arrangements the communications network includes data storage means arranged to hold group records, each group record being indicative of network usage relating to members of the group. The data processing means can be arranged to determine whether said message falls within predetermined message transmission criteria, and to modify a group record corresponding to the group when said criteria are met. The group record can hold data indicative of an allocation of usage associated with the group, in which case the data processing means is arranged to reduce allocation associated with the group. Alternatively the data processing means is arranged to store data indicative of a charge for transmission of the message in the group record.

Preferably the data storage means is also arranged to hold subscriber records including a plurality of fields including a group field for storing data indicative of group membership of a subscriber; the group field is preferably

initially empty and is populated in response to receipt of group membership data from the subscriber. In one arrangement the data processing means is arranged to request access to a remotely accessible information source on the basis of identification data; responsive to receipt of a response from the remotely accessible information source, the data processing means can perform a first storage action in respect of a response of a first type and can perform a second storage action in respect of a response of a second type. Receipt of a response of the first type from the remotely accessible information source causes the data processing means to update the group field in the subscriber record so as to indicate authenticated membership of the group identified in the received group membership data.

Thus, membership of a given subscriber in relation to a particular group is verified subsequent to the subscriber providing details of a given group of which they purport to be a member, and the subscriber record is updated to reflect the verification, or otherwise, of the asserted membership. The verified group membership can then be used to identify group membership for use in message modification according to embodiments of the invention.

In preferred arrangements the remotely accessible information source is associated with the group, meaning that usage of communications-based group services is dependent on verification, by a party corresponding to the group, of the subscriber's credentials. In one arrangement, the party might be a web server hosting group-related information that is only accessible on the basis of a bone fide password and login. Standard web login and password procedures are therefore conveniently used as a verification process in embodiments of the invention rather than (as is usual) as a process for accessing information.

In such an arrangement the data processing means can be arranged to look for cookies (a packet of data for use in sending to the web server), a web page of a predetermined format, or similar, within the response received from the web server and update the subscriber record accordingly.

The data processing means can be provided by a data processor having the requisite processing resources and configured to function as described

above. Such a configuration can be provided by bespoke software components executed by the processing resources.

According to still further aspects of the present invention there is provided software adapted to be executed by the data processing means to provide the functionality described above.

Further features and advantages of the invention will become apparent from the following description of preferred embodiments of the invention, given by way of example only, which is made with reference to the accompanying drawings.

Brief Description of the Drawings

Figure 1 is a schematic illustration of a mobile network arranged in accordance with an embodiment of the invention;

Figure 2 is a schematic illustration of data exchanges between components of the system illustrated in Figure 1;

Figure 3a is a block diagram showing components of the registration server shown in Figures 1 and 2;

Figure 3b is a schematic timing diagram showing messages passed between various components of the system illustrated in Figure 1; and

Figure 4 is a schematic block diagram showing components of the message modification server shown in Figures 1 and 2.

Figure 5 is a flow diagram showing the operation of a message modification server modifying and sending messages in accordance with an embodiment of the present invention.

Detailed Description of the Invention

Embodiments of the invention are concerned with modification of data messages. The nature of this modification, and the criteria relating thereto, is described in detail later, but first a description of the infrastructure needed to support the modification will be presented.

Figures 1 and 2 show an example of a data messaging system 1 within which embodiments of the invention operate. In Figure 2, the arrows indicate data flows within the data messaging system 1 and the blocks indicate components of the data messaging system 1. Embodiments, described herein as a message modification service, are concerned with modifications to short message service messages (SMS), but it will be appreciated that other message types, such as multimedia message service (MMS), email messages, bespoke messages in the form of GPRS data and/or streamed data and voice messages can alternatively be modified according to embodiments of the invention, and that the specific arrangement of the data messaging system 1 is dependent on the type of message being transmitted.

In the arrangement shown in Figures 1 and 2, a terminal 2 communicates with various network devices within the data messaging system 1 via network 6. The terminal 2 may be a wireless terminal such as a mobile phone or a PDA. The data messaging system 1 comprises a WAP gateway 8, which is typically a network operator's WAP gateway and a registration services server S1, with which the terminal 2 communicates. In addition the data messaging system 1 comprises a message modification server S2, a store-and-forward message server SMSC 16 configured to store and forward messages in accordance with conventional methods, and a database DB1, arranged to store data in respect of subscribers, terminals such as 2, and content data. The database DB1 can either be provided by a plurality of separate databases 20, 24, as shown in Figure 1, or by a single database, as shown in Figure 2.

In embodiments of the invention it is assumed that the user of the terminal 2 is a subscriber of the network, and that network usage is allocated, at least in part, in dependence on subscribers accepting delivery of a predetermined number and/or type of promotional messages; subscription is contingent on the subscriber entering data indicative of their demographic data and interests, this subsequently being used, e.g. by the message modification server S2 to tailor selection of the promotional messages.

The registration server S1 can be accessed by a user of the terminal 2 or via a terminal T1 typically connected to the Internet 10 (the terminal T1 can be e.g. a laptop computer or a personal computer fixedly attached to a network) by actuating a URL corresponding to the server S1 when entering such details; referring to Figure 3a, in addition to standard CPU, memory, data bus, Input/Output ports, data storage, and operating system programs, the server S1 comprises registration software 301, which receives identification, group membership, demographic and preference data from the subscriber; and authentication software 303, which, as will be described in detail later, authenticates the received group membership data. Once these data have been received and, where appropriate, authenticated, a subscriber record is completed and/or updated for the subscriber and stored in the database DB1, for subsequent access by the SMSC 16 and the message modification server S2 (among other network components). The database DB1 thus holds subscriber data for each subscriber, the data identifying: the billing account to which the subscriber belongs; interests and preference data relating to the subscriber; and if the subscriber has been authenticated as belonging to a group, data identifying the group to which the subscriber belongs. In preferred embodiments of the invention the group records are initially empty, and are populated once membership of a given group has been confirmed so as to include data indicative of the type of subscription held for the group. The database DB1 is configured so that any details relating to a billing account held in the database may be retrieved by selecting the appropriate billing account, any details relating to a group held on the database may be retrieved by selecting the appropriate group, and any details relating to a particular subscriber held in the database may be retrieved by selecting the appropriate subscriber.

Broadly speaking, embodiments of the invention comprise two processes, each of which can operate independently of the other, but for illustrative purposes will herein be described together. The first process is a registration process, effected by the authentication software component 303, and which operates so as to verify group membership details entered by subscribers

when providing their demographic details. The second process is a message modification process, executed by the message modification server S2, wherein messages are modified based on sender and recipient identities and their respective membership or otherwise in a given group. In a preferred arrangement the two processes are linked by the involvement of a so-called sponsor, which pays for the transmission of messages between parties contingent on their respective – and authenticated – group membership. Successful authentication according to the first (registration) process, which is itself designed to verify group membership, therefore confirms to the sponsor that discounts (by way of free or discounted messaging) are being applied correctly.

Each of these processes and the functional parts required to implement the processes will now be described, starting with the authentication process, for the case where the subscriber completes the registration process using terminal T1. Referring back to Figure 2, at step 201 the user enters the URL corresponding to the registration server S1, which causes the registration software 301 to send a Web page from the server S1, via an Internet gateway 12, where it is modified, using conventional techniques, into a format suitable for display on the user's terminal T1, and sent to the terminal T1. The user then enters various registration details into the web page and the terminal T1 sends the details to the registration services server S1, via the gateway 8. As part of the registration process, the user enters personal information details, such as name, address, terminal details (including capabilities), sex, occupation, interests, etc. group memberships, and these details are stored, at step 202b, in the database DB1. The group membership data in respect of each group are stored in association with a respective group flag indicating authentication status thereof: the registration software 301 passes such group data to the authentication software 303 component, and in the first instance sets the status of each group flag to "unknown". The authentication software component 303 is then triggered to perform a group membership authentication process, this involving an exchange of data with the terminal T1 and the output of which

results in a change to the status of the group flag (either "authenticated" or "bogus" or "undetermined").

In one embodiment the authentication process involves the authentication software component 303 capturing respective user login details corresponding to a web-based service for the (or each) group, using these captured details to simulate a login process, and using the results thereof as the basis for updating the group flag status. Referring also to Figure 3b, in one arrangement the authentication component 303 sends a pop-up, a frame or a bespoke login sheet to the terminal T1 (step S3.1), inviting the subscriber to enter his user ID and password; assuming these details to be duly entered, the authentication component 303 receives the entered data (step S3.3) and replicates the normal login process with a web server S3 corresponding to the group identified by the subscriber (step S3.5). As per a conventional login procedure, the group web server S3 returns data indicative either of a successful login process – in the form of a cookie, predetermined application programming interface data or a predetermined web page containing a predetermined layout or confirmation message – or of an unsuccessful login process (step S3.7). Examples of successful and unsuccessful login procedures are shown in the scripts below:

```
Successful
==========

Request
------
POST /config/login? HTTP/1.1
Host: login.yahoo.com
User-Agent: Mozilla/5.0 (Macintosh; U; PPC Mac OS X Mach-O; en-US;
rv:1.7.3) Gecko/20040910
Accept: text/xml,application/xml,application/xhtml+xml,text/
html;q=0.9,text/plain;q=0.8,image/png,*/*;q=0.5
Accept-Language: en-us,en;q=0.5
Accept-Encoding: gzip,deflate
Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.7
Keep-Alive: 300
Connection: keep-alive
Referer: https://login.yahoo.com/config/login?
Cookie: B=33f4nh50i49&b=3&s=2a
Content-Type: application/x-www-form-urlencoded
Content-Length: 279
.tries=3&.src=my&.md5=&.hash=&.js=&.last=&promo=&.intl=us&.bypass=&.pa
rtner=&.u=25ub0q1uk6q&.v=0&.challenge=rIt9CsSjzavp3MwrRduDZy&.yplus=
&.emailCode=&pkg=&stepid=&.ev=&hasMsgr=0&.chkP=Y&.done=http%3A%2F%
2Fmy.yahoo.com&.pd=my_ver%23d0&login=XXXXXX&passwd=XXXXXXX
```

```
Answer
-------
HTTP/1.x 200 OK
Date: Fri, 13 Oct 2006 08:43:19 GMT
P3P: policyref="http://p3p.yahoo.com/w3c/p3p.xml", CP="CAO DSP COR
CUR ADM DEV TAI PSA PS IVDi CONi TELo OTP DELi SAMi OTRi UNRi PUBi
IND PHY ONL UNI FIN COM NAV INT DEM CNT STA POL HEA PRE GOV"
Cache-Control: private
Pragma: no-cache
Expires: Thu, 05 Jan 1995 22:00:00 GMT
Connection: close
Transfer-Encoding: chunked
Content-Type: text/html
Set-Cookie:
F=a=SrNlnuQsvfC8VdCWs4SKlvdGqBl7owTNi8TC4cs2qNo_EhUT.JexzZ&b=afek;
expires=Thu, 15 Apr 2010 20:00:00 GMT; path=/; domain=.yahoo.com
Set-Cookie: Y=v=1&n=51on1c961sa&l=90dd4.0jed4d/
o&p=m25kd4012000000&jb=34|26|&r=ge&lg=us&intl=us&np=1; path=/;
domain=.yahoo.com
Set-Cookie: PH=fn=xBi7MUz4jIYIJyBmw-; path=/; domain=.yahoo.com
Set-Cookie: T=z=nG1LFBnMFBGgWHDicYK5A2BjUyNTE1TzU3NTc-
&a=YAE&sk=DAAbx4xUSO.Lm&d=c2wBTlRjeESTFN0RJd01qQS0BYQFZQUUBb2sBWlcw
LQF0aXABVEZKMHlCAXp6AW5UxGQmdXQQ--; path=/; domain=.yahoo.com


Failed login:
=============

Request:
------
POST /config/login? HTTP/1.1
Host: login.yahoo.com
User-Agent: Mozilla/5.0 (Macintosh; U; PPC Mac OS X Mach-O; en-US;
rv:1.7.3) Gecko/20040910
Accept: text/xml,application/xml,application/xhtml+xml,text/
html;q=0.9,text/plain;q=0.8,image/png,*/*;q=0.5
Accept-Language: en-us,en;q=0.5
Accept-Encoding: gzip,deflate
Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.7
Keep-Alive: 300
Connection: keep-alive
Referer: https://login.yahoo.com/config/
login_verify2?.page=p1&.partner=&.intl=us&.src=my&.done=http://
my.yahoo.com
Cookie: B=33f4nh52h0i49&b=3&s=2a
Pragma: no-cache
Cache-Control: no-cache
Content-Type: application/x-www-form-urlencoded
Content-Length: 264
.tries=1&.src=my&.md5=&.hash=&.js=&.last=&promo=&.intl=us&.bypass=&.pa
rtner=&.u=25ub0q12iuk6q&.v=0&.challenge=Mk1bieR_zKyeimTiryyrId_3Po&.yp
lus=&.emailCode=&pkg=&stepid=&.ev=&hasMsgr=0&.chkP=Y&.done=http%3A%
2F%2Fmy.yahoo.com&.pd=my_ver%253d0&login=foo&passwd=foo

Answer
-------
HTTP/1.x 200 OK
Date: Fri, 13 Oct 2006 08:40:37 GMT
P3P: policyref="http://p3p.yahoo.com/w3c/p3p.xml", CP="CAO DSP COR
CUR ADM DEV PSD IVAi IVDi CONi TELo OTPi OUR DELi SAMi OTRi UNRi
PUBi IND PHY ONL UNI PUR FIN COM NAV INT DEM CNT STA POL HEA PRE GOV"
Connection: close
Transfer-Encoding: chunked
Content-Type: text/html
```

On the basis of the response from the server S2, the authentication component 303 updates the group flag status (step S3.9); this group flag status is

then subsequently used by the data message modification service according to the second aspect of the invention.

Turning now to aspects of the message modification process, in one arrangement the message modification server S2 is arranged to selectively modify messages based on respective group membership of the sender and recipient; for example, assuming a group to be tagged as sponsored by a particular third party, messages transmitted between group members are modified to include a first type of information, whereas messages transmitted from a group member to a non-group member are modified to include a second type of information. The content of the first and second types of information can be controlled by the sponsor and are preferably related in some way: for example, the first type of information could be a message stating "this message has been sponsored by XYZ", whereas the second type of information could be a message stating "this message could have been delivered free to you by XYZ if you were a member of group G1".

Referring to Figure 4, the message modification server S2 comprises standard processing components together with various bespoke message modifying components; these message modifying components include selecting software 401 and a repository of rules R, each rule specifying a set of group membership conditions and data to select for use in modifying a given message in dependence on the conditions being satisfied (whilst shown as being stored local to the server S2, the rules could be stored in the database DB1 and accessed therefrom by the selecting software 401). The server S2 also includes message modifying software 403 for modifying the incoming message so as to include the selected data, thereafter forwarding the modified messages to the SMSC 16 in accordance with standard methods.

The rules are preferably specified by the group, or by the sponsor of the group, and in one arrangement specify particular tags to apply to a message in the event that the conditions are satisfied. Examples of the conditions include:

Rule	Condition(s)
R1	Sender & Recipient both members of same group

R2 Sender & Recipient both members of a group, but the groups are different

R3 Sender is a member of a group (& recipient is not)

R4 Recipient is a member of a group (& sender is not)

R5 Neither Recipient nor Sender is member of a group

R6 If Sender &/or Recipient are members of more than one group, apply inter-Group precedence rules (previously agreed between groups and managed by the data messaging server S2) to decide which of rules R particular to each of the groups should be applied.

The actions associated with these rules are specified in the form of a billing action and a message modification action. Preferably the message modification actions in respect of at least two of the rules are related: in one embodiment the action (message modification) is identical, but the content of the tags applied to modify the message are different, but related; and in another embodiment the actual actions taken in respect of different rules are different, but related. The actions are stored in the database DB1, in association with a given rule and thus a given group.

For example, the message modification actions applicable in respect of Rules R1 … R4 for group G1 could be as follows:

RULE	ACTION(S)	MESSAGE MODIFICATION TAG
R1	<u>Billing Action:</u> Do not debit accounts of sender or recipient <u>Message modification actions:</u> • Concatenate Tag A1 with name of sponsor & add to message received from sender (to be sent to recipient only) • Add/Send sponsor-selected message	A1 This message was sponsored by "Sponsor" for the community G1 members

	for G1 (to be added to message to be sent to recipient; to be sent cold to sender) [optional]	
R2, R3	Billing Action: Debit account of recipient Message modification actions: • Concatenate Tag A2 with name of sponsor & add concatenated tag to message received from sender and send to recipient • Add/Send sponsor-selected message for G1 (to be added to message to be sent to recipient; to be sent cold to sender)	A2 If you joined group G1 you could benefit from free text messaging thanks to "Sponsor"
R4	Billing Action: Debit account of sender Message modification actions: • Concatenate Tag A2 with name of sponsor & send concatenated tag to sender • Add/Send sponsor-selected message for G1 (to be added to message to be sent to sender; to be added to message to be sent to recipient) [optional]	A2 (As above)
R5	Billing Action: Debit account of sender &/ recipient Message modification actions: • Concatenate Tag A2 with name of sponsor, add concatenated tag to message received from sender and	A2 (As above)

	send to recipient; send concatenated tag as cold message for sender • Add sponsor-selected message for G1 (to be added to message to be sent to sender; to be added to message to be sent to recipient) [optional]	

TABLE: Actions for Group G1

Turning back to Figure 2, upon receipt of an SMS from a sender (step S203), the selecting software 401 identifies sender and/or recipient information from an incoming message and selects, by accessing the database DB1, the respective group membership(s), together with all associated message modification actions associated therewith (step 204). On the basis of the group memberships, the selecting software 401 identifies and processes one or more applicable rules R1 … Rn (step 205) in order to identify billing arrangements for the message and to determine how to modify the incoming message (step 206). After the message has been modified, the modified message is transmitted to the SMSC 16 of the licensed operator (step 207a); thereafter billing instructions are transmitted to the database DB1 for storage therein in respect of the sender/recipient/sponsor (step 207b), consistent with the billing action identified at step 205.

The foregoing can conveniently be explained by way of a couple of examples, firstly for the case where a message M1 is sent from subscriber A to subscriber B, and both A and B are determined to be members of community G1, and for which the sponsor of community G1 is Coke™. In this example the selecting software component 401 selects rule R1, particular to Group G1, which has the following output actions:

1. All text communication between community members of G1 are free;

2. Text messages should be tagged with tag A1, concatenated with the name of the sponsor (Coke™); thus in this example, the tag reads: "this message was sponsored by Coke™ for the members of community G1".

This then causes the message M1 to be modified so as to include the branded tag and is sent onto the recipient; since both A and B are members of group G1, neither of their accounts is debited for the message transmission and receipt.

In a second example, message M1 is sent from subscriber A to subscriber B; subscriber A is not a member of any community, but subscriber B is a member of group G1. Assuming for illustrative purposes the sponsor of group G1 again to be Coke™, the following output actions are generated at step 205:

1. Bill the sender of the message for the transmission to the recipient;
2. Create a message to send to the sender based on tag A2 and concatenated with the name of the sponsor (Coke™); thus in this example, the message reads: "If you joined group G1 you could benefit from free text messaging thanks to Coke™".
3. Do not bill the sender for the transmission of the tagged promotional message

It will be appreciated that the content of the messages sent to the respective parties A and B is related by virtue of the identity of the group sponsor, and that the tagging and/or creation of respective messages, by the message modification server S2, is dependent on which of the sender or recipient is, or is not, a group member.

In a third example, message M1 is sent from subscriber A to subscriber B; subscriber A is a member of Group G1, but subscriber B is not a member of the same group G1. Assuming for illustrative purposes the sponsor of group G1 again to be Coke™, the following output actions are generated at step 205:

1. Do not bill the sender of the message for the transmission to the recipient;
2. Create a message to send to the recipient based on tag A2 and concatenated with the name of the sponsor (Coke™); thus in this example, the message

reads: "If you joined group G1 you could also benefit from free text messaging thanks to Coke™ ".

In the event that both the sender and recipient are members of different groups (e.g. sender is a member of group G1 and recipient is a member of group G2), the inter-group precedence rules mentioned above in relation to rule R6 could include the following conditions:

- Review sponsor data in respect of G1 & G2 to see whether they include any prestored (or shared) precedence specifications;
- Review temporal data in respect of G1 & G2 to see whether they include any prestored precedence specifications;
- If there are no prestored precedence specifications, prioritise the group associated with the sender over that associated with the recipient, and debit the account of the group sponsor corresponding to the sender;

Shared precedence specifications might include agreed sharing of messaging costs between sponsors of particular groups, so that, in the event that the sponsors of groups G1 and G2 have an inter-group agreement, the costs of transmitting messages are shared between sponsors. In this case, the tag A2 added to messages would alert each party to the existence of the group of which the other party is a member (e.g. if sender A is a member of G1 and recipient B is a member of G2, the tag A2 added to the message sent to A would read "If you joined group G2 you could benefit from free text messaging thanks to "Sponsor2" and the tag added to the message sent to B would read "If you joined group G1 you could benefit from free text messaging thanks to "Sponsor1").

Since, in embodiments of the present invention, the message modification server S2 retrieves group membership(s) and associated message modification actions (S204), the step of modifying the message (S206) can be performed more efficiently compared to prior art systems which do not modify messages based on group membership. This is because, whereas in prior art systems, the modifying process must iterate through all available message tags (e.g. one or more for each advertiser) to determine which, if any, of the tags are suitable for

the recipient and/or sender of the message, in embodiments of the present invention, the process of modifying need only iterate through each group of which the sender and/or recipient is a member. For example, where modifying the message (S206) comprises accessing a database containing the tags, in prior art systems one query is made to this database for each tag, whereas in embodiments of the present invention, only one query per group is required. This greatly improves the efficiency of message modification.

Further embodiments

Further embodiments of the invention in which content of a message is appended to another message for delivery to a receiving party are now described with reference to Figure 5. The steps of Figure 5 may be performed using the message modification server S2 described above.

At step S500, the message modification server S2 receives a first message from the terminal 2. The first message comprises a message body, typically containing a message specified by the user of the terminal 2, and an identifier of a receiving party of the first message. The receiving party is typically another terminal, such as the terminal 4 shown in Figure 2. The identifier typically comprises a telephone number of the recipient, in the case that the first message comprises an SMS message, for example, but may comprise some other identifier, such as an email address.

At step S502, the first message is analysed and a receiving party is identified. This may comprise simply determining the content of the identifier (e.g. telephone number), or it may also comprise identifying further characteristics of the sender of the message, such as a group of which the sender is a member; this may be done by accessing the database DB1 as described above.

At step S503 the first message is stored; it may be stored in an internal memory of the message modification server S2, for example. The message modification server S2 starts monitoring for further messages at step S504; at step S506 it checks whether a predetermined period of time (T) has expired.

The length of time T may be fixed for all messages, or it may vary according to one or more predetermined criterion, such as a priority level of the message and/or the time of day the message is sent. Additionally, or alternatively, the message may specify a time of day (e.g. 9am) by which the message is to be sent; this time may be specified by a user, either as part of the message body, or as a separate message parameter. For example, in the former case, if the message body contains the message "Let's meet at 9am", the message modification server S2 may automatically read the time 9am specified in the message and set a delivery time, t1, such that the message is delivered by this time; in the latter case, the user may separately specify as part of an option in an application on the terminal 2 that the message is to be delivered by 9am.

If it is determined at step S506 that T has expired (or that delivery time t1 has been reached), the message is sent to the receiving party at step S508. If T has not expired, the message modification server S2 determines whether any further messages have been received at step S510. If no further messages have been received, the process returns to step S506. However, if a further message has been received, a receiving party of the further message is identified (step S512). At step S514, the message modification server S2 compares the receiving party of the first message identified at step S502 with the receiving party of the further message identified at step S512. If the receiving parties are different, the process returns to step S506; the further message may be stored as per step S503, and a parallel process corresponding to the process here described with respect to first message may run in respect to the further message.. However if the receiving parties are the same, the further message is modified to include the message body of the first message. The modified further message including the message body of the first message is then sent to the identified receiving party at step S518.

The further message may originate from a further terminal, such as a further mobile terminal. In some cases it may originate from an information source which generates messages such as advertising messages for sending to specified receiving parties.

Each of the first message and the further message may comprise identifiers of only a single receiving party, or may comprise identifiers for more than one receiving party. When the further message is intended for transmission to multiple recipients, steps S502 and S512 may comprise identifying each of the recipients; further, the step of comparing message receiving parties S514 may comprise making multiple comparisons.

In some embodiments, further steps may be included in the process described above with reference to Figure 5. For example, the step of modifying the further message S516 may include a determination of whether there is sufficient space in the further message for the message body to be included. For example, message bodies for SMS messages typically have a maximum size of 160 characters; if an SMS message contains 150 characters, it can therefore only be added to messages containing 10 characters or less. In cases where the message body size exceeds the maximum, the message modification server S2 may create however many messages are required to accommodate the whole message body and include indicators in the messages indicating that they each contain a part of a single message body, so that the receiving terminal can concatenate the messages on receipt to present the original message body as a single message.

Further, the first message may contain information indicating whether it is suitable to be added to a further message. For example, a provider of a service using embodiments of the present invention may only wish to provide the service to subscribers of the service; accordingly, the first message may contain information (such as a PIN) indicating that the sending party is a subscriber to the service. In some arrangements concatenated messages may be provided only to certain receiving parties, for example receiving parties who have indicated in the above described registration process, or otherwise, that they are willing to receive such messages. Alternatively, or additionally, the message modification server S2 may determine group membership for sending and/or receiving parties; the first message may only be added to the further message in the case that the sending party of the first message is a member of a

specified group or groups, or if both the sending party and the receiving party are members of the same group, for example.

Where the further message has multiple receiving parties (e.g. members of a group), not all of which are common to the first message, the further message may be modified selectively, so that it contains the message body of the first message only for the common receiving parties. Conversely, where the first message has multiple receiving parties, not all of which are common to the further message, the message body of the first message may be appended to the further message only for those receiving parties that are common to both messages; in this case, the message may remain stored as described above until its message body has been sent to all parties, either by being appended to (perhaps multiple) other messages or by being sent independently. In other arrangements, the modified further message may be sent to all receiving parties of the first message, of the further message, or of both.

In the above description, the message body of a single first message was appended to a second message; however, the invention extends to arrangements in which any number of message bodies are appended to a further message. Further, in some cases a message body of the further message may be appended to the first message for sending.

In some embodiments, some of the steps described with reference to Figure 5 may not be necessary. For example, in some cases, there is no predetermined time limit and steps S506 and S508 are not performed; that is, in some arrangements the first message is stored for an indefinite period of time until a suitable further message is received.

Implementation Details & Alternatives

The registration software 301, category selection software 303, authentication software 305, selecting software 401 and modifying software 403 are preferably written in the Java programming language. The server S1 could, for example, be an Apache HTTP server, and the proxy message server SMSC_1 could be a J2EE JMS Server (see http://openjms.sourceforge.net/).

The registration software 301, category selection software 303 and authentication software 305 could be Java™ servlet containers configured to run within a Java platform such as Java 2 Platform Standard Edition v1.4.1 (for further information see resources available from Sun Microsystems™ e.g. at http://java.sun.com/j2se/1.4.1/ and http://java.sun.com/products/servlet/index.html). The skilled person will appreciate that the software could be written in any suitable language.

As an alternative to the registration software component 301 sending a web page to the terminal T1, the terminal T1 could have, stored thereon, an application arranged to capture such demographic data (not shown in the Figures). In the case where the subscriber uses his mobile terminal 2 to communicate with the registration server S1, such an application could be stored on a SIM card, which, as is known in the art, is used for the storage and retrieval of data items by the terminal T1. The command set, data file structure and data coding format for data communicated via the interface between the terminal T1 and the SIM processor are all specified, in GSM technical specification 11.11. Alternatively the application could be transmitted to the terminal T1 (or mobile 2) (e.g. via GPRS or Bluetooth) in response to a request received by the server S1 from the terminal T1 and would be of a format suitable for cooperating with the operating system in use on the terminal T1.

Whilst authentication of a given group membership is described as being performed via login-simulation, it will be appreciated that such a method is only possible in relation to groups that are web-based; for other groups (e.g. retail establishments using loyalty cards and the like, where membership of a group can be defined on the basis of subscribers being in possession of a loyalty card and account, neither or which are managed by a user-accessible web service), membership of a given group could be established by sending of an authentication request message by the authentication software component 303 to a service associated with the retail establishment, or on the basis of previously determined authentication data that is retrievable from a third party.

In the above embodiments, message modification is performed by the message modification server S2; however, message modification could instead be performed by a proxy store and forward node (not shown), which is logically distinct from the network operator's SMSC 16. In order to ensure that messages are sent to this proxy SMSC in the first instance (and not to the network operator's SMSC) the mobile terminal 2 would require configuring with details of this proxy e.g. via an Over-The-Air (OTA) SMS settings message. In response, the operating system programs on the terminal 2 automatically configure the default SMSC settings to the network address of the proxy message server. This therefore means that any SMS messages subsequently sent from the terminal 2 will be sent to the proxy message server in the first instance. For further information regarding use of OTA protocol for the delivery of data to a WAP client from a WAP server, the reader is referred to literature available from the WAP Forum Ltd., in particular "Wireless Application Protocol, PUSH OTA Protocol Specification", published 16th August 1999, available from http://www.wapforum.org/what/technical/PROP-PushOTA-19990816.pdf.

As a further alternative, the message modification process could be performed by the network operator's SMSC 16.

Whilst the above embodiments describe the messages originating from a terminal 2, the messages could instead originate from a service that may or may not also be responsible for performing modification of the message. For example such a service could include an Internet service configured to send SMS messages; group records would be created for the service as described above and accessed subsequent to, or in parallel with, message creation so as to modify the message.

Whilst the above embodiments describe transmitting messages within a mobile communications network, it is to be understood that messages can originate from and be transmitted, wholly or at least in part, within a fixed network such as the Internet.

The above embodiments are to be understood as illustrative examples of the invention. It is to be understood that any feature described in relation to any

one embodiment may be used alone, or in combination with other features described, and may also be used in combination with one or more features of any other of the embodiments, or any combination of any other of the embodiments. Furthermore, equivalents and modifications not described above may also be employed without departing from the scope of the invention, which is defined in the accompanying claims.

Claims

1. A method of transmitting a message in a data communications network, said method comprising:

receiving a first message from a sending party, said first message comprising a first identifier and a message body, said first identifier identifying a first receiving party of said first message and said message body being at least partly specified by said sending party;

receiving a second message, said second message comprising a second identifier identifying a receiving party thereof;

responsive to identification that a receiving party of the second message corresponds to said first receiving party, appending said message body to said second message so as to generate a modified second message; and

sending said modified second message to said first receiving party.

2. A method according to claim 1, in which said second message body comprises a message body, and the steps of appending and sending are dependent on a predetermined criterion, said predetermined criterion being independent of said message body of said second message.

3. A method according to claim 1 and claim 2, in which said first message comprises an indicator that said first message is suitable for said appending, and said appending is performed in response to receiving said indicator.

4. A method according to any preceding claim, comprising determining whether said sending party is a member of a predetermined group, in which the steps of appending and sending are performed in response to determining that said sending party is a member of said predetermined group.

5. A method according to claim 4, in which said first receiving party is a member of said predetermined group.

6. A method according to claim 5, including identifying a plurality of receiving parties for said first message and sending said modified second message to at least one other member of said predetermined group.

7. A method according to any preceding claim, comprising determining whether said first receiving party is a member of a further predetermined group, in which the steps of appending and sending are performed in response to determining that said receiving party is a member of said further predetermined group.

8. A method according to claim 7 dependent on any one of claim 4 to claim 6, in which at least some of the members of the further predetermined group are members of the predetermined group of which the sending party is a member.

9. A method according to any preceding claim, in which the steps of appending and sending are only performed in the case that said second message is received within a predetermined time period of receiving said first message.

10. A method according to claim 9, in which said first message is sent independently of said second message in the case that said second message is not received within said predetermined time period.

11. A method according to either of claim 9 and claim 10, in which said first message comprises an indicator of said predetermined time period.

12. A method according to any of claim 9 to claim 11, in which said predetermined time period is user-selectable.

13. A method according to any of claim 9 to claim 12, in which said predetermined time period depends on a time of day.

14. A method according to any of claim 9 to claim 13, in which said predetermined time period depends on a priority level of said first message.

15. A method according to any preceding claim, in which at least one of said first message and said second message comprises an SMS message.

16. A method according to any preceding claim, in which at least one of said first identifier and said second identifier comprise a telephone number.

17. A method according to any preceding claim, in which at least one of said first message and said second message is received from a user terminal.

18. Apparatus for transmitting a message in a data communications network, said apparatus comprising:

an interface for receiving a first message from a sending party, and a second message, wherein said first message comprises a first identifier and a message body, said first identifier identifying a first receiving party of said first message and said message body being at least partly specified by said sending party, and said second message comprises a second identifier identifying a receiving party thereof;

processing means responsive to identification that a receiving party of the second message corresponds to said first receiving party to append said message body to said second message to generate a modified second message; and

means for sending said modified second message to said first receiving party.

19. Apparatus according to claim 18, wherein at least one of said first message and said second message comprises an SMS message.

20. Apparatus according to either of claim 18 and claim 19, wherein at least one of said first identifier and said second identifier comprises a telephone number.

21. Apparatus according to any of claim 18 to claim 20, wherein said processing means has access to a database, said database comprising an indication of at least one predetermined group of which said sending party is a member, and the processing means appends said message body to said second message in dependence on said sending party group membership.

22. Apparatus according to claim 21, wherein said database comprises an indication of at least one predetermined group of which said first receiving party is a member, and the processing means only appends said message body to said second message in response to determining that there is at least one predetermined group of which both said sending party and said first receiving party are members.

23. Apparatus for modifying a message for transmission through a data communications network, the message including transmission data identifying a sending party and a recipient of said message and a message body identifying content thereof, at least part of which is specified by the sending party, the apparatus comprising data processing means arranged to:

identify membership of a group in relation to a sending party and a recipient of a said message;

identify an action in dependence on concordance between respective group memberships;

modify the message on the basis of the identified action; and

transmit the modified message to the recipient in accordance with the transmission data.

24. Apparatus according to claim 23, wherein the data processing means is arranged such that a given action includes selecting a tag for adding to the received message.

25. Apparatus according to claim 24, comprising a storage system arranged to store a plurality of tags and index data corresponding thereto, each index data item comprising data indicative of a group membership configuration corresponding to the sending party of a message and the recipient of a message.

26. Apparatus according to claim 24 or claim 25, wherein the data processing means is arranged such that a given action includes inserting, within the selected tag, data indicative of an entity associated with a group of which the sending party or the recipient is a member.

27. Apparatus according to any one of claim 24 to claim 26, wherein the storage system comprises a set of precedence rules for use in selecting a tag in the event that the sending party and the recipient are identified to be members of a different group.

28. Apparatus according to any one of claim 24 to claim 27, wherein the data processing means is arranged to select a tag indicative of a group of which the sending party is a group in the event that the sending party and the recipient are identified to be members of a different group.

29. Apparatus according to any one of claim 24 to claim 28, wherein the data processing means is further arranged to send a message comprising a selected tag to the sending party.

30. Apparatus according to any one of claim 23 to claim 29, wherein, in the event that group membership of the sending party is different to group membership of the recipient, the data processing means is arranged to select a first tag for use in modifying the message to be transmitted to the recipient and to select a second tag, different to said first tag, for sending to said sending party, wherein said first tag is related to said second tag.

31. Apparatus according to any one of claim 23 to claim 30, wherein the communications network includes data storage means arranged to hold group records, each group record being indicative of network usage relating to members of the group, the data processing means being arranged to determine whether said message falls within predetermined message transmission criteria, and to modify a group record corresponding to the group when said criteria are met.

32. Apparatus according to claim 31, wherein the group record holds data indicative of an allocation of usage associated with the group and the data processing means is arranged to reduce allocation associated with the group, whereby to modify the group record.

33. Apparatus according to claim 32, wherein the data processing means is arranged to store data indicative of a charge for transmission of the message in the group record, whereby to modify the group record.

34. Apparatus according to any one of claim 23 to claim 33, in which the data communications network comprises a mobile communications network portion.

35. A method of modifying a message for transmission through a data communications network, the message including transmission data identifying a sending party and a recipient of said message and a message body

identifying content thereof, at least part of which is specified by the sending party, the method comprising:

identifying membership of a group in relation to a sending party and a recipient of a said message;

identifying an action in dependence on concordance between respective group memberships;

modifying the message on the basis of the identified action; and

transmitting the modified message to the recipient in accordance with the transmission data.

36. A method according to claim 35, including selecting a tag for adding to the received message.

37. A method according to claim 35 or claim 36, including inserting, within the selected tag, data indicative of an entity associated with a group of which the sending party or the recipient is a member.

38. A method according to any one of claim 35 to claim 37, including applying precedence rules for selecting a tag in the event that the sending party and the recipient are identified to be members of a different group.

39. A method according to any one of claim 35 to claim 38, including selecting a tag indicative of a group associated with the sending party in the event that the sending party and the recipient are identified to be members of a different group.

40. A method according to any one of claim 35 to claim 39, including sending a message comprising a selected tag to the sending party.

41. A method according to any one of claim 35 to claim 40, in which, in the event that group membership of the sending party is different to group

membership of the recipient, the method comprises selecting a first tag for use in modifying the message to be transmitted to the recipient and selecting a second tag, different to said first tag, for sending to said sending party, said first tag being related to said second tag.

42. A method according to any one of claim 35 to claim 41, in which the communications network includes data storage means arranged to hold group records, each group record being indicative of network usage relating to members of the group, the method comprising determining whether said message falls within predetermined message transmission criteria, and modifying a group record corresponding to the group when said criteria are met.

43. A method according to claim 42, in which the group record holds data indicative of an allocation of usage associated with the group, the method comprising reducing allocation associated with the group, whereby to modify the group record.

43. A method according to claim 42, including storing data indicative of a charge for transmission of the message in the group record, whereby to modify the group record.

44. A computer program product, or a suite of computer program products comprising program code means being adapted to perform the steps of any one of claim 35 to claim 43 when the program is run on a computer or on a suite of computers.

45. A computer-readable medium having stored thereon a data structure comprising the computer program product according to claim 44.

46. Apparatus for collecting subscription data for subscribers in a telecommunications system for use in metering usage of network resources, said apparatus comprising:

data storage means arranged to hold subscriber records, said subscriber records including a plurality of fields including a group field for storing data indicative of group membership of a subscriber, said group field being initially empty; and

data processing means arranged to request access to a remotely accessible information source on the basis of identification data, and, responsive to receipt of a response from the remotely accessible information source, to perform a first storage action in respect of a response of a first type and to perform a second storage action in respect of a response of a second type,

wherein, responsive to receipt of group membership data from the subscriber, the data processing means is arranged to identify a remotely accessible information source corresponding to the group and to request access thereto on the basis of identification data associated with the received group membership data, and

wherein, responsive to a response of the first type received from the remotely accessible information source, the data processing means is arranged to update the group field in the subscriber record so as to indicate authenticated membership of the group identified in the received group membership data.

47. Apparatus according to claim 46, wherein, responsive to a response of the second type received from the remotely accessible information source, the data processing means is arranged to update the group field in the subscriber record so as to indicate unauthenticated membership of the group identified in the received group membership data.

48. Apparatus according to claim 46 or claim 47, wherein the data processor is arranged to process the response received from the remotely accessible information source to as to derive therefrom a packet of data for use in sending to the remotely accessible information source.

49. Apparatus according to any one of claim 46 to claim 48, wherein the data storage means is arranged to hold group records, each group record being indicative of network usage relating to members of the group,

wherein the data processing means is arranged to analyze data indicating that a subscriber authenticated in respect of a group has sent a message, to determine whether said message falls within predetermined message transmission criteria, and to modify a group record corresponding to the group when said criteria are met.

50. Apparatus according to claim 49, wherein the group record holds data indicative of an allocation of usage associated with the group and the data processor is arranged to reduce allocation associated with the group, whereby to modify the group record.

51. Apparatus according to claim 49, wherein the data processor is arranged to store data indicative of a charge for transmission of the message in the group record, whereby to modify the group record.

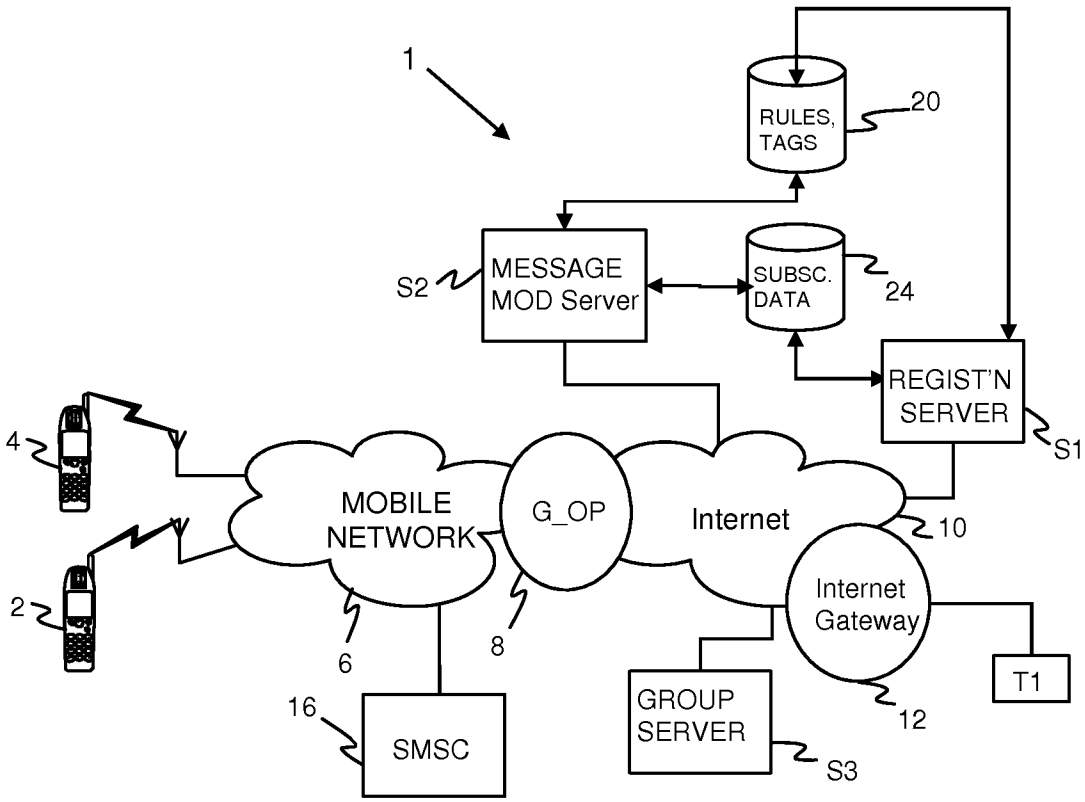

1
RULES, TAGS
20
S2
MESSAGE MOD Server
SUBSC. DATA
24
REGIST'N SERVER
S1
4
2
MOBILE NETWORK
G_OP
Internet
10
Internet Gateway
T1
6
8
16
SMSC
GROUP SERVER
12
S3

Figure 1

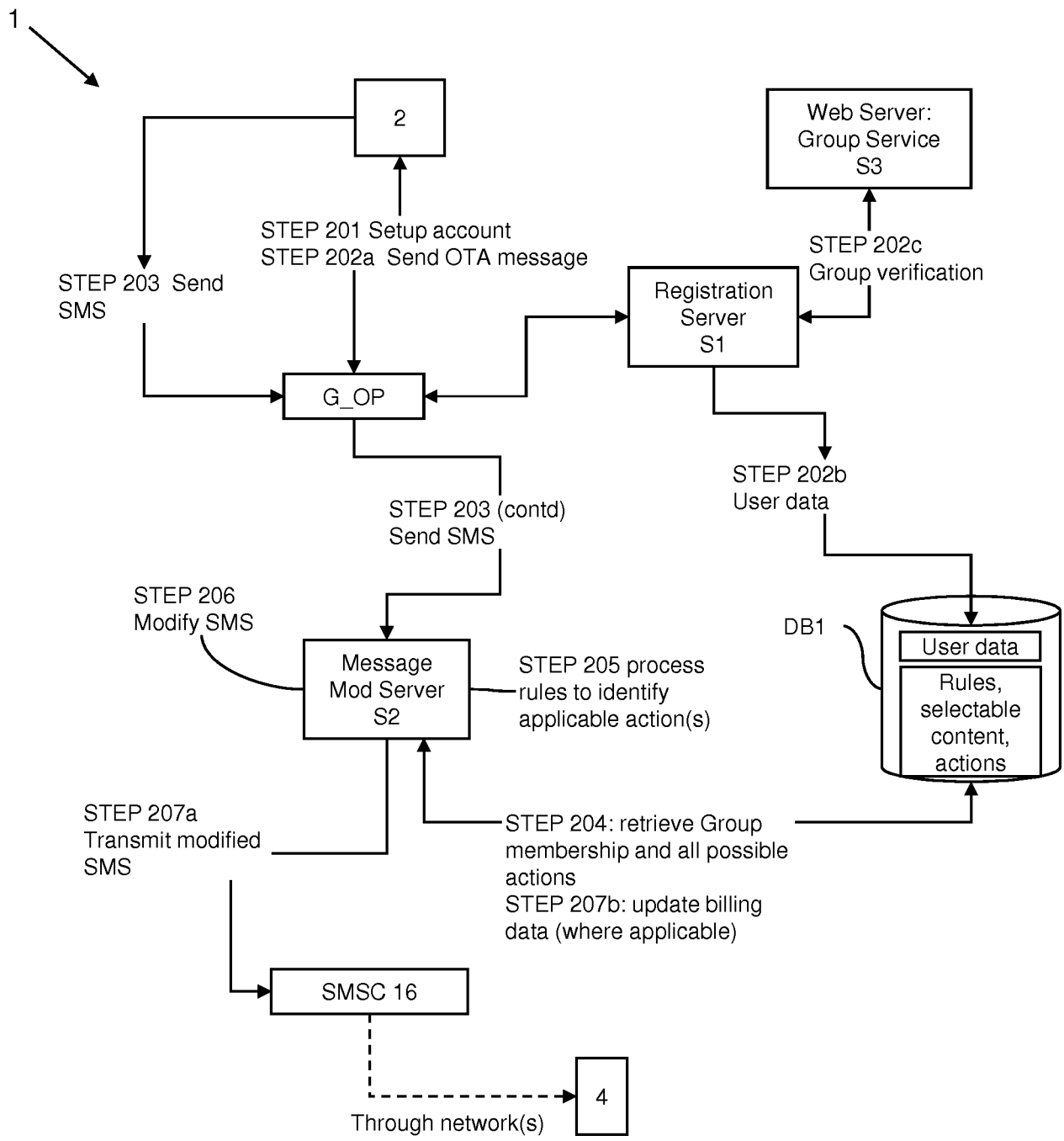

1
2
Web Server:
Group Service
S3
STEP 201 Setup account
STEP 202a Send OTA message
STEP 202c
Group verification
STEP 203 Send
SMS
Registration
Server
S1
G_OP
STEP 202b
User data
STEP 203 (contd)
Send SMS
STEP 206
Modify SMS
DB1
User data
Rules,
selectable
content,
actions
Message
Mod Server
S2
STEP 205 process
rules to identify
applicable action(s)
STEP 207a
Transmit modified
SMS
STEP 204: retrieve Group
membership and all possible
actions
STEP 207b: update billing
data (where applicable)
SMSC 16
4
Through network(s)

Figure 2

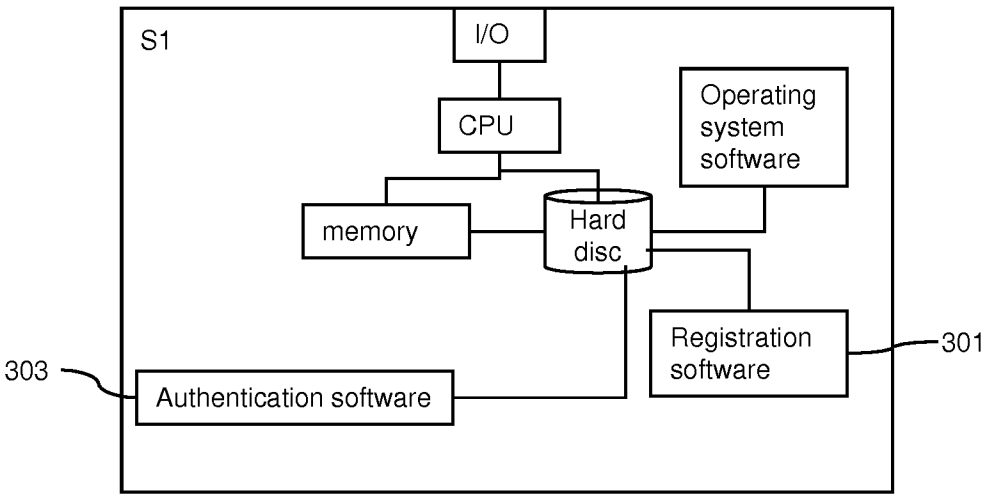


Figure 3a

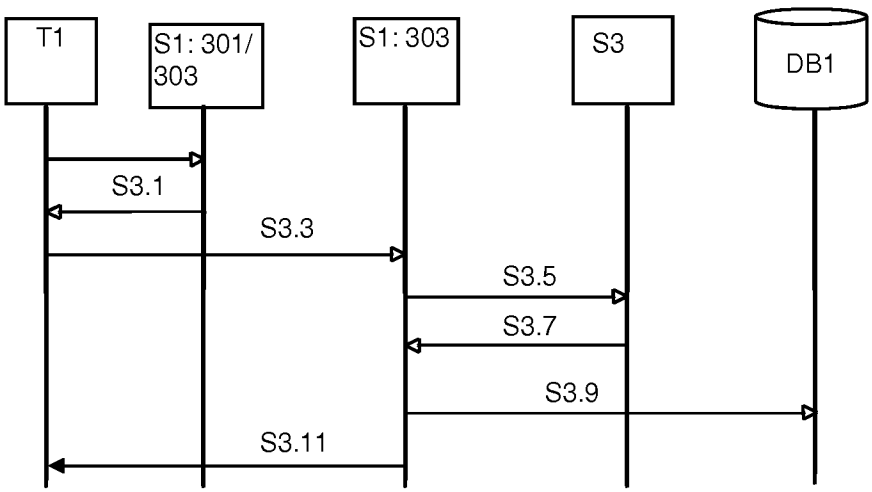


Figure 3b

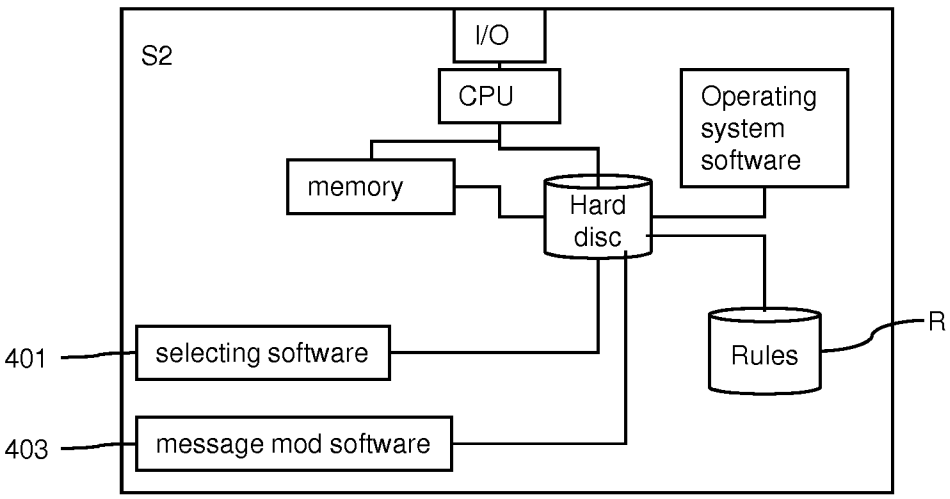
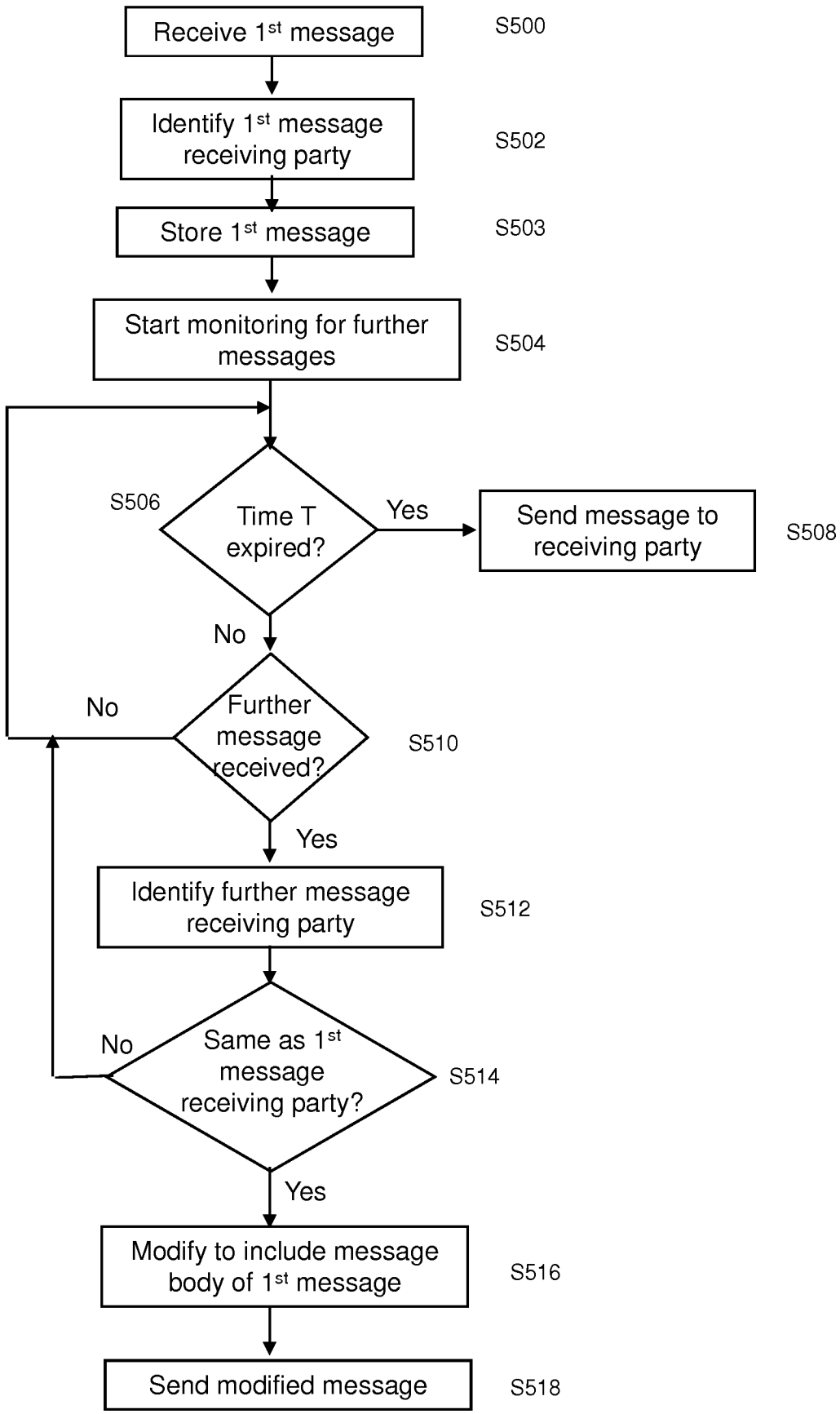

S2
I/O
CPU
Operating system software
memory
Hard disc
401
selecting software
Rules
R
403
message mod software

Figure 4

Figure 5


Receive 1st message
S500
Identify 1st message receiving party
S502
Store 1st message
S503
Start monitoring for further messages
S504
S506
Time T expired?
Yes
Send message to receiving party
S508
No
No
Further message received?
S510
Yes
Identify further message receiving party
S512
No
Same as 1st message receiving party?
S514
Yes
Modify to include message body of 1st message
S516
Send modified message
S518