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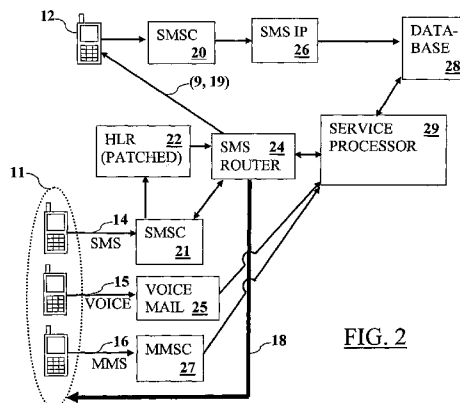


FIG. 2

(57) Abstract: An apparatus for processing communications from an originator (11) to a recipient (12) in a telecommunications network is described. The apparatus comprises a memory for storing an availability status indicator for a recipient of communications and a service processor. The service processor (29) is operable to receive an indication that a communication for the recipient has been received by the network in any one of a number of different communication formats, e.g. text message formats or a voice call format, to determine from the availability status indicator for the recipient whether the intended recipient is indicated as being unavailable to respond to the communication, and on determining that the intended recipient is indicated as being unavailable to respond to the communication, to instigate delivery of an outgoing text message to the originator to inform the him of this. Thus subscribers of the network can readily configure a text-message "Out of Office" type reply to communications directed to them in any one of a number of different formats.

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SENDING REPLY MESSAGES TO CALLERS
WHEN CALLED PARTY IS UNAVAILABLE

BACKGROUND ART

This invention relates to a telecommunications services apparatus and methods for use with a telecommunications system, such as a mobile telephone network. In particular the invention relates to processing communications from an originator to a recipient when the recipient is unavailable to receive the communication.

Voice mail is a well-known application in telecommunications. A caller (i.e. originator of a communication) may be directed to the voice mail system of an intended recipient automatically under a configurable set of conditions, for example recipient busy, ring with no answer timeout or a do-not-disturb setting on the recipient's telephone. The recorded or synthesised outgoing message that the caller hears when reaching the voice mail system can be a personalised greeting chosen by the mailbox owner (recipient), or may be a default greeting provided by the system / service provider. If a recipient chooses to record his own greeting, then he generally has the option of changing the greeting whenever he chooses. In some corporate environments in particular, users may be required to update their voice mail announcements on a frequent basis so that the message provides useful contemporary information for the caller. For example, a recipient who will be out of the office for a morning might record an outgoing voice mail message saying:

“Hello, this is John Smith. It's Friday 6th June and I am away from the office until 2pm this afternoon ...”.

This can help ensure the caller is made aware that the message is up-to-date, and also is helpful to the caller since it provides the caller with an indication of the earliest he might expect a return call. Thus an outgoing voice mail greeting message may be used if desired to inform a caller about a recipient's current status. In a business

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environment this type of messaging information is commonly known as 'Out of Office' after the parallel feature in common email clients, whereby an email message can be configured to be returned in response to an email message sent to a recipient while the recipient's "Out of Office" feature is activated / turned on. Thus a service which provides this presence information may be referred to as an 'Out of Office' service. In a consumer (i.e. non-office) environment, this type of feature may be more appropriately referred to as an 'Away' service, a 'Back Soon' service or an "Unavailable" service. However, for simplicity, the term 'Out of Office' will often be used here to refer to this type of service regardless of whether the service is operating in a literal office environment, or whether the service is operating in another environment, e.g. as an individual consumer service. The term 'Out of Office' should therefore be interpreted accordingly unless the context demands otherwise.

It is also known that "Out of Office" functionality can be provided in the text-messaging domain. In this situation, if a text message is received while the recipient has his "Out of Office" service active, then a pre-configured text message may be automatically returned to the sender. This message may if desired convey presence or status information, for example a return text message might read:

*"Thank you for your text message. I am holiday until 9 June
and will not be able to respond until after that date."*

It is also known that some handsets have a feature whereby an incoming call can be rejected with a text message. Typically a default text message for this purpose is stored in the handset, and when a voice call is rejected, the recipient is presented with the option to edit and send this message to the originator / caller.

While it may be desirable for a user to be able to utilise their outgoing voice mail greeting as an "Out of Office" message (i.e. a message containing useful contemporaneous information), in practice this is rarely done unless a company policy forces regular message updates. This is because setting up a satisfactory voice greeting is difficult to achieve; in fact many users never set up a greeting at all. Part of the

reason for the difficulty is that a voice message carries significant additional content apart from just the words spoken. Issues such as clarity, background noise, emotional content, and stumbles in diction can all lead to unsatisfactory messages. Consequently, for those users who make the effort to set up an outgoing voice mail greeting, once they have achieved a recording of satisfactory quality they tend to be reluctant to change it and prefer to leave it alone. Some voice mail systems support a technical feature whereby a temporary greeting can be substituted without erasing the original recording, but this feature is seldom used. Even if this option is available, there is still a perceived risk of losing one's main recording.

Consequently in current systems, voice callers do not usually benefit from receiving any "Out of Office" status indication when they have called a recipient who is unavailable to take their call. This is because the greeting that they hear is generally unlikely to carry any contemporary information.

Thus a further problem with present voice mail systems is that when a caller reaches voice mail, he does not generally know why he has reached voice mail. It could be because the called party is temporarily out of coverage, or it could be that the called party is on a two-week vacation. Generally, the voice greeting will not allow the caller to determine the reason for reaching voice mail.

There is therefore a need for apparatus and methods for providing an improved "Out of Office" type functionality in telecommunication systems.

SUMMARY OF THE INVENTION

According to a first aspect of the invention there is provided an apparatus for processing communications from an originator to a recipient in a telecommunications network, the apparatus comprising a status storage unit for storing availability status indicators for potential recipients of communications, and a service processor operable to receive an indication that a communication for an intended recipient has been received by the network in any one of a number of different communication formats, to determine from the availability status indicator for the intended recipient in the status storage unit whether or not the intended recipient is indicated as being unavailable to respond to the communication, and on determining that the intended recipient is indicated as being unavailable, to instigate delivery of an outgoing text message to the originator.

Thus subscribers of the network can readily configure a text-based message as an automated and centrally administered "Out of Office" type reply to communications directed to them in any one of a number of different formats.

It will be appreciated that if a recipient is indicated in the database as being unavailable, he may not literally be unavailable. Rather he may have simply chosen to be considered as being unavailable. Thus whether or not a recipient is indicated in the database as being unavailable may be seen as merely an indicator as to whether the outgoing message is to be sent to an originator, regardless of the motive for enabling the service. Furthermore, as described further below, a user may be indicated as being unavailable for one communication format (e.g. voice calls), but available for another (e.g. SMS text messages).

The apparatus may further comprise a status configuration unit operable to set an availability status indicator for a recipient in the status storage unit in response to a communication received from the recipient, e.g. a text message.

Thus a subscriber of the network (i.e. a potential recipient) can readily change their availability status indicator.

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The apparatus may further comprise a message storage unit for storing the outgoing text messages for recipients, and the service processor may be operable retrieve the outgoing message for the intended recipient from the message storage unit.

Furthermore, the apparatus may further comprise a message configuration unit operable to set the outgoing message for the recipient in the message storage unit in response to a communication received from the recipient, e.g. a text message.

Thus a subscriber can readily change the content of their outgoing message to reflect changing circumstances and reasons for unavailability.

The number of different communication formats may includes at least a text message format and an audio call format.

Furthermore, the number of different communication formats may include one or more of a short message service (SMS) format, a multi-media message service (MMS) format, an email format, a voice call format, and a video call format.

The outgoing text message may be a short message service (SMS) message, an email message, or a multi-media message service (MMS) message, for example.

The apparatus may further comprise an audio message unit operable to play an audio message to the originator in the event the communication is in an audio and / or video communication format and it is determined that the recipient is indicated as being unavailable to respond to the communication. Thus an originator using an audio and / or video communication format may be informed at the time of their call that the intended recipient is unavailable, and perhaps also that they can expect to receive the outgoing text message with more details.

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Various trigger mechanisms may be used to indicate to the service processor that a communication has been received in the network. The trigger mechanisms may depend on the different formats of the communication that the apparatus is configured to handle.

For example, in the event the communication is in a short message service (SMS) format, the apparatus may be operable to route the SMS communication from the originator via the service processor to provide the service processor with the indication that a communication for the intended recipient has been received in the network. In the event the communication is in a multi-media message service (MMS) communication format, the apparatus may be operable to route a Wireless Application Protocol (WAP) Push message associated with the MMS message from the originator via the service processor to provide the service processor with the indication that a communication for the intended recipient has been received in the network.

The availability status indicators may be stored within a Home Location Register (HLR) of the network (or the HLR may have access to the availability status indicators stored elsewhere). Thus the availability status indicators could be set automatically as subscribers become / stop being IMSI attached, e.g. as their telephone is switched on their status indicator could indicate available, and as their and telephone is switched off, their status indicator could indicate unavailable. Subscribers may nonetheless be provided with the ability to override these settings.

The status storage unit may be configured to store a plurality of availability status indicators for a recipient, wherein different ones of the plurality of availability status indicators relate to different communication formats such that the determination as to whether or not the intended recipient is indicated as being unavailable to respond to a communication is dependent on the format of the communication. Thus a potential recipient of communications may configure himself to be available for text-message format communications, but unavailable for voice call communications.

The service processor may further be operable to append pre-defined content to the outgoing text message, e.g. operator branding or advertising.

According to a second aspect of the invention there is provided a method of processing a communication from an originator to a recipient in a telecommunications network, the method comprising receiving an indication that a communication for an intended recipient has been received by the network in any one of a number of different communication formats, determining from an availability status indicator for the intended recipient whether or not the intended recipient is indicated as being unavailable to respond to the communication, and on determining that the intended recipient is indicated as being unavailable, instigating delivery of an outgoing text message to the originator.

According to a third aspect of the invention there is provided a computer program product bearing machine readable instructions for implementing a method according to the second aspect of the invention.

According to a fourth aspect of the invention there is provided a computer apparatus loaded with machine readable instructions for implementing a method according to the second aspect of the invention.

Thus according to some embodiments of the invention there is provided a telecommunications services apparatus operable to send a message indicative of the status of a subscriber, wherein in response to a voice communication being sent to the subscriber the apparatus is configurable to send a message to the originator indicative of the status of the addressed subscriber.

According to some other embodiments of the invention there is provided a telecommunications services apparatus operable to provide a voice and/or video mail service and also operable to send a message indicative of the status of a subscriber, wherein in response to a call being delivered to the voice and/or video mail service the apparatus is configurable to send a message indicative of the status of the called subscriber.

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According to some other embodiments of the invention there is provided a telecommunications services apparatus operable to send a message indicative of the status of a subscriber, wherein in response to a voice call, video call, multi-media message, instant Message, text message, email or the like being sent to the subscriber the apparatus is configurable to send a message to the originator indicative of the status of the addressed subscriber.

According to some other embodiments of the invention, the message indicative of the status of the addressed subscriber that is sent to the originator may itself be any of a recorded or synthesised voice message, a video message, a multi-media message, an instant Message, a text message or an email message.

According to some other embodiments of the invention, an "Out of Office" message is sent back to the originator using one particular medium (e.g. MMS), the medium being independent of the medium of the originated communication.

According to some other embodiments of the invention, a text message is sent back to the originator, regardless of the medium of the originated communication.

According to some other embodiments of the invention, an "Out of Office" message is only sent back to each originator once, and further communications from them in a defined period do not generate a further "Out of Office" message, unless the "Out of Office" status message has been changed since the last time it was sent to this originator.

According to some other embodiments of the invention, the recipient of a communication may enable or disable the "Out of Office" service, i.e. configure the apparatus to send or not to send a message back to the originator of the communication.

According to some other embodiments of the invention, a subscriber may configure or choose the content of the message to be sent back to an originator in response to a communication received while the "Out of Office" service is enabled.

Thus embodiments of the invention may provide a text-based "Out of Office" type message that does not suffer from the same problems as identified above for voice-mail based applications. This is because a text message comprises just the words entered, and has no issues of clarity, background noise, or colouration by emotion or diction. A stored text message can easily be changed and then returned to its exact previous state just by pressing a few keys, and this can be done from anywhere and in any environment. The widespread use of "Out of Office" in email environments is testament to this. Furthermore, several generations of users are now thoroughly familiar with text entry on handsets.

Thus in accordance with embodiments of the invention, a caller (i.e. an originator of a conventional voice call format communication) reaching voice mail may benefit from a system whereby he can be informed of the present status of the called party by a text message, even though the voice mail greeting that they hear may not carry any current status information.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the invention and to show how the same may be carried into effect reference is now made by way of example to the accompanying drawings in which:

Figure 1A schematically shows network processing of a short message service (SMS) communication from an originator to a recipient, where the recipient is unavailable to respond to the communication, in accordance with an embodiment of the invention;

Figure 1B schematically shows network processing of a voice call communication from an originator to a recipient, where the recipient is unavailable to respond to the communication, in accordance with an embodiment of the invention;

Figure 1C schematically shows network processing of a multi-media message service (MMS) communication from an originator to a recipient, where the recipient is unavailable to respond to the communication, in accordance with an embodiment of the invention; and

Figure 2 schematically shows a network architecture for processing a communication in any one of a plurality of potential formats sent from an originator to an recipient unavailable to respond to the communication in accordance with an embodiment of the invention.

DETAILED DESCRIPTION

In accordance with embodiments of the invention, a telecommunications network is configured so as to send a text-based outgoing message, e.g. a short message service (SMS) message, a multi-media message service (MMS) message, or an email, to an originator of a communication if the intended recipient has previously indicated they are to be considered unavailable to respond to communications. The text-based outgoing message may be configured by the intended recipient, e.g. so as to say:

'Thank you for attempting to contact me earlier. However, I am currently on holiday. I will return on 28 June'.

Significantly, in accordance with embodiments of the invention, the intended recipient may configure the service so as to send this kind of text-based "Out of Office" message to originators of communications regardless of the format of the communication. That is to say, the same outgoing text message may be sent in response to any one of a number of pre-selected communication formats, e.g., any one of an SMS format, MMS format or voice / video call format, and so on.

Figures 1A-1C schematically show how three example formats of originator communication may be dealt with in accordance with embodiments of the invention so as to result in an "Out of Office" type message being returned to the originator when the intended recipient of the communication has indicated they are to be considered as being unavailable to respond to communications.

Figure 1A shows an example in which the communication from an originator 11 is an SMS text message 14. The SMS 14 sent by the originator is intended for a recipient 12 who is a subscriber of telecommunications network 40 configured to provide an "Out of Office" service in accordance with embodiments of the invention.

It will be assumed here the recipient 12 is a subscriber of the "Out of Office" service (the service may be provided to all subscribers of network 40, or may be provided

selectively). Furthermore, it will be assumed that at the time the SMS 14 is sent by the originator 11, the recipient 12 is indicated as being unavailable to respond to communications. Here it will be assumed this is because the recipient 12 is on holiday, returning on 28 June. However, it will be appreciated there are many reasons why a recipient may be considered as being unavailable to respond to communications. For example, the recipient may have previously intentionally indicated he wishes to be considered unavailable (e.g. because the recipient has decided he does not want to be disturbed by any communications), or the recipient may literally be unavailable / unable to respond to communications (e.g. because the recipient is out of network coverage, or already engaged in another communication). It will thus be appreciated that references in this description to a recipient being unavailable to respond to communications should not be interpreted as meaning only that the recipient is literally unavailable to respond to communications. Rather, unless the context demands otherwise, the term should be interpreted as meaning the recipient is to be considered as being unavailable so far as processing of communications in accordance with embodiments of the invention is concerned, regardless of whether he is in fact literally unavailable, or has simply chosen to be considered as being unavailable.

Turning again to Figure 1A, the telecommunications network is broadly conventional, e.g. in accordance with the Global System for Mobile communications (GSM) standards. The network 40 shown in Figure 1A differs from a conventional network primarily by the addition of a service processor 29 and an associated database 28. The service processor 29 is primarily responsible for providing the functionality of the "Out of Office" service provided by embodiments of the invention based on subscriber information stored in the database 28. The database 28 may, for example, contain an availability status indicator for each subscriber of the "Out of Office" service (i.e. for potential recipients of communications to be processed in accordance with embodiments of the invention). The database 28 may also store recipient configurable outgoing messages to be sent to originators when the intended recipient of a communication is indicated as being unavailable. Thus for the example described here, an availability status indicator in the database for the recipient 12 is set to indicate the

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recipient 12 is unavailable to respond to communications, and the database 28 stores an outgoing message for the recipient comprising the text string

'Thank you for attempting to contact me earlier. However, I am currently on holiday. I will return on 28 June'.

The service processor 29 and associated database 28 are schematically shown in Figure 1A as a single unit. However, in other examples the service processor 29 and associated database 28 may be physically separate elements. The functionality of the service processor 29 may be provided, for example, by a suitably programmed general purpose computer. The database may be stored in a conventional memory / storage unit associated with the service processor 29.

Also shown schematically in Figure 1A is the SMS routing infrastructure 30 for the network 40. Except as indicated otherwise below, the network's SMS routing infrastructure 30 may be conventional. In this example, the network's SMS routing infrastructure 30 is broadly based on principles similar to the Home Routing techniques described in EP 1 474 934 [1]. In accordance with these techniques, SMS messages may be diverted from the network routing followed in accordance with originally-defined telecommunications standards, e.g. the GSM standard, by providing "fake" responses to the conventional routing information requests (e.g. the SRI_SM request in the GSM standard). Further details of a suitable configuration for the network's SMS routing infrastructure 30 are provide below with reference to Figure 2.

Thus the originator 11 of the SMS message 14 sends the SMS message from his handset to the recipient 12 in what is the usual way. The SMS 14 is routed to the SMS infrastructure 30 of the recipient's home network 40 in accordance with the known principles home routing techniques [1] and as discussed further below.

The SMS infrastructure 30 of the recipient's home network 40 is configured to respond to the receipt of the SMS message 14 from the originator 11 to the recipient 12 by sending a trigger signal 17A to the service processor 29 (i.e. an indication that a

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communication for the intended recipient has been received by the network). The trigger signal 17A contains an indication of the identity of the recipient 12 and an indication of the identity of the originator 11. These are readily derivable by the SMS infrastructure 30 from the various fields of the SMS message 14. In this example the trigger signal 17A is provided by the SMS infrastructure simply forwarding the SMS message on to the service processor 29. However, other forms of trigger signal 17A could equally be used, e.g. proprietary format trigger signals could be used.

In some examples, e.g. where all subscribers of a network 40 have access to the "Out of Office" service provided in accordance with embodiments of the invention, a trigger signal may be sent from the SMS infrastructure 30 to the service processor 29 for all communications received in the network 40. In other examples, e.g. where provision of the service is selective, the SMS infrastructure 30 may be configured to only send trigger signals to the service processor 29 if the recipient is a subscriber of the "Out of Office" service, e.g. based on level of service information stored in a Home Location Register (HLR) of the network 40. In yet other cases, the provision of the "Out of Office" service may be selective, but a trigger signal may nonetheless be sent from the SMS infrastructure 30 to the service processor 29 for all communications received in the network 40. The service processor 29 may then be responsible for determining whether the service should be applied, e.g. based on information stored in the data base.

On receipt of a trigger signal 17A, the service processor 29 interrogates the database 28 to determine whether or not the recipient 12 indicated in the trigger signal 17A is a subscriber of the "Out of Office" service (if appropriate for the implementation at hand). If the recipient is a subscriber of the service, the service processor 29 interrogates the database 28 to determine whether an availability status indicator for the recipient is set to indicate the recipient is available, or whether it is set to indicate the recipient is unavailable. The availability status indicator may, for example be a single bit value in the database, e.g., set to zero for recipient not available, and set to one for recipient available.

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If the service processor 29 determines from the availability status indicator that the recipient 12 is unavailable to respond to communications (or at least is indicated as being unavailable to respond to messages), the service processor 29 retrieves the text string stored in the database for the outgoing message for the recipient, and instigates delivery of a text message 18 containing the recipient's outgoing message to the originator 11. The service processor 29 may be configured to provide the text message in such a way that the telephone number of the intended recipient appears as the "from" address for the message. The sending of the outgoing text message 18 may be done in accordance with conventional techniques whereby service platforms are able to send "machine generated" text messages. The outgoing text message in this example is in SMS format, but MMS format or email format could equally be used.

Thus in due course the originator will receive the text message 18 at his handset. The message will appear to be from the intended recipient of his initial communication and will inform him:

'Thank you for attempting to contact me earlier. However, I am currently on holiday. I will return on 28 June'.

Thus the originator 11 is provided with useful information regarding the status of the recipient he sent a communication to. For example, the originator now knows that he need not attempt to send communications to the recipient until after 28 June.

In addition to sending the outgoing text message to the originator, the original SMS format text message 14 sent by the originator 11 may be routed to the recipient's handset so that it is available for the recipient at a later time. This is schematically indicated in Figure 1A by delivered SMS message 19. Onward delivery of the SMS message 19 may be instigated by the service processor 29 or the SMS infrastructure 30 of the network 40.

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Thus in accordance with an embodiment of the invention schematically shown in Figure 1A, an originator of an SMS format communication to a recipient indicated as being unavailable receives a text-based message informing of this.

If on receiving a trigger signal the service processor 29 were to determine from the availability status indicator that a recipient was available to respond to communications, it would not retrieve and instigate delivery of the outgoing text message 18 to the originator. Instead the original communication would be routed onward to the recipient to be dealt with in the normal way. Again this onward routing may be performed by the SMS infrastructure 30 or the service processor itself.

Figure 1B shows another example of communication processing within a network 40 in accordance with an embodiment of the invention. Figure 1B is similar to and will be understood from Figure 1A, with corresponding elements being identified by the same reference numerals. However, whereas Figure 1A schematically shows processing of an SMS message format communication from an originator 11 to an intended recipient 12, Figure 1B schematically shows processing of a conventional voice call format communication from an originator 11 to an intended recipient 12 indicated as being unavailable in accordance with an embodiment of the invention.

Thus as indicated in Figure 1B, an originator 11 instigates a conventional voice call 15 to an intended recipient 12. As with Figure 1A, it will be assumed here the recipient 12 is a subscriber of the "Out of Office" service and at the time the voice call 15 is placed recipient 12 is indicated as being unavailable to respond to communications. Again it will be assumed this is because the recipient 12 is on holiday, returning on 28 June.

Processing of the voice call 15 in the telecommunications network is broadly conventional, e.g. again in accordance with the Global System for Mobile communications (GSM) standards. Thus in response to the recipient not answering their telephone, or rejecting the call, or the recipient's telephone being off, or out of coverage, etc., the originator's voice call 15 is routed to a voice mail platform 25 in the

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conventional manner. The originator 11 may then listen to a conventional voice mail greeting and leave a message as normal.

However, in addition to this standard behaviour, the network 40, and in particular the voice mail platform 25, is configured to respond to the access of the voice mail platform 25 by the voice call 15 from the originator by sending a trigger signal 17B to the service processor 29 (i.e. an indication that a communication for the intended recipient has been received by the network). As with the SMS message format communication example shown in Figure 1A, the trigger signal 17B contains an indication of the identity of the recipient 12 and an indication of the identity of the originator 11. These are readily derivable by the voice mail platform 25 from the various control fields associated with of the conventional voice call 15. In this example the trigger signal 17B is a proprietary format trigger signal that the voice mail platform 25 has been configured to provide.

As with the example shown in Figure 1A, whether or not a trigger signal 17B is sent to the service processor 29 in response to all accesses to the voice mail platform 25 or only selected accesses will depend on the implementation at hand, and the manner in which the "Out of Office" service is made available to subscribers.

On receipt of a trigger signal 17B, the service processor 29 interrogates the database 28 to determine whether or not the recipient 12 indicated in the trigger signal 17B is a subscriber of the "Out of Office" service (if appropriate for the implementation at hand). If the recipient is a subscriber of the service, the service processor 29 interrogates the database 28 to determine whether an availability status indicator for the recipient is set to indicate the recipient is available, or whether it is set to indicate the recipient it unavailable.

It will be appreciated that for voice calls the mere fact that the voice mail platform 25 for a recipient has been accessed means the recipient is not available. Thus in principle there is no need for the service processor 29 receiving a trigger signal 17B from the voice mail platform 25 to separately interrogate the database as to the availability of

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the recipient. However, it is expected that in many implementations users will wish to govern the behaviour of their "Out of Office" service independently of their voice mail service. For example, the recipient 12 might be unavailable only briefly, or may simply not have heard their telephone ringing when the initial voice call 15 was made. In such cases the recipient may be able to return the missed call, or answer a follow-on call, soon after missing the initial call. In such a case the user may not want to have "Out of Office" type messages being sent, and indeed most probably would not have an appropriate outgoing message configured in any case. Thus in this example, even though the trigger signal 17B is instigated by a voice mail access which in itself indicates the recipient was unavailable to take the call, the service processor 29 nonetheless accesses the database 28 to determine whether the recipient should or should not be considered as being available to respond to communications so far as processing in accordance with embodiments of the invention are concerned.

If the service processor 29 determines from the availability status indicator that the recipient 12 is indicated as being unavailable to respond to communications, and as in the example shown in Figure 1A, the service processor 29 retrieves the text string stored in the database for the outgoing message for the recipient, and instigates delivery of a text message 18 containing the recipient's outgoing message to the originator 11.

Thus in due course the originator will receive the text message 18 at his handset. The message will appear to be from the intended recipient of his initial communication and will inform him:

'Thank you for attempting to contact me earlier. However, I am currently on holiday. I will return on 28 June.'

Thus the originator 11 is again provided with useful information regarding the status of the recipient of his communication. What is more, the information is provided in the same format, and employs the same pre-configuration by the recipient, regardless of

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the communication format used by the originator, i.e. whether an SMS text message format (Figure 1A) or a voice call format (Figure 1B).

In addition to sending the outgoing text message to the originator, the service processor 29 may also be configured to send an SMS message 9 to the recipient 12 to confirm details of the processing. For example the SMS message 9 might list the time of the voice call 15, the originator's calling line identity (CLI) and the contents of the outgoing message 18 sent to the originator. However, in some implementations this may not be desired. It may be noted there is no specific need for the service processor 29 to take action to inform the recipient that a voice call has been missed since in general the voice mail service platform 25 will already be configured to do this.

Thus in accordance with the embodiment of the invention schematically shown in Figure 1B, an originator of a voice call format communication to a recipient who is indicated as being unavailable receives a text-based message informing of this.

If on receiving a trigger signal 17B the service processor 29 were to determine from the availability status indicator that a recipient was available to respond to messages, it would not retrieve and instigate delivery of the outgoing text message 18 to the originator. In this case the service processor 29 need not take any further action.

It will be appreciated that while Figure 1B shows processing of a conventional voice call communication in accordance with an embodiment of the invention, the same principles apply equally to processing a video call communication routed to a video mailbox.

Figure 1C shows yet another example of communication processing within a network 40 in accordance with an embodiment of the invention. Figure 1C is similar to and will be understood from Figures 1A and 1B, with corresponding elements being identified by the same reference numerals. However, whereas Figure 1A schematically shows processing of an SMS message format communication from an originator 11 to an intended recipient 12, and Figure 1B schematically shows processing of a conventional

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voice call format communication, Figure 1C schematically shows processing of an MMS message format communication from an originator 11 to an intended recipient 12

Processing of MMS format messages as shown in Figure 1C in accordance with embodiments of the invention differs from processing of SMS format messages as shown in Figure 1A in accordance with embodiments of the invention primarily in the manner trigger signals are provided. Thus in the interest of brevity only this aspect of Figure 1C will be described, The remaining aspects of the processing, e.g. the response of the service processor 29 to trigger signals for MMS format messages will be understood from the corresponding case for SMS format messages shown in Figure 1A and discussed above.

Thus as indicated in Figure 1C, an originator 11 sends a conventional MMS message 16 to its intended recipient 12 as normal. The message is routed to a multi-media message service centre (MMSC) 27 in the recipient's home network in accordance with known routing techniques.

As is conventional, normal onward routing of the MMS message 16 from the MMSC 27 to the recipient 12 is preceded by a Wireless Application Protocol (WAP) Push SMS text message 13 from the MMSC 27 to the recipient. This WAP push message carries the information that allows the recipient's handset to pull the MMS message from the MMSC 27. The WAP Push SMS 13 follows the same path as any other SMS message directed to the recipient. Thus in the same way as described above with reference to Figure 1A for the SMS format message 14 from the originator, the SMS format WAP Push message from the MMSC 27 is also routed to the SMS infrastructure 30 for the network 40. Arrival of the WAP Push message 13 from the MMSC 27 at the SMS infrastructure 30 in the recipient's home network 40 may then give rise to a trigger signal 17C for the service processor 29 in the same way as described above for the SMS format message sent from the message originator 11 in Figure 1A.

As noted above, the service processor 29A can then respond to the trigger signal 17C in broadly the same way as described above with reference to Figure 1A for the trigger signal 17C. The WAP Push SMS message may similarly be routed onto the recipient 12, as schematically indicated by delivered WAP Push message 19. Further processing of the MMS delivery can continue as normal.

Instead of relying on the WAP Push message in this way, the MMSC 27 may alternatively be configured to send a proprietary trigger signal 23 directly to the service processor 29. This could be done in similar manner as for the trigger signal 17B in the example shown in Figure 1B. Although this may require modification of the MMSC infrastructure, it has the advantage of allowing the "Out of Office" service to be used by recipients with non-MMS enabled handsets, for which WAP Push SMS messages are not generated.

In either case, the originator 11 is again provided with useful information regarding the status of the recipient of his communication. What is more, the information is again provided in the same format, and employs the same pre-configuration by the recipient, regardless of the communication format used by the originator, i.e. whether an SMS text message format (Figure 1A), a voice call format (Figure 1B), or an MMS message format (Figure 1C).

Thus Figures 1A, 1B and 1C show examples of how communications in different formats may be processed in accordance with embodiments of the invention to provide a consistent text-based outgoing message to an originator of communications to provide him with status information for an intended recipient classified as not being available to respond to the message. Although the processing for different communication formats has been shown in separate figures, this is for ease of explanation and in practice a network providing an "Out of Office" type service such as described above will do configured to do so for communications received in any one of a number of different communication formats.

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Figure 2 shows elements of a network operable to provide an "Out of Office" service for communications received from an originator 11 in any one of an SMS message format (SMS message 14), a voice (and / or video) call format (voice call 15), or an MMS message format (MMS message 16) in accordance with an embodiment of the invention. Elements of Figure 2 which are similar to and will be understood from corresponding elements of Figures 1A, 1B and 1C are identified by the same reference numeral. Furthermore, details of the processing of the three different communication formats in Figure 2 will be respectively understood from the corresponding Figures 1A, 1B and 1C. This will not be described again here in the interest of brevity.

However, Figure 2 additionally shows details associated with a manner by which a subscriber of the network (i.e. a potential recipient for communications) may configure the "Out of Office" service. Figure 2 also shows further details of some aspects of the SMS infrastructure 30 seen in Figures 1A and 1C. In particular the SMS infrastructure is schematically represented in Figure 2 by three constituent elements, namely an HLR 22 (patched to provide home routing functionality in accordance with known techniques [1]), an SMS Router 24, and a conventional short message service centre (SMSC) 22. The SMSC 22 is an SMSC of the originator's home network, and so in the general case, as is assumed here, is not a part of the subscriber / intended recipient's network.

Referring generally to Figure 2, a subscriber / potential recipient 12 may configure his "Out of Office" service by setting his outgoing message and enabling / disabling the service by SMS text messages sent via his home network SMSC 20 (or other Mobile Originating (MO) format to Mobile Terminating (MT) format entity depending on the subscriber's network's infrastructure). The configuration messages are addressed to an SMS processing engine 26 referred to here as an SMS IP 26. The configuration messages are delivered to the SMS IP 26 according to conventional SMS routing techniques, The SMS IP 26 is shown in Figure 2 as being functionally separate from the service processor 29. However, a single apparatus, e.g. a programmable computer, may be configured to provide the functionality of these elements in implementations of embodiments of the invention. The SMS IP 26 processes the received configuration

data and updates the database 28 accordingly. As with the SMS IP 26, the database 28 is shown in Figure 2 as being functionally separate from the service processor 29, but the functionality of these elements may be provided by a single network element (e.g. as schematically indicated in Figures 1A-C). As described above, the service processor 29 is responsible for generating "Out of Office" text messages to be sent back to originators, using data stored in the database and triggers arising from the various communications that may be sent by the originators 11. Examples of trigger sources might be text message arrival from an SMSC 21, clear down of a voice or video mail message deposit call from a voice or video mail platform 25, or arrival of an MMS message at an MMSC 27. The generated "Out of Office" message is delivered to the originator of a communication that triggered the message in the example shown in Figure 2 via the SMS Router 24 under instruction from the service processor 29. Shown in Figure 2 is an example trigger from a text message sent by an originator 11.

Referring now to the case of an originator 11 sending an SMS format text message 14, the message is conventionally directed to the originator's SMSC 21. The SMSC 21 sends a conventional SRI_SM to the recipient's HLR 22. The HLR 22 is patched to provide home routing in accordance with known techniques [1]. Thus the HLR 22 forwards the SRI_SM request to the SMS Router 24. The SMS Router 24 is configured to raise the trigger signal for the service processor. Thus the service processor 29 determines whether or not the recipient 12 is available for responding to communications, and if not, retrieves the out going text string stored in the database and instigates delivery of a text-based "Out of Office" reply 18 to the originator.

A benefit of embodiments of the present invention is that a subscriber may configure his "Out of Office" message in one place and at one time and the same message can be sent to any originator regardless of whether they call, text, send an MMS or a make a video call. Furthermore in an embodiment the "Out of Office" message may be sent as an SMS text message and the configuration of the "Out of Office" message may also be done with text messaging. This can make it easy for users to set up and change the "Out of Office" message, and to enable and disable the service, just by sending a text to a service number for the SMS IP 26..

Thus referring again to Figure 2, in a configuration phase of operation, a service subscriber / potential intended recipient 12 sets up his "Out of Office" message. This may be done by sending a text message comprising the desired "Out of Office" message to a service number for the SMS IP 26 via the SMSC 20 of the subscriber's home network using conventional routing techniques. The SMS IP in this example has a text processing engine that permits natural language requests to be processed in order to control the "Out of Office" service. Alternatively a strict syntax could be enforced for configuration messages. The database 28 stores any configured text message, and stores the present status of the service – enabled or disabled, e.g. as indicated by a subscriber in an enabling / disabling configuration message sent to the SMS IP 26.

In an example further phase of operation, and broadly as described above, an originator 11 makes a voice call 15 to the subscriber 12, but the call is delivered to voice mail 25. The voice mail system is adapted, e.g. using techniques known in the field of 'Missed Calls Alert' services, to send a trigger whenever a call has been delivered to voice mail. Typically the trigger is sent when the calls clears down. In this application such a trigger is arranged to arrive at the service processor 29. The trigger carries information identifying the originator and the intended recipient of the voice call. This allows the service processor to check the "Out of Office" status of the recipient, and provided that the service is provisioned and enabled for this subscriber and an outgoing message has been stored, to send the message as an SMS via the SMS Router 24 to the originator 11. The database 28 may implement per recipient a ring buffer of originator telephone numbers to which an "Out of Office" message has been sent on behalf of the recipient, together with timestamps. This can be used by the "Out of Office" application to prevent duplicate "Out of Office" messages being sent unnecessarily. The ring buffer may be cleared if the subscriber changes his "Out of Office" message.

In an alternative embodiment, an "Out of Office" message may be sent in response to an SMS message sent to the subscriber. In this case known SMS Home routing techniques are used to ensure that the mobile terminated SMS message passes via the

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SMS Router 24 and the Service Processor 29 before being delivered normally via the SMS Router 24. This allows the Service processor to trigger an "Out of Office" message to the originator if appropriate in the same way as for a voice call.

In an alternative example further phase of operation, and broadly as described above, an "Out of Office" message may be sent in response to a multi-media message (MMS) sent to the subscriber. Either of two possible trigger mechanisms may be considered appropriate. A first mechanism utilises the WAP Push SMS that precedes the MMS delivery to the recipient. This SMS message carries the information that allows the recipient's handset to pull the MMS message from the MMSC. The WAP Push SMS follows the same path as the SMS message described above by virtue of SMS Home Routing, thereby allowing the Service processor 29 to trigger an "Out of Office" message to the originator if appropriate.

In embodiments of the invention, a problem of originators not knowing why they have reached a recipient's voice mail could be addressed in the following way. A voice switch could be placed in front of ("in-line with") the voice mail system so that a system voice announcement could be played to callers who reach voice mail informing them that the called party has activated an "Out of Office" service and that a message will be sent to them. This could help to prevent unnecessary message deposit, but can also help to prevent unnecessary call retries which cost the operator money and radio resources, but generate no revenue.

Embodiments of the invention may be used for sending a message back to callers who are unsuccessful in reaching a called party in circumstances when voice mail is either switched off or not subscribed. For example in Italy, the usage of voice mail is relatively low compared with other European countries, and a message send back to the caller, e.g. by text, would be a useful means of preventing unnecessary repeated attempts and facilitating successful communication at another time or be another medium. Also, when combined with a missed-calls alert service for the called party, the present invention would help to enhance successful call-back.

In alternative embodiments, the "Out of Office" message could itself be an MMS message, a recorded voice or video message or an email.

In a further embodiment, the HLR status (e.g. whether the recipient is IMSI Attached or not, whether conditional and unconditional diverts are set or not, whether the Message waiting flags are set etc.) could also be used to affect the sending (or not) of an "Out of Office" message, and could also affect the content of the message. The service processor could then use additional information from the HLR, as well as the database, to decide whether to send an "Out of Office" message. In this way at least, automated means may be defined for enabling and disabling "Out of Office" based on HLR status. One application of this would be to automatically enable "Out of Office" when a handset is switched off (and detaches from the network), and to disable it when the handset logs on again.

In some embodiments it would be possible for the "Out of Office" status to be different for different communication formats. For example a subscriber could be indicated as being available for voice, but unavailable for text. Unstructured Supplementary Service Data (USSD) could also be used as a means for enabling and disabling the "Out of Office" message. For example it would be possible for a handset, when connected to a hands-free car kit, to send a USSD or other signal to the network to send an "Out of Office" message for text messages received, but not for voice calls. This message could be automatically generated and indicate that the user is in a car and unable to respond to text. It would also be possible to automatically configure the "Out of Office" message and/or its enabled/disabled status according to status drawn from an external system such as a personal calendar, for example as may be provided under Microsoft Outlook (RTM) or Lotus Notes (RTM).

In some embodiments of the inventions, "Out of Office" messages sent to originators may be branded automatically when they are generated, so that the person receiving the "Out of Office" message may, for example, be made aware for marketing purposes of the network that is operating this service. The branding may be done by appending or prepending a text string to an outgoing "Out of Office" text message, or by making

equivalent changes for "Out of Office" messages sent using other media. For example an MMS could include a pictorial network logo and/or strapline, or a video could carry an image or audio-visual brand identity. Such image branding could either be superimposed on or sequenced with the "Out of Office" message.

In so far as the embodiment(s) of the invention described above may be implemented, at least in part, using software controlled processing apparatus, it will be appreciated that a computer program providing such software control and a storage medium by which such a computer program is stored are envisaged as aspects of the invention.

Thus an apparatus for processing communications from an originator to a recipient in a telecommunications network has been described. The apparatus comprises a memory for storing an availability status indicator for a recipient of communications and a service processor. The service processor is operable to receive an indication that a communication for the recipient has been received by the network in any one of a number of different communication formats, e.g. text message formats or a voice call format, to determine from the availability status indicator for the recipient whether the intended recipient is indicated as being unavailable to respond to the communication, and on determining that the intended recipient is indicated as being unavailable to respond to the communication, to instigate delivery of an outgoing text message to the originator to inform the him of this. Thus subscribers of the network can readily configure a text-message "Out of Office" type reply to communications directed to them in any one of a number of different formats.

REFERENCES

- [1] EP 1 474 934 (Intellprop Limited)

CLAIMS

1. An apparatus for processing communications from an originator to a recipient in a telecommunications network, the apparatus comprising a status storage unit for storing an availability status indicator for potential recipients of communications, and a service processor operable to receive an indication that a communication for an intended recipient has been received by the network in any one of a number of different communication formats, to determine from the availability status indicator for the intended recipient in the status storage unit whether or not the intended recipient is indicated as being unavailable to respond to the communication, and on determining that the intended recipient is indicated as being unavailable, to instigate delivery of an outgoing text message to the originator.
2. An apparatus according to claim 1, further comprising a status configuration unit operable to set an availability status indicator for a recipient in the status storage unit in response to a communication received from the recipient.
3. An apparatus according to claim 1 or 2, further comprising a message storage unit for storing the outgoing text message for a recipient, wherein the service processor is operable retrieve the outgoing message for the intended recipient from the message storage unit.
4. An apparatus according to claim 3, further comprising a message configuration unit operable to set the outgoing message for the recipient in the message storage unit in response to a communication received from the recipient.
5. An apparatus according to any preceding claim, wherein the number of different communication formats includes at least a text message format and an audio call format.
6. An apparatus according to any preceding claim, wherein the number of different communication formats includes one or more of a short message service (SMS) format, a

multi-media message service (MMS) format, an email format, a voice call format, and a video call format.

7. An apparatus according to any preceding claim, wherein the outgoing text message is a short message service (SMS) message.

8. An apparatus according to any preceding claim, wherein the outgoing text message is an email message.

9. An apparatus according to any preceding claim, wherein the outgoing text message is a multi-media message service (MMS) message.

10. An apparatus according to any preceding claim, further comprising an audio message unit operable to play an audio message to the originator in the event the communication is in an audio and / or video communication format and it is determined that the recipient is indicated as being unavailable to respond to the communication.

11. An apparatus according to any preceding claim, wherein in the event the communication is in a short message service (SMS) format, the apparatus is operable to route the SMS communication from the originator via the service processor to provide the service processor with the indication that a communication for the intended recipient has been received in the network.

12. An apparatus according to any preceding claim, wherein in the event the communication is in a multi-media message service (MMS) communication format, the apparatus is operable to route a Wireless Application Protocol (WAP) Push message associated with the MMS message from the originator via the service processor to provide the service processor with the indication that a communication for the intended recipient has been received in the network.

13. An apparatus according to any preceding claim, wherein the availability status indicators are stored within a Home Location Register (HLR) of the network.

14. An apparatus according to any preceding claim, wherein the status storage unit is configured to store a plurality of availability status indicators for a recipient, wherein different ones of the plurality of availability status indicators relate to different communication formats such that the determination as to whether or not the intended recipient is indicated as being unavailable to respond to a communication is dependent on the format of the communication.

15. An apparatus according to any preceding claim, wherein the service processor is further operable to append pre-defined content to the outgoing text message.

16. A method of processing a communication from an originator to a recipient in a telecommunications network, the method comprising receiving an indication that a communication for an intended recipient has been received by the network in any one of a number of different communication formats, determining from an availability status indicator for the intended recipient whether or not the intended recipient is indicated as being unavailable to respond to the communication, and on determining that the intended recipient is indicated as being unavailable, instigating delivery of an outgoing text message to the originator.

17. A computer program product bearing machine readable instructions for implementing a method according to claim 16.

18. A computer apparatus loaded with machine readable instructions for implementing a method according to claim 16.

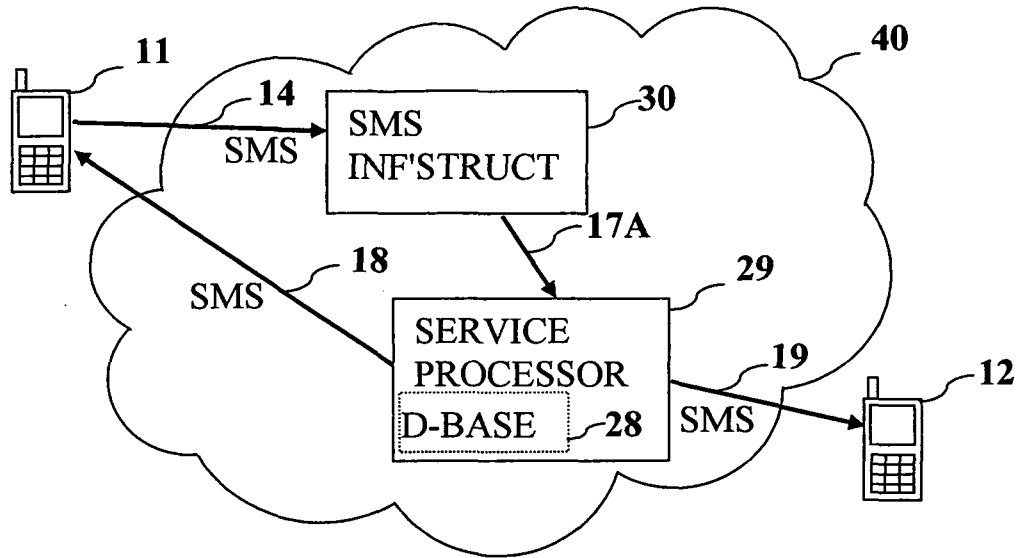


FIG. 1A

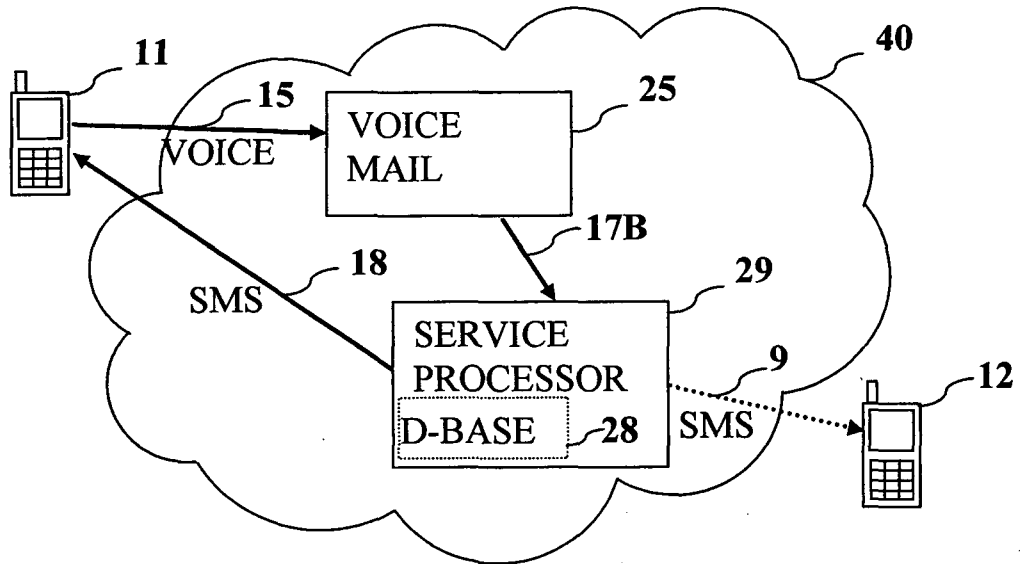


FIG. 1B

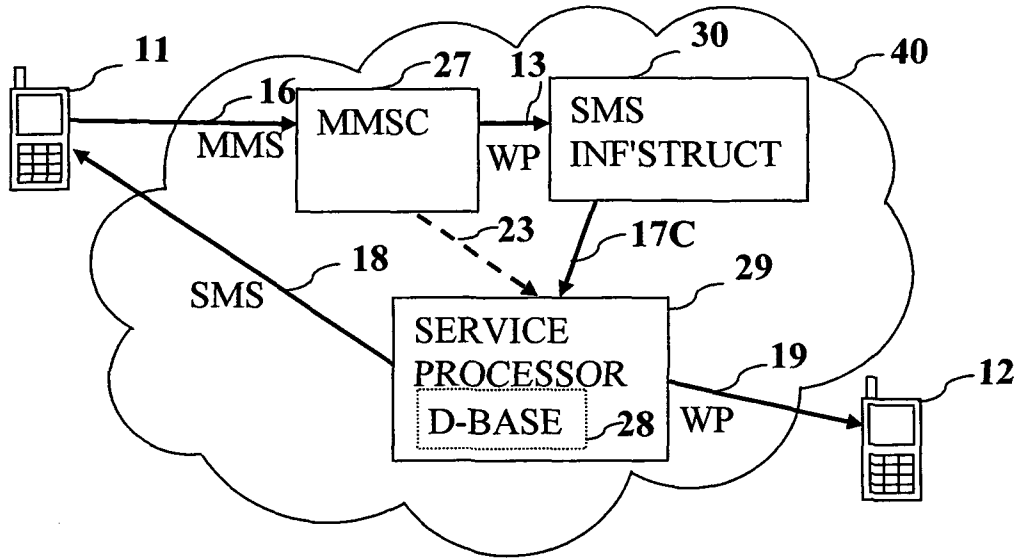


FIG. 1C

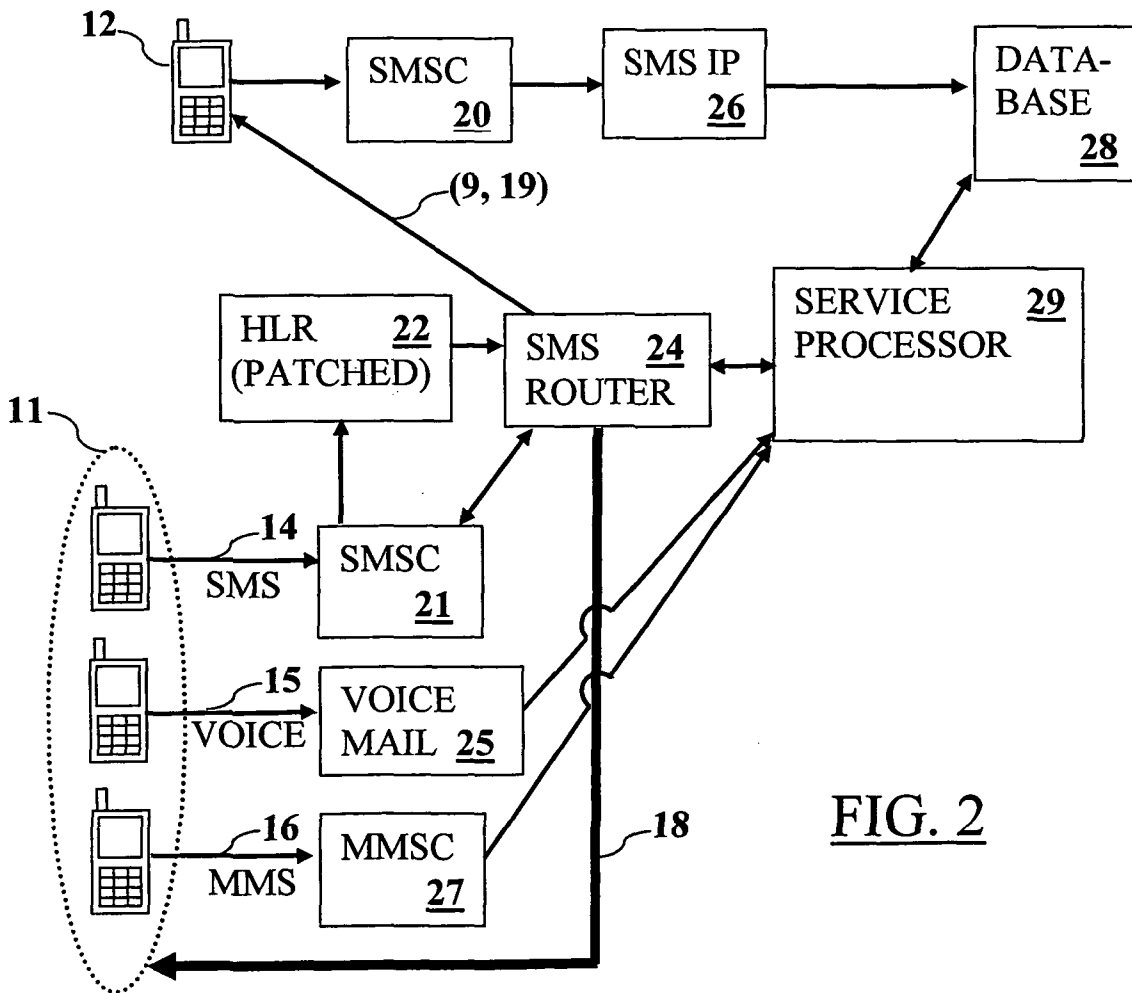


FIG. 2

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2009/001112

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04M3/42

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)
H04M

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/118807 A1 (PEDERSEN ELIN RONBY [US] PEDERSEN ELIN ROENBY [US]) 29 August 2002 (2002-08-29) figures 1-7 paragraph [0005] - paragraph [0009] paragraph [0022] - paragraph [0057]	1-18
X	WO 2004/049684 A1 (JACKSON TECHNOLOGIES PTY LTD [AU]; YOUNAN ANTHONY [AU]; MANNING ROBERT) 10 June 2004 (2004-06-10) page 1, line 2 - line 26 page 4, line 20 - page 8, line 12 figures 1-4	1-18

Further documents are listed in the continuation of Box C.

See patent family annex.

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- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
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6 August 2009

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2009/001112

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002118807	A1	29-08-2002	NONE
WO 2004049684	A1	10-06-2004	CA 2511882 A1 10-06-2004
		EP 1574026 A1	14-09-2005
		GB 2413239 A	19-10-2005