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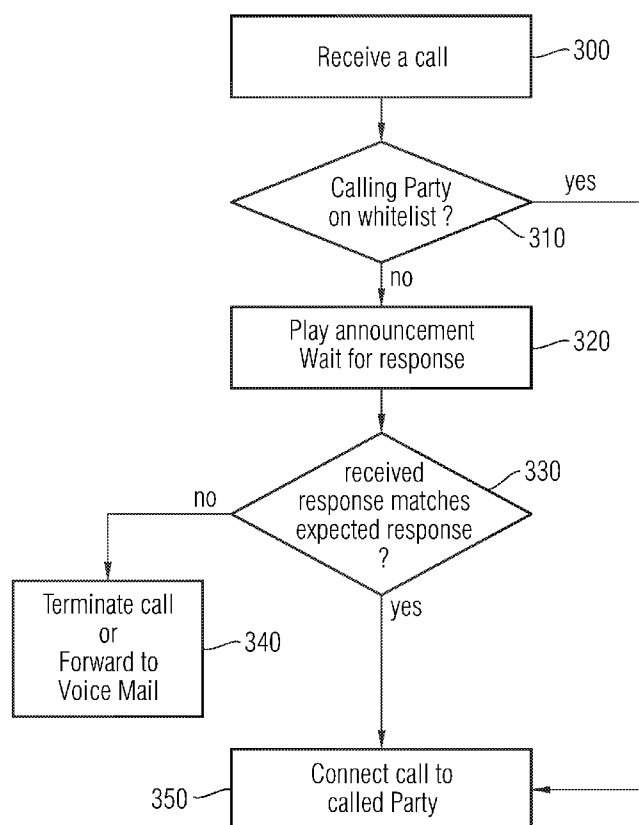
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(54) Title: METHOD AND APPARATUSES FOR PROCESSING CALLS



(57) Abstract: The present invention relates to a method and apparatuses for processing calls. More particularly, the present invention relates to a method and apparatuses for determining and refusing potentially unwanted calls. In accordance with the invention a call is received from a calling party (140). An announcement is played to the calling party (140), the announcement requesting the calling party (140) to respond, the announcement comprising enough information for a human caller to determine a correct response. The response provided by the calling party (140) is compared with the predefined correct response, and the call is connected to a called party (110) only if the response provided by the calling party (140) matches the correct response.

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## Description

## Method and Apparatuses for processing calls

5 This application is related to and claims the benefit of commonly-owned U.S. Provisional Patent Application No. 60/726,716, filed October 14, 2005, titled "Method and Apparatus for a Spit Blocker Service" which is incorporated by reference herein in its entirety.

10

The present invention relates to a method and apparatuses for processing calls. More particularly, the present invention relates to a method and apparatuses for determining and refusing potentially unwanted calls.

15

Telecommunications networks are currently evolving from traditional circuit based networks (PSTN = Public Switched Telephony Network) to packet based networks, wherein communication is facilitated by well-known voice-over-packet (VoP) mechanisms. A prominent example of VoP is voice over Internet Protocol (VoIP), wherein the well-established Internet Protocol (IP) is used as network layer protocol for conveying both signaling and voice.

20

25 In general, phone service via VoIP is free or costs less than equivalent service from traditional sources. Some cost savings are due to using a single network to carry voice and data.

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The rise in the popularity of VoIP, and in particular that of SIP (Session Initiation Protocol) which is most commonly used for the signaling task in VoIP, makes a phenomenon called SPIT (Spam over IP Telephony) a serious concern.

35

Telephony Spam, or SPIT, consists of computers making telemarketing voice calls or sending SIP instant messages. Such calls consume subscriber bandwidth, waste time, are irritable and generally unwanted by the called party. Many of these calls are generated using computers. A computer application

employed by a telemarketer may send a SIP invite message, wait for the called party to answer/accept the call and then re-direct the call to a sales associate or a recorded message. If a called party employs voice mail, his/her voice-mail box could become clogged with unwanted advertising messages, just like email inboxes are today.

Assuming that several automated call agents ("SPIT bot") attempt to reach a particular called party simultaneously or in rapid succession, e.g. during the early evening hours normally preferred by telemarketers, the same effect as what is known as a distributed denial-of-service attack may occur, namely a service interruption of the called party's phone and even internet service.

A known attempt to reducing the number of unwanted calls is to maintain black lists having entries of caller IDs known to initiate unwanted calls. This is easily rendered ineffective by masquerading the caller ID of a black-listed caller, in particular in the VoIP realm where spoofing an IP address poses no problem at all.

Another approach to avoiding unwanted calls is known as Selective Caller Accept (SCA). This service provides the subscriber with a PIN that each caller must enter to be connected. Callers who do not enter the correct PIN are diverted either to voice mail or are rejected. A disadvantage with SCA is that the PIN has to be pre-shared among all allowed callers. Communicating (i.e., pre-sharing) the PIN, and changing the PIN, is a time-consuming process.

It is therefore an object of the present invention to provide a novel method and apparatuses for processing calls, the method and apparatuses capable of determining and refusing potentially unwanted calls.

In accordance with the foregoing objects, there is provided by the invention a method for processing calls, comprising:

- receiving a call from a calling party;

- playing an announcement to the calling party, the announcement requesting the calling party to respond, the announcement comprising enough information for a human caller to determine a correct response;
- 5 - comparing a response provided by the calling party with the predefined correct response; and
- connecting the call to a called party only if the response provided by the calling party matches the correct response.

10

By this method, a non-human caller, e.g. an automated call agent such as a SPIT bot, will be confronted with a request it cannot respond to without analyzing the announcement and comprehending the information contained therein, pointing to  
15 the correct answer. Thereby, most automated call agents will be prevented from being connected to the called party.

In an embodiment of the invention, a white list screening may precede the step of playing the announcement, thereby allowing known caller IDs (friends, family) to bypass the request-response steps and directly reach the called party.

To prevent automated call agents having automated speech recognition capabilities from correctly recognizing the announcement, the announcement may be composed of an instruction or question with underlying noise or music.

In an embodiment, the response may be provided by a human caller by subsequently pressing one or more keys of a standard telephone keypad, creating DTMF (dual-tone multi-frequency) signals, which are well known in the art.

In a further embodiment there may exist a set of announcements from which an announcement will be randomly selected, thereby preventing a one-time human analysis of the announcement for the purpose of providing the correct response to the automated call agent for future automated provisioning of the correct response by the automated call agent.

In an embodiment, the information required for a human caller to determine a correct response is given directly in the announcement, e.g. in spoken format ("Please press 1 to continue").

5

In another embodiment, the information required for a human caller to determine a correct response is given indirectly in the announcement, i.e., in one or more pieces of information that need to be arithmetically or logically combined by a human caller in order to yield the predefined correct response ("Please enter the result of 7 minus 2").

10

In accordance with the invention, there is also provided a network element serving a called party having means for performing the method of any of claims 1 through 7, and a user terminal attachable to a telecommunications network having means for performing the method of any of claims 1 through 7.

15

Embodiments of the invention will now be described in more detail with reference the drawings, wherein:

20

Fig. 1 schematically shows a network arrangement having a network element in accordance with the invention;

Fig. 2 shows the network element of Fig. 1 in greater detail; and

25

Fig. 3 is a flow diagram of a preferred embodiment of the present invention.

In Fig. 1, there is shown a network arrangement 100 comprising a subscriber's premises 110 (in the following also: the called party) having multiple terminal devices including telephones 112, 114, 118 and a personal computer 116; a network 120; and a telemarketing agency 140 (in the following also: the calling party).

30

35

Network 120 in the preferred embodiment is an IP based network and may, for example, be the Internet. In other embodiments, network 120 may represent a legacy TDM (Time Division Multiplex) network. In the preferred embodiment, network 120

comprises several network elements, including at least one switching network element 122 serving the called party 110 and access devices such as integrated access device (IAD) 124 providing connectivity for the called party 110, a DSLAM  
5 (digital subscriber line access multiplexer) 126, and IAD 128 providing connectivity for the calling party 140.

A database or database server 130 may be provided for storing the white list and/or for storing announcements and expected  
10 responses.

In operation of the network arrangement of Fig. 1, subscriber 110 is assumed to have subscribed to a SPIT blocker service which provides the inventive method for subscriber 110 in  
15 network arrangement 100. The SPIT blocker service may be configured to allow subscriber 110 to provide personal announcements along with corresponding expected responses to his/her serving network element 122 which in turn stores a digital representation thereof in database 130. It shall be noted  
20 that personal announcements will prove much more difficult to counter by manufacturers of automated call agents than standardized announcements since somewhat advanced automated call agents would, if at all, only be able to anticipate standardized announcements and perhaps respond correctly. Subscriber  
25 110 may further be enabled to provide white list entries comprising caller IDs that are always allowed to bypass the SPIT blocker service.

If an automated call agent residing in some programmable device at the telemarketing agency 140 initiates a call request  
30 to called party 110, switching network element 122 determines that called party 110 has SPIT blocker service activated with a white list configured. Switching network element 122 then verifies whether the caller ID of the automated call agent is  
35 in the white list. If it is not, then switching network element 122 will retrieve a personalized announcement from database 130, if available. If no personalized announcement is available, a standard announcement may be used. The announcement is played to the caller 140, requesting the caller 140

to respond. If no response is received within a timeout, or the response does not match the expected response, then the call may be terminated or redirected in accordance with the called party's stored preference.

5

The announcement may be randomly selected from a set of available announcements. Of course, an announcement may be chosen to consist of a fixed part and a randomly selected variable part for more efficient memory management. The fixed  
10 part may for example be the general request to the calling party ("Please enter the following number using your telephone keypad") and the variable part a randomly generated number ("123") which will be appended to the fixed part, e.g. in the form of synthesized speech. The caller will then be  
15 expected to successively press the keys 1-2-3 on his/her telephone keypad to be connected to the called party.

To further obstruct automated call agents, the announcement may comprise a question that requires the caller to perform  
20 an arithmetical or logical task in order to arrive at the expected response. Examples include "What is 6 divided by 3?"; "Please type the first three letters of my last name using the keypad.". Again, the announcement may be split into a fixed and a variable part, the variable part preferentially  
25 being the pieces of information to be combined in accordance with the general instructions of the fixed part in order to arrive at the expected response.

Turning now to Fig. 2, there is shown a call processing engine 220 of network element 122. An incoming signaling manager of call processing engine 220 receives a call setup message 210 in accordance with any signaling protocol including  
30 but not limited to ISUP (ISDN user part), ITU-T Q.931, H.323, SIP, or MGCP (Media Gateway Control Protocol). Call processing engine 220 then determines the called party from the call setup message and further determines if the called party has the SPIT blocker service enabled. If the SPIT blocker service is enabled for the called party, the white list check and an-  
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nouncement retrieval is performed as explained above by interfacing with database 130 using an interface 228.

In accordance with the result of the SPIT blocker handling, call processing engine 220 will either terminate the call or output a modified or an unmodified signaling message 230 in order to redirect the call to an answering device (not shown) or connect the call to the called subscriber, respectively, by means of an outgoing signaling manager 224.

Finally, Fig. 3 shows a block diagram of a preferred embodiment of the inventive method. In step 300, the operation begins with receiving a call. It is then determined, in optional step 310, if the calling party is in a white list. If the calling party is in the white list, then the operation of the call processing resumes normally with connecting the call to the called party in step 350. If the calling party is not in the white list, then the called party will be presented with an announcement in step 320, the announcement prompting the caller to respond. If no response is received in step 330 or the response does not match an expected response, the call processing continues with terminating the call or diverting it to voice mail in step 340. If however the response received matches the expected response, then call processing resumes with connecting the call to the called party in step 350.

In a preferred embodiment, the announcement is composed of an instruction or question with underlying noise or music, thereby obstructing advanced automated caller agents, namely those capable of automated speech recognition, as these might be able to respond correctly to the announcement. Initial research shows that classical music may be suitable to prevent automated speech recognition of the announcement. Alternatively, the announcement could be unnaturally distorted by modifying the playback timing parameters, inserting delays, etc., such that the announcement is still comprehensible to human callers but unusable for the purpose of automated speech recognition. In yet another alternative, the announce-

ment could be a question or announcement in the form of a short song, i.e. the music itself could be the announcement.

5 It shall be noted that the SPIT blocker service as described above can be implemented in centrally in a network element 122 such as a switch or a signaling gateway or an application server coupled to a network element 122 but may also be implemented in a subscriber device such as a residential gateway or any terminal device.

10 While the present invention has been described by reference to specific embodiments and specific uses, it should be understood that other configurations and arrangements could be constructed, and different uses could be made, without departing from the scope of the invention as set forth in the following claims.

15

## Claims

1. A method for processing calls, comprising:
  - receiving a call from a calling party (140);
  - 5 - playing an announcement to the calling party (140), the announcement requesting the calling party (140) to respond, the announcement comprising enough information for a human caller to determine a correct response;
  - comparing a response provided by the calling party (140)
  - 10 with the predefined correct response; and
  - connecting the call to a called party (110) only if the response provided by the calling party (140) matches the correct response.
- 15 2. The method of claim 1, comprising:
  - prior the playing the announcement, querying a white list, the white list comprising a list of caller IDs allowed to bypass the announcement-answer steps; and
  - connecting the call to the called party if the calling
  - 20 party's caller ID is in the white list.
3. The method of any of claims 1 or 2, wherein the announcement is composed of an instruction or question with underlying noise or music, thereby obstructing automated speech recognition of the announcement.
- 25 4. The method of any of claims 1 through 3, wherein the announcement can be responded to by subsequently pressing one or more keys of a standard telephone keypad.
- 30 5. The method of any of claims 1 through 4, wherein the announcement is randomly selected from a predefined set of announcements.
- 35 6. The method of any of claims 1 through 5, wherein the information for a human caller to determine a correct response comprises an audible representation of the predefined correct response.

7. The method of any of claims 1 through 5, wherein the information for a human caller to determine a correct response comprises one or more pieces of information that, when arithmetically or logically combined by a human caller, yield the predefined correct response.

8. In a telecommunications network (100), a network element (122, 124) serving a called party having means for performing the method of any of claims 1 through 7.

9. A user terminal (112, 114, 116, 118) attachable to a telecommunications network (100) having means for performing the method of any of claims 1 through 7.

FIG 1

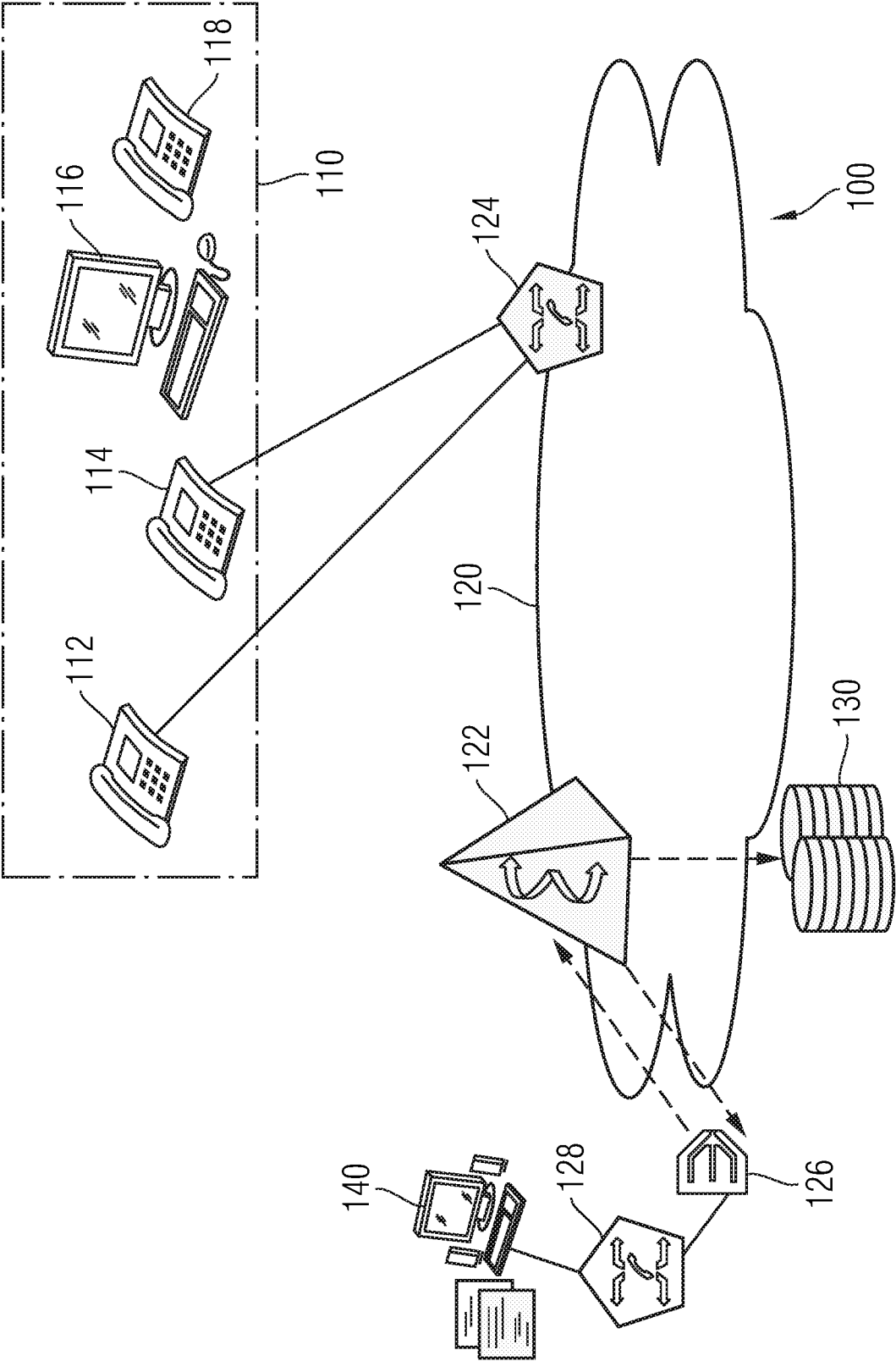


FIG 2

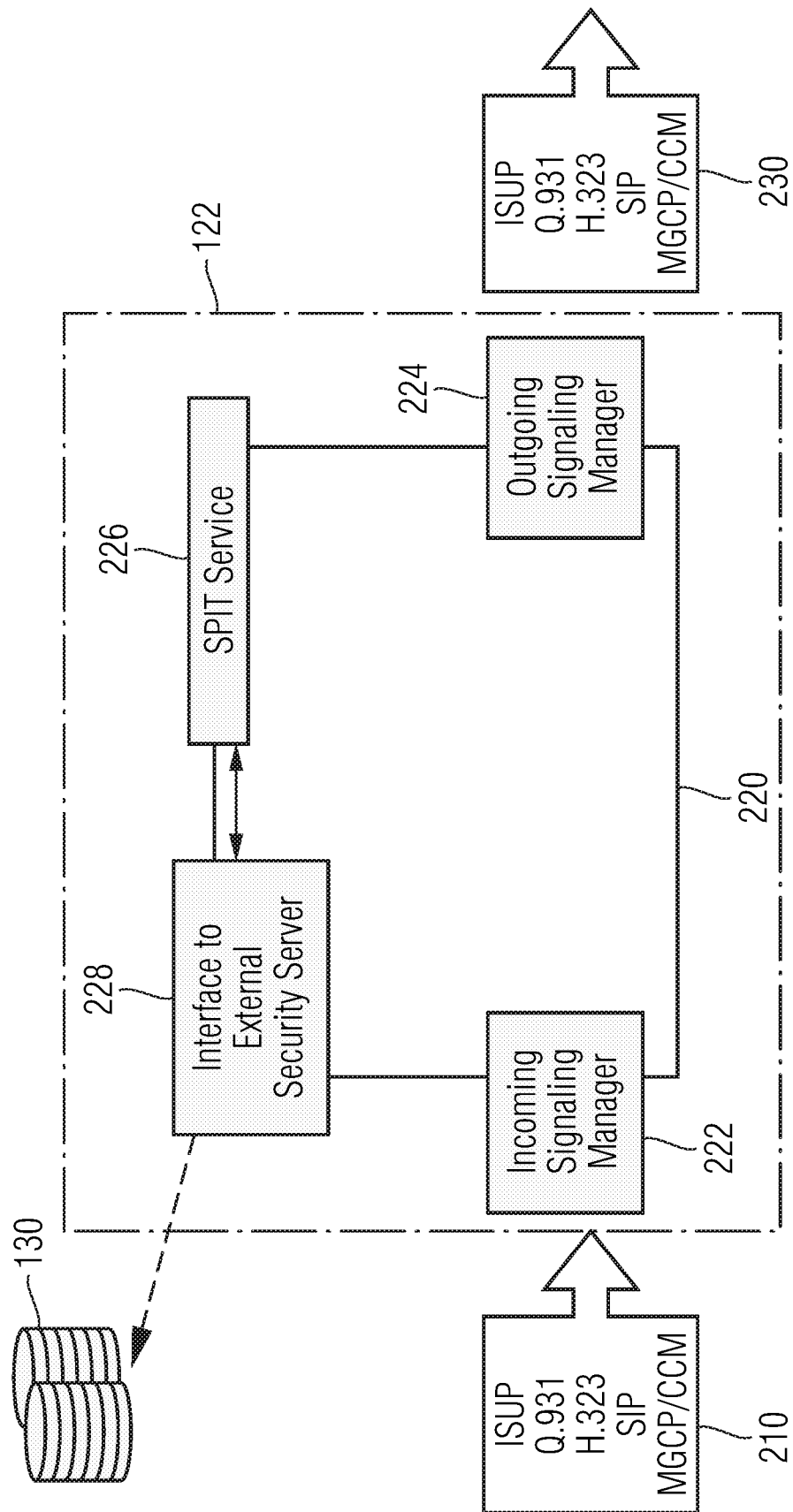
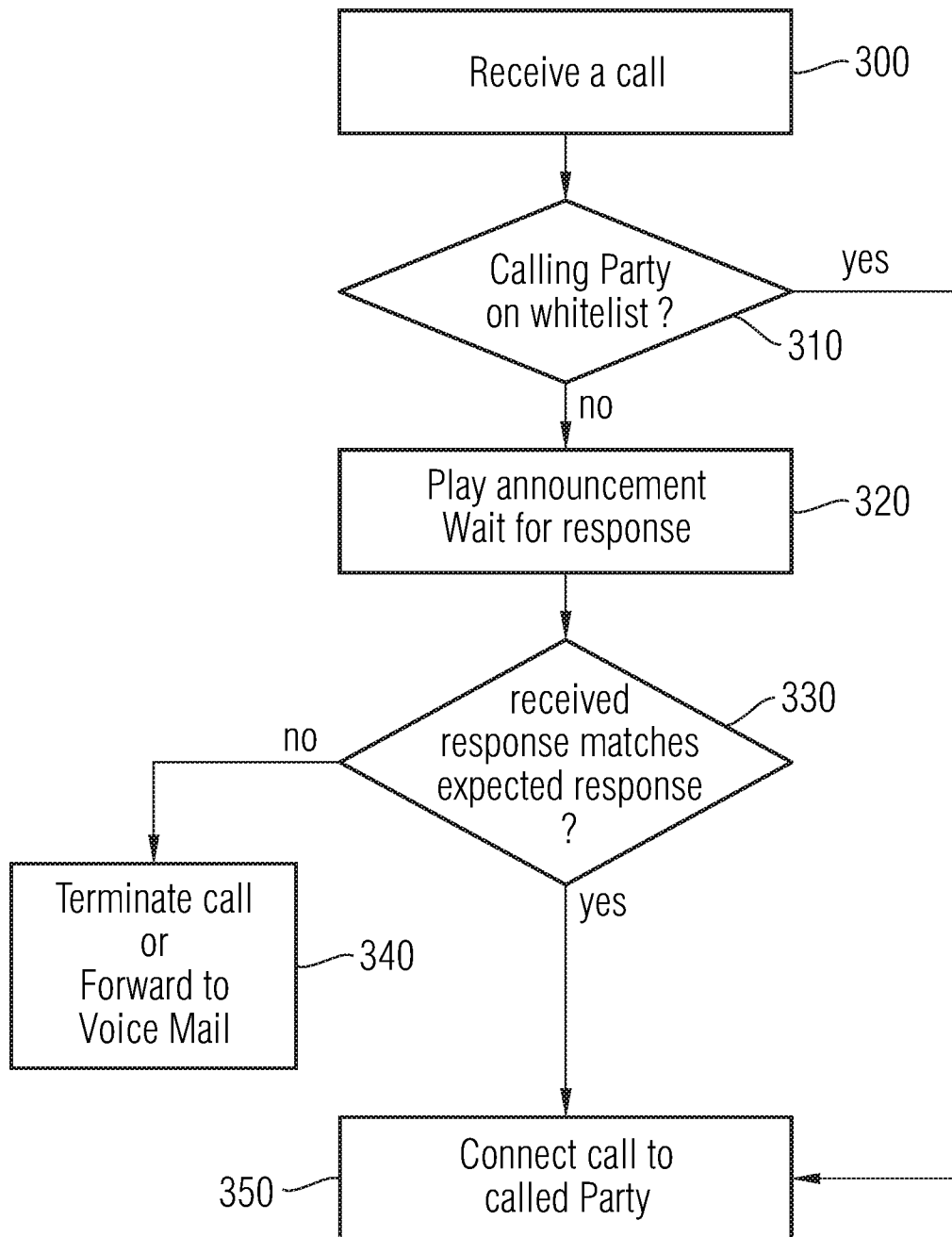


FIG 3



# INTERNATIONAL SEARCH REPORT

International application No  
PCT/EP2006/066005

## A. CLASSIFICATION OF SUBJECT MATTER

INV. H04M3/436

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, PAJ, INSPEC, IBM-TDB, COMPENDEX

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 542 583 B1 (TAYLOR GLEN A [US]) 1 April 2003 (2003-04-01) abstract column 1, line 57 - column 2, line 48 column 4, line 43 - line 51 column 5, line 26 - line 36	1-9
X	US 2003/095651 A1 (BOOK NANCY ANN [US] ET AL) 22 May 2003 (2003-05-22) abstract paragraphs [0054] - [0057], [0083] - [0085], [0090] - [0093], [0101]	1-9

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6542583	B1	01-04-2003	NONE	
US 2003095651	A1	22-05-2003	NONE	