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(54) Title: METHOD OF PERFORMING AUTOMATIC CALLBACK NOTIFIER ON REVERSED MISSED CALLS THROUGH NETWORK BASED ENABLERS.

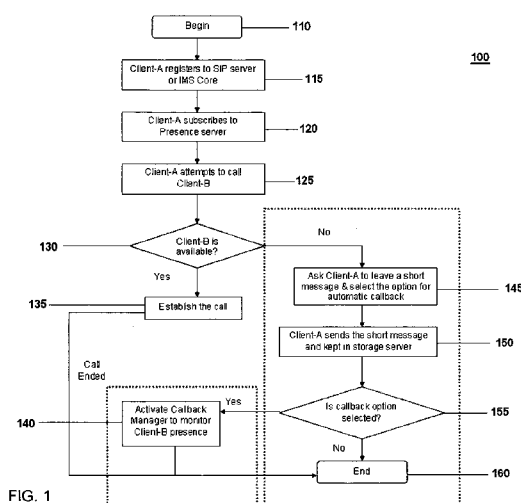


FIG. 1

(57) Abstract: A method of performing automatic callback notifier on reversed missed calls through network based enabler helps a caller to reach a callee by making reference to the presence status and subscribed to the callback service (115) provided by the network service providers. This method extends the functionality of existing device with a feature that prompts users to auto callback the callee who cannot be reached previously but is currently becoming available. This feature works by determining the presence status of the callee (215). Whenever the callee turns his status presence from "Not available" to "Available", the caller device will be acknowledged. This allows the caller device to automatically prompt the caller to proceed calling back the same callee (225).

METHOD OF PERFORMING AUTOMATIC CALLBACK NOTIFIER ON REVERSED MISSED CALLS THROUGH NETWORK BASED ENABLERS.

Technical Field:

The present invention relates to a registration of unanswered calls in telecommunication network, and more particularly, to a method of performing automatic callback notifier on reversed missed calls through network based enablers.

Background Art:

Telecommunication has started as early as during the first patented invention of a device that could transmit speech electrically (the telephone) by the well known inventor, Alexander Graham Bell in the 1870s. Pursuant to the invention, telecommunication application has evolved rapidly through centuries and promoting advance technology towards telecommunication. In 21st century, the presence of telecommunication devices i.e. mobile phones, PDAs, computers, pagers and etc introduces a world without border. The omnipresence of these telecommunication devices allow us to be easily contacted while at the same time enable us to effortlessly contact other person regardless of time or distance.

The usage of servers in telecommunication applications allows each and every telecommunication process being more reliable and convenient. The

application of servers may be exemplified by an occasion when a call made is left unanswered, the person who makes the call (hereinafter referred as "Caller") will be informed to leave a message by the server to notify the person who should receive the call (hereinafter referred as "Callee"). This is whenever the callee is unable to answer an incoming calls, the information of the caller will be recorded by the server. Further, callee will be left with a message indicating that he had received a call during his unavailability. In a scenario where the use of presence server and callback server may help reaching your contact, a caller starts a video call on the mobile device to reach a callee. Before the call is forwarded to the callee, the presence status of the callee shall first be examined. This is to determine whether the callee is available or unavailable to answer the call. Obviously, if callee is available, he will answer the call. On the other hand, the caller shall be asked to leave a message if the callee is not available to pick up the call. When callee becomes available later, he could return a call to the caller. However, this subjects to whether the callee is aware of or paying attention to the message the caller sent to him. Such issue promotes to a solution in order to re-establish connectivity and communication between the caller and the callee. The present invention seeks to address the above mentioned problems by promoting a method of performing automatic callback notifier on reversed missed calls through network based enablers.

In one of the prior arts, publication number WO 2008/050325 A1 disclosed a method and system for automatic call completion of unanswered calls made to or

from a telecommunication device. The prior art teaches a method to re-establish connectivity between the callee and the caller when a call is left unanswered. However, said prior art is different from the present invention wherein it only performs call completion by periodically reading a call log of unanswered calls within caller device. Furthermore, the prior art does not utilize any intermediate server and caller periodically attempt to call the unanswered callee which results in unnecessary generation of traffic on performing call attempts. It is distinguished from the present invention whereby the present invention performs call completion by automatically reacting to the changes of presence status of callee of the specific unanswered call and relies on intermediate server, i.e. Presence server, to notify the caller of when to attempt calling back the unanswered call. Caller will only be notified when callee changed the status from "unavailable" to "available".

Another example of prior art of method to re-establish connectivity between callee and caller is disclosed in automatic callback system and method (US5784438 (A)). This prior art disclosed a system and method for providing an automatic call-back when a calling party number encounters a ring-no-answer condition upon calling a callee. The prior art only establish the connectivity of the first caller depending on subsequent telephone call on-hook by the callee and utilizing a switch network and audible notifier to re-establish the connectivity. Said method did not teach any of connectivity re-establishment depending on the callee availability or unavailability profile as promoted by the present invention which is said to be more practical than what has been disclosed.

Therefore, there exists a need in the art for a reliable, traffic-free and convenient method of performing automatic callback notifier on reversed missed calls through network based enablers which does not leave any calls due to unavailability of Callee unattended.

Disclosure of the Invention:

This invention describes a method of performing automatic callback notifier on reversed missed calls through network based enablers that helps a caller to reach a callee by making reference to the presence status and subscribed to the callback service provided by the network service providers. This method extends the functionality of existing device with a feature that prompts users to auto callback the callee who cannot be reached previously but is currently becoming available. This feature works with the use of presence status update mechanism of the callee. Whenever the callee turns his status presence from "Not available" to "Available", the caller device will be acknowledged. This allows the caller device to automatically prompt the caller to proceed calling back the same callee.

In one embodiment of the present invention, a method of performing automatic callback notifier on reversed missed calls through network based enablers comprises the steps of: monitoring the presence status of said Client B, logging down any unanswered call made by said Client A to said Client B, inquiring said Client A to leave message or automatic callback if said Client B did not answer the call, which further comprises the steps of: asking said Client A to

leave a message; and/or performing automatic callback from Client A to Client B wherein further comprises the steps of monitoring the presence status of Client B, suggesting said Client A to re-establish a call to said Client B whenever the Presence status of said Client B has changed to Available state.

In another embodiment of the present invention, subscribing a callback server is performed by Client A and Client B.

In a further embodiment of the present invention, the callback server is SIP application server that sits on top of an IMS core server provided by a network service provider.

In another embodiment of the present invention, the presence status of Client B further comprises communicating to the presence server.

In a further embodiment of the present invention, the call is notified to be established between said Client A and said Client B is when the presence status of Client B has changed to the "Available" state.

In an embodiment of the present invention, the message is stored in Message Storage server, e.g. the XML Data Management Server (XDMS).

In another embodiment of the present invention, the automatic callback is performed by a callback manager on the client device.

In a further embodiment of the present invention, the automatic callback is performed by a callback server.

In another embodiment of the present invention, the automatic callback notifies the Client A to perform a call when the presence of Client B changed to "available".

While the invention is described herein by way of example using several embodiments and illustrative drawings, those skilled in the art will recognize that the invention is not limited to the embodiments of drawing or drawings described, and are not intended to represent the scale of the various components. Further, some components that may form a part of the invention may not be illustrated in certain figures, for ease of illustration, and such omissions do not limit the embodiments outlined in any way. It should be understood that the drawings and detailed description thereto are not intended to limit the invention to the particular form disclosed, but on the contrary, the invention is to cover all modification, equivalents and alternatives falling within the spirit and scope of the present invention as defined by the appended claims. The headings used herein are for organizational purposes only and are not meant to be used to limit the scope of the description or the claims. As used throughout this application, the word "may"

is used in a permissive sense (i.e., meaning having the potential to), rather than the mandatory sense (i.e., meaning must). Similarly, the words "include," "including," and "includes" mean including, but not limited to. Further, the words "a" or "an" mean "at least one" and the word "plurality" means one or more, unless otherwise mentioned.

Description of Drawings and Best Mode for Carrying Out the Invention:

So that the manner in which the above recited features of the present invention can be understood in detail, a more particular description of the invention, briefly summarized above, may be had by reference to embodiments, some of which are illustrated in the appended drawings. It is to be noted, however, that the appended drawings illustrate only typical embodiments of this invention and are therefore not to be considered limiting of its scope, for the invention may admit to other equally effective embodiments.

FIG 1 illustrates the overall process flow of Client A attempting to contact Client B (100).

FIG. 2 illustrates the process flow of presence status monitoring process for performing callback (200).

FIG. 3 illustrates the diagram of two IMS clients and a server and the message interaction between each of the components within the client device and across the network with the server components (300).

FIG. 4 illustrates the diagram of alternative implementation for providing the callback service (400).

Referring to FIG. 1, the figure shows the process flow of Client A attempting to contact Client-B (100). The process begins (110) by having both clients to register with the IMS Core server (115), and subscribing to the Presence server (120). Once the registration and subscription are done, Client-A will attempt to call Client-B (125). Two general presence status of Client B, i.e. "Available" or "Not available" are determined in order to re-establish connectivity between the two parties. Presence status is the setting which each client could change to reflect its current situation, i.e. whether he is available to interact, or not available to interact. The not available status could be further categorized into "Away" or "Busy" but not limited to these profiles.

Before the call can be established by Client-A to Client-B, a check with the presence status (130) of Client-B is necessary. If Client-B is available, call can be established (135) and continued until it is terminated. However, if Client-B is not available at the moment of the call being made, Client-A VoIP (Voice over Internet Protocol) application will prompt Client-A to leave a short message (145).

Client a then sends the short message and the message is stored in a server (150). Besides that, an option will be provided whether Client-A prefers to call Client-B again whenever Client-B becomes available later (155) (i.e. the presence status of Client-B is changed from "not available" into "available"). If Client A refuses to call Client B, the connectivity between the two parties will end (160). However, if Client A insists of continuing the connectivity with Client B, the server will activate callback manager to monitor Client B's presence (140).

Referring now to FIG. 2, the figure shows the process flow of presence status monitoring process (200). The same process could be executed either by the callback manager on the IMS client device or the callback server on the server. The process started (210) off by checking the presence status of Client-B (215). Whenever Client-B becomes available (220), Client-A will be prompted a choice (225) of whether to establish a call back to Client-B or vice versa (230). If Client-A agrees, the call shall be established (235); otherwise the process shall be ended (240).

Figure 3 indicates the system of two IMS clients and a server and the message interaction between each of the components within the client device and across the network with the server components (300).

The internal architecture of an IMS client on a computing device is shown in assembly (385). The topmost layer is the VoIP (310) application which interacts

to a callback manager (315), session manager (320) and stream manager (325). Callback manager (315) manages the automatic callback service whenever a reversed missed call takes place. This is done by logically interacting with the remote presence server (360). The flow of the interaction is to go through the session manager (320), which manages all types of SIP (session initiation protocol) (345) for the VoIP (310) application on the device, then through the presence handler (330) that communicates with the presence server (360). Besides managing the presence server (360), the session manager (320) also interacts with the underlying message handler (340) that uses SIP (345) to send and receive messages across the network to the XDMS (XML Document Manager Server) message storage (365). This is where the offline message is deposited to the XML Document Manager Server (XDMS) (365) as message storage on the server whenever a designated callee did not answer the call made by a caller. The session manager (320) also interacts with the call handler (335) to make call, answer call and manage the call throughout the session such as media negotiation. Besides these, the session manager (320) is responsible for registering the client device with the IMS core server (370) whenever the device is activated. The registration is done by the IMS Core server (370) that interacts with the Home Subscriber Service (HSS) (375) database to verify and validate the IMS client (385) device. Once the IMS registration, IMS call session negotiation and presence status update are done, the VoIP (310) application shall start sending and receiving voice data packet in the form of RTP and RTCP packets, through the RTP/RTCP handler (350).

On the server side, the main component is the IMS Core server (370) that is the controller of all server-side services, which basically includes registration and service invocation. Whenever a registration is successful, the IMS client (385) device is allowed to interact directly with the designated application server hosted on top of the IMS Core server (370). In this case, such servers are namely the presence server (360) and XDMS server (365).

As for the corresponding IMS client 2 (callee) (380), it also must first register with the IMS Core server (370), subscribe and update its presence status, interact with the XDMS server (365) when necessary to retrieve or deposit messages, and also to communicate with the remote IMS client 1 (caller) (385) to send and receive voice data packet.

Referring to FIG. 4, the figure depicts a diagram of alternative implementation for providing the callback service (400). In this alternative implementation, the process flow in the IMS client (385) as shown in FIG. 3 are of the same, however, the intelligence and processing of monitoring the status of the missed call callee are located on the server, namely the Callback Server (460). Once a reversed missed call is detected and the caller is subscribed to such service, the callback server (460) starts communicating and monitoring presence status of the specific callee by constantly interacting with the presence server (465). The main advantage of such implementation is that there is less network overheads

because monitoring could be done locally within the server network segment or maybe on the same server machine depending on the actual deployment scenario. For this benefit, the monitoring could be done quite frequently because power consumption is also no longer an issue and the response time will also be improved due to constant monitoring. The difference between the flow chart of FIG 3 and FIG 4 is that Callback Manager (415) on the IMS client device (500) is now interacting directly with the Callback Server (460), instead of communicating with the presence server (465).

In the foregoing specification, specific embodiments of the present invention have been described. However, one of ordinary skill in the art will appreciate that various modifications and changes can be made without departing from the spirit and scope of the present invention as set forth in the various embodiments discussed above and the claims that follow. Accordingly, the specification and figures are to be regarded in an illustrative rather than a restrictive sense, and all such modifications are intended to be included within the scope of present invention. The benefits, advantages, solutions to problems, and any element(s) that may cause any benefit, advantage, or solution to occur or become more pronounced are not to be construed as a critical, required, or essential features or elements as described herein.

CLAIMS:

1. A method of performing automatic callback notifier on reversed missed calls through network based enablers comprises the steps of:

subscribing to a callback server;

monitoring the presence status of said Client B;

logging down any unanswered call made by said Client A to said Client B;

inquiring said Client A to leave message or automatic callback if said Client B did not answer the call, which further comprises the steps of:

asking said Client A to leave a message; and/or

performing automatic callback from Client A to Client B wherein further comprises the steps of :

monitoring the presence status of Client B;

suggesting said Client A to re-establish a call to said Client B whenever the Presence status of said Client B has changed to Available state

2. The method according to claim 1 wherein subscribing to a callback server is performed by Client A and Client B.

3. The method according to claim 2 wherein the callback server is SIP application server that sits on top of an IMS core server provided by a network service provider.

4. The method according to claim 1 wherein monitoring the presence status of Client B further comprises communicating to the presence server (120).
5. The method according to claim 1 wherein the call is notified to be established between said Client A and said Client B is when the presence status Client B is available.
6. The method according to claim 1 wherein the message is stored in XDMS message storage server.
7. The method according to claim 1 wherein the automatic callback is performed by a callback server.
8. The method according to claim 1 wherein the automatic callback is performed by a callback manager on the client device.
9. The method according to claim 1 wherein the automatic callback notifies the Client A to perform a call when the presence of Client B changed to "available".

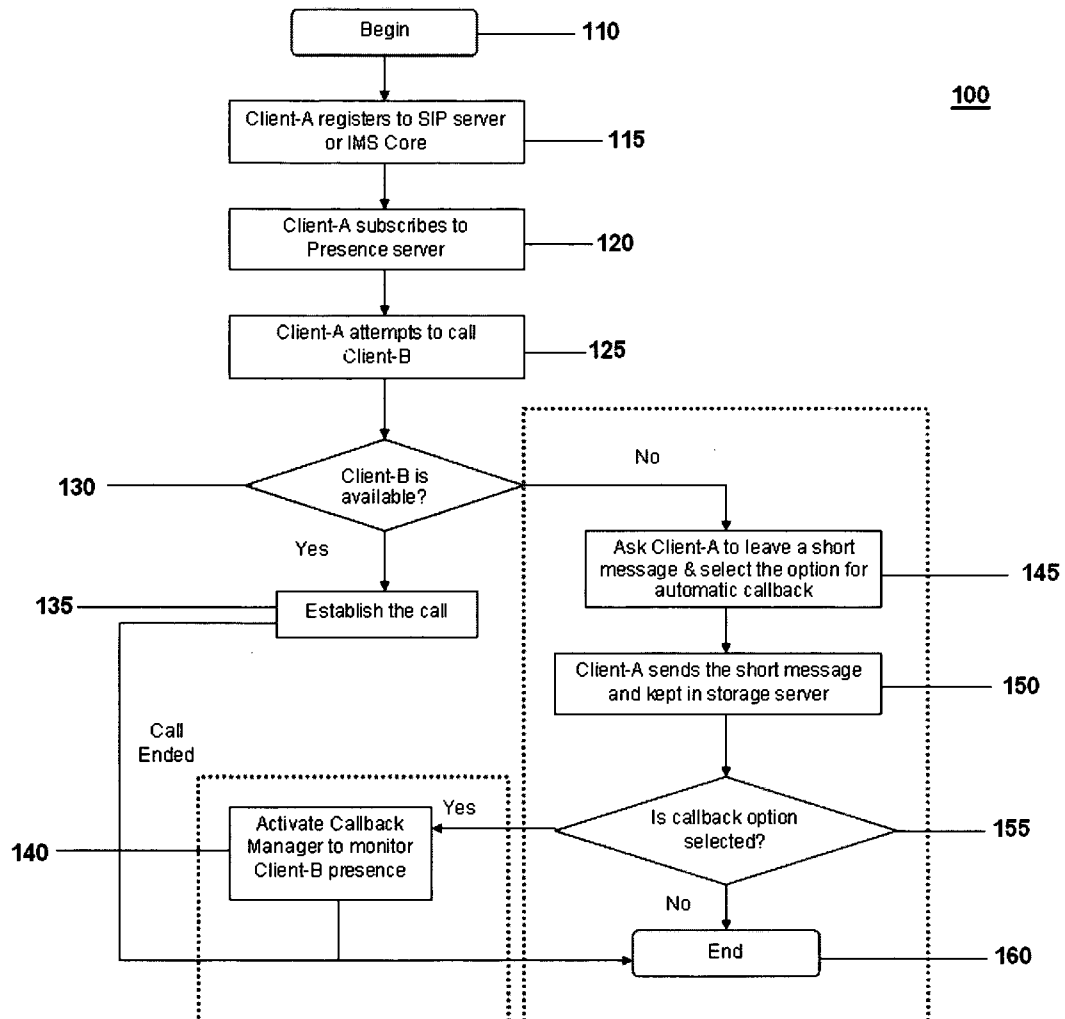


FIG. 1

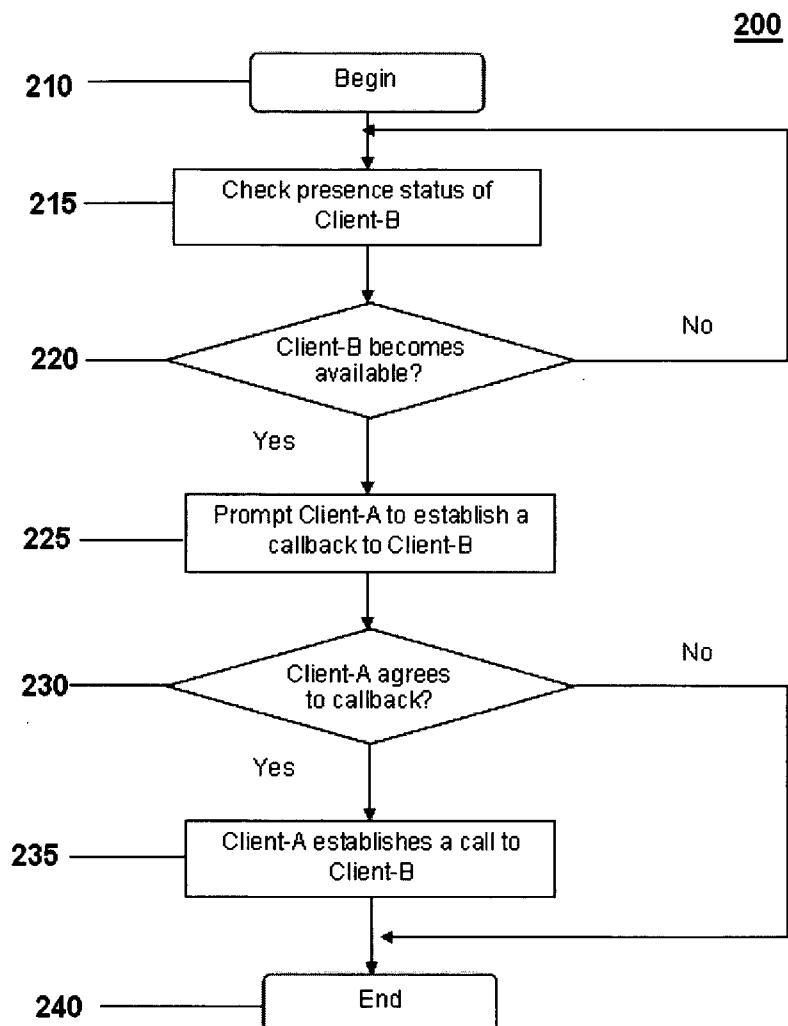


FIG. 2

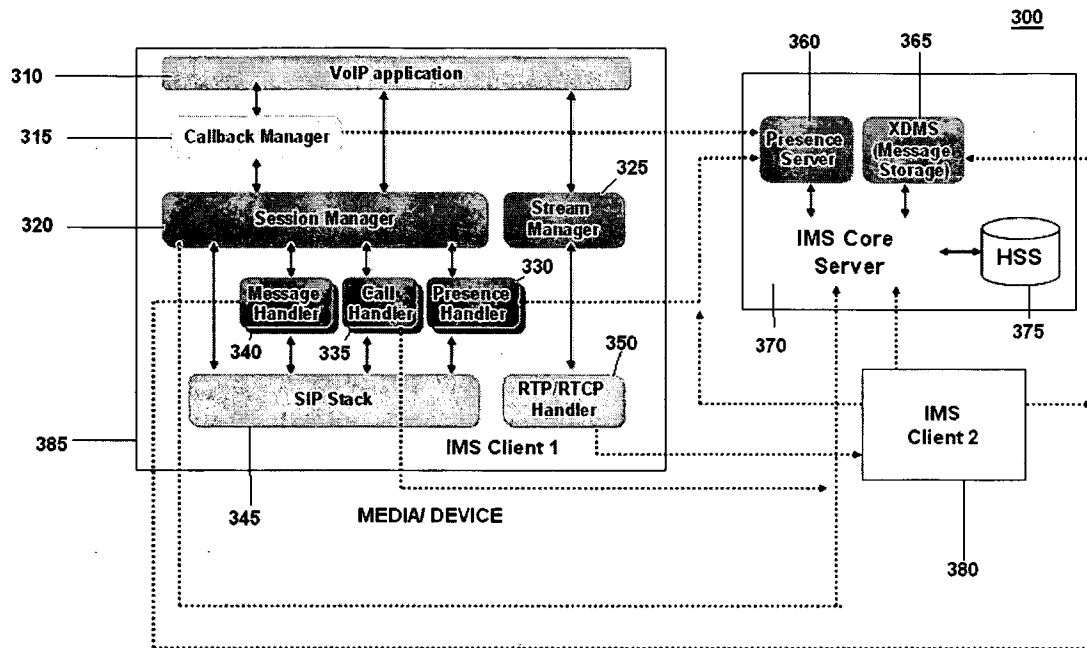


FIG. 3

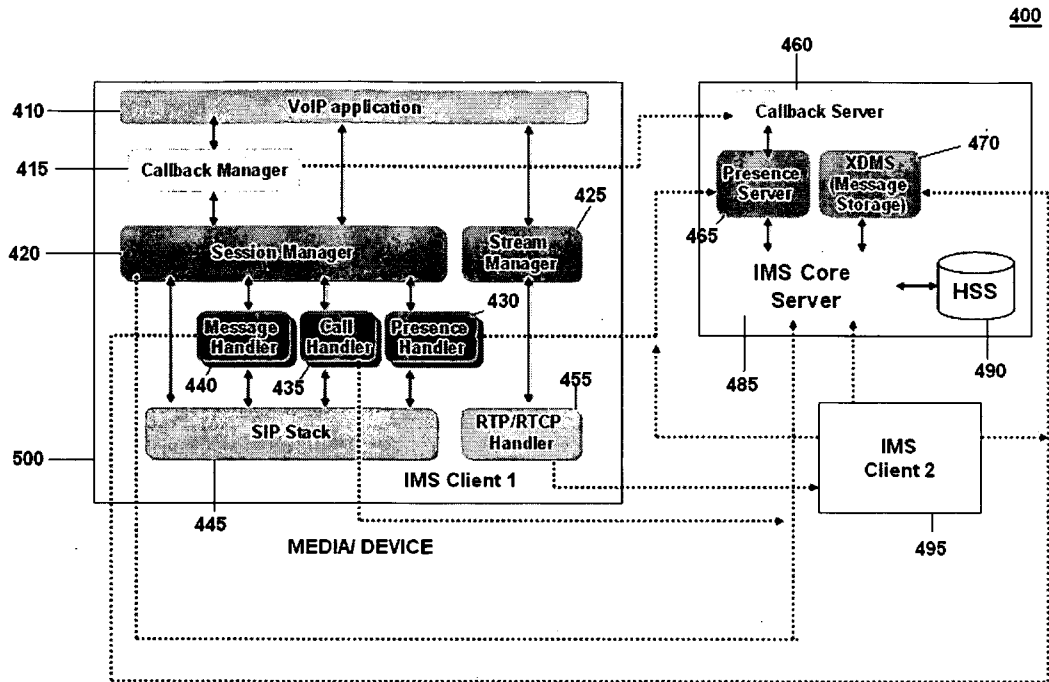


FIG. 4