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(54) SYSTEM FOR ADAPTATION OF SIP MESSAGES BASED ON RECIPIENT'S TERMINAL CAPABILITIES AND PREFERENCES

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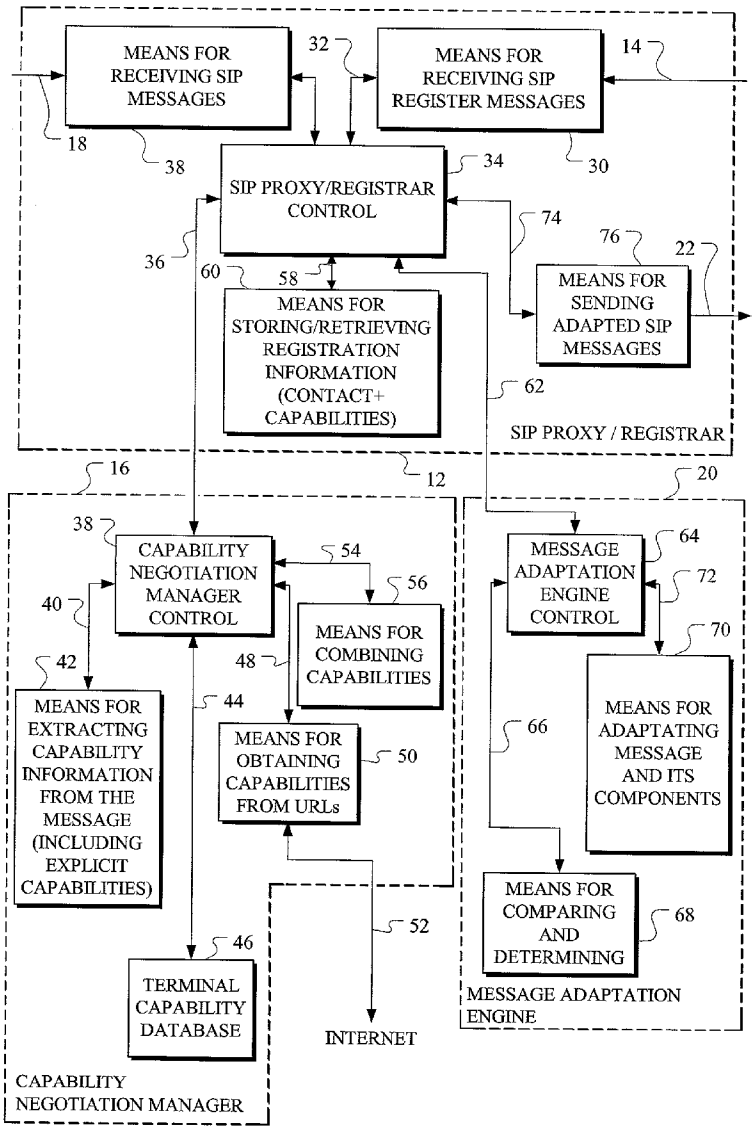
(57) **ABSTRACT**

A system of Session Initiation Protocol (SIP) terminals capable of processing SIP messages and SIP servers that perform selected functions at the request of the SIP terminals, includes a SIP server **(12)** for pre-registering capabilities and user preferences of a registering terminal **(15)** after resolution by a Capability Negotiation Manager **(16)**, and for subsequently receiving an incoming SIP message from a sending terminal **(19)** indicating a message intended for the pre-registered terminal, and adaptation means **(20)** for adapting the incoming message to meet the capabilities and user preferences of the pre-registered terminal for transmission by the SIP server to the pre-registered terminal.



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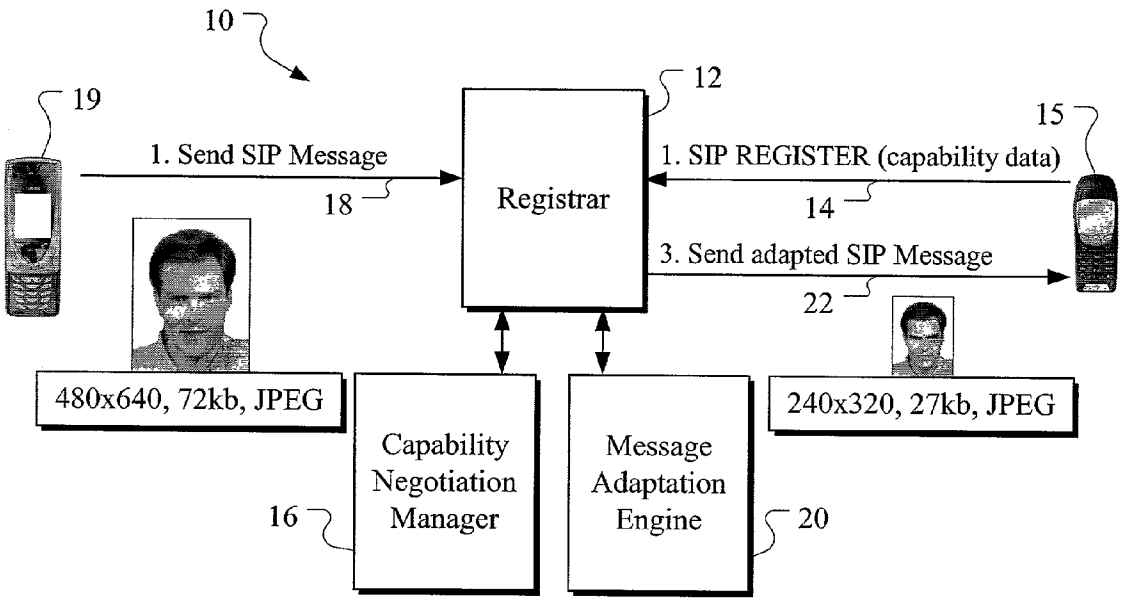

FIG. 1

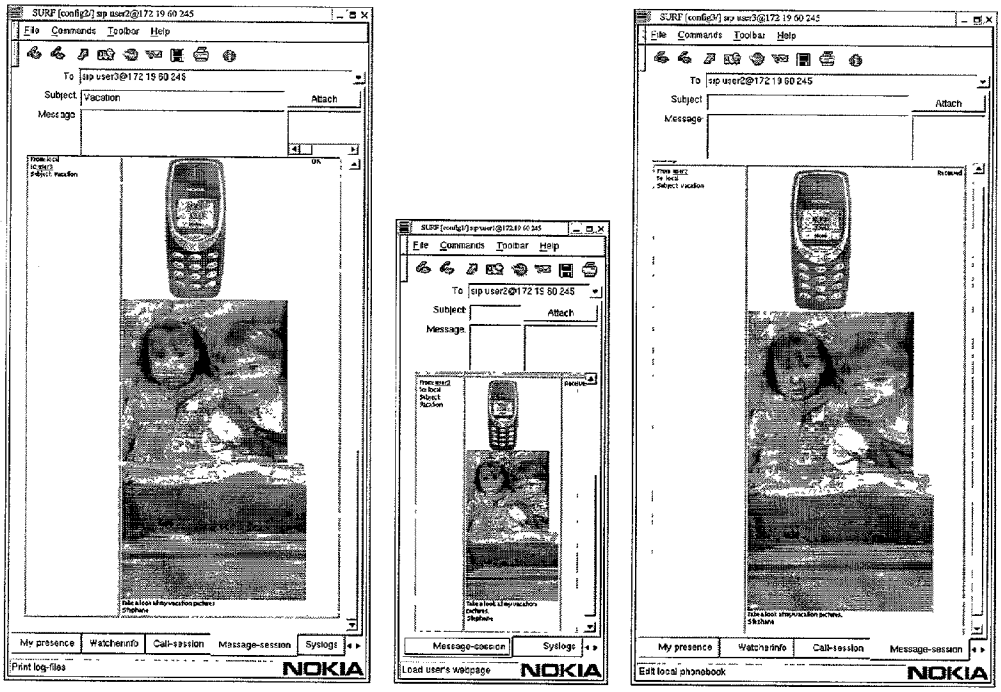

FIG. 2

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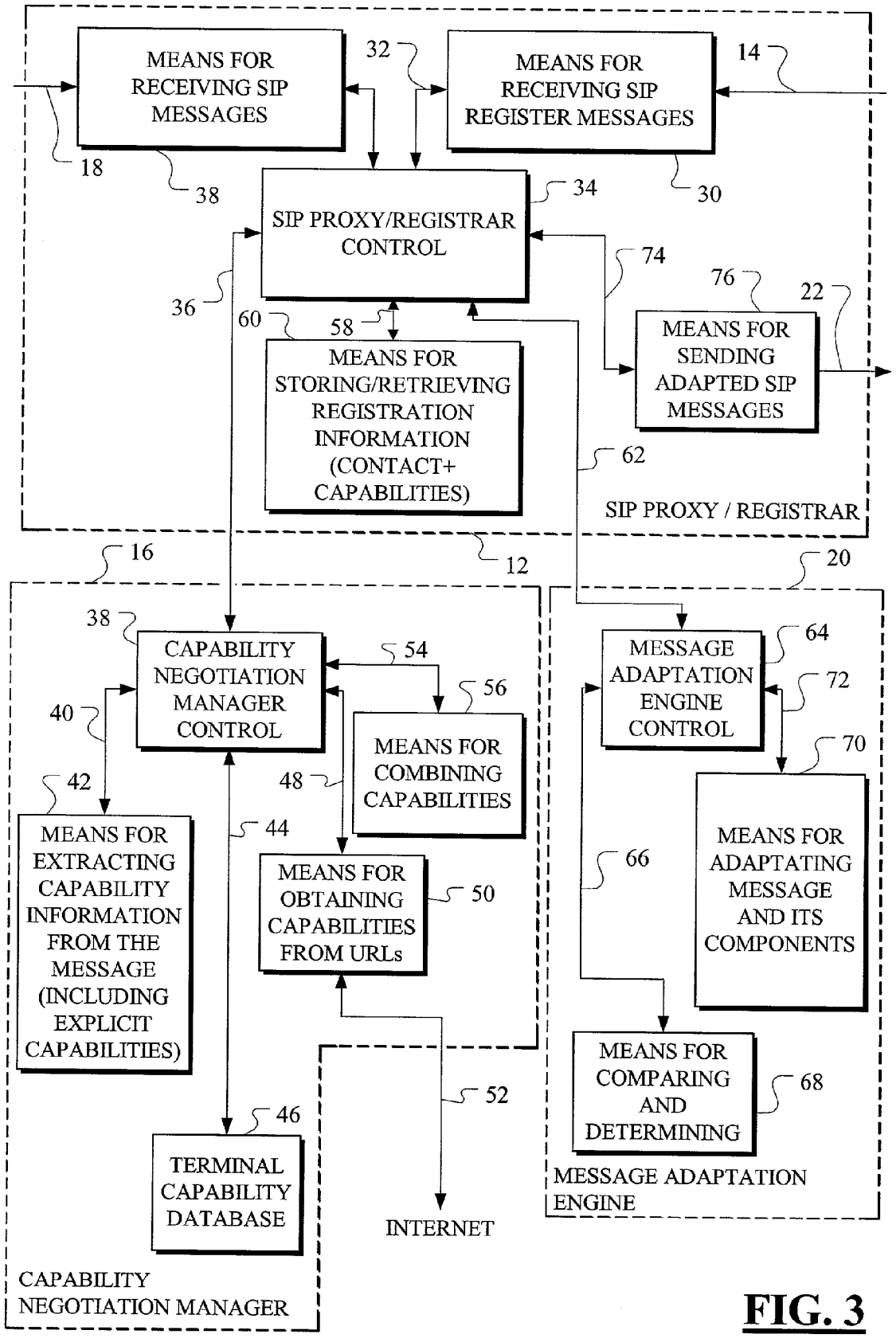

FIG. 3

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SYSTEM FOR ADAPTATION OF SIP MESSAGES BASED ON RECIPIENT'S TERMINAL CAPABILITIES AND PREFERENCES

TECHNICAL FIELD

[0001] The present invention relates to interoperability between terminal devices using session initiation protocol (SIP) messages and, more particularly, to multimedia content adaptation.

BACKGROUND ART

[0002] Interoperability is of paramount importance in messaging. Users expect that messages will reach their destination and will be handled properly by the recipient's terminal. But emerging mobile terminals have made this requirement more challenging, due to the wide diversity of terminal characteristics: display size and resolution, available memory, formats supported, etc. Sometimes the network also imposes limitations (e.g. maximum message size over UDP).

[0003] Content adaptation was addressed in publication EP 1 091 601 A2 in which a sending terminal first checked with a special application service center regarding an intended recipient terminal to find out if it could process a multimedia message. The service center contacted the intended recipient terminal to find out its capabilities. If the intended recipient terminal was not able, the message was posted to a special website and the intended recipient terminal was sent an SMS message with a URL to access the message over the Internet using a PC.

[0004] An example of a web browser user interface for low resolution displays can be found in co-owned, co-pending U.S. patent application Ser. No. 09/845,818 filed Apr. 30, 2001 where less than the full extent of high resolution web site content can be selected for viewing on a low resolution display, for instance in a browsing cell phone. An example shows the fall extent of the web page content downloaded to memory in the cell phone and the subsequent processing of that content in the cell phone based on a user's selection of a small portion of the full page.

[0005] However, it appears that media content adaptation proxies will play an important role in maintaining interoperability and increasing user experience in many domains of applications including messaging. These proxies, commonly referred as transcoding proxies, actually transform media content to make it suitable for the destination terminal. For instance, one such transformation is format conversion, e.g. PNG to GIF.

[0006] Although the need for such transcoding proxies is clear, the framework to facilitate adaptation is not. One exception to this is the specific case of browsing. In browsing, methods to adapt Web pages to different end users have been addressed in the past. But those solutions can't be applied directly to all applications. The dynamics of other applications are often very different from browsing. For instance, in browsing, the destination terminal type is known since such information is provided in the request for content (e.g. User-Agent header in HTTP). In SIP (Session Initiation Protocol) messaging, the recipient doesn't "make a request" to receive a message; it arrives without advance warning. A different mechanism is therefore required in the proxy to obtain the recipient's terminal capabilities.

[0007] The invention tries to overcome the problem of interoperability between terminals and to improve the end user experience by providing a framework for making SIP messages conform to the recipient's terminal capability and characteristics. First the message must be able to reach the recipient. Message size reduction may be required for the message to reach the destination terminal due to limited terminal memory or network restrictions. The second aspect relates to the usability of the received message. It needs to be ensured that the content has the appropriate formats, characteristics (e.g., image resolution or audio sampling rate), and presentation (looks good on the small display). The invention describes the mechanisms that make possible such adaptation based on the destination terminal characteristics and user preferences.

[0008] The problem was not solved for SIP messages. The need for transcoding services is well-known. In B. Carpenter, S. Brim, "Middleboxes: taxonomy and issues," draft-carpenter-midtax-01.txt, IETF, Internet Draft, April 2001, transcoders are defined as:

[0009] "Transcoders are boxes performing some type of on-the-fly conversion of application level data. Examples include the transcoding of existing web pages for display on hand-held wireless devices, and transcoding between various audio formats for interconnecting digital mobile phones with voice-over-IP services. By definition, such transcoding cannot be done by the end-systems, and at least in the case of voice, it must be done in strict real time with extremely rapid failure recovery. Not all media translators are mandatory. They may just be useful in case of multicast, for example, where all the low-bandwidth receivers sit in one "corner" of the network and it would be inefficient for the sender to generate two streams or send both stream all the way across the network if the "thin" one is only needed far awayfrom the sender. Generally, media translators are only useful if the two end systems don't have overlapping codecs or if the overlapping set is not a good network match."

[0010] There is no mention of how this could work in practice in the context of SIP messages. This requires a solution different from the well-known problem of information browsing. In browsing, a terminal making a request for a Web page will provide his terminal capabilities (often in the form of header fields: User-Agent, Accept, Accept-Encoding, etc.). The Web server will resolve the terminal capabilities, compose an appropriate Web page response and send it. Gateways (such as WAP gateways) also know the terminal capabilities from the Web page request and can perform adaptation accordingly.

[0011] In SIP, the messages flow from a sender to a recipient. The proxy is in the middle and doesn't know the capabilities of the recipient since the recipient did not initiate the request. This changes the application dynamics and the adaptation framework used in browsing doesn't apply directly for SIP messages. A new adaptation framework is required. There is no earlier solution providing a framework for SIP message adaptation.

DISCLOSURE OF INVENTION

[0012] An object of the present invention is to provide a framework for SIP message adaptation services.

[0013] A method, according to a first aspect of the present invention, comprises the steps of receiving at a server from

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a registering or subscribing terminal a message having information indicative of capabilities or user preferences of the registering or subscribing terminal, and storing the information for later comparison with the characteristics of an incoming message from another entity and adaptation of the incoming message to match the capabilities or user preferences of the registering or subscribing terminal, if needed.

[0014] In further accord with the first aspect of the present invention, the method further comprises the steps of receiving the incoming message, comparing the capabilities or user preferences of the registering or subscribing terminal with the characteristics of the incoming message from the other entity, adapting the incoming message to the capabilities or user preferences of the registering or subscribing terminal, and sending an adapted message to the registering or subscribing terminal.

[0015] In still further accord with the first aspect of the present invention, the step of comparing is carried out by a message adaptation engine in communication with the server.

[0016] Further still in accord with the first aspect of the present invention, the step of adapting is carried out by a message adaptation engine in communication with the server.

[0017] According further to the first aspect of the present invention, the steps of receiving the incoming message and sending the adapted message are carried out at the server.

[0018] According still further with the first aspect of the present invention, the method further comprises the step of determining the capabilities or user preferences of the registering or subscribing terminal from the message received by the server from the registering or subscribing terminal prior to the step of storing. The step of determining may be carried out by a capability negotiation manager.

[0019] Still further in accord with the first aspect of the present invention, the message received at the server from the registering or subscribing terminal is a session initiation protocol (SIP) register or subscribe message.

[0020] In accordance still further with the first aspect of the present invention, the incoming message from the other entity is an SIP message. Likewise, the adaptation of the incoming message may be an adaptation of the incoming SIP message for sending an adapted SIP message to the registering or subscribing terminal.

[0021] Further still in accord with the first aspect of the present invention, the registering or subscribing terminal is a mobile terminal. Likewise, the other entity may be a mobile terminal, although it could be a server or any other kind of entity.

[0022] A device, according to a second aspect of the present invention, comprises means for receiving at a server from a registering or subscribing terminal a register or subscribe message having information indicative of capabilities or user preferences of the registering or subscribing terminal, and means for storing the information for later comparison with characteristics of an incoming message from another entity and adaptation of the incoming message to match the capabilities or user preferences of the registering or subscribing terminal, if needed.

[0023] In further accord with the second aspect of the present invention, the device further comprises means for receiving the incoming message, means for comparing the capabilities or user preferences of the registering or subscribing terminal with the characteristics of the incoming message from the other entity, means for adapting the incoming message to the capabilities or user preferences of the registering or subscribing terminal, and means for sending an adapted message to the registering or subscribing terminal. The means for comparing may comprise a message adaptation engine in communication with the server. The means for adapting may comprise a message adaptation engine in communication with the server. The means for receiving the incoming message and the means for sending the adapted message may both be in the server.

[0024] In still further accord with the second aspect of the present invention, the device further comprises means for resolving the capabilities or user preferences of the registering or subscribing terminal from the message received by the server from the registering or subscribing terminal. The means for resolving may comprise a capability negotiation manager.

[0025] In accordance still further with the second aspect of the present invention, the register or subscribe message from the registering or subscribing terminal is a session initiation protocol (SIP) message.

[0026] Further still in accord with the second aspect of the present invention, the incoming message from the other entity is an SIP message.

[0027] According still further to the second aspect of the present invention, the adapted message is an adapted SIP message.

[0028] In further accord with the second aspect of the present invention, the registering or subscribing terminal is a mobile terminal.

[0029] A system having terminals that are capable of processing messages and servers that perform selected functions at the request of terminals, according to a third aspect of the present invention, includes a server for receiving a registration or subscription request message from a registering or subscribing terminal, a capability negotiation manager for receiving a request from the server to resolve capabilities or user preferences of the registering or subscribing terminal, for resolving the capabilities or user preferences, and for providing information concerning the capabilities or user preferences back to the server, wherein the server, in response to a subsequently received incoming message from a sending entity or terminal intended for the registering or subscribing terminal provides both the incoming message and the information concerning the capabilities or user preferences for use in adapting the incoming message, and adaptation means, responsive to the incoming message and the information concerning the capabilities or user preferences from the server, for adapting the incoming message to a format determined by comparing characteristics of the incoming message to the information concerning the capabilities or user preferences of the registering or subscribing terminal for transmission of an adapted incoming message in that format by the server to the registering or subscribing terminal.

[0030] In further accord with the third aspect of the present invention, the registration or subscription request

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