

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
15 December 2005 (15.12.2005)

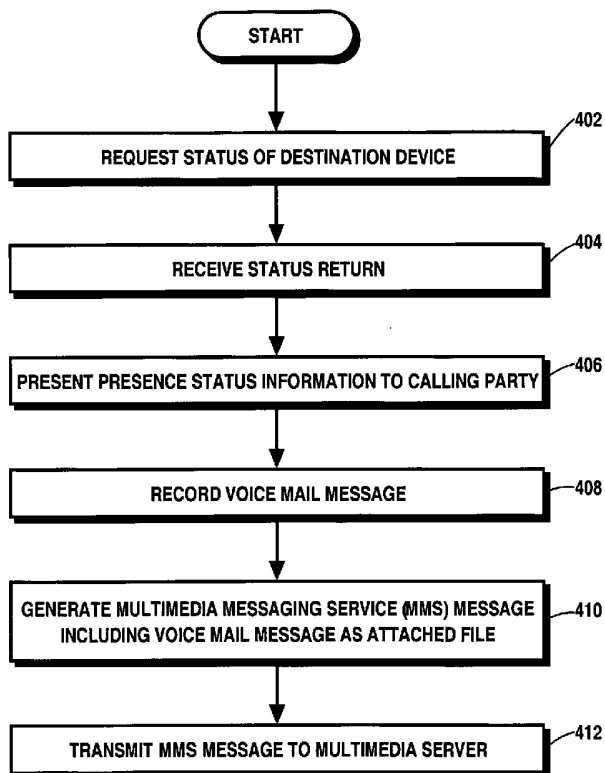
PCT

(10) International Publication Number
WO 2005/120031 A1

- (51) International Patent Classification⁷: H04M 1/725, 3/53, H04Q 7/38
- (21) International Application Number: PCT/US2005/018508
- (22) International Filing Date: 25 May 2005 (25.05.2005)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/574,757 26 May 2004 (26.05.2004) US
11/133,654 19 May 2005 (19.05.2005) US
- (71) Applicant (for all designated States except US): QUALCOMM INCORPORATED [US/US]; 5775 Morehouse Drive, San Diego, CA 92121 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): GOGIC, Aleksandar [US/US]; 3610 Torrey View Court, San Diego, CA 92130 (US).
- (74) Agents: OGR0D, Gregory, D. et al.; 5775 Morehouse Drive, San Diego, CA 92121 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH,

[Continued on next page]

(54) Title: APPARATUS, SYSTEM, AND METHOD FOR PROVIDING VOICEMAIL SERVICE USING PRESENCE STATUS IN PACKET DATA MESSAGING SYSTEM



(57) Abstract: An apparatus, system, and method provide voicemail service using a packet data messaging service such as multimedia message service (MMS). Upon detecting that the presence status of a destination device is "unavailable", the voicemail message is recorded at an origination mobile station and transmitted in a packet data message through a packet data messaging service center such as a multimedia messaging service center (MMS-C). If the destination device is a destination mobile station subscribing to the packet data messaging service, the packet data message is deposited in the destination mobile station.

WO 2005/120031 A1



GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent

(AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for all designations
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations

Published:

- with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

**APPARATUS, SYSTEM, AND METHOD FOR PROVIDING VOICEMAIL
SERVICE USING PRESENCE STATUS IN PACKET DATA MESSAGING
SYSTEM**

Claim of Priority under 35 U.S.C §119

[0001] The present Application for Patent claims priority to U.S. Provisional Application No. 60/574,757, entitled "Interworking Between Wireless Voicemail and MMS to Achieve Efficient Use of Network Resources", filed May 26, 2004, and assigned to the assignee hereof and hereby expressly incorporated by reference herein.

BACKGROUND

I. Field

[0002] The invention relates in general to voicemail systems and more specifically to an apparatus, system, and method for providing voicemail service through a packet data messaging system.

II. Background

[0003] Voicemail systems provide a mechanism for an origination party to record a voice message that can be retrieved by a destination party. Typically, a voicemail box associated with a telephone number of the destination party is used to store the voicemail message. The destination party retrieves the message by accessing a voicemail server that maintains the voicemail box and by entering the appropriate identification and security information. In conventional voicemail systems, a real-time call such as a circuit switched call or a virtual circuit switched call is maintained with the voicemail server while voicemail message is deposited or retrieved. In circumstances where communication resources are limited, however, conventional systems have substantial drawbacks. In conventional wireless communication systems, for example, bandwidth and communication channels are valuable resources that are often used for retrieving and depositing voicemail messages. Since only one party is involved with the transfer of a voicemail message at any particular time, a low latency, real-time communication link is not required. Using a circuit switched call in a circuit

switched network, or a virtual circuit switched call in a packet switched network, to deliver or retrieve voicemail messages results in an inefficient use of wireless resources. In systems utilizing packet switched networks such as VoIP (Voice over Internet Protocol) networks, for example, establishing a real-time call for a voicemail submission or retrieval results in an inefficient use of resources since a voice quality call is established for the virtual circuit switched connection. Data packets exchanged during the voicemail call are unnecessarily treated as high priority, low latency data packets required for a real-time call.

[0004] Accordingly, there is a need for an apparatus, system, and method for efficiently providing voicemail services in a wireless communication system.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. 1 is a block diagram of a communication system in accordance with an exemplary embodiment of the invention.

[0006] FIG. 2 is a block diagram of the exemplary communication system where a first mobile station is an originating device and a second mobile station is a destination device.

[0007] FIG. 3 is a block diagram of the origination mobile station in accordance with the exemplary embodiment of the invention.

[0008] FIG. 4 is a flow chart of a method of providing voicemail service using a packet data messaging service in accordance with the exemplary embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0009] An apparatus, system, and method efficiently provide voicemail services in a wireless communication system. Voicemail messages are deposited and retrieved using a packet data messaging system such as a multimedia message service (MMS) system. Resources are efficiently managed by minimizing the durations of real-time calls in the wireless communication system. Voicemail messages are exchanged using higher latency packet data transmissions than required for voice quality calls. Voicemail messages deposited by a wireless user are recorded at an origination mobile station and

transmitted through a packet data communication link as a packet data message. Voicemail messages retrieved by a wireless user are received at a destination mobile station through a packet data communication link and stored in memory at the mobile station. Employing a packet data messaging system maximizes the efficiency of the use of wireless communication resources for voicemail services. Since a greater degree of latency can be tolerated with the transmission of a packet data message, for example, the packet data message that includes a voicemail message can be efficiently transferred at a lower QoS (quality of service) level than required by virtual circuit switched calls in packet switched networks. Communication resources are, therefore, efficiently assigned using a QoS policy that may result in increased latency while employing channels having a higher data transfer rate than a virtual circuit switched call.

[0010] FIG. 1 is a block diagram of a communication system 100 in accordance with an exemplary embodiment of the invention. Origination mobile stations 106 communicate with a base station 108 of an origination network 110 through wireless communication channels 112. At least a portion of the origination network 110 includes a wireless communication system which may be any cellular, radio, optical, or other wireless system that facilitates the wireless exchange of signals with at least one mobile unit 106. Examples of suitable wireless communication systems include cellular telephone systems operating in accordance with Code Division Multiple Access (CDMA) or Global System for Mobile Communication (GSM) standards. The wireless communication system of the origination network 110 has one or more base stations 108 that exchange wireless signals with the mobile stations 106 to establish communication with the mobile stations 106. The base stations 108 are connected to a real-time communication network 114 that routes mobile station calls in accordance with known techniques. The real-time communication network 114 includes any combination of routing and/or switching equipment, communication links, and other infrastructure suitable for establishing a real-time communication link between the base station 108 and a destination device 118 in the destination network 102. In the exemplary embodiment, the real-time communication network 114 is a packet switched network comprising one or more Internet Protocol (IP) routers that facilitate the exchange of data packets using Internet Protocol (IP) to establish a virtual circuit switched communication link between the base station 108 and the destination device

118. In accordance with known techniques, a real-time call can be established between a mobile station 106 and the destination device 118 by prioritizing and managing the transmission of data packets. The real-time communication network 114 includes equipment for interfacing and managing communications with the mobile station 106 through the base station 108. For example, the real-time communication network 114 may include a mobile switching center emulator (eMSC) in some situations. The cloud representing the real-time communication network 114 in the FIG.s is shown overlapping the origination network 110 and the destination network 102 to illustrate that components within the origination network 110 and the destination network 102 can be considered as part of the real-time communication network 114. Further, some of the equipment and infrastructure used to establish communication through the real-time communication network 114 may be utilized by the packet data messaging system discussed immediately below.

[0011] A packet data messaging system transmits data packets through the packet switched network to exchange messages containing the voice mail messages. The packet data messaging system may be any type of packet data system that provides a mechanism for routing data packets that contain files or other information representing the contents of voicemail messages. An example of a suitable packet data messaging system includes an electronic mail (email) system that is capable of routing email messages having attached audio files. In the exemplary embodiment, the packet data messaging system is a multimedia messaging service (MMS) system that facilitates the exchange of text, video, audio and graphics files between appropriately equipped mobile stations 106 and other devices serviced by the MMS system. The other devices may be serviced by the same wireless network, a different wireless network, a wired network, or a computer network. A packet data messaging service center stores and manages the packet data messages exchanged with the mobile stations 106. In the exemplary embodiment the packet data message service center is a multimedia messaging service center (MMS-C) 116 that stores and manages multimedia messages exchanged with the mobile stations 106. The MMS-C 116 includes a MMS server and a MMS relay (not shown in FIG. 1). In some circumstances, other equipment, servers, networks, and storage may be connected to the MMS-C 116. For example, temporary message storage devices and permanent message storage devices may be used to store

MMS messages. Those skilled in the art will readily recognize the various topologies, protocols, architectures, and implementations of the communication system 100, origination network 110 and destination network 102 that can be used based on these teachings as applied to known techniques. The functions and operations of the blocks described in FIG. 1 may be implemented in any number of devices, circuits, or infrastructure. Two or more of the functional blocks may be integrated in a single device and the functions described as performed in any single device may be implemented over several devices. For example, the communication link between the base station 108 and the MMS-C 116 includes other distinct origination network 110 elements not shown in FIG. 1 such as a base station controller (BSC) and a packet data access gateway switching node (PDSN).

[0012] In the exemplary embodiment, the communication system 100 utilizes Voice over Internet Protocol (VoIP) techniques over packet switched networks. A Session Initiation Protocol (SIP) facilitates the establishment of virtual circuit switched calls between calling parties and called parties such as between an origination mobile station 106 and the destination device 118.

[0013] Depending on the particular situation, a wireless communication system may comprise a voicemail origination network 110, a voicemail destination network 102, or both. Therefore, a mobile station 106 may be used to generate a voicemail for another party or may be used to receive a voicemail deposited by the other party where the other party's communication device may be a mobile station 106 on the same wireless network or a mobile station 106 on a different wireless network. In the exemplary system shown in FIG. 1, the other party's device (destination device 118) is illustrated as connected to the origination network 110 through the destination network 102. In some situations, however, the destination network 102 and the origination network 110 may be the same network. The communication networks 102, 110 may include any number of wireless, wired, computer, Internet, or Intranet networks.

[0014] A presence server 104 includes hardware and software for receiving and storing presence information corresponding to the destination devices 118. The destination device 118 may have any of several presence states including, for example, "Busy", "Do Not Disturb", "Unavailable", and "Available". The destination devices 118 registered with the presence server 104 occasionally transmit presence status update

messages to the presence server 104. When a change in presence status has occurred for a particular destination device 118, the destination device 118 provides the appropriate presence status update to the presence server 104. A change in presence status may occur automatically (e.g. without user action). For example, when the destination device is turned off by the user, prior to disconnecting the destination device 118 from the network, the destination device 118 updates the presence server status to "Powered Off". Analogously, when the device is turned back on, the presence status is automatically updated to "Available". On the other hand, a change in presence status may occur by deliberate action of the user of the destination device 118. For example, if the user is about to attend other business when he/she cannot be disturbed by real-time call alerts, but may be able to monitor text and other messages that he/she receives, the user may deliberately set the presence status to "Do not disturb", and may supplement it by recording a voice message to be accessible via presence status, which further explains reason for absence, e.g. "I am not available until 11:00 AM while attending a meeting". When a call is attempted with the destination device 118, the calling party first obtains the presence status of the destination device 118. In response, the presence server 104 provides the current presence status to the origination device. In the exemplary embodiment, a voice mail procedure can be invoked by the origination device if the destination device 118 is unavailable. In some circumstances, the presence server 104 may be a destination party proxy such as a network based entity that acts on behalf of the destination party.

[0015] In accordance with the exemplary embodiment of the invention, the mobile stations 106 exchange MMS messages including voicemail messages with the MMS-C 116. After the origination device receives a return status message indicating the destination device 118 can not receive a call, the origination party (calling party) records a voicemail message for a destination party (called party) at the origination mobile station. The voicemail message is stored, at least temporarily, in memory of the origination mobile station and is forwarded through the MMS-C 116 to the destination network 102. The voicemail message deposited for the user of the destination mobile station (118) is transferred to the destination mobile station (118) from the MMS-C 116 as an MMS message. The MMS message is stored in the memory of the destination mobile station (118) and locally played when the user accesses the voicemail. In some

situations, the voicemail message may be streamed to the destination mobile station (118) allowing playback of the voicemail message before the entire message file is transferred. Therefore, a packet data message, such as a MMS message, including the recorded voicemail message is transmitted through a packet data communication link, such as a MMS communication link, to the destination network 102.

[0016] FIG. 2 is a block diagram of the exemplary communication system 100 where a first mobile station 106 is an originating device (originating mobile station 202) and a second mobile station 106 is a destination device (destination mobile station 204). In the exemplary situation discussed with reference to FIG. 2, the originating mobile station 202 communicates through the origination network 110 and the destination mobile station 204 communicates through a destination network 102 where the origination network 110 and the destination network 102 each comprise a MMS-C 116, 208 as well as IP routers that at least partially comprise the real-time communication network 114. In the interest of clarity, base stations 102 and other communication equipment are not shown in FIG. 2. The presence server 104 in the destination network 102 provides presence status services for destination devices 118 such as the destination mobile station 204. Those skilled in the art will readily recognize the various topologies, protocols, architectures, and implementations of the communication network 100 that can be used based on these teachings and known techniques. The functions and operations of the blocks described in FIG. 2 may be implemented in any number of devices, circuits, or infrastructure. Two or more of the functional blocks may be integrated in a single device and the functions described as performed in any single device may be implemented over several devices. For example, the functionality of the presence server 104 may be implemented within eMSC (not shown) or a proxy service server (not shown).

[0017] A voicemail delivery procedure is invoked when the originating mobile station 202 attempts to place a call to the destination mobile station 204 and the call can not be completed. In accordance with known techniques, the origination mobile station 202 initiates a new call through equipment in the origination network of the real-time communication network 114 to communication equipment of the destination network 204. In the exemplary embodiment, the Origination mobile station 202 sends a presence status request message before attempting a VoIP call to a destination mobile

station 204. The presence server 104, or proxy server, responds to the presence status request message with a status return message. In some circumstances, the origination mobile station 202 may attempt to establish a VoIP call before, or simultaneously with, sending the presence status request message. For example an "INVITE" message may be generated and transmitted using SIP from the origination mobile station 202 along with the presence status request message. Based on information forwarded to the presence server 104 regarding the status of the destination mobile station 204, the presence server 104 generates and sends the status return message. In the exemplary embodiment, the presence status request message and the status return message are transmitted in accordance with a standardized presence server protocol such as eXtensible Markup Language (XML) Configuration Access Protocol (XCAP). The status return message includes information indicating the presence status of the destination mobile station 204 and may include a coded value indicating the status, and/or may include a multimedia file including any combination of text, audio, photographs, cartoons, and video describing the status of the destination party. In the exemplary embodiment, the multimedia information is transmitted to the origination mobile station 202 through the packet messaging system. The origination mobile station 202 presents multimedia information to the origination party. For example, the origination mobile station 202 may play an audio greeting message returned with the status return message. If the Presence Status returned from the Presence Server is "Not Available", or any other status precluding direct voice communication between the calling party and the called party, the originating mobile station 202 records a voicemail message by capturing audio signals through a microphone and/or video signals through a camera and storing a digital representation of the signals in memory. Examples of suitable audio formats include WAV, EVRC, and AMR files. An example of a suitable format for storing video or multimedia files includes the MPEG4 format. Those skilled in the art will recognize the various other formats that can be used for storing and transmitting audio, video, and multimedia files. In some circumstances, the Presence Status message may also include a list of multimedia formats that the destination device supports such as Multipurpose Internet Multimedia Extension or MIME formats. Therefore, the origination device message can be constrained to the type and format of media supported by the destination device. If the destination device is only voice and

text capable, for example, the message recorded and sent by the origination device can be confined to only those types of media.

[0018] After the appropriate processing of the voicemail message file, the origination mobile station 202 generates a MMS message addressed to the destination mobile station 204 using the destination mobile address. Examples of suitable destination addresses include an email address or any address routable using Internet Protocol (IP). Since in the exemplary embodiment the call is a VoIP call, addressing information for the destination mobile station 204 is established at the time of session initiation of the virtual circuit switched call (VoIP call). Accordingly, Internet routable addressing information is available at the origination mobile station 202 or through a network-resident proxy device such as a SIP signaling controller and any MMS messages from the originating mobile station 202 to the destination mobile station 204 can be routed using the destination address used for the original VoIP call. In some situations, the destination address may be stored at the origination mobile station 202 and associated with the destination mobile station 204 telephone number. For example, an Internet routable destination address such as an email address may be stored in an address book of the origination mobile station 202.

[0019] The origination mobile station 202 generates a multimedia messaging service (MMS) message containing a file or other data representing the voicemail message. In the exemplary embodiment, the MMS message includes the voicemail message as an attached digital file and includes the destination address of the destination mobile station. The MMS message is forwarded to the MMS-C 116 and routed through the communication system to the MMS-C 208 of the destination network 102 in accordance with known MMS techniques. Generally, the MMS message is routed to a multimedia server in the MMS-C 208 based on the destination address and stored in memory at the MMS-C 208.

[0020] The MMS server in the MMS-C 208 deposits the voicemail message in the destination mobile station 204. In accordance with MMS techniques, for example, the MMS-C 208 stores the content of the MMS message and makes it available as a dynamically generated URL link to local data file. In the exemplary embodiment, a data file such as a WAV audio file representing the voicemail message is associated with the MMS message. Where the audio file cannot be deposited in the destination mobile

station 204, a notification is transmitted to the destination mobile station 204 indicating that a message has arrived and is available for download. Depending on the particular configuration of the destination mobile station 204, the MMS message may be retrieved with or without user intervention. In some circumstances, the message may be streamed to the destination mobile station 204 allowing the voicemail message to be played before the entire file is transferred into the memory of the destination mobile station 204.

[0021] Although various protocols, signaling schemes, and formats can be used to deposit the MMS message in the destination mobile station 204, established MMS techniques are used in the exemplary embodiment. For example, the MMS-C 208 generates and transmits a MMS notification message to the destination mobile station 204 using a Wireless Application Protocol (WAP) "Push" procedure over Short Message Service (SMS). The MMS notification message contains a URL pointer to the dynamically generated MMS message including the audio file representing the voicemail message. After receiving the MMS notification message, the mobile station initiates a data connection that provides TCP/IP network connectivity. The destination mobile station 204 performs an HTTP (or WSP) "get" procedure to retrieve the MMS message from the MMS-C. In the exemplary embodiment, the MMS message is transmitted using any of several protocols utilized in the mobile communication systems. Examples of suitable protocols include M-IMAP, OMA-MM1, and SIP-based MM1. In addition, email protocols such as IMAP and POP can be used in some circumstances.

[0022] In the exemplary embodiment, an alert message is sent to the destination mobile station 204 after the voicemail message is received at the MMSC 120. The alert message notifies the destination mobile station 204 that a voicemail message is available at the MMSC 120. The alert message allows for notification and recovery of the voicemail message where an error has occurred with the MMS message. The alert message is transmitted to the destination mobile station 204 in accordance with known techniques and protocols. An example of a suitable method for alerting the destination mobile station 204 includes transmitting the alert message using Short Message Service (SMS) message.

[0023] FIG. 3 is a block diagram of the origination mobile station 202 in accordance with the exemplary embodiment of the invention. A transceiver 302 including a transmitter 310 and receiver 312 exchanges wireless signals with a base station 108 to exchange information including voice, data, video, graphics, and audio. A processor 304 facilitates the execution of the various functions of the origination mobile station 202 as well as facilitating the overall functionality of mobile station 202. The processor 304 includes a microprocessor, computer, or other processor arrangement suitable for processing computer code to facilitate the execution of the functions described herein. The processor 304 may include other circuitry such as analog to digital (AD) converters and audio processors in some circumstances. The memory 306 is any memory module, integrated circuit (IC), or other device suitable for storing digital data such as the audio files representing the voicemail message and greeting message. An input device 308 connected to the processor 304 captures any combination of audio and video. In the exemplary embodiment, the input device 308 is a microphone and the voicemail message is an audio message. Examples of other suitable input devices 308 include video cameras and digital cameras. Greeting messages and other received communications are played through an output device 314 such as an audio speaker.

[0024] A status return message is received through the receiver 312 indicating that a call can not be completed to the destination mobile station 204 at the current time. Multimedia information contained in the status return message is presented to the origination party through the output device 314 such as visual displays and audio speakers. The processor converts signals received by the input device 308 into a digital file representing the incoming signals to record the voicemail message. The file is at least temporarily stored in the memory 304 prior to inclusion in a MMS message generated by the processor 304. The message is transmitted by the transmitter 310 to the base station 108 to forward the MMS message to the MMS-C 116.

[0025] FIG. 4 is a flow chart of a method of providing voicemail service using a packet data messaging service such as MMS in accordance with the exemplary embodiment of the invention. The method is performed in an origination mobile device 202 in the exemplary embodiment and is described with reference to a MMS system. Those skilled in the art will readily apply the techniques discussed to other types of packet data messaging system based on these teachings.

[0026] At step 402, the origination mobile station 202 requests the presence status of the destination mobile station 204 by sending a presence status request message to the presence server 104. As explained above, the presence server 104 may be a proxy of the destination mobile station 204 in some circumstances. Further, the origination mobile station 202 may request the status directly from the destination mobile station 204 in some situations. In some circumstances, the origination mobile station 202 may request the presence status when attempting to establish a VoIP call with the destination mobile station 204. For example, a presence status request may be sent in addition to an "INVITE" message in accordance with SIP protocols. In such circumstances, the call attempt is aborted when presence status indicates the destination mobile station 204 is unable to receive calls at the present time.

[0027] At step 404, a status return message is received at the origination mobile station. In the exemplary embodiment, the presence server 104 generates a status return message in response to the presence status request message. In some situations, the destination mobile station proxy may provide the status return message. The status return message describes the presence status of the destination mobile station 204 and may include a personal greeting describing the status of the destination party. The status return may include information in a variety of formats. For example, the status return message may include multimedia information such as photographs, cartoons, video, and/or text describing the presence status of the called party. The status return message may also be a value indicating presence status in accordance with a standardized status code protocol in some situations.

[0028] At step 406, presence status information is presented to the origination party. In the exemplary embodiment, a greeting message received as an audio file is played to the origination party. If the status return message includes other multimedia information such as cartoons, photographs, video clips or text, the multimedia information is displayed through the appropriate output devices 414 such as speakers and visual displays.

[0029] At step 408, a voicemail message is recorded. In the exemplary embodiment the voicemail message is an audio message recorded by a processor in the origination mobile station 202 by capturing the originating party's voice through a microphone 308. The voicemail message, however, may be any combination of audio, video, text,

graphics or other multimedia information. Other devices such as cameras, for example, may be used to capture information for the voicemail message. The voicemail message is stored in memory 306 of the destination mobile station 202 as a digital file.

[0030] At step 410, a MMS message is generated by the origination mobile station 202. Using the destination address (IP routable address) of the destination mobile station 204, the origination mobile station 202 generates a MMS message and attaches the voicemail message file. In the exemplary embodiment, the IP address of the destination mobile station 204 used for the attempted VoIP call is used as the destination address. In circuit switched networks, the destination address is stored in a local database in the memory 306 or is received from the voicemail server 104. For example, the destination address may be entered by the originating party and associated with the telephone number of the destination device 204, 302. Where the voicemail server 104 provides the destination address, a message containing the destination address may be sent through the circuit-switched call or it may be forwarded to the destination mobile station 202 using MMS. Where the destination device 302 does not subscribe to the MMS, the destination address is a destination address associated with the voicemail box of the destination device 302. In some circumstances, the voicemail message file may be formatted in accordance with CODEC of the destination mobile station 204.

[0031] At step 412, the MMS message including the voicemail message file is sent to the destination device 204, 302. The MMS message is transmitted to the MMS-C 116 in accordance with known techniques.

[0032] Therefore, the exemplary embodiment efficiently provides voicemail service using MMS. Voicemail messages are deposited and retrieved using MMS minimizing the durations of real-time calls in the communication system 100. Voicemail messages deposited by a wireless user are recorded at an origination mobile station 202 and transmitted through a MMS communication link as a MMS message. Voicemail messages retrieved by a wireless user are received at a destination mobile station 204 through a MMS communication link and stored in memory at the destination mobile station 204. Employing a MMS system maximizes the efficiency of the use of wireless communication resources for voicemail services. Since a greater degree of latency can be tolerated with the transmission of a MMS message, a voicemail message can be efficiently transferred at a lower QoS (quality of service) level than required by circuit

switched calls in circuit switched networks or virtual circuit switched calls in packet switched networks. In systems utilizing VoIP, efficiencies can be observed by utilizing a spectrally efficient 3G high speed radio link. Delivery can be scheduled to relieve burden of the communication networks 102, 110 during busy traffic periods. Further, delivery of the voicemail message using MMS minimizes inaccuracies and errors during delivery and maximizes voice quality since the possibility of frame errors or transcoding is minimized or eliminated. In conventional systems, for example, a voicemail message may be delivered by converting from wireless to PCM, from PCM to voice mail specific, from voicemail specific to PCM, and from PCM to wireless formats during submission. Also, features during message creation can be implemented without consuming airtime. In addition, voicemail messages may include multimedia components such as photographs, graphics, and video clips.

[0033] Clearly, other embodiments and modifications of this invention will occur readily to those of ordinary skill in the art in view of these teachings. The above description is illustrative and not restrictive. This invention is to be limited only by the following claims, which include all such embodiments and modifications when viewed in conjunction with the above specification and accompanying drawings. The scope of the invention should, therefore, be determined not with reference to the above description, but instead should be determined with reference to the appended claims along with their full scope of equivalents.

WHAT IS CLAIMED IS:

CLAIMS

1. A method performed in an origination mobile station, the method comprising:

receiving a status return message indicating that a presence status of a destination device is "unavailable" and the destination device is unable to receive a call;

recording a voicemail message at the origination mobile station;

and

transmitting a packet data message including the voicemail message from the origination mobile station to a packet data messaging service center.

2. A method in accordance with claim 1, wherein receiving comprises receiving the status return message from a presence server.

3. A method in accordance with claim 2, further comprising transmitting a presence status request message to the presence server, the status return message transmitted from the presence server in response to the presence status request message.

4. A method in accordance with claim 3, wherein the status request message is transmitted through a real-time communication link, the method further comprising tearing down the real-time communication link prior to recording the voicemail message.

5. A method in accordance with claim 3, further comprising:
presenting, to an originating party, a greeting message transmitted by the presence server.

6. A method in accordance with claim 1, wherein the packet data message is a multimedia messaging service (MMS) message and the packet data messaging service center is a multimedia messaging service center (MMS-C).

7. A method in accordance with claim 1, wherein voicemail message comprises an audio message and the recording comprises storing audio signals in a memory of the originating mobile station.

8. A method in accordance with claim 1, wherein the voicemail message comprises a video message and the recording comprises storing video signals in a memory of the originating mobile station.

9. A method in accordance with claim 1, further comprising:
generating the packet data message to include the voicemail message as an attached file.

10. A method in accordance with claim 9, wherein the destination device is a destination mobile station.

11. A method in accordance with claim 10, further comprising:
generating the packet data message to include a destination address of the destination mobile station.

12. A method in accordance with claim 11, wherein destination address is an electronic mail (email) address of the destination mobile station.

13. A method in accordance with claim 12, wherein the email address is an Internet Protocol (IP) format.

14. A mobile station comprising:
a receiver configured to receive a status return message indicating that a presence status of a destination device is "unavailable" and the destination device in unable to receive a call;
a processor configured to convert an input signal received through an input device into a digital file to record a voicemail message and generate a packet data message comprising the voicemail message; and

a transmitter configured to transmit the packet data message including the voicemail message from the origination mobile station to a packet data messaging service center.

15. A mobile station in accordance with claim 14, wherein the receiver is configured to receive the status return message from a presence server.

16. A mobile station in accordance with claim 15, wherein the transmitter is further configured to transmit a presence status request message to the presence server, the status return message transmitted from the presence server in response to the presence status request message.

17. A mobile station in accordance with claim 16, wherein the status request message is transmitted through a real-time communication link, the processor further configured to tear down the real-time communication link prior to recording the voicemail message.

18. A mobile station in accordance with claim 14, wherein the packet data message is a multimedia messaging service (MMS) message and the packet data messaging service center is a multimedia messaging service center (MMS-C).

19. A mobile station in accordance with claim 14, further comprising an output device configured to present a greeting message transmitted by the presence server.

20. A mobile station in accordance with claim 14, wherein the voicemail message comprises audio signals, the mobile station further comprising a memory for storing the audio signals.

21. A mobile station in accordance with claim 14, wherein the voicemail message comprises video signals, mobile station further comprising a memory for storing the video signals.

22. A mobile station in accordance with claim 14, wherein the packet data message comprises an address of the destination device.

23. A mobile station in accordance with claim 22, wherein the destination address is an electronic mail (email) address of the destination mobile station.

24. A mobile station in accordance with claim 23, wherein the email address in an Internet Protocol (IP) format.

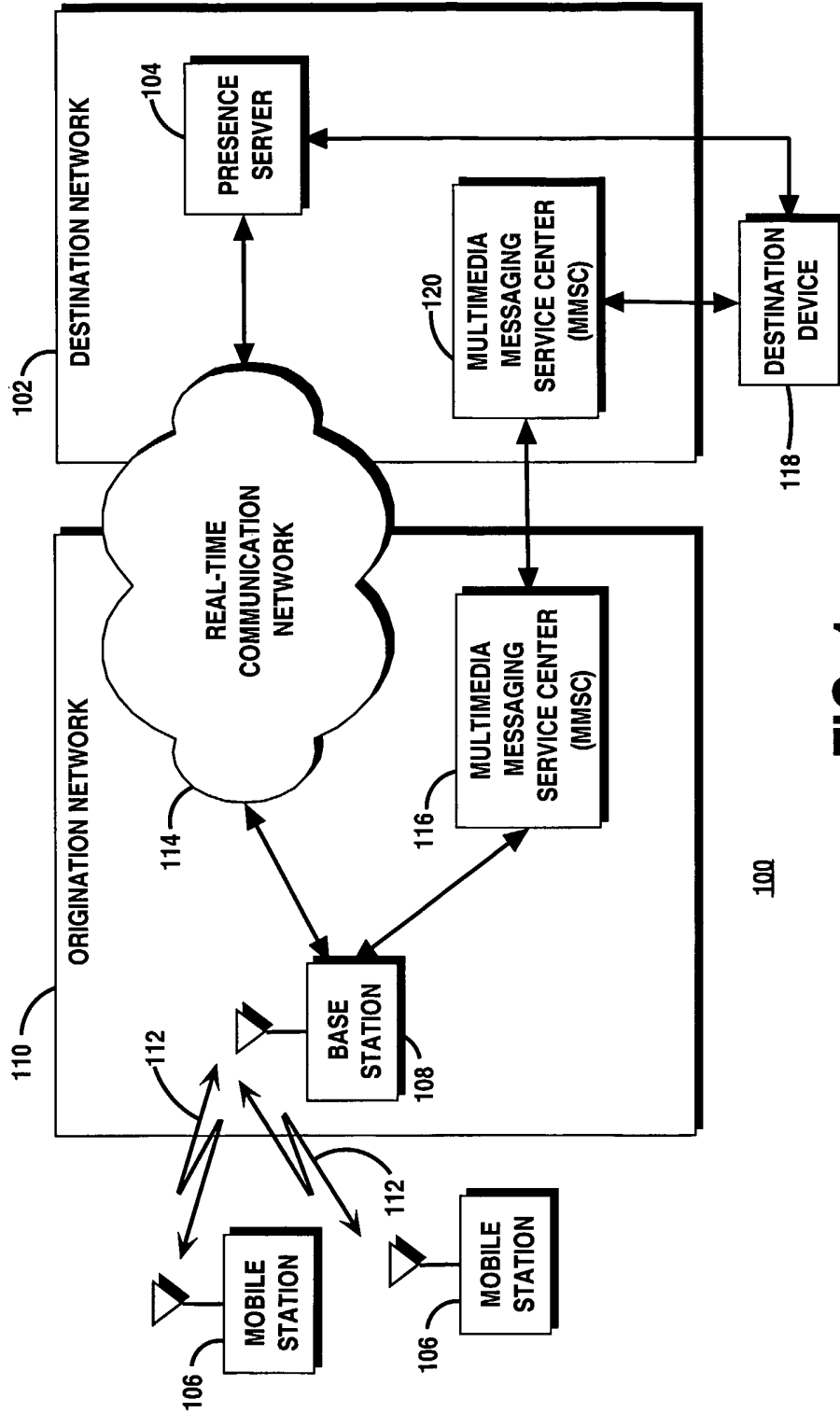


FIG. 1

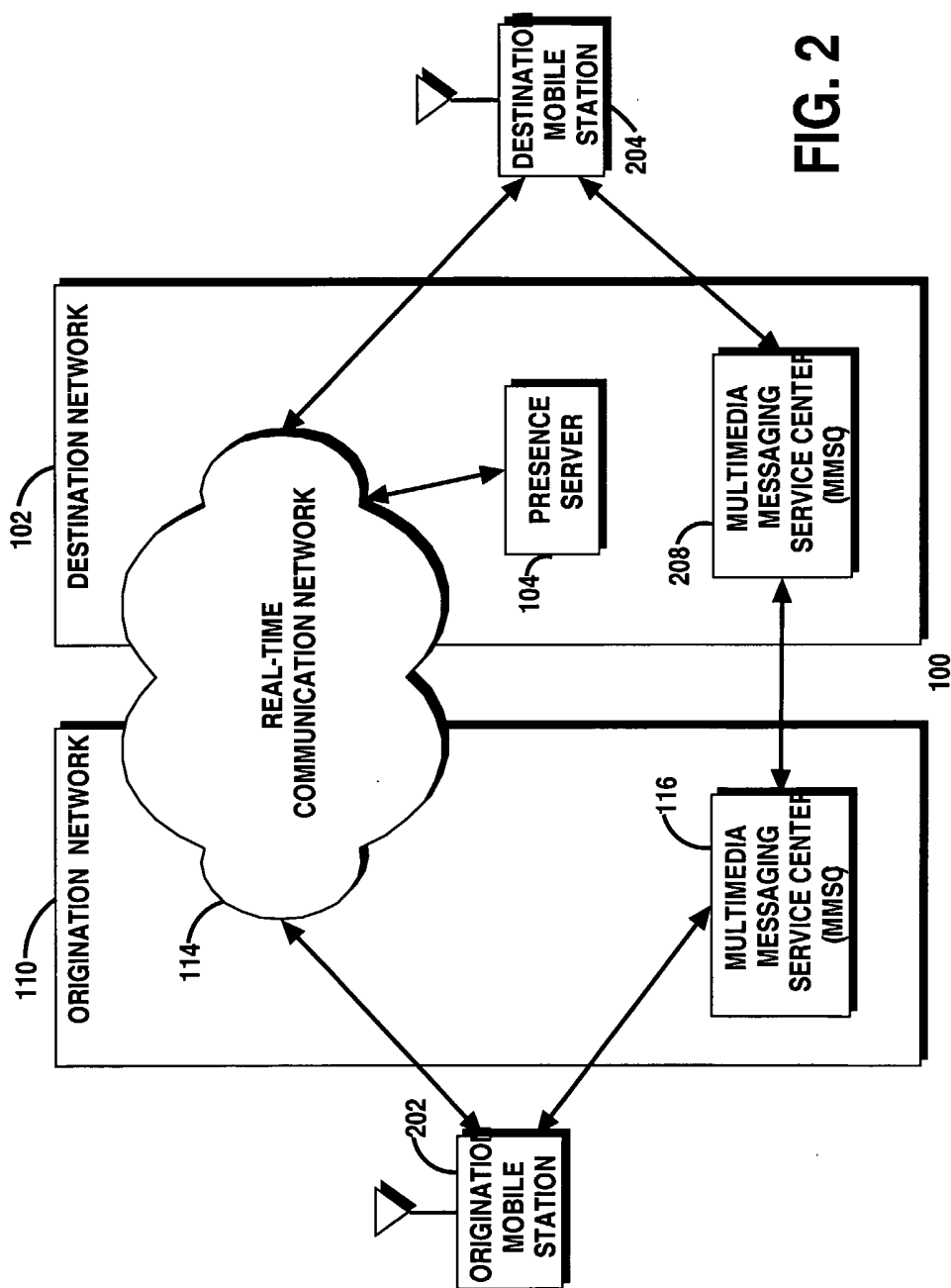


FIG. 2

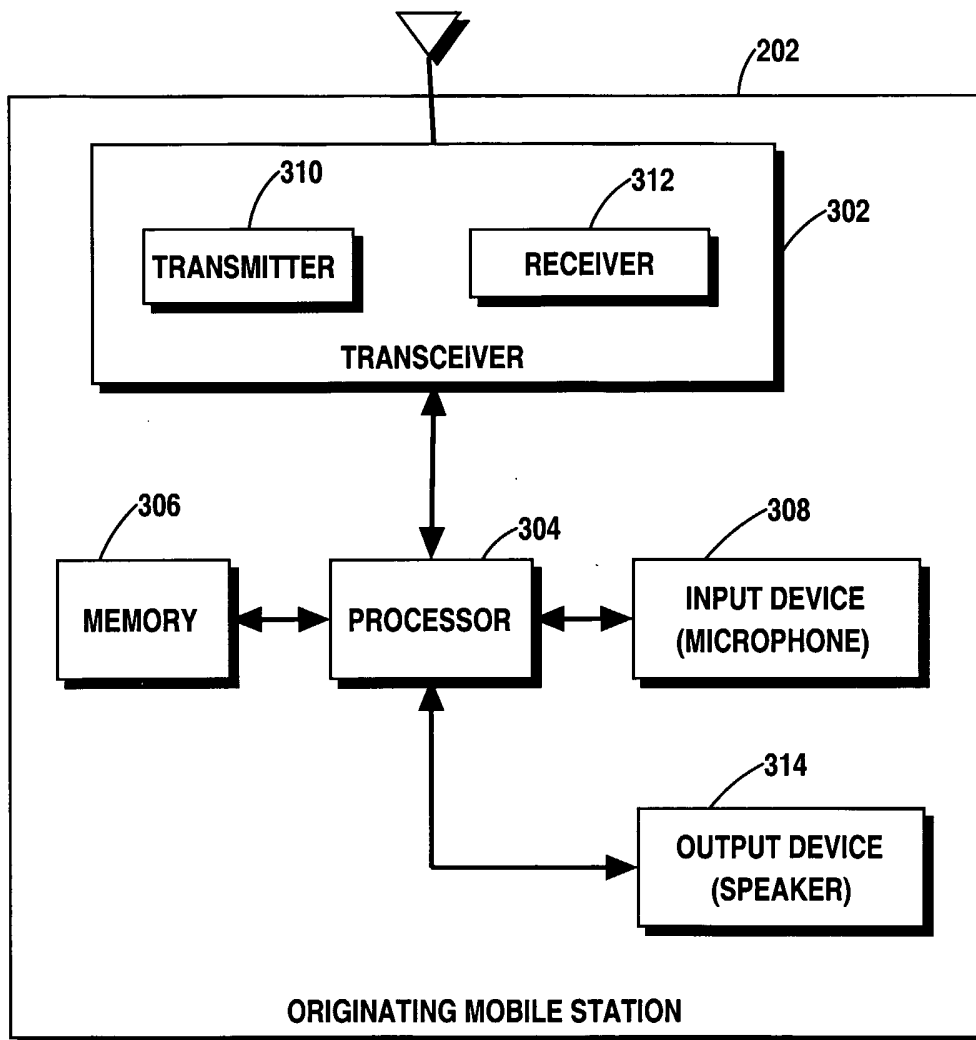


FIG. 3

4/4

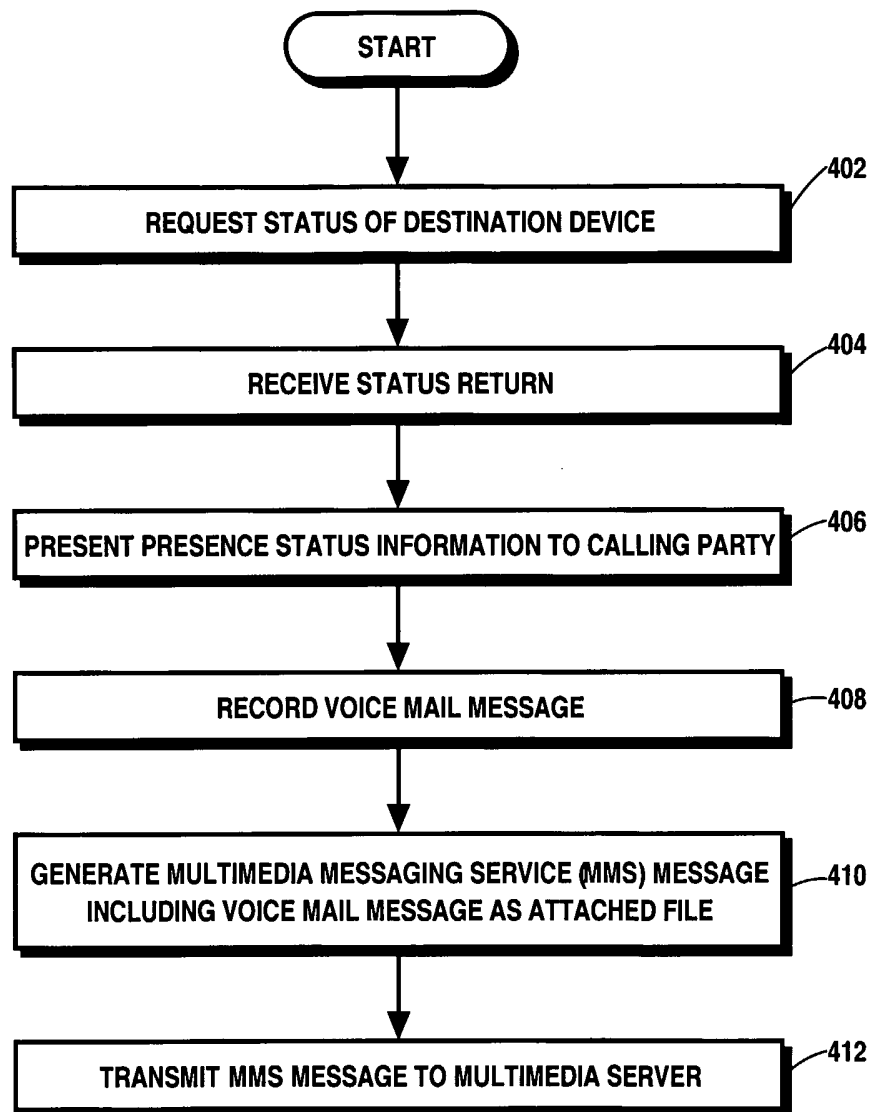


FIG. 4

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2005/018508

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 H04M1/725 H04M3/53 H04Q7/38		
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) IPC 7 H04M H04Q		
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, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 2003/169865 A1 (OREN DAVID) 11 September 2003 (2003-09-11) paragraph '0002! - paragraph '0009! paragraph '0020! - paragraph '0028! figure 3	1,6-14, 18,20-24 2-5, 15-17,19
Y A	EP 1 071 295 A (PHONE.COM INC) 24 January 2001 (2001-01-24) paragraph '0006! - paragraph '0009! paragraph '0022! paragraph '0051! - paragraph '0056! figures 1,3b	2-5, 15-17,19 1,14
	----- -/--	
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.		
<input checked="" type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents :		
A document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed		
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 *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *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. *&* document member of the same patent family		
Date of the actual completion of the international search 15 September 2005		Date of mailing of the international search report 22/09/2005
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl. Fax: (+31-70) 340-3016		Authorized officer Schorgg, A

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2005/018508

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 5 881 104 A (AKAHANE ET AL) 9 March 1999 (1999-03-09) column 1, line 65 - column 2, line 15 column 2, line 58 - column 4, line 59 figure 1</p> <p style="text-align: center;">-----</p>	1,14
A	<p>EP 1 139 677 A (HEWLETT-PACKARD COMPANY) 4 October 2001 (2001-10-04) abstract paragraph '0017!</p> <p style="text-align: center;">-----</p>	1,14

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2005/018508

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2003169865 A1	11-09-2003	AU 2003230608 A1 DE 10392361 T5 GB 2401746 A WO 03079657 A1	29-09-2003 14-04-2005 17-11-2004 25-09-2003
EP 1071295 A	24-01-2001	CN 1282184 A JP 2001078272 A	31-01-2001 23-03-2001
US 5881104 A	09-03-1999	JP 10065597 A	06-03-1998
EP 1139677 A	04-10-2001	DE 60108545 D1 US 2001027097 A1	03-03-2005 04-10-2001