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Roberts et al.

(54) **METHODS, SYSTEMS, AND PRODUCTS FOR INTERNET CALL WAITING MESSAGING**

(76) Inventors: **Linda Ann Roberts**, Decatur, GA (US); **Edward Michael Silver**, Atlanta, GA (US); **Hong Thi Nguyen**, Atlanta, GA (US)

Correspondence Address:
SCOTT P. ZIMMERMAN, PLLC
PO BOX 3822
CARY, NC 27519 (US)

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(57) **ABSTRACT**

Systems, methods, and apparatuses are disclosed for providing Internet Call Waiting (ICW) Messaging Services. In an embodiment, a calling party places an incoming call to a called telephone number having an active ICW session and data connection. A telecommunications system allows a calling party to communicate an ICW message to a computer system engaged in the ICW session and data connection. The telecommunications system may also allow a called party (e.g., the user of the computer system) to communicate a response to the ICW message and, thus, allow interactive ICW messaging.

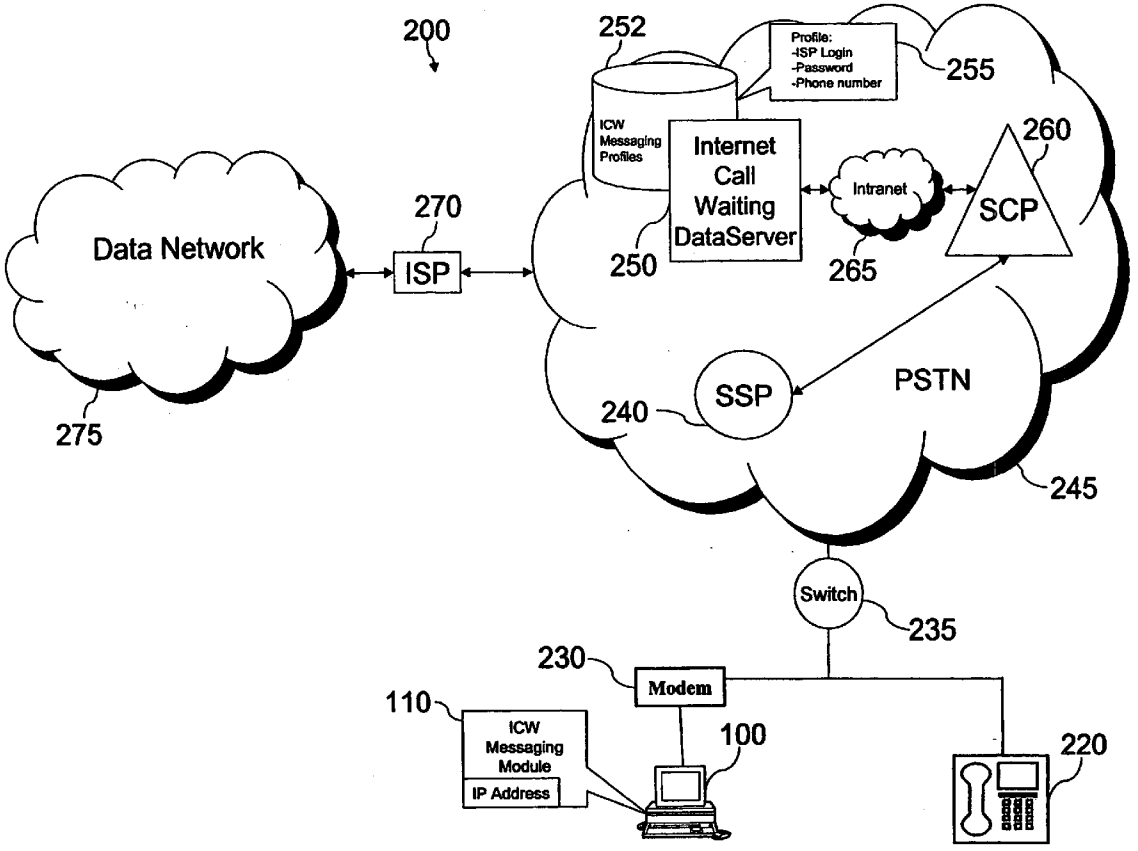
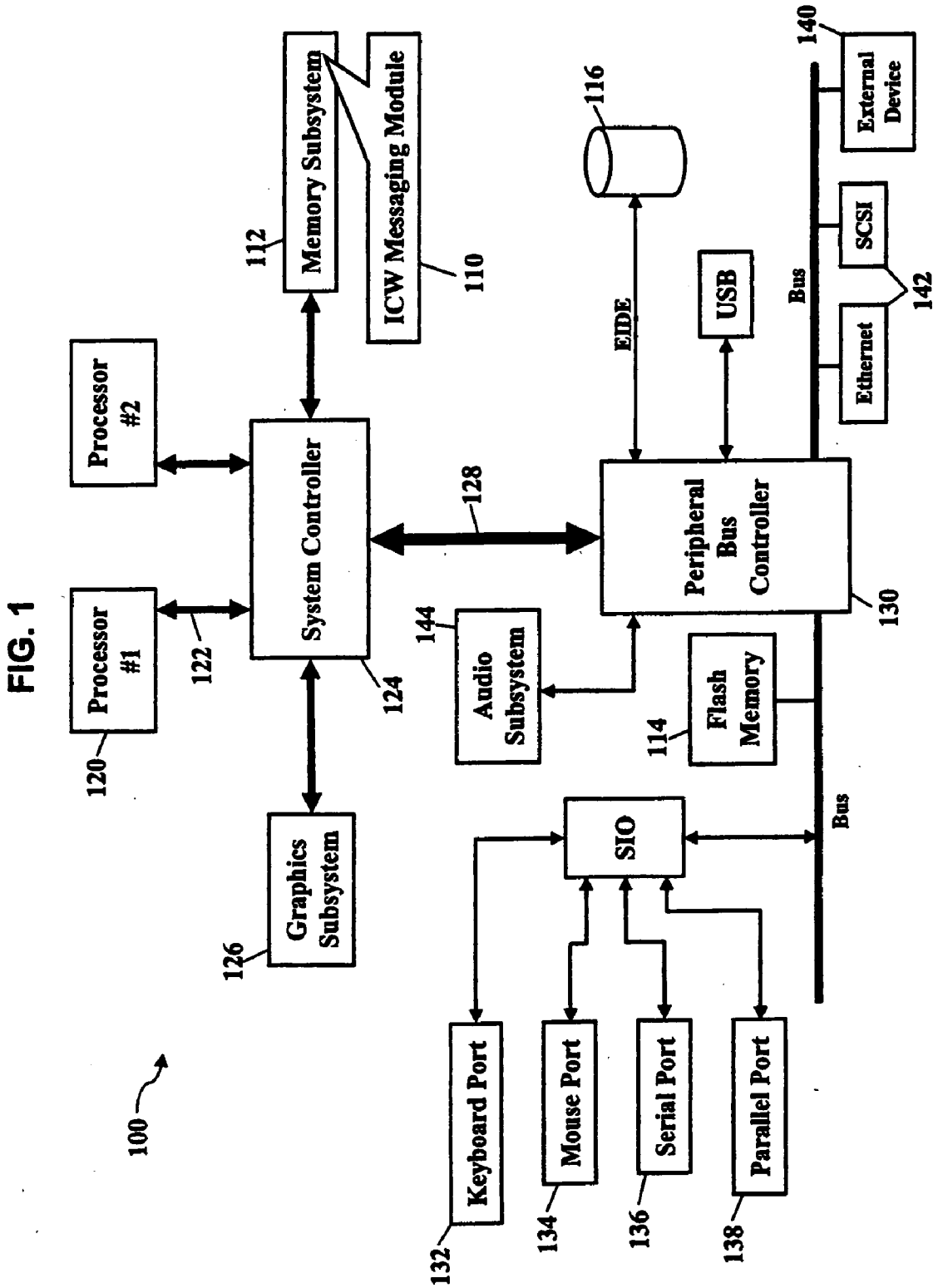


FIG. 1


100
Processor #2
Processor #1
120
122
System Controller
124
128
Memory Subsystem
112
ICW Messaging Module
110
116
EIDE
USB
Peripheral Bus Controller
130
140
External Device
SCSI
142
Ethernet
Bus
144
Audio Subsystem
114
Flash Memory
Graphics Subsystem
126
SIO
Bus
Keyboard Port
132
Mouse Port
134
Serial Port
136
Parallel Port
138

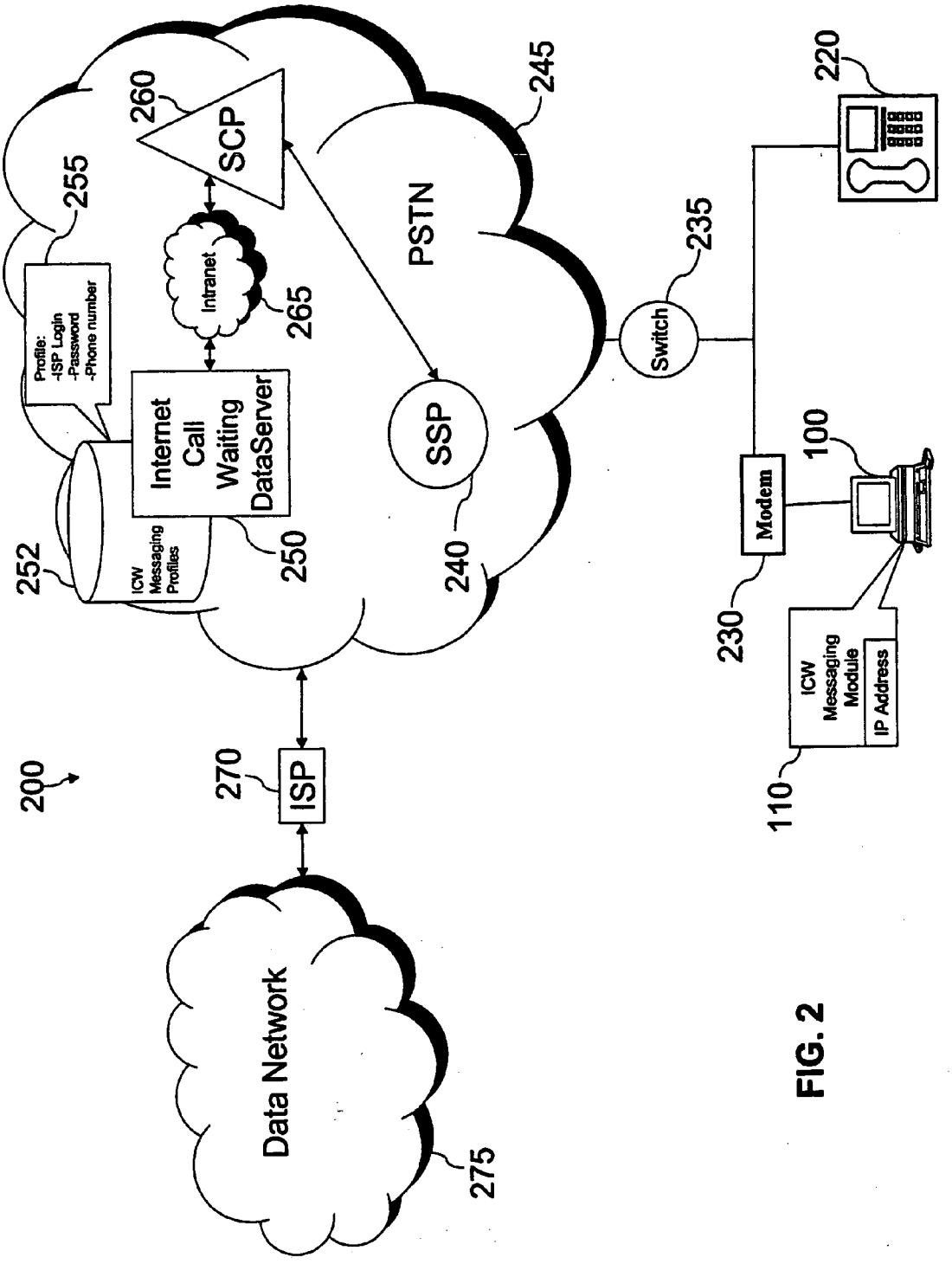

200
270
ISP
Data Network
275
252
ICW Messaging Profiles
Internet Call Waiting DataServer
250
Profile:
-ISP Login
-Password
-Phone number
255
Intranet
265
260
SCP
PSTN
245
SSP
240
Switch
235
220
Modem
230
100
ICW Messaging Module
IP Address
110

FIG. 2

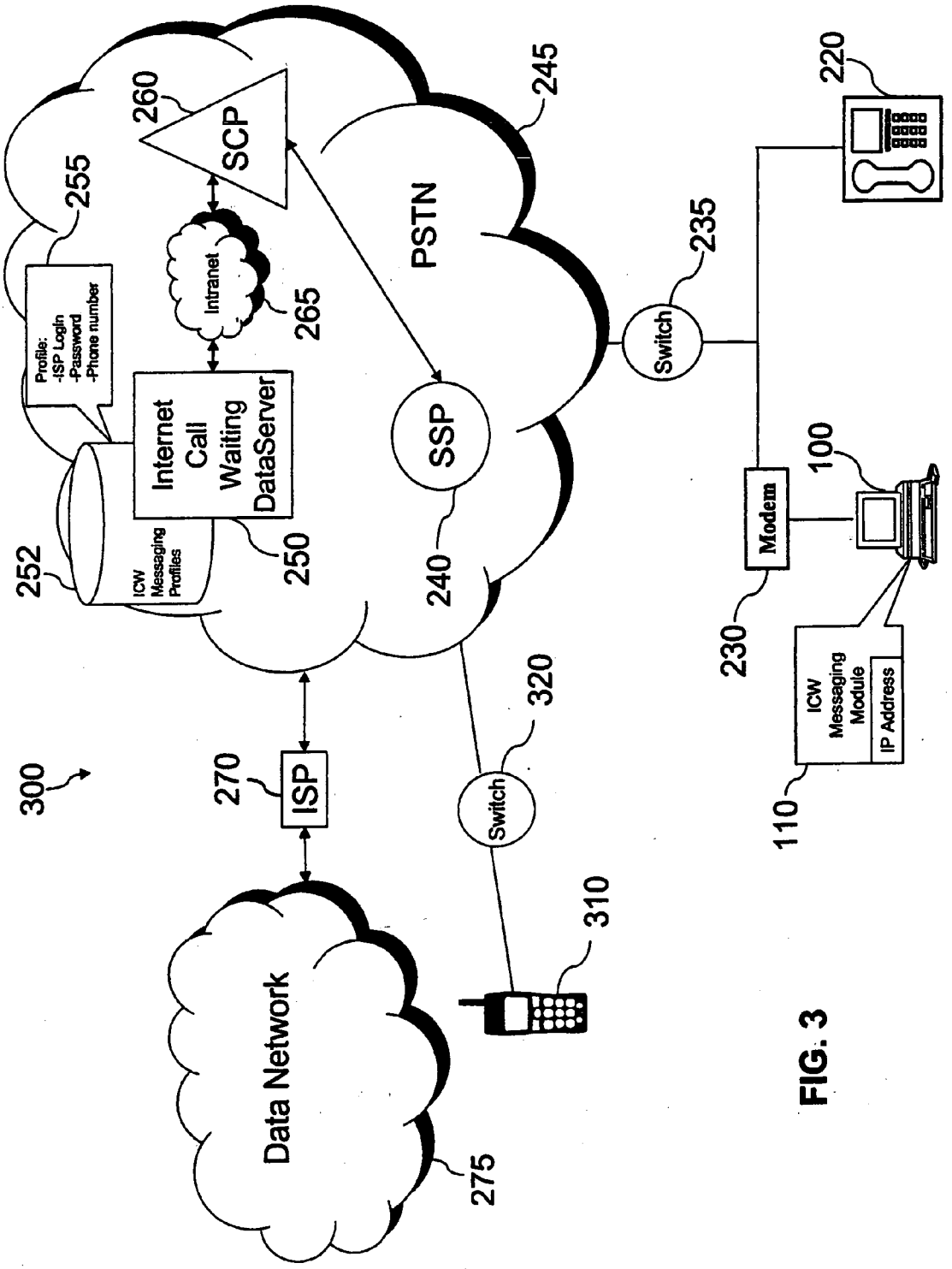

300
270
ISP
Data Network
275
Switch
320
310
PSTN
245
SSP
240
SCP
260
Intranet
265
255
Profile:
-ISP Login
-Password
-Phone number
Internet
Call
Waiting
DataServer
250
252
ICW
Messaging
Profiles
Switch
235
220
Modem
230
100
ICW
Messaging
Module
IP Address
110

FIG. 3

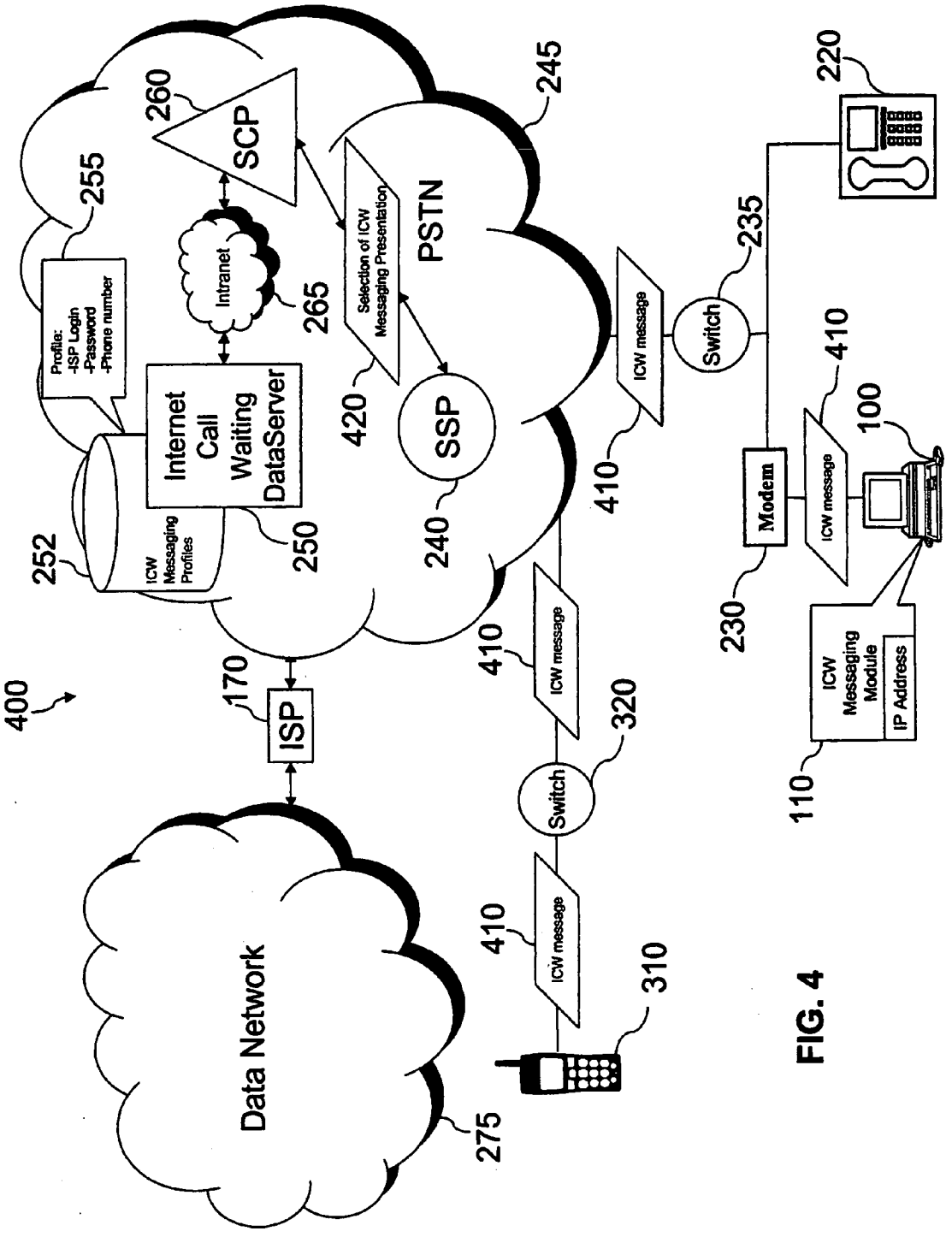

400
Data Network
275
ISP
170
ICW Messaging Profiles
252
Profile:
-ISP Login
-Password
-Phone number
255
Internet Call Waiting DataServer
250
Intranet
265
SCP
260
PSTN
245
Selection of ICW Messaging Presentation
420
SSP
240
ICW message
410
Switch
320
ICW message
410
310
ICW message
410
Switch
235
220
Modem
230
ICW message
410
100
ICW Messaging Module
IP Address
110

FIG. 4

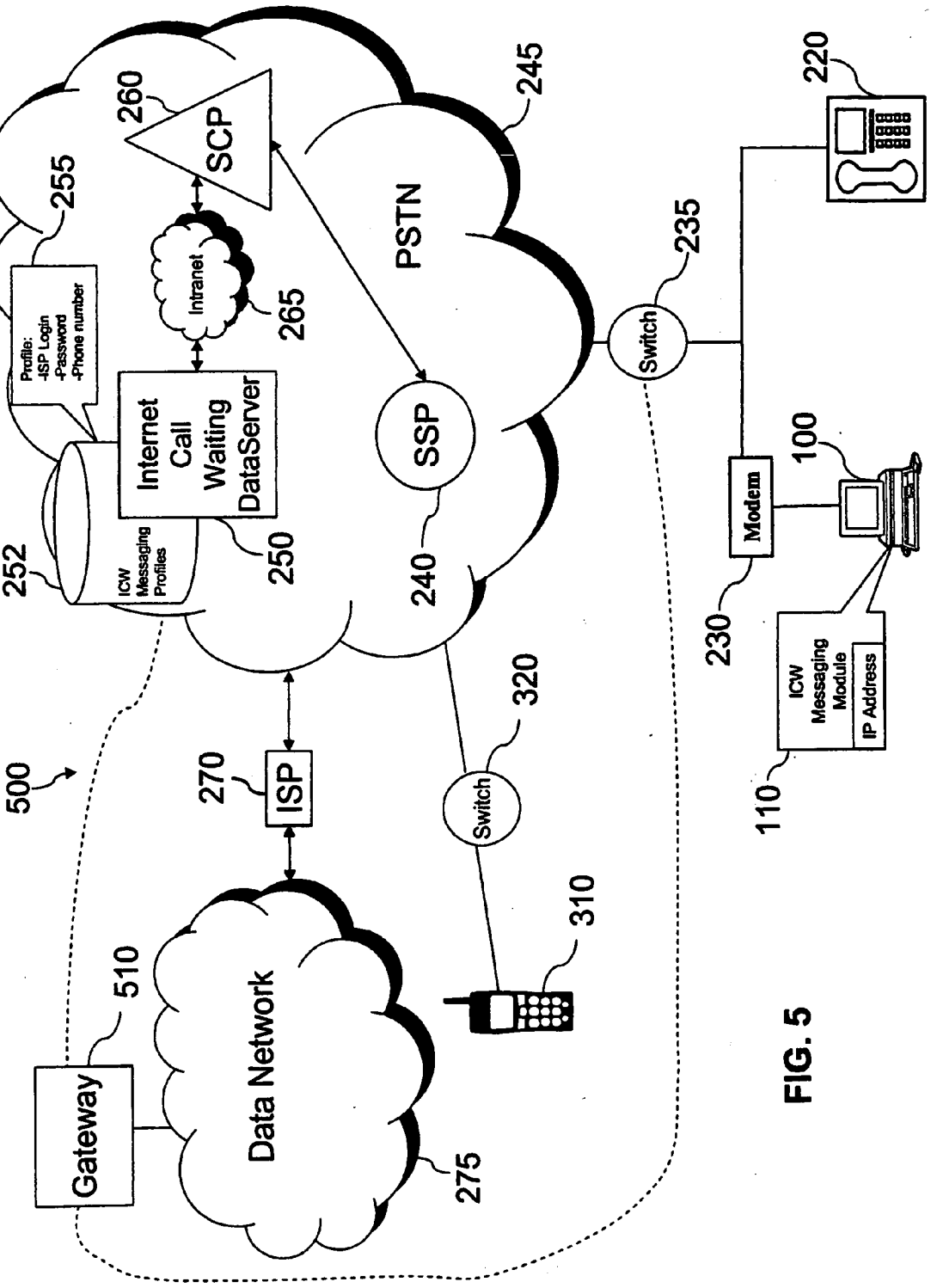

500
PSTN
245
SCP
260
255
Intranet
265
Profile:
-ISP Login
-Password
-Phone number
Internet
Call
Waiting
DataServer
250
ICW
Messaging
Profiles
252
SSP
240
Switch
235
220
Modem
230
100
ICW
Messaging
Module
IP Address
110
ISP
270
Switch
320
Gateway
510
Data Network
275
310

FIG. 5

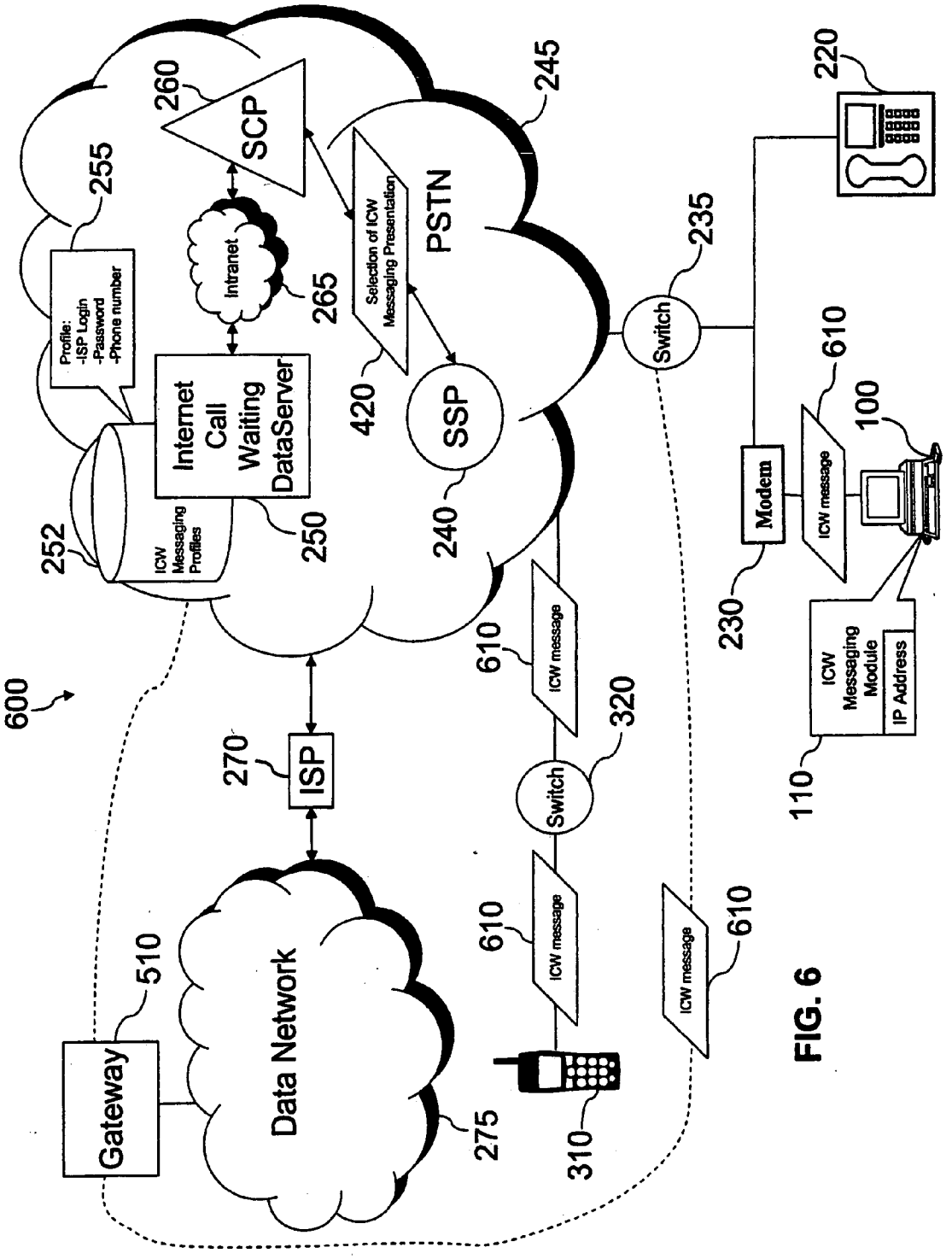

600
PSTN
245
SCP
260
Intranet
265
255
Profile:
-ISP Login
-Password
-Phone number
Internet Call Waiting DataServer
250
ICW Messaging Profiles
252
Selection of ICW Messaging Presentation
420
SSP
240
Switch
235
220
Modem
230
ICW message
610
100
ICW Messaging Module
IP Address
110
ISP
270
Switch
320
ICW message
610
Gateway
510
Data Network
275
310
ICW message
610

FIG. 6

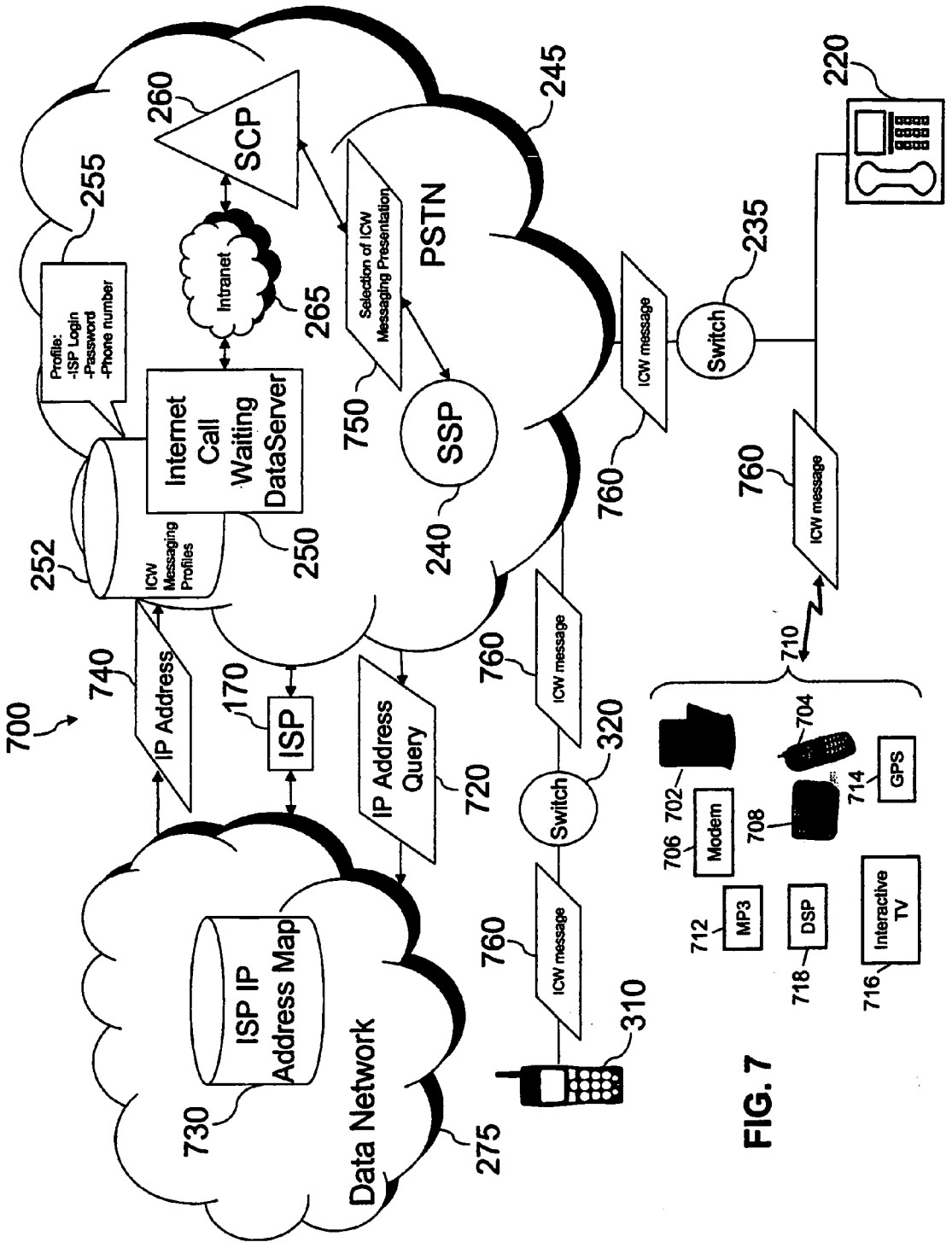
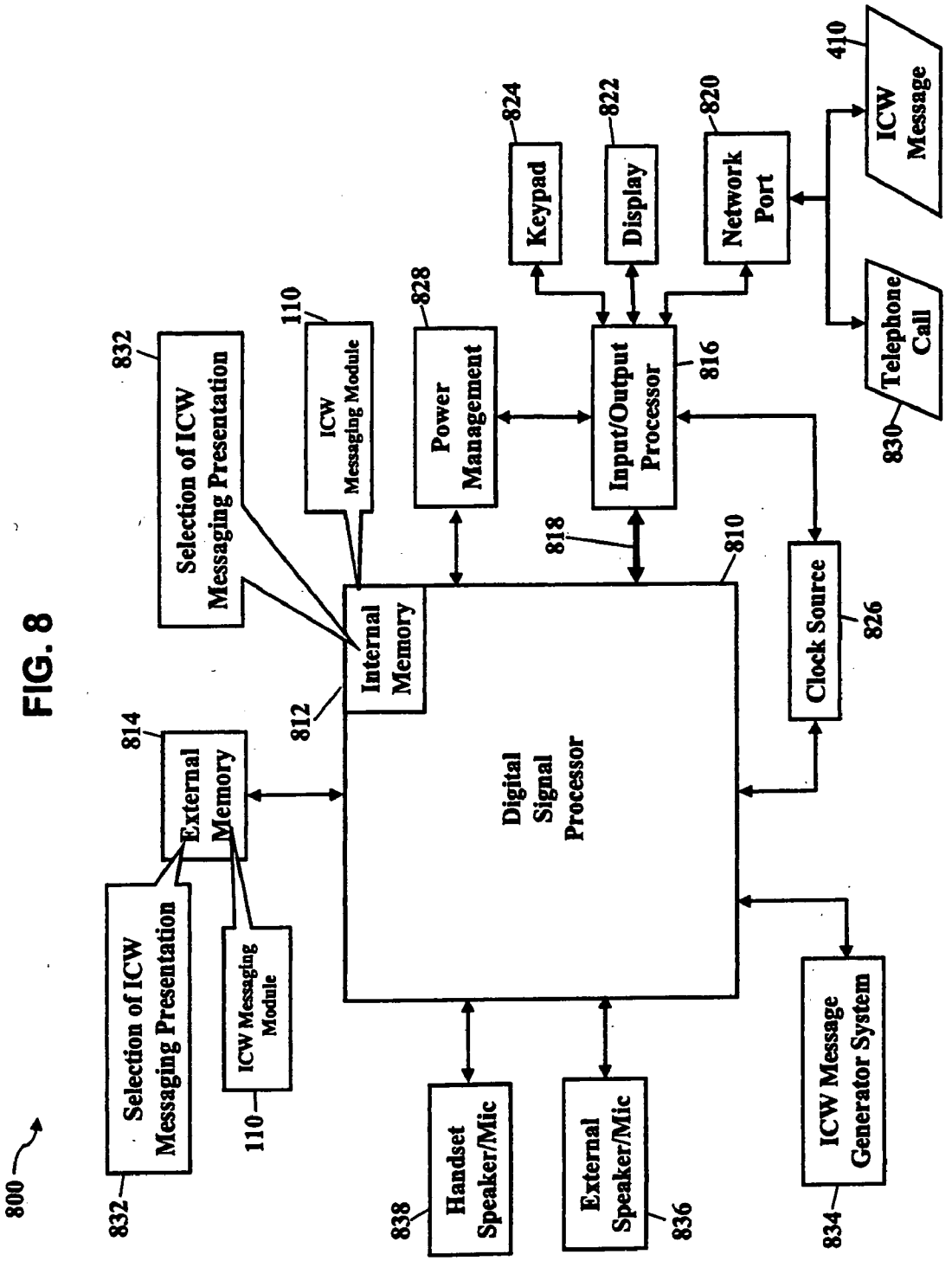

700
740
IP Address
170
ISP
252
ICW Messaging Profiles
Profile:
-ISP Login
-Password
-Phone number
255
Internet Call Waiting DataServer
250
260
SCP
Intranet
265
Selection of ICW Messaging Presentation
750
PSTN
245
SSP
240
IP Address Query
720
760
ICW message
320
Switch
760
ICW message
310
ISP IP Address Map
730
Data Network
275
760
ICW message
Switch
235
220
760
ICW message
710
704
714
GPS
702
706
Modem
708
712
MP3
DSP
718
Interactive TV
716

FIG. 7

FIG. 8


800
832
Selection of ICW Messaging Presentation
110
ICW Messaging Module
814
External Memory
812
Internal Memory
832
Selection of ICW Messaging Presentation
110
ICW Messaging Module
828
Power Management
818
810
Digital Signal Processor
816
Input/Output Processor
824
Keypad
822
Display
820
Network Port
410
ICW Message
830
Telephone Call
826
Clock Source
838
Handset Speaker/Mic
836
External Speaker/Mic
834
ICW Message Generator System

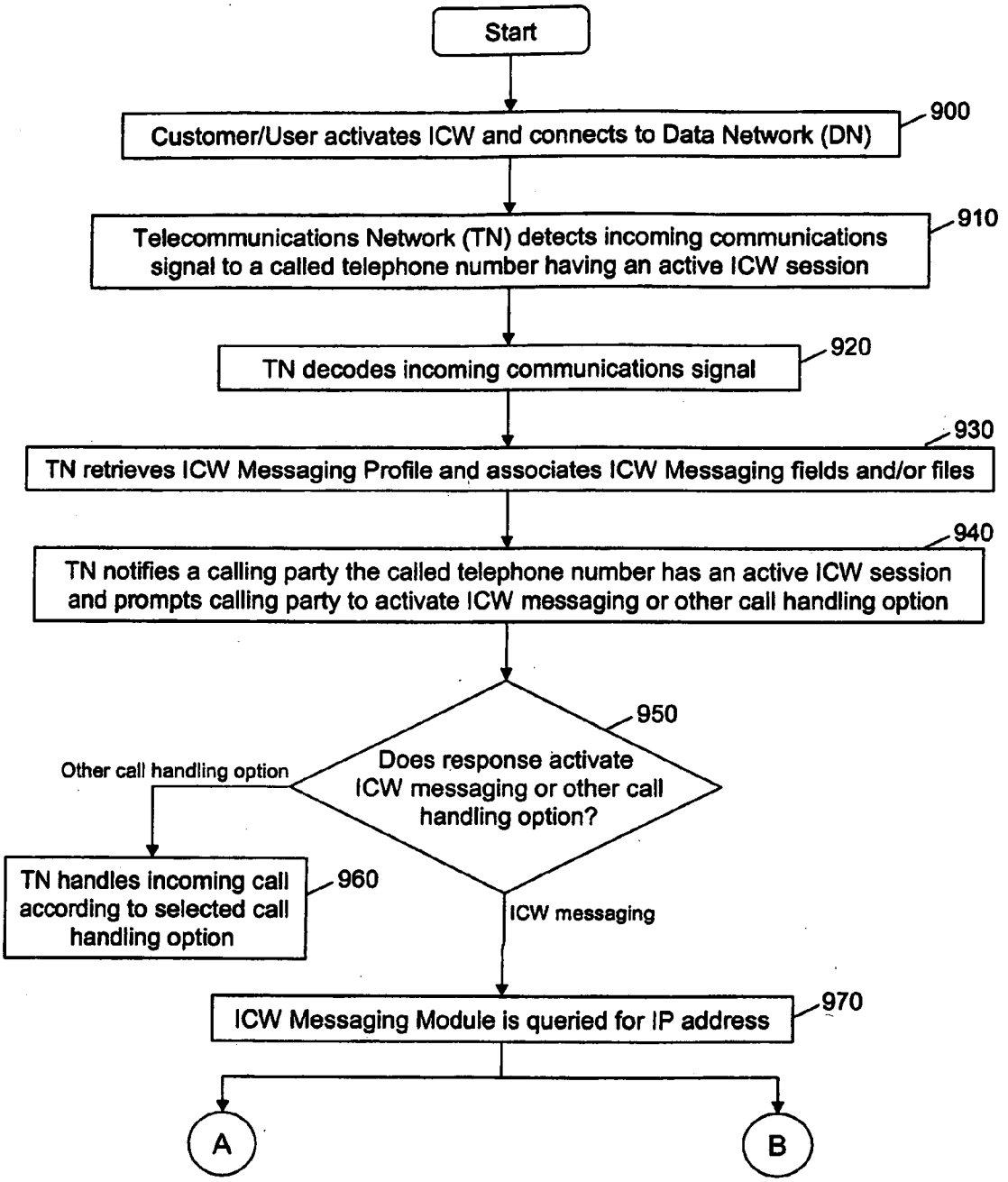

Start
Customer/User activates ICW and connects to Data Network (DN)
900
Telecommunications Network (TN) detects incoming communications signal to a called telephone number having an active ICW session
910
TN decodes incoming communications signal
920
TN retrieves ICW Messaging Profile and associates ICW Messaging fields and/or files
930
TN notifies a calling party the called telephone number has an active ICW session and prompts calling party to activate ICW messaging or other call handling option
940
Does response activate ICW messaging or other call handling option?
950
Other call handling option
TN handles incoming call according to selected call handling option
960
ICW messaging
ICW Messaging Module is queried for IP address
970
A
B

FIG 9

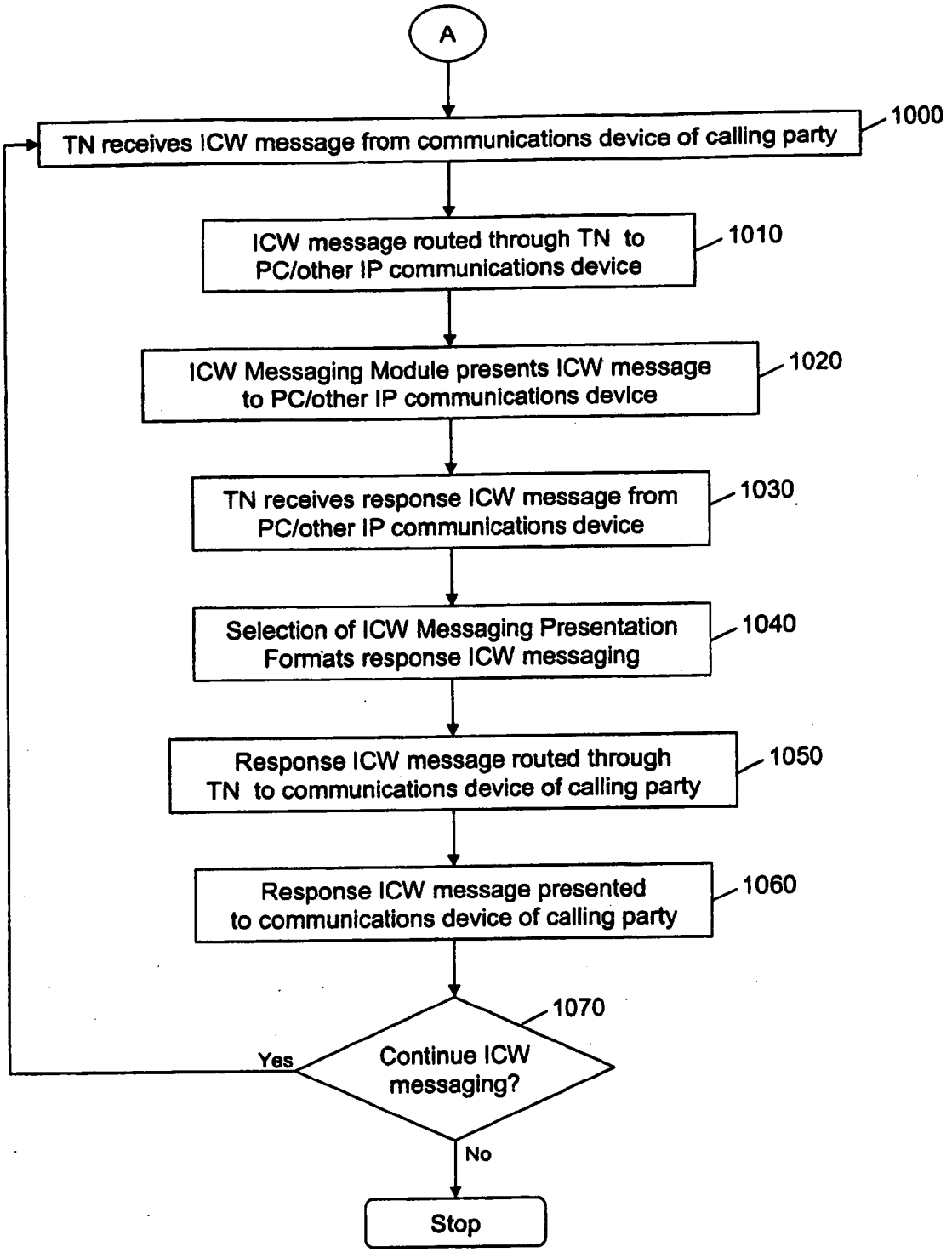

A
TN receives ICW message from communications device of calling party
1000
ICW message routed through TN to PC/other IP communications device
1010
ICW Messaging Module presents ICW message to PC/other IP communications device
1020
TN receives response ICW message from PC/other IP communications device
1030
Selection of ICW Messaging Presentation Formats response ICW messaging
1040
Response ICW message routed through TN to communications device of calling party
1050
Response ICW message presented to communications device of calling party
1060
Continue ICW messaging?
1070
Yes
No
Stop

FIG 10

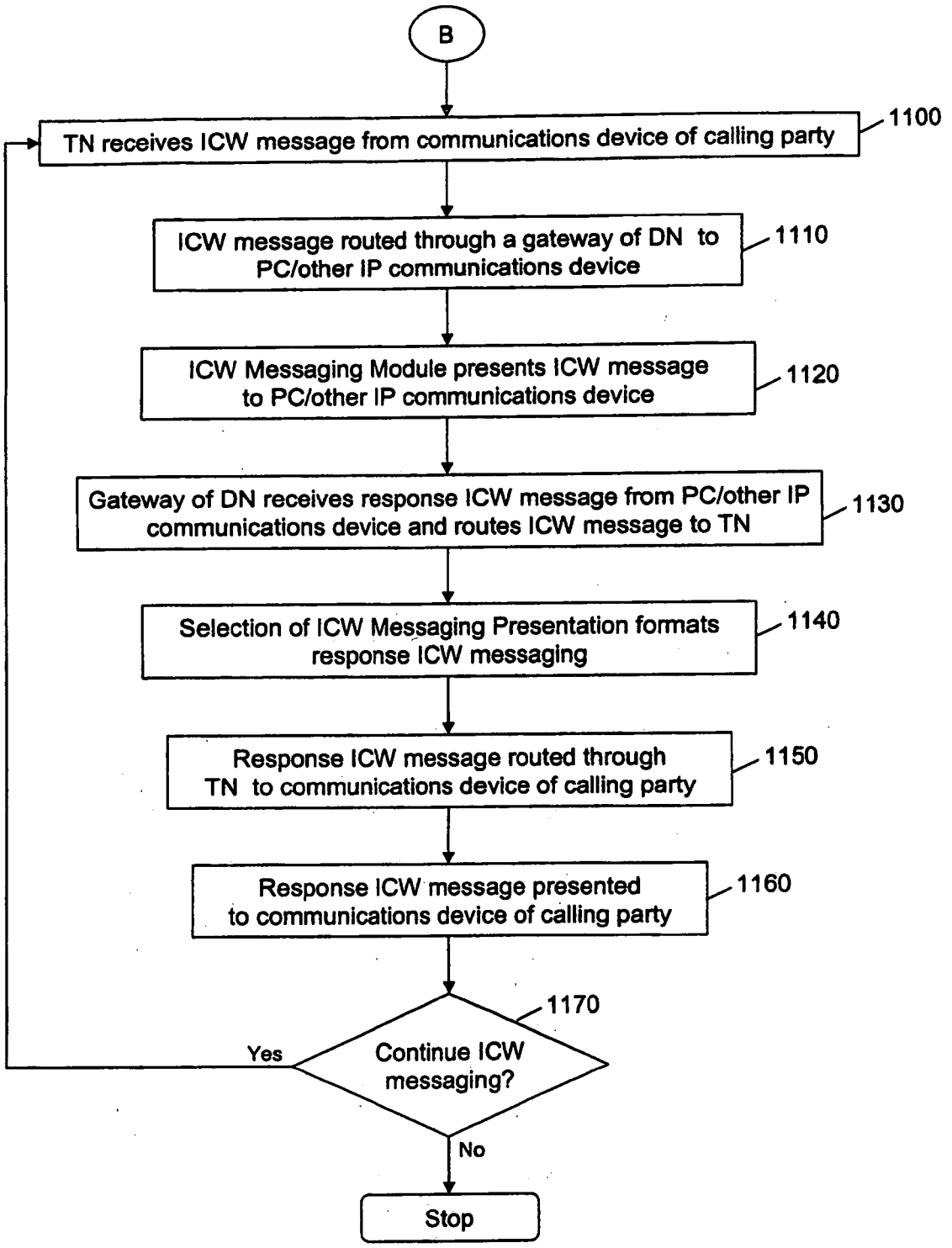

B
TN receives ICW message from communications device of calling party
1100
ICW message routed through a gateway of DN to PC/other IP communications device
1110
ICW Messaging Module presents ICW message to PC/other IP communications device
1120
Gateway of DN receives response ICW message from PC/other IP communications device and routes ICW message to TN
1130
Selection of ICW Messaging Presentation formats response ICW messaging
1140
Response ICW message routed through TN to communications device of calling party
1150
Response ICW message presented to communications device of calling party
1160
1170
Continue ICW messaging?
Yes
No
Stop

FIG 11

METHODS, SYSTEMS, AND PRODUCTS FOR INTERNET CALL WAITING MESSAGING

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. application Ser. No. 10/177,181, filed Jun. 21, 2002 and entitled "Internet Call Waiting Messaging" (Attorney Docket 02099), now issued as U.S. Pat. No. _____, and incorporated herein by reference in its entirety. This application also relates to applicants' co-pending U.S. application Ser. No. 11/158,539, filed Jun. 22, 2005 (Attorney Docket 02112 CON), which is a continuation of U.S. patent application Ser. No. 10/176,572, filed Jun. 21, 2002 and entitled "Caller Control of Internet Call Waiting" (Attorney Docket 02112), now issued as U.S. Pat. No. 6,931,117, with both applications incorporated herein by reference in their entirety.

NOTICE OF COPYRIGHT PROTECTION

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BACKGROUND OF THE INVENTION

[0003] 1. Field of the Invention

[0004] This invention relates generally to the field of communications. More particularly, this invention relates to special services implemented over a telecommunications network that communicate incoming and/or outgoing messages via an Internet Protocol (IP) addressable communications device during a data connection.

[0005] 2. Description of the Related Art

[0006] Telecommunications has experienced explosive growth, and more growth is planned as telecommunication access and numerous communication devices improve. This explosive growth is revolutionizing special services offered to subscribing customers. Of the special service offerings, the most relevant to this invention are the Internet Call Waiting (ICW) services. A user of a personal computer (PC) or other IP communications devices with an active ICW session is able to receive information about incoming calls from a calling telephone number without interrupting an active data connection between the PC and a data network, such as the World Wide Web, an Internet, an Intranet, and an Extranet. Presently available ICW services provide the calling telephone number, a billing name associated with the calling telephone number (if available), and call handling options. Call handling options typically include disabling the ICW session and data connection to answer the call, putting the call on hold and presenting a message to a calling party that a called party is aware of the call and will answer the incoming call shortly, routing the call to a voice mailbox associated with the called telephone number, ignoring the call, and forwarding the call to another telephone number. These options are presented to the user in a Graphical User Interface (GUI) that appears as a pop-up screen with separate command buttons. The user clicks on a desired call handling command button on the screen for the ICW PC software application and the selected option is transmitted to the telecommunications network over the Internet. The telecommunications network then processes the call according to the selected handling option.

[0007] Most subscribers of ICW services rely on a single telephone line to make voice calls and to access a data network. When the telephone line is utilized for a data connection (e.g., via modem), an ICW session is often automatically activated by a dialing software, which dials an appropriate prefix code for activating ICW before dialing the telephone number to establish the link with the data network. For example, a user's communications device may dial a telephone number of an Internet Service Provider (ISP) for access to the world wide web including an Internet, Intranet, Extranet, or other data network. Given that there is only one telephone line and ICW has been activated, the user of the connected PC controls how the incoming call is handled. For example, if the user is notified of the incoming call, then the user may choose to not answer the call and maintain an on-line session via the data connection. Consequently, the calling party cannot communicate with the user, such as to provide that user with a short message that the user may use to make an informed decision about how to handle the call. As an example, a parent calling his/her own home telephone number may hear ringing, but no answer, as a consequence of a child's failure to associate the calling telephone number with his/her parent and the child's unwillingness to interrupt or terminate an Internet gaming session and answer the incoming call. As a result, the parent is unable to communicate with his/her child.

[0008] Therefore, there is a need for systems and methods that allow a calling party to communicate an incoming message to a communications device at a called number engaged in an ICW session and data connection. Further, there is a need to allow the user of the communications device engaged in the ICW session and data connection to communicate a response message to the calling party. Finally, there is a need to provide several authorization levels for the calling party and/or user to control the messaging capabilities during the ICW session and the data connection.

BRIEF SUMMARY OF THE INVENTION

[0009] This invention addresses the above needs by providing a telephony network-based solution that allows a calling party to communicate a message to a communications devices having an IP address (hereinafter referred to as an "IP communications device") engaged in an ICW session and a data connection (also referred to as an on-line session) of a called telephone number. Preferably, the IP communications device includes a personal computer (PC) system (also referred to herein as computer system In an embodiment, the calling party places an incoming call to a called telephone number that has activated the ICW service(s). A telecommunications network (e.g., a Public Switched Telephone Network (PSTN), a mobile switching network, etc.) detects the incoming call to the called telephone number, decodes a calling telephone number of the incoming call, and retrieves an ICW Messaging Profile associated with the called telephone number and/or calling telephone number. For example, the ICW Messaging Profile may include preferences for enabling ICW messaging between the called telephone number and calling telephone number, such as, for example, automatically enabling ICW messaging, prompting the calling party or a user of the computer system at the called telephone number to activate ICW messaging, presentation format of

ICW messaging (e.g., audio, video, text, and/or combinations thereof), automatically enabling response message capabilities for ICW messaging, etc. This is cool! The telecommunications network may notify the calling party that the called telephone number is engaged in an ICW session. Further, the telecommunications network may prompt the calling party to activate ICW messaging or other call handling options. Alternatively, the ICW Messaging Profile may automatically activate ICW messaging or other call handling options. If ICW messaging is activated, then the telecommunications network associates connectivity requirements of the computer system of the called telephone number so that ICW messaging is enabled. Further, the telecommunications network may associate connectivity requirements of a communications device of the calling telephone number to allow interactive ICW messaging.

[0010] In an embodiment, the telecommunications network allows the calling party to interrupt the ICW service(s) and transmit the incoming message. The incoming message may be communicated by temporarily interrupting or pausing an interactive on-line session via the data connection and routing the incoming message to the computer system of the called telephone number over the data connection (e.g., an IP call). Alternatively, the incoming message could be routed to the computer system of the called telephone number over the telecommunications network. With either routing, an ICW Messaging Module of the computer system of the called telephone number presents the ICW messaging so that the use may be alerted of the incoming message associated with the incoming call.

[0011] In another embodiment, the telecommunications network allows the user of the computer system of the called telephone number to transmit the response message to the communications device of the calling party. The telecommunications network utilizes a Selection of ICW Messaging Presentation formats (that may be associated with data from the ICW Messaging Profile, the ICW Messaging Module, an incoming caller line identification (ICLID) signal, etc.) so that the response message can be formatted for the calling party's communications device. After the response message is formatted, it is routed through the telecommunications network to the calling party's communications device for presentation.

[0012] In another embodiment, this invention makes use of the ICW Messaging Module mentioned above. The ICW Messaging Module comprises computer programs, computer systems, and/or telecommunications systems that allow the user to customize presentation and features of the incoming message(s) and/or response message(s) and that allow the user to control how the data connection is interrupted. For example, the user may select a desired presentation format based upon information associated with an ICW Messaging Profile (e.g., the calling party's telephone number is associated with a personal digital assistant (PDA) and all incoming calls from PDAs are formatted for text-messaging presentation), a name associated with the calling telephone number, a time of day, a date identifier (e.g., day of week or calendar date), other information associated with the ICLID signal, length and/or duration of ICW message(s), display of GUI (e.g., color, font, placement of incoming message on screen, etc.), whether to bookmark a site associated with the active data connection or save information prior to connecting message, and other similar selections. The ICW Messaging Module provides a convenient and user-friendly web-interface that allows the customer and/or user to manage ICW messaging and to specify how to process interrupted on-line sessions. The ICW Messaging Module thus integrates telephony events with data network events (such as World-Wide-Web packetized messages).

[0013] In another embodiment, the ICW messaging services may be assigned different levels of access and/or authority for interrupting ICW and the data connection to send the incoming message. For example, Calling Party Mom (i.e., a calling party that is a mother) may have an ICW Messaging Profile associated with her cellular phone number that always allows interruption of ICW services and initiates the ICW messaging services. However, Calling Party Child (i.e., a calling party that is a child) may have an ICW Messaging Profile associated with an access code entered by the child that alerts the user of the computer system that Calling Party Child is trying to send an incoming message and prompts the user of the computer system to accept or to enter an authorization code in order to activate ICW messaging. If the user of the computer system does not accept or enter the authorization code or if the user fails to respond to the authorization prompt within a selected period of time, then the network may default to activate ICW messaging.

[0014] Another embodiment describes an apparatus that generates or otherwise transforms the incoming message routed to the computer system to an audible and/or visual announcement that can be presented by the computer system. The apparatus includes a network port, a memory device, and a digital signal processor. The network port receives the incoming message from the telephone network. The memory device stores a selection of announcement formats to accompany the incoming communications signal. The digital signal processor communicates with the memory device and selects an announcement format based upon information contained within the incoming message. The information contained within the incoming message could be associated with telephone network information provided by the telecommunications system. After the announcement format is selected and retrieved from the memory device, the apparatus could also include a system that presents and/or plays the incoming message.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The above and other embodiments, objects, uses, advantages, and novel features of this invention are more clearly understood by reference to the following description taken in connection with the accompanying figures, wherein:

[0016] FIG. **1** is a block diagram showing of the ICW Messaging Module that resides in a computer system according to an embodiment of this invention;

[0017] FIG. **2** is a schematic of a telecommunications system showing a computer system engaged in an ICW session and a data connection according to an embodiment of this invention;

[0018] FIG. **3** is a schematic of an incoming call to the telecommunications system shown in FIG. **2**;

[0019] FIG. **4** is a schematic of a telecommunications system illustrating the ICW messaging call flow according to an embodiment of this invention;

[0020] FIG. **5** is a schematic of a telecommunications system showing a gateway of a data network communicating with the computer system engaged in the ICW session and the data connection according to an embodiment of this invention;

[0021] FIG. **6** is a schematic illustrating the ICW messaging call flow through a telecommunications network and the gateway of the data network of the telecommunications system shown in FIG. **5**;

[0022] FIG. **7** is a block diagram of an exemplary apparatus that generates or otherwise transforms the incoming message to an audible and/or visual announcement that can be presented by the computer system according to an embodiment of invention; and

[0023] FIGS. **8-10** are flowcharts illustrating several ICW Messaging methods associated with the telecommunications system architects depicted in FIGS. **2-6**.

DETAILED DESCRIPTION OF THE INVENTION

[0024] This invention now will be described more fully hereinafter with reference to the accompanying drawings, in which exemplary embodiments are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those of ordinary skill in the art. Moreover, all statements herein reciting embodiments of the invention, as well as specific examples thereof, are intended to encompass both structural and functional equivalents thereof. Additionally, it is intended that such equivalents include both currently known equivalents as well as equivalents developed in the future (i.e., any elements developed that perform the same function, regardless of structure).

[0025] Thus, for example, it will be appreciated by those of ordinary skill in the art that the schematics, flowcharts, block diagrams, and the like represent conceptual views or processes illustrating systems and methods embodying this invention. The functions of the various elements shown in the figures may be provided through the use of dedicated hardware as well as hardware capable of executing associated software. Similarly, any switches shown in the figures are conceptual only. Their function may be carried out through the operation of program logic, through dedicated logic, through the interaction of program control and dedicated logic, or even manually, the particular technique being selectable by the entity implementing this invention. Those of ordinary skill in the art further understand that the exemplary hardware, software, processes, methods, and/or operating systems described herein are for illustrative purposes and, thus, are not intended to be limited to any particular named manufacturer.

[0026] Referring now to the figures, FIG. **1** is a block diagram showing an ICW Messaging Module **110** residing in a computer system **100**. The ICW Messaging Module **110** operates within a system memory device. The ICW Messaging Module **110**, for example, is shown residing in a memory subsystem **112**. The ICW Messaging Module **110**, however, could also reside in flash memory **114** or peripheral storage device **116**. The computer system **100** also has one or more central processors **120** executing an operating system. The operating system, as is well known, has a set of instructions that control the internal functions of the computer system **100**. A system bus **122** communicates signals, such as data signals, control signals, and address signals, between the central processor and a system controller **34** (typically called a "Northbridge"). The system controller provides a bridging function between the one or more central processors **120**, a graphics subsystem **126**, the memory subsystem **112**, and a PCI (Peripheral Controller Interface) bus **128**. The PCI bus **128** is controlled by a Peripheral Bus Controller **130**. The Peripheral Bus Controller **130** (typically called a "Southbridge") is an integrated circuit that serves as an input/output hub for various peripheral ports. These peripheral ports could include, for example, a keyboard port **132**, a mouse port **134**, a serial port **136** and/or a parallel port **138** for a video display unit, one or more external device ports **140**, and networking ports **142** (such as SCSI or Ethernet). The Peripheral Bus Controller **130** could also include an audio subsystem **144**.

[0027] The processor **710** is typically a microprocessor. Advanced Micro Devices, Inc., for example, manufactures a full line of ATHLON™ microprocessors (ATHLON™ is a trademark of Advanced Micro Devices, Inc., One AMD Place, P.O. Box 3453, Sunnyvale, Calif. 94088-3453, 408.732.2400, 800.5128.8450, www.amd.com). The Intel Corporation also manufactures a family of X86 and P86 microprocessors (Intel Corporation, 2200 Mission College Blvd., Santa Clara, Calif. 95052-8119, 408.765.8080, www.intel.com). Other manufacturers also offer microprocessors. Such other manufacturers include Motorola, Inc. (1303 East Algonquin Road, P.O. Box A3309 Schaumburg, Ill. 60196, www.Motorola.com), International Business Machines Corp. (New Orchard Road, Armonk, N.Y. 10504, (914) 499-1900, www.ibm.com), and Transmeta Corp. (3940 Freedom Circle, Santa Clara, Calif. 95054, www.transmeta-.com).

[0028] The preferred operating system is WINDOWS® (WINDOWS® is a registered trademark of Microsoft Corporation, One Microsoft Way, Redmond Wash. 98052-6399, 425.882.8080, www.Microsoft.com). Other operating systems, however, are also suitable. Such other operating systems would include the UNIX® operating system (UNIX® is a registered trademark of the Open Source Group, www.opensource.org), the UNIX-based Linux operating system, WINDOWS NT®, and Mac® OS (Mac® is a registered trademark of Apple Computer, Inc., 1 Infinite Loop, Cupertino, Calif. 95014, 408.996.1010, www.apple.com).

[0029] The system memory device (shown as memory subsystem **112**, flash memory **114**, or peripheral storage device **116**) may also contain an application program. The application program cooperates with the operating system and with a video display unit (via the serial port **136** and/or the parallel port **138**) to provide a GUI for the ICW Messaging Module **110**. The GUI typically includes a combination of signals communicated along the keyboard port **132** and the mouse port **134**. The GUI provides a convenient visual and/or audible interface with the customer or user of the computer system **100**. As is apparent to those skilled in the art, the selection and arrangement of the ICW Messaging Module **110** to manage ICW Messaging Services may be programmed over a variety of alternate mediums, such as, for example, a voice-activated menu prompt, an interactive session with an telecommunications network administrator, and the like.

[0030] The ICW Messaging Module **110** allows a user to manage ICW messaging services, such as (1) allowing the user to customize presentation and features of the incoming message(s) and/or response message(s) and (2) allowing the user to control how the data connection is interrupted. For example, the user may select a desired presentation format presented by computer system **100** or an alternate IP communications device servicing a called telephone number (or to a Service Node address). The desired presentation format may be based upon information associated with an ICW Messaging Profile, a name associated with the calling telephone number, a time of day, a date identifier (e.g., day of week, calendar date, etc.), other information associated with the ICLID signal, length and/or duration of an incoming message(s) and/or outgoing message(s), display of GUI (e.g., color, font, placement of ICW Messaging Module on display device, etc.), etc. The ICW Messaging Module **110** also allows the user to customize features, such as call handling options and other special services that may be provided with the incoming message. For example, the ICW Messaging Module may present the incoming message(s) and also allow the user to answer the call (or place the call in voicemail, etc.). Still further, the ICW Messaging Module **110** allows the user to control how the data connection is interrupted, paused, and/or suspended during ICW messaging. Since the ICW messaging makes use of TCP/IP or other similar technology, an on-line session of the data connection (e.g., checking e-mail, playing a game, reading an article, etc.) may be suspended or interrupted while the ICW message is communicated and/or responded to. For example, if the user was reading an on-line article when the incoming call was received, the user could answer the incoming call, and then, after hanging-up, the user could return to reading the article after the incoming call was terminated. In an embodiment, the interruption control of the ICW service functions to provide a book-marking feature and/or otherwise remembers the web address. Further, the interruption control of ICW may also save information input by the user, so that the user does not data or other information input by the user. Thus, the ICW Messaging Module provides a convenient and user-friendly interface that allows the customer and/or user to manage ICW messaging services and to integrate telephony events with data network events.

[0031] FIG. **2** is a schematic showing the ICW Messaging Module **110** operating within a telecommunications system **200** according to an embodiment of this invention. The telecommunications system **200** includes the computer system **100**, the ICW Messaging Module **110** residing within computer system **100**, a POTS telephone **220**, a modem **230**, a telecommunications switch **235**, a Public Switched Telephone Network (PSTN) **245** including a service switching point (SSP) **240**, an Internet Call Waiting (ICW) DataServer **250** including a database of ICW Messaging Profiles **252** and a Profile **255**, and a service control point (SCP) **260**, an Internet Service Provider (e.g., America On-Line) **270**, and a data network **275**.

[0032] Typically, a subscribing customer (i.e., a customer of the ICW Messaging Services) or the user at the customer's premises has access to the computer system **100** and/or the telephone **220**. For example, if a user wishes to call a particular telephone number, the user may use telephone **220** to dial the telephone number and establish a voice connection. If, however, the user wishes to send, receive, or access voice, video, and/or data (e.g., read and respond to e-mail, order products, view video-clips, listen to music, engage in an interactive gaming session, etc.), then modem **230** allows the computer system **100** to access the data network **275** via the PSTN **245**. To facilitate the data connection through modem **230** and Internet Service Provider (ISP) **270**, the computer system **100** typically uses Internet browsing software (or other appropriate software to manage the data connection), such as, for example, Microsoft Explorer™ or Netscape Navigator™.

[0033] Whether the user is attempting to make a voice connection or a data connection, each telephone number dialed from the customer's premises is sent to the PSTN **245** via switch **235**. Thereafter, the PSTN **245** connects the outgoing call to a dialed telephone number (or to another Service Node address) to establish the voice connection (not shown) or to the ISP **270** to establish the connection with the data network **275**. Communications signals sent from the customer's premises arrive at SSP **240** that analyzes the signals and determines routing of the outgoing call. Depending on the dialed telephone number, the SSP may route the outgoing call immediately over the PSTN **245** to attempt a connection or the SSP may communicate with SCP **260** for further call processing and routing information. The telecommunications system **200** may include wired, optical, and/or wireless elements and may further include private network elements, such as private branch exchanges (PBXs), and/or other elements (not shown). The PSTN **245** includes Advanced Intelligent Network (AIN) componentry controlling many features of the network. The PSTN **245** or switch **235** could also include a packet-based "soft switch" that uses software control to provide voice, video, and/or data services by dynamically changing its connection data rates and protocols types. If the PSTN **245** or switch **235** should include a softswitch, the AIN componentry is replaced by an application server that interfaces with the softswitch via a packet protocol, such as Session Initiation Protocol (SIP). The signaling between the computer system **100**, the switch **235**, the PSTN **245** including AIN componentry, and the data network **275**, however, are well understood in by those of ordinary skill the art and will not be further described. Further, those of ordinary skill in the art will be able to apply the principles of this invention to their own network configurations which may differ substantially from the telecommunications system shown in the figures.

[0034] ICW DataServer **250** communicates with SSP **240** and SCP **260** to effectively provide ICW services to users of the PSTN **245** so that ICW can be activated, de-activated, administered by the telecommunications provider, and controlled by the subscribing customer, user, or other entity with authorization. Thus, ICW DataServer **250** functions as a computer server and database dedicated to managing ICW services over data network **275** and PSTN **245**. ICW DataServer **250** communicates with the data network **275** using standard transmission control protocol and Internet protocol (TCP/IP). Further, the ICW Messaging Module **110**, may be downloaded from ISP **270**, ICW DataServer **250**, or provided on a storage media (e.g., diskette, CD-ROM, or installed by the computer system manufacturer) to a subscribing customer or user to install on the computer system **100** to enable, disable, and further control a variety of the ICW services (e.g., providing call handling options, such as routing an incoming call to voicemail, for incoming calls during the ICW session and data connection), including ICW Messaging Services (e.g., allowing the user to customize presentation and features of

the incoming message(s) and/or response message(s) and allowing the user to control how the data connection is interrupted, etc.).

[0035] In an embodiment, the ICW Messaging Module **110** is used to establish an ICW Messaging Profile **255**. The ICW DataServer **250** stores a database of ICW Messaging Profiles **252**. The customer interacts with the ICW Messaging Module **110** and with the telecommunications system **200** to access and login to the ICW DataServer and to establish the ICW Messaging Profile **255**. The ICW Messaging Profile **255** could contain a variety of fields and/or files associated with at least one of the following: ISP Login information, password entered by the user, telephone number of the subscribing customer, profile of a communications device associated with a telephone number of the calling party (e.g., if telephone number is associated with a personal digital assistant (PDA) and all incoming calls from PDAs are formatted for text-messaging presentation, then any response message(s) would be formatted for text-messaging), a name associated with the calling telephone number, a time of day, a date identifier (e.g., day of week or calendar date), other information associated with the ICLID signal, length and/or duration of ICW message(s), display of GUI (e.g., color, font, placement of ICW Messaging Module on screen, etc.), whether to bookmark a site associated with the active data connection or save information prior to connecting message, and other selections related to ICW messaging presentation, features, and managing the data connection during ICW messaging.

[0036] In an embodiment, the ICW messaging services may be assigned different levels of access and/or authority for interrupting ICW and the data connection to send the incoming message. For example, Calling Party Mom (i.e., a calling party that is a mother) may have an ICW Messaging Profile associated with her cellular phone number that always allows interruption of ICW services and initiates the ICW messaging services. However, Calling Party Child (i.e., a calling party that is a child) may have an ICW Messaging Profile associated with an access code entered by the child that alerts the user of the computer system that Calling Party Child is trying to send an incoming message and prompts the user of the computer system to accept or to enter an authorization code in order to activate ICW messaging. If the user of the computer system does not accept or enter the authorization code or if the user fails to respond to the authorization prompt within a selected period of time, then the network may default to activate ICW messaging.

[0037] FIG. **3** illustrates a telecommunications system **300** with an incoming call from a cellular phone **310** that is transmitted to an antenna (not shown) and then coupled to a mobile telecommunications switch **320** and to the PSTN **245**. The telecommunications network associates the incoming call to the called telephone number with the computer system **100** and the telephone **220**. Because, however, a data connection is already established between the computer system **100** and the data network **275**, in an embodiment, the PSTN **245** routes an active ICW session announcement to the cellular phone **310** and prompts the calling party to select ICW messaging or another call-handling option. For example, the ICW session announcement might be an audible communication capable of being played over the cellular phone **310** and communicate that "[t]he party you are calling has activated Internet Call Waiting and has established a data connection. Press 1 if you would like to send a message for presentation on the computer system . . . ." Alternatively, the announcement may be presented in a format that utilizes voice, video, and/or data to the cellular phone **310** used by the calling party. In another embodiment, the calling party places an incoming call to the called telephone number, but the calling party is not prompted for a selection to send a message. Rather, the ICW DataServer **250** might look up the calling telephone number in a database of telephone numbers associated with the ICW Messaging Profiles **252**. If there is a match, then the matched ICW Messaging Profile could alert the calling party to immediately enter an ICW Message and initiate ICW messaging.

[0038] FIG. **4** illustrates a telecommunications system **400** similar to the telecommunications system disclosed in FIG. **3**. Telecommunications system **400** includes an IP address query **410**, and ISP IP address map **420**, a search result with the IP address **430**, a selection of ICW messaging presentation **440**, at least one ICW message **450**. FIG. **4** illustrates a query that is made for dynamic IP addressing so that the ICW message(s) (e.g., incoming message(s) and response message(s)) can be sent to computer system **100** through the telecommunications network **245**. Some Internet Service Providers assign a "static" IP address to a customer's account, whereas other Internet Service Providers dynamically change a customer's IP address. A static IP address is permanently assigned to the customer, while a dynamic IP address may change with each login or may dynamically change during a session. The IP address query **410** is sent from PSTN **245** (typically, via the ICW DataServer **250**), routed over the data network **275**, and to an ISP IP address map **420** serving the computer system **100**. The IP address query **410** requests the IP address **430** assigned to the computer system **100**. The IP address **430**, for example, could be mapped to the ISP login information. If the ISP login information contained within the ICW Messaging Profile matches the ISP's login information, then the PSTN **245** could have access to the ISP IP address map **420**. Regardless of how the IP address **430** is accessed, the IP address **430** is returned and communicated to the ICW DataServer **250** of the PSTN **245** so that switch **235** can communicate at least one ICW message(s) **450** to/from the computer system **100** via the IP address **430** of the called telephone number. Incoming and/or response ICW message(s) **450** may be communicated to the computer system **100** or cellular phone **310** using an audio format, text format, video format, and combinations thereof.

[0039] Typically, the ICW Messaging call flow through telecommunications system **400** involves the calling party using cellular phone **310** to provide an ICW message **450** that is routed through switch **320** to PSTN **245**. PSTN **245** routes the ICW message **450** to the IP address **430** of computer system **100** via switch **450**. The ICW Messaging Module **110** presents the ICW message **450** so that the user of the computer system **100** is alerted of the information contained in the ICW message **450**. In this embodiment, the user may also enter a response ICW message **450** that is routed through switch **235** to PSTN **245**. PSTN **245** may need to further access the ICW DataServer **250** to associate a Selection of ICW Messaging Presentation **440** for the calling party's communications device. The Selection of ICW Messaging Presentation **440** provides fields and/or files that appropriately format the response ICW message so that it can be presented on the cellular phone **310** or any other communications device of the calling party. For example, the response ICW message **450** may be a text-based message that is incapable of being visually displayed by cellular phone **310**. Thus, the

Selection of ICW Messaging Presentation **440** has the intelligence to associate the presentation capabilities of the calling party's communications device, and, in this example utilizes a commercially available text-to-speech application to transform the text-based message to an audio-based message (e.g., synthesized voice message) that is routed to switch **320** and played to cellular phone **310**. Further, the Selection of ICW Messaging Presentation **440** may default to transform or convert all response messages from computer system **100** to audio-based messages if it is unable to associate the presentation capabilities of the calling party's communications device.

[**0040**] In addition to using the PSTN **245**, to communicate ICW messaging as described above in FIG. **4**, this invention also allows the calling party to communicate ICW messaging via a gateway **510** of the data network **275** shown in FIGS. **5-6**. As shown in FIG. **5**, telecommunications system **500** routes an incoming call to an IP address (not shown) of computer system **100** via a gateway **510** communicating with the data network **275**. The gateway **510** transmits a communications signal of the incoming call that utilizes the TCP/IP connection of the data network **275** with the computer system **100** so that the incoming call can be broadcast (i.e., presented via voice, video, and/or data/text communications) over the computer system **100**. Consequently, the ICW feature that typically cancels call waiting during a data connection to prevent the incoming call from being routed over the PSTN **245** to the computer system **100** is ignored so that the incoming call utilizes the data connection between the computer system **100** and the data network **275** to establish ICW messaging communications between the calling party using cellular phone **310** and the computer system **100**.

[**0041**] FIG. **6** illustrates an ICW Messaging call flow through the gateway **510** shown in FIG. **5**. Typically, the ICW Messaging call flow through telecommunications system **600** involves the calling party using cellular phone **310** to provide an ICW message **450** that is routed through switch **320** to PSTN **245**. PSTN **245** may route the ICW message **450** directly to gateway **510** or may route the ICW message **450** to the gateway **510** via the data network **275** and ISP **270**. Regardless of how routed from PSTN **245**, the Gateway **510** then routes the ICW message **450** to computer system **100** via switch **235**. The ICW Messaging Module **110** presents the ICW message **450** so that the user of the computer system **100** is alerted of the information contained in the ICW message **450**. Similar to the embodiment described in FIG. **5**, the user may also enter a response ICW message **450** that is routed through switch **235** to gateway **510**. Thereafter, the ICW message **450** is routed back to PSTN **245** (either via ICW DataServer **252** or via data network **275** and ISP **270**). As described above, PSTN **245** may need to further access the ICW DataServer **250** to associate a Selection of ICW Messaging Presentation **440** for the calling party's communications device. After the response ICW message **450** is transformed or formatted, PSTN **245** routes the response ICW message **450** to switch **320** for presentation by cellular phone **310**. The calling party may communicate another ICW message **450** or terminate the communications connection.

[**0042**] FIG. **7** is a block diagram of an apparatus **700** embodying this invention. This apparatus generates an ICW messaging presentation for ICW message(s) (incoming and responses) to a called telephone number serviced or coupled with the computer system **100**. The apparatus includes the ICW Messaging Module **110** operating within a memory device of a digital signal processor **710**. The memory device could include internal memory **712** of the digital signal processor, or the memory device could include an external memory **714** communicating with the digital signal processor **710**. The digital signal processor **710** converts analog signals to digital signals and converts digital signals to analog signals. The digital signal processor **710** could include compression and decompression algorithms, cancellation algorithms, audio-processing circuitry, filter circuitry, and amplifier circuitry. Although digital signal processors can be designed to provide differing capabilities and a variety of performance criteria, the basic functions of the digital signal processor are known and, thus, will not be further discussed.

[**0043**] The digital signal processor **710** interfaces with an input/output processor **716**. The input/output processor **716** controls system input/output and provides telephony-like control features. A bus **718** provides a signal communication path between the digital signal processor **710** and the input/output processor **716**. The input/output processor **716** is a microprocessor that includes memory (not shown), communication controllers (not shown), and peripheral controllers (not shown). The communication controllers, for example, could control packet-based communications with a data network (shown as reference numeral **275** in FIGS. **2-6**) through a network port **720**. The communication controllers could also control packet-based communications with a telecommunications switch (shown as reference numeral **235** in FIGS. **2-6**) through the network port. The peripheral controllers provide an interface with an LCD/LED/CRT display **722** and with telephony-like control features, such as a keypad **724**. A clock source **726** provides a system clock for the apparatus **700**, and the clock source **726** may also include higher and lower frequency multiples of the system clock depending upon power requirements and power availability. A power management system **728** provides differing power control mechanisms, such as a sleep mode and a low-power mode, to efficiently utilize available power and to reduce thermal management concerns.

[**0044**] The apparatus **700** generates the ICW messaging presentation for the incoming ICW message. If, for example, the apparatus **700** communicates with the telecommunications switch (shown as reference numeral **235** in FIGS. **2-6**), the ICW Messaging Module **110** causes the apparatus **700** to visually or audibly alert a nearby customer or user of the incoming ICW message. The network port **720** receives the ICW message **450** via a communications link to the telecommunications switch (shown as reference numeral **235** in FIGS. **2-6**). The ICW message **450** may include information associated with an ICW Messaging Profile. When the ICW Message **450** is received, the digital signal processor **710** interfaces with the ICW Messaging Module **110** and with the internal memory **712** and/or the external memory **714**. The ICW Messaging Module **110** instructs the digital signal processor **710** to retrieve the selected ICW messaging presentation format from a Selection of ICW Messaging Presentations **732** stored in the memory device. Alternatively, the ICW messaging presentation format may be stored in the telecommunications network (shown as reference numeral **245** in FIGS. **2-6**) or in the data network (shown as reference numeral **275** in FIGS. **2-6**). The presentation format is then selected based upon the information contained within the ICW Messaging Module **110** and/or ICW Messaging Profile as previously discussed.

[0045] Once the presentation format is selected, the apparatus **700** generates the ICW message. The digital signal processor **710** interfaces with an ICW Message Generator System **734**. The ICW Message Generator System **734** executes the selected presentation format, populates associated fields and/or files, and presents the ICW message. The digital signal processor **700** and the ICW Message Generator System **734** interface with an external speaker/microphone (mic) system **736** and/or with a visual display device **722** to audibly and/or visually present the ICW message **450**.

[0046] FIGS. **8-10** illustrate a flowchart showing an overview of a process for ICW Messaging Services according to an embodiment of this invention. A customer or user activates ICW and connects to a data network (block **800**). A telecommunications network (TN) detects an incoming communications signal to a called telephone number having an active ICW session and data connection (block **810**). The telecommunications network decodes the incoming communications signal (block **820**) and retrieves an ICW Messaging Profile to associates ICW Messaging fields and/or files (block **830**). Thereafter, the telecommunications network notifies a calling party that the called telephone number has an active ICW session and data connection and prompts the calling party to activate ICW messaging or another call handling option (block **840**). For example, the telecommunications network may play an audible announcement to the calling party that "The party you are calling has activated Internet Call Waiting and has established a data connection. Press 1 if you would like to send a message over the data connection . . . ." Thereafter, the telecommunications network receives a response to either activate ICW messaging or another call handling option (block **850**). If the calling party chooses another call handling option (e.g., leaving a voice message), then the telecommunications network handles the call accordingly (block **860**). If, however, the calling party chooses to activate ICW messaging, then the telecommunications network queries the ISP for an IP address (block **870**). ICW Messaging Service may then be activated (1) over the telecommunications network (as shown in FIG. **9**) or (2) over the data network (as shown in FIG. **10**). By allowing both network architects, ICW Messaging Services may be dynamically implemented in case the data connection is disconnected due to a transmission error, delay over the data connection, problems at the ISP, software errors, or the like.

[0047] If the telecommunications network is utilized, the method continues with FIG. **9**. The telecommunications network receives the ICW message from the communications device of the calling party (block **900**) and routes the ICW message to the PC or other IP communications device (block **910**). The ICW Messaging Module of the PC of other IP communications device presents the ICW message (block **920**). Thereafter, in this embodiment, the user chooses to send a response ICW message (not shown). The telecommunications network receives the response ICW message (block **930**) and formats the response ICW message according to a selection of ICW messaging presentation formats associated with a calling party's communications device (block **940**). Next, the formatted response ICW message is routed to the communications device of the calling party (block **950**) and is presented over the communications device (block **960**). Finally, a decision is made whether to continue ICW messaging or not (e.g., terminate call, leave a voice message, or another call handling option) (block **970**). If ICW messaging continues, then steps **900-970** may be repeated. Otherwise, the call is processed according to another call handling option (not shown in figure).

[0048] If the data network is utilized, the method continues with FIG. **10**. The telecommunications network receives the ICW message from the communications device of the calling party (block **1000**) and routes the ICW message through the gateway of the data network to the PC or other IP communications device (block **1010**). The ICW Messaging Module of the PC of other IP communications device presents the ICW message (block **1020**). Thereafter, in this embodiment, the user chooses to send a response ICW message (not shown). The gateway of the data network receives the response ICW message and routes the response ICW message to the telecommunications network (block **1030**). The telecommunications network formats the response ICW message according to a selection of ICW messaging presentation formats associated with a calling party's communications device (block **1040**). Next, the formatted response ICW message is routed to the communications device of the calling party (block **1050**) and is presented to the communications device (block **1060**). Finally, a decision is made whether to continue ICW messaging or not (e.g., terminate call, leave a voice message, or another call handling option) (block **1070**). If ICW messaging continues, then steps **1000-1070** may be repeated. Otherwise, the call is processed according to another call handling option (not shown in figure).

[0049] While the processes in FIGS. **8-10** are shown in series, these processes may occur in different orders and/or at simultaneous times as one of ordinary skill in the art will understand. Further, alternative IP communications device may be used instead of computer system **100**. For example, alternative "IP communications device" may include a wireless phone, a cellular phone, a satellite phone, a computer, a modem, an audio pager, a personal digital assistant, a digital signal processor, a global positioning system transceiver, an interactive television, and other IP addressable communications devices capable of delivering audio, video, and/or data communications.

[0050] Several exemplary implementations of various embodiments of this invention are described herein; however, various modifications and alternate embodiments will occur to those of ordinary skill in the art. For example, the ICW Messaging Module **110** discussed above may be physically embodied on or in a computer-readable medium, such as a CD-ROM, DVD, tape, cassette, floppy disk, memory card, and large-capacity disk (such as IOMEGA®, ZIP®, JAZZ®, and other large-capacity memory products). This computer-readable medium, or media, could be distributed to end-customers, licensees, and assignees. These types of computer-readable media, and other types not mention here but considered within the scope of this invention (such as an Internet file that could be downloaded to the PC), allow the ICW Messaging Module **110** to be easily disseminated. Accordingly, this invention is intended to include those other variations, modifications, and alternate embodiments that adhere to the spirit and scope of this invention.

1. A method, comprising:

activating an Internet Call Waiting messaging service that enables an exchange of Internet Call Waiting messages between a called number and a calling number;

receiving an Internet Call Waiting message from the calling number; and

routing the Internet Call Waiting message to an Internet Protocol address associated with the called number.

2. The method of claim 1, further comprising prompting the calling number to activate the Internet Call Waiting messaging service.

3. The method of claim 1, further comprising processing a call from the calling number to the called number, the called number being busy as a result of an established connection to a data network.

4. The method of claim 1, further comprising retrieving a profile associated with at least one of the called number and the calling number.

5. The method of claim 4, further comprising retrieving authority to interrupt an online session of the called number.

6. The method of claim 4, further comprising retrieving an access code that is required to interrupt an online session of the called number.

7. The method of claim 6, further comprising prompting the calling number for the access code.

8. The method of claim 1, further comprising notifying the calling number that the called number is engaged in an online session.

9. The method of claim 1, further comprising routing a called party's response message to the Internet Call Waiting message.

10. The method of claim 9, further comprising formatting the called party's response message to suit a calling party's device.

11. The method of claim 1, further comprising compare the calling number to a database storing numbers associated with profiles.

12. The method of claim 11, wherein when the calling number matches a number in the database, then prompting the calling party to send the Internet Call Waiting message to the called number.

13. The method of claim 1, further comprising querying for the Internet Protocol address associated with the called number.

14. The method of claim 1, storing a bookmark to an Internet Protocol address when the called number is engaged in an online session.

15. The method of claim 14, further comprising interrupting the online session.

16. The method of claim 15, further comprising receiving an instruction from a calling party to interrupt the online session.

17. The method of claim 16, further comprising reestablishing the online session to the bookmarked Internet Protocol address.

18. The method of claim 1, further comprising:

interrupting an online session to the called number;

establishing a voice connection to the called number; and

when the voice connection is terminated, reestablishing the online session to the called number.

19. A system, comprising:

means for activating an Internet Call Waiting messaging service that enables an exchange of Internet Call Waiting messages between a called number and a calling number;

means for receiving an Internet Call Waiting message from the calling number; and

means for routing the Internet Call Waiting message to an Internet Protocol address associated with the called number.

20. A computer readable media storing processor executable instructions for performing a method, the method comprising:

activating an Internet Call Waiting messaging service that enables an exchange of Internet Call Waiting messages between a called number and a calling number;

receiving an Internet Call Waiting message from the calling number; and

routing the Internet Call Waiting message to an Internet Protocol address associated with the called number.

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