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UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA

J2 GLOBAL, INC. and ADVANCED MESSAGING TECHNOLOGIES, INC.

Plaintiffs,

v.

INTEGRATED GLOBAL CONCEPTS, INC.

Defendant.

Case No. CV12-3439 MRP (PLAx)

COMPLAINT FOR PATENT INFRINGEMENT AND PERMANENT INJUNCTION

DEMAND FOR JURY TRIAL

Plaintiffs j2 Global, Inc. and Advanced Messaging Technologies, Inc. (collectively, "j2"), for their Complaint against Defendant Integrated Global Concepts, Inc. ("IGC"), allege upon knowledge as to themselves and their conduct and upon information and belief as to all other matters, as follows:

JURISDICTION AND VENUE

1. This action arises under the patent laws of the United States, including 35 U.S.C. §§ 271, 281, and 283-285. This court has jurisdiction over this action under 28 U.S.C. §§ 1331 and 1338(a).

2. Venue is proper in this district under 28 U.S.C. §§ 1391(b) and § 1400(b). Defendants are doing business in this District and acts of infringement have occurred in this District.

PARTIES

3. Plaintiff j2 is a corporation organized under the laws of the State of Delaware with its principal place of business at 6922 Hollywood Boulevard, Suite 500, Los Angeles, California, 90028. j2 provides messaging and communications services to millions of customers around the world. Plaintiff Advanced Messaging Technologies, Inc. ("AMT") is a Delaware corporation with its principal place of business at 6922 Hollywood Boulevard, Los Angeles, California 90028, and is a wholly-owned subsidiary of j2. The term "j2" shall be used herein to mean either j2 Global, Inc. or j2 Global, Inc. and AMT collectively, as the context warrants.

4. IGC, through its MaxEmail™ service, provides Internet facsimile and voicemail messaging services to customers across the United States. IGC's principal place of business is 501 N. Cleveland, # 1F, Chicago, Illinois 60610. IGC is doing business in California, including in this District. It solicits and has customers in this District and offers telephone numbers in this District for use by its customers.

FACTS

5. j2 is the owner, by assignment, of U.S. Patent No. 6,208,638, entitled "Method and Apparatus For Transmission And Retrieval Of Facsimile And Audio Messages Over A Circuit Or Packet Switched Network," which was duly and legally issued to Jack Rieley and Jaye Muller on March 27, 2001, by the United States Patent and Trademark Office ("PTO"). A copy of the U.S. Patent No. 6,208,638 is attached to this complaint as Exhibit A.

6. On December 8, 2008, the PTO issued a Reexamination Certificate for U.S. Patent No. 6,208,638 (as reexamined, the "'638 Patent"). The Reexamination Certificate confirmed the patentability of claims 1 and 13, as amended, confirmed the patentability of claims 2-12 and 14-22, dependent on amended claims, and added new claims 23-40. A copy of the Reexamination Certificate for the '638 Patent is attached to this complaint as Exhibit B.

7. The claims of the '638 Patent are valid and enforceable.

8. AMT is the owner, by assignment, of U.S. Patent No. 6,350,066, entitled "Systems and Methods for Storing, Delivering and Managing Messages," which was duly and legally issued to Charles R. Bobo, II, by the PTO on February 26, 2002. A copy of U.S. Patent No. 6,350,066 is attached to this complaint as Exhibit C.

9. On April 15, 2009, the PTO issued a Reexamination Certificate for U.S. Patent No. 6,350,066 (as reexamined, the "'066 Patent"). The Reexamination Certificate cancelled claims 1-35 and added new claims 36-57. A copy of the Reexamination Certificate for the '066 Patent is attached to this complaint as Exhibit D.

10. The claims of the '066 Patent are valid and enforceable.

11. j2 is the owner, by assignment, of U.S. Patent No. 6,597,688, entitled "Scalable Architecture for Transmission of Messages over a Network," which was duly and legally issued to Anand Narasimhan, Yaacov Shemesh and

Amit Kumar, by the PTO on July 22, 2003. A copy of U.S. Patent No. 6,597,688 is attached to this complaint as Exhibit E.

12. On March 11, 2008, the PTO issued a Reexamination Certificate for U.S. Patent No. 6,597,688 (as reexamined, the "'688 Patent"). The Reexamination Certificate confirmed the patentability of all of the 27 claims of the '688 Patent. A copy of the Reexamination Certificate for the '688 Patent is attached to this complaint as Exhibit F.

13. The claims of the '688 Patent are valid and enforceable.

14. Because they have been subjected to and been issued following reexamination, the '638 Patent, the '066 Patent, and the '688 Patent each enjoys an enhanced presumption of validity.

15. j2 is the owner, by assignment, of U.S. Patent No. 7,020,132, entitled "Scalable Architecture for Transmission of Messages over a Network," (the "'132 Patent") which was duly and legally issued to Anand Narasimhan, Yaacov Shemesh and Amit Kumar, by the PTO on March 28, 2006. A copy of U.S. Patent No. 7,020,132 is attached to this complaint as Exhibit G.

16. The claims of the '132 Patent are valid and enforceable.

17. IGC offers its customers an online fax service, called MaxEmail™, including in-bound and out-bound Internet fax. An in-bound Internet fax service delivers faxes sent to customers, either to customer email boxes as email attachments, or to customer in-boxes which the customers can access by logging in over the Internet. An out-bound Internet fax service delivers faxes for customers, receiving the faxes from customers as e-mail attachments.

18. IGC also offers its customers an online voicemail service, which enables customers to receive voicemails as email attachments.

19. IGC offers inbound phone numbers with area codes that are found within this judicial district. http://www.maxemail.com/max/did_loc.html.

20. IGC has customers within this judicial district, per customer testimonials. http://www.maxemail.com/max/testimonials.html.

21. According to IGC's description of its Internet fax services, at http://www.maxemail.com/max/fax.html:

> MaxEmail Internet Fax Services Features
>
> **Send & Receive Internet Faxes by Email**. No fax machine or telephone line is needed. If you have an email address, you can send and receive faxes anywhere and anytime.
>
> **Personal, Unique Internet Fax Number.** We assign you your own dedicated fax number for your convenience and privacy.
>
> **Access Faxes Online From Anywhere**. Faxes that are sent to your fax number are sent directly to your email address, so you receive your faxes wherever you are.
>
> **Easy setup**. Since faxes are delivered as PDF files, you probably won't even need to install any extra software on your computer.
>
> **No busy signals.** Because we maintain fax servers with hundreds of incoming fax lines, you can receive multiple faxes at the same time without callers getting busy signals, 24 hours a day, seven days a week.

22. According to IGC's description of its in-bound fax service, at http://www.maxemail.com/max/fax-to-email.html:

> Our fax to email service is included in all of our service plans (Trial, Lite, Plus, and Corporate), and allows you to receive faxes without owning a fax machine or having a dedicated phone line.
>
> Immediately after you sign up for fax to email service, we will assign you your own personal unique 10-digit telephone number from one of 150 available locations, including Japan. To send you a fax, your business associates simply dial your new Maxemail fax number from their fax machine. It is completely transparent to the sender and requires no special extension numbers or software.

> Your faxes are then delivered to you as email attachments in your choice of TIF-F or PDF formats.
>
> Aside from the cost benfits [sic], you also have the luxury of receiving your faxes in digital format anywhere you access your email. And since you receive all your faxes directly to your email inbox, you can avoid privacy concerns in shared office environments.
>
> Additionally, you can receive multiple faxes at the same time so your callers will not experience any busy signals.
>
> Other fax services are also included in all of our service plans. For no additional charge, you can enable a full-featured voicemail system that delivers your voicemail messages to you via email or over the phone.

23. According to IGC's description of its in-bound voicemail service, at http://www.maxemail.com/max/voicemail-to-email.html:

> Our Voice Mail to Email service is included in all of our service plans (Trial, Lite, Plus, and Corporate).
>
> Immediately after you sign up, we will assign you your own personal unique 10-digit telephone number without any extensions for the caller to dial. Your voice mail can be configured to be delivered to you as email attachments in your choice of WAV or Real Audio formats, or messages can simply be retrieved by calling your voice mail number and listening to your messages over the phone.
>
> Our voice mail service allows you to record your own custom greeting, and can be used as a standalone voice mail system, or may also be configured to receive fax messages. You can receive multiple voice messages at the same time so your callers will not experience any busy signals.

24. The systems and methods employed by IGC in providing its in-bound Internet fax solution infringe one or more claims of the '638 Patent, including but not limited to Claim 13.

25. At http://www.maxemail.com/max/comp.html, IGC also says the following about its in-bound services:

> "Retrieve Faxes Anywhere": "You can log into our account and securely download any of your fax messages that are stored online for 30 days after receipt."
>
> "30 Day Online Storage": "All accounts include 30 days of online storage. You can log in to your account, view and download your messages that you have received in the last 30 days."

26. IGC also says the following about its in-bound services, in the "FAQ" section of IGC's Web site (http://www.maxemail.com/max/cgi-bin/support.cgi?action=m_faq_detail&code=A106):

> Question:
>
> Received Messages (Under Receive tab)
>
> Answer:
>
> In this area, you can view the last 30 days of faxes and/or voicemails received on your account. If you have the Extended Storage feature enabled (additional charge), 1 year of receive history is available.
>
> The Receive Activity displays the date, time, MaxEmail ID, number of pages, sender ID and file size of messages received. Caller ID is displayed if you have that feature enabled (additional charge). There is also a small clickable square to the far right of each message. Clicking a square opens up a notes field where you can type comments about a fax. The square will change to a small notepad icon if you save notes for a fax.
>
> From the activity log, you can re-send messages to your e-mail address, forward faxes to another e-mail address , or delete messages from your log. Check the box to the right of a message to select it, then click the Resend, Forward or Delete button at the bottom of the page to perform the action.

> To open a fax or voice message from within the activity log, click on the ID. This allows you to access your messages when you are away from your e-mail, but you must still have the proper software loaded to view faxes and listen to voicemail in this manner.

27. The systems and methods employed by IGC in providing its in-bound fax and voicemail services infringe one or more claims of the '066 Patent, including but not limited to Claim 36.

28. According to IGC's description of its out-bound fax service, at http://www.maxemail.com/max/email-to-fax.html:

> Our email to fax service is included in all of our service plans (Trial, Lite, Plus, and Corporate), and allows you to send faxes anywhere in the world from your own email client or online through our web site, all without owning a fax machine or additional phone line. You no longer need to tie up your computer's modem to send a fax!
>
> Email to fax eliminates the need to print out your documents only to feed them into the scanner of your fax machine. Now you can simply attach a supported file type (ie. Microsoft Word or PDF file) to an email and send your faxes directly from your email client. You pay only for faxes that are successfully delivered.
>
> To send a fax from your email client using our system, simply address your fax to[fax_number]@maxemailsend.com and attach any supported document file to your email, and then send it!
>
> The MaxEmail Send system currently supports the following file attachments:
> .doc, .xls, .txt, .pdf, .tif, .html, .htm, .gif, .jpg, .pub, .rtf, .wps, .wpd, .cpy, .efx., xif, .pcx, .dcx, .fxd, .fxm and .fxs
>
> Once your email is received by our system, we convert the attached file or files and then send it out as a fax to the number you specified in the first part of the email address.

29. At http://www.maxemail.com/max/comp.html, IGC also says the following about its out-bound Internet fax services:

"Send Faxes by Email": "You can send faxes by email by addressing your email in a specific format and attaching the document you would like to fax. We handle the rest!"

30. The systems and methods employed by IGC in providing its out-bound fax service infringe one or more claims of the '688 Patent, including but not limited to Claim 1.

31. The systems and methods employed by IGC in providing its out-bound fax service also infringe one or more claims of the '132 Patent, including but not limited to Claim 1.

32. IGC has been aware of the '638 Patent, the '066 Patent, the '688 Patent, and the '132 Patent for several years, but IGC has elected to willfully disregard and infringe j2's patent rights.

33. Unless enjoined by this Court, IGC will continue to infringe the '638 Patent, the '066 Patent, the '688 Patent, and the '132 Patent.

34. This is an exceptional case under 35 U.S.C. § 285.

COUNT I

CLAIM FOR PATENT INFRINGEMENT UNDER 35 U.S.C. § 271 ('638 PATENT)

35. j2 incorporates by reference the allegations in paragraphs 1 through 34 of this complaint.

36. IGC has offered to sell and provide, has sold and provided, and continues to offer to sell and provide and to sell and provide, in the United States and in this District, products and services that infringe one or more claims of the '638 Patent, including, but not limited to, Claim 13.

37. IGC's infringement of the '638 Patent has been and continues to be willful.

38. Unless enjoined by this Court, IGC will continue to infringe the claims of the '638 Patent.

39. By reason of the foregoing, IGC has caused j2 damages in the amount of at least a reasonable royalty for IGC's continued infringement of the '638 Patent, to which j2 is entitled.

COUNT II

CLAIM FOR PATENT INFRINGEMENT
UNDER 35 U.S.C. § 271 ('066 PATENT)

40. j2 incorporates by reference the allegations in paragraphs 1 through 34 of this complaint.

41. IGC has offered to sell and provide, has sold and provided, and continues to offer to sell and provide and to sell and provide, in the United States and in this District, products and services that infringe one or more claims of the '066 Patent, including, but not limited to, Claim 36.

42. IGC's infringement of the '066 Patent has been and continues to be willful.

43. Unless enjoined by this Court, IGC will continue to infringe the claims of the '066 Patent.

44. By reason of the foregoing, IGC has caused j2 damages in the amount of at least a reasonable royalty for IGC's continued infringement of the '066 Patent, to which j2 is entitled.

COUNT III

CLAIM FOR PATENT INFRINGEMENT
UNDER 35 U.S.C. § 271 ('688 PATENT)

45. j2 incorporates by reference the allegations in paragraphs 1 through 34 of this complaint.

46. IGC has offered to sell and provide, has sold and provided, and continues to offer to sell and provide and to sell and provide, in the United States

and in this District, products and services that infringe one or more claims of the '688 Patent, including, but not limited to, Claim 1.

47. IGC's infringement of the '688 Patent has been and continues to be willful.

48. Unless enjoined by this Court, IGC will continue to infringe the claims of the '688 Patent.

49. By reason of the foregoing, IGC has caused j2 damages in the amount of at least a reasonable royalty for IGC's continued infringement of the '688 Patent, to which j2 is entitled.

COUNT IV

CLAIM FOR PATENT INFRINGEMENT

UNDER 35 U.S.C. § 271 ('132 PATENT)

50. j2 incorporates by reference the allegations in paragraphs 1 through 34 of this complaint.

51. IGC has offered to sell and provide, has sold and provided, and continues to offer to sell and provide and to sell and provide, in the United States and in this District, products and services that infringe one or more claims of the '132 Patent, including, but not limited to, Claim 1.

52. IGC's infringement of the '132 Patent has been and continues to be willful.

53. Unless enjoined by this Court, IGC will continue to infringe the claims of the '132 Patent.

54. By reason of the foregoing, IGC has caused j2 damages in the amount of at least a reasonable royalty for IGC's continued infringement of the '132 Patent, to which j2 is entitled.

PRAYER FOR RELIEF

WHEREFORE, j2 demands judgment on its Complaint as follows:

A. A permanent injunction against IGC's continued infringement of the '638 Patent;

B. An award of damages in an amount of at least a reasonable royalty for IGC's infringement of the '638 Patent;

C. A permanent injunction against IGC's continued infringement of the '066 Patent;

D. An award of damages in an amount of at least a reasonable royalty for IGC's infringement of the '066 Patent;

E. A permanent injunction against IGC's continued infringement of the '688 Patent;

F. An award of damages in an amount of at least a reasonable royalty for IGC's infringement of the '688 Patent;

G. A permanent injunction against IGC's continued infringement of the '132 Patent;

H. An award of damages in an amount of at least a reasonable royalty for IGC's infringement of the '132 Patent;

I. A trebling, pursuant to 35 U.S.C. § 284, of any and all damages awarded for IGC's infringement of the '638, '066, '688, and '132 Patents;

J. A finding that this is an exceptional case under 35 U.S.C. § 285;

K. An award, pursuant to 35 U.S.C. § 285, of reasonable attorneys' fees;

L. An award of interest and costs; and

M. Such other and further relief as the Court deems proper.

Dated: April 20, 2012

Respectfully submitted,

Robert A. Sacks /MNE

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Attorneys for Plaintiffs j2 Global, Inc. and Advanced Messaging Technologies, Inc.

DEMAND FOR TRIAL BY JURY

Plaintiffs j2 Global, Inc. and Advanced Messaging Technologies, Inc. hereby demand a trial by jury.

Dated: April 20, 2012

Respectfully submitted,

Robert A Sacks /BNE

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Brian R. England (SBN 211335)
Edward E. Johnson (SBN 241065)
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Attorneys for Plaintiffs j2 Global, Inc. and Advanced Messaging Technologies, Inc.

EXHIBIT A

US006208638B1

(12) **United States Patent**
Rieley et al.

(10) **Patent No.: US 6,208,638 B1**
(45) **Date of Patent: *Mar. 27, 2001**

(54) **METHOD AND APPARATUS FOR TRANSMISSION AND RETRIEVAL OF FACSIMILE AND AUDIO MESSAGES OVER A CIRCUIT OR PACKET SWITCHED NETWORK**

(75) Inventors: **Jack Rieley**; **Jaye Muller**, both of New York, NY (US)

(73) Assignee: **J 2 Global Communications, Inc.**, Hollywood, CA (US)

(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **08/829,857**

(22) Filed: **Apr. 1, 1997**

(51) **Int. Cl.**[7] **H04L 12/66**; H04M 7/00

(52) **U.S. Cl.** **370/354**; 370/401; 379/88.17; 379/100.08; 379/221; 709/227

(58) **Field of Search** 370/352, 354, 370/428, 396, 401; 379/88.17, 100.01, 100.08, 100.17, 100.12, 265, 221, 89; 709/217, 218, 227, 219; 341/20

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,113,430	*	5/1992	Richardson, Jr. et al.	379/88.17
5,351,276	*	9/1994	Doll, Jr. et al.	370/354
5,557,659	*	9/1996	Hyde-Thomson	379/88.13
5,737,395	*	4/1998	Irribarren	379/88.13
5,812,639	*	9/1998	Bartholomew et al.	379/89
5,911,776	*	6/1999	Guck	709/217
5,930,493	*	7/1999	Ottesen et al.	709/227
5,933,490	*	8/1999	White et al.	379/221
5,946,386	*	8/1999	Rogers et al.	379/265
5,991,292	*	11/1999	Focsaneanu et al.	370/352
5,996,006	*	11/1999	Speicher	709/218
6,009,469	*	12/1999	Mattaway et al.	709/227
6,084,892	*	7/2000	Benash et al.	370/401
6,108,329	*	8/2000	Oyama et al.	370/352

* cited by examiner

Primary Examiner—Hassan Kizou
Assistant Examiner—John Pezzlo
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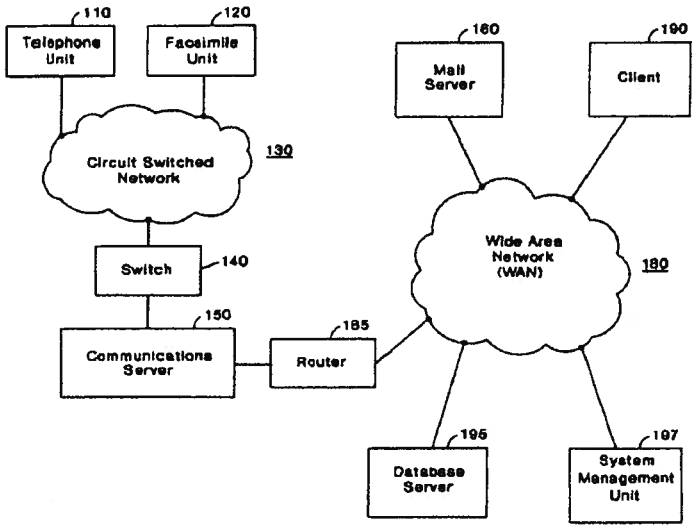
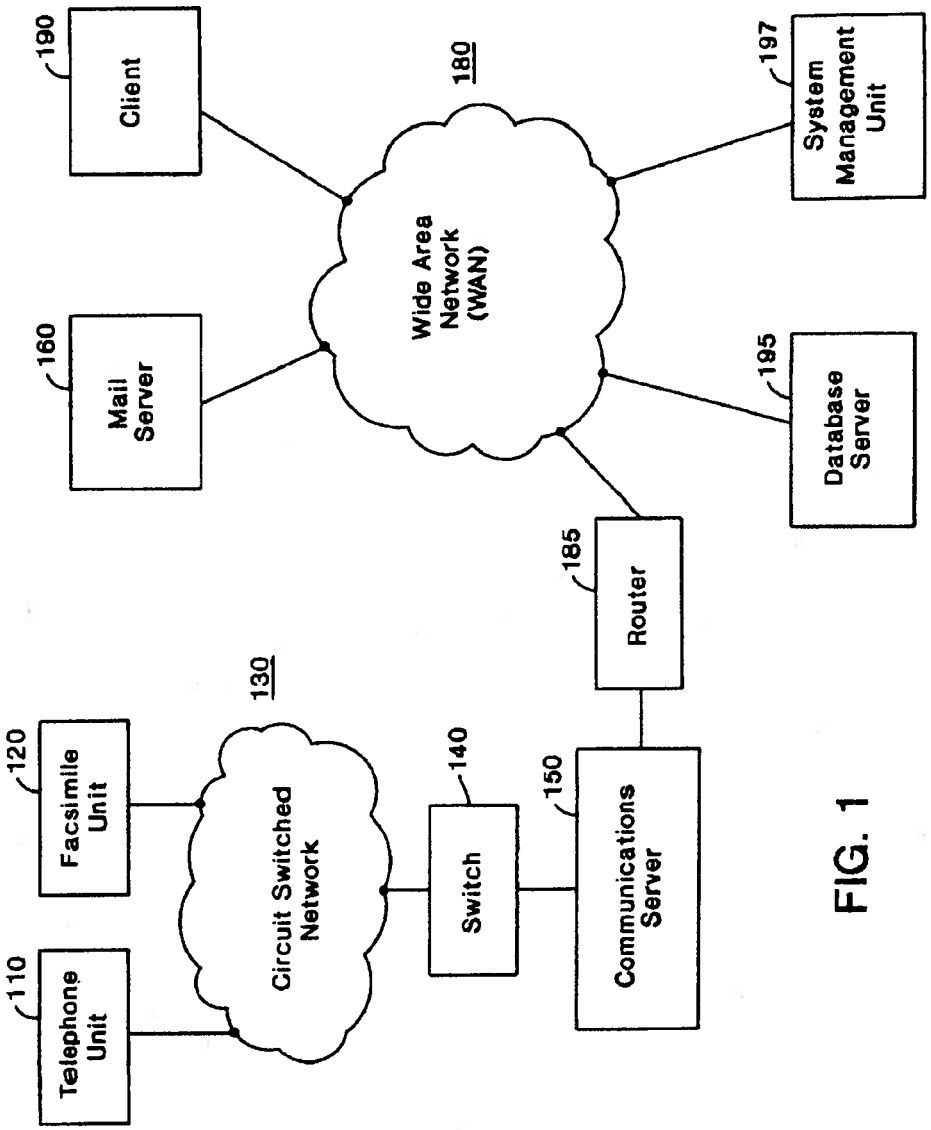
(57) **ABSTRACT**

A method and apparatus for accepting an incoming message over a circuit switched network and transmitting it over a packet switched network. The apparatus including means for implementing the steps of receiving an incoming call signal along with a inbound address; determining a user account and a final address on said packet switched network associated with said inbound address; allocating a message processing resource; processing said incoming call into a processed message; and, sending said processed message to said final address.

22 Claims, 3 Drawing Sheets




190
Client
180
Wide Area Network (WAN)
197
System Management Unit
160
Mail Server
195
Database Server
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Router
130
120
Facsimile Unit
Circuit Switched Network
140
Switch
150
Communications Server
110
Telephone Unit

FIG. 1

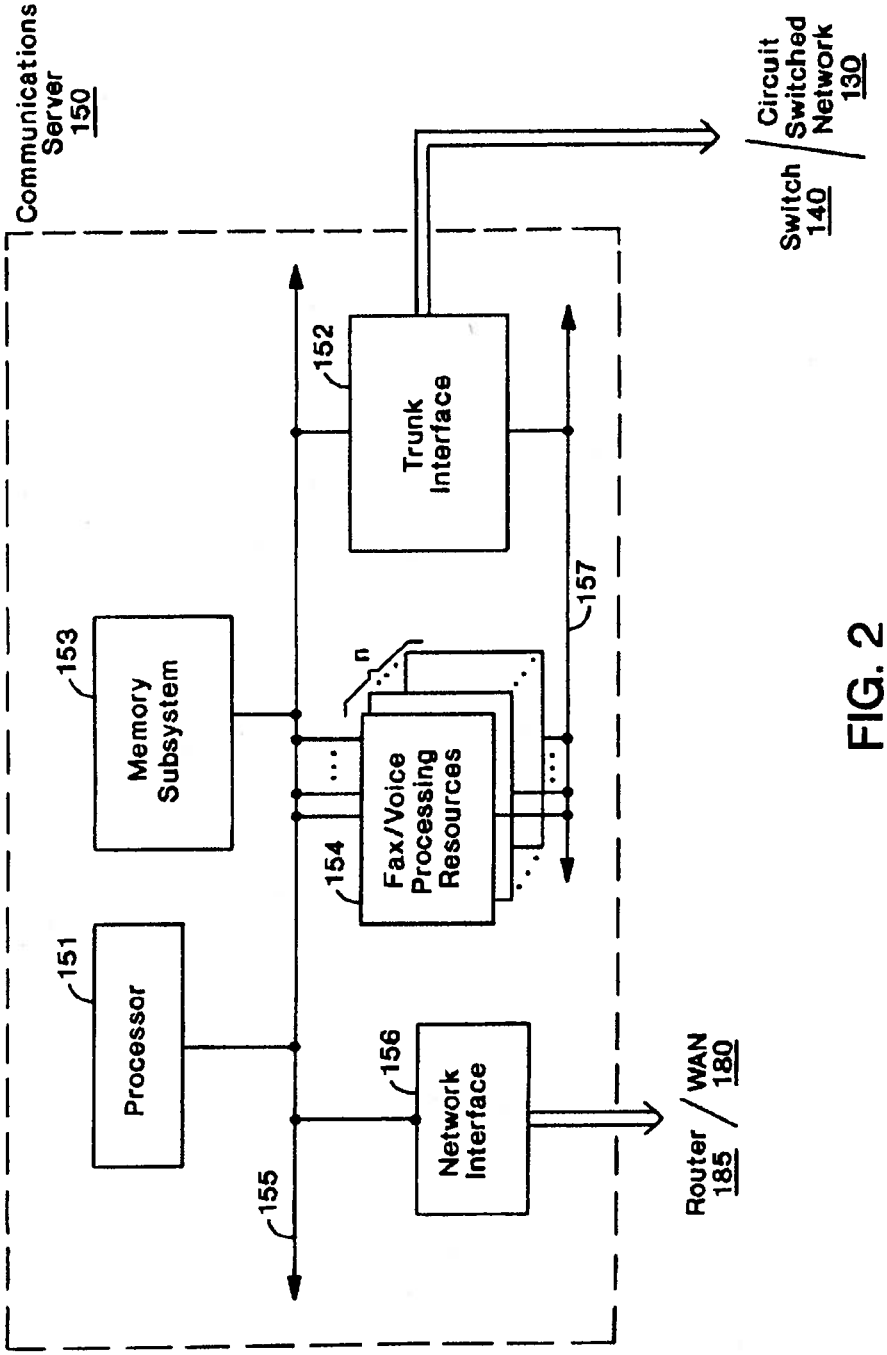
Communications Server 150
Circuit Switched Network 130
Switch 140
Trunk Interface
152
Memory Subsystem
153
Fax/Voice Processing Resources
154
Processor
151
Network Interface
156
Router 185
WAN 180
155
157
n

FIG. 2

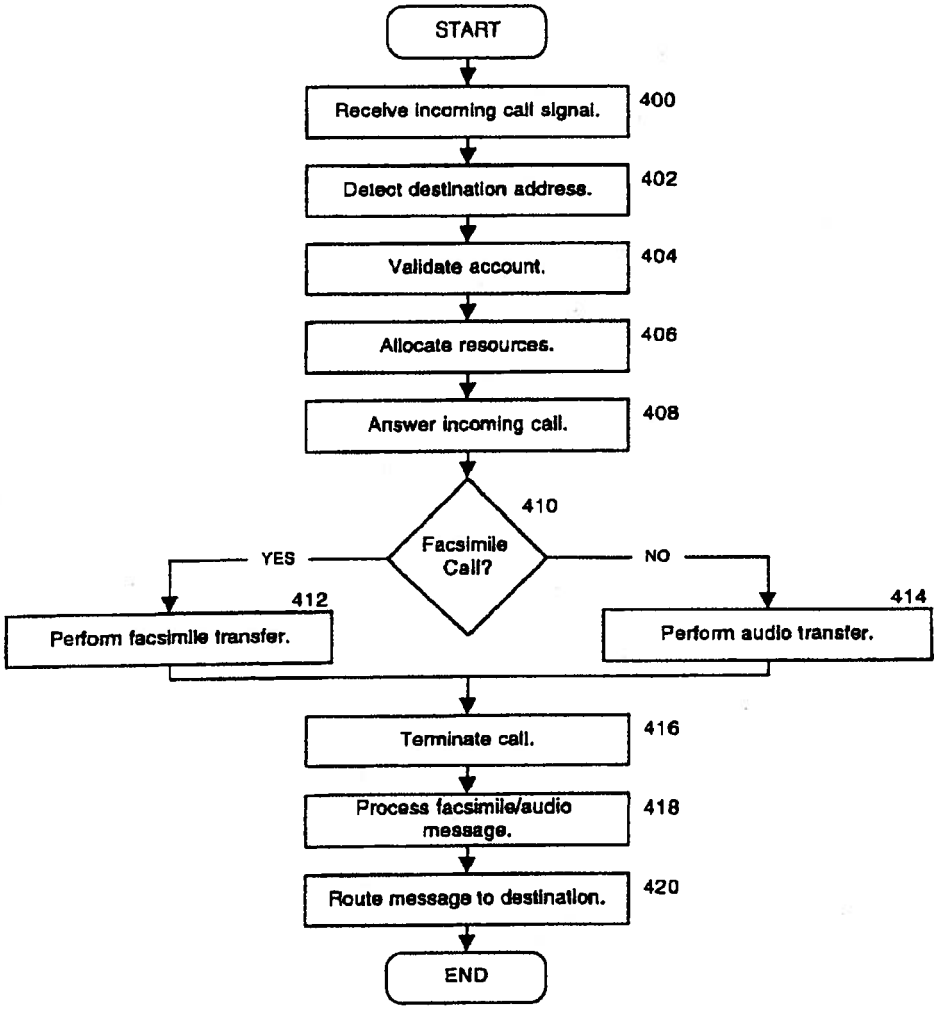
START
Receive incoming call signal.
400
Detect destination address.
402
Validate account.
404
Allocate resources.
406
Answer incoming call.
408
410
Facsimile Call?
YES
NO
412
Perform facsimile transfer.
414
Perform audio transfer.
Terminate call.
416
Process facsimile/audio message.
418
Route message to destination.
420
END

FIG. 3

METHOD AND APPARATUS FOR TRANSMISSION AND RETRIEVAL OF FACSIMILE AND AUDIO MESSAGES OVER A CIRCUIT OR PACKET SWITCHED NETWORK

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to the field of message receipt/transmission and delivery using computer networks. Specifically, the present invention relates to the subject of facsimile and voice transmission and retrieval over circuit/packet switched voice/data networks.

2. Description of Related Art

Voice and data communications systems such as the public switched telephone network (PSTN) are currently used to transfer image and text data transmitted by facsimile ("fax") machines in addition to the normally carried voice traffic. These faxed images are usually transmitted through the PSTN and received for printout or storage of the image on a destination fax machine or computer for the use by the recipient. Since the destination machine has typically been a fax, computer, printer or other such large capacity storage and output device, there has not been a need to compress the fax significantly for the destination output device. Furthermore, as the traditional destination has been either a full size print-out, computer monitor or mass storage media, no attempt has been made to facilitate the delivery of fax messages using other methods so as not to require the recipient to be physically close to the device which is coupled to the telephone line in order to receive the fax message.

For example, where user A has a fax machine connected to the PSTN using a telephone line with a number "XXX-YYY-ZZZZ" (where "XXX" represents the area code of the number, "YYY" the prefix of the number, and "ZZZZ" the remainder of the number), in order for user A to view a received fax message, user A must be physically located in the same area as the fax machine.

Similarly, audio messages are stored on fixed destination devices such as answering machines and "voice-mail" systems. To retrieve such audio messages, a recipient would either have to dial into the destination device or physically activate the play-back of audio messages through manipulation of the controls of an answering machine.

Thus, the ability to access both voice and fax messages from additional locations which would not require a user to either (1) be physically stationed near the receiving fax machine; or (2) to have to manually call a device to retrieve audio messages; would be desirable.

In addition, as a sender currently has to call or fax directly to the destination phone or fax machine, the sender incurs additional charges imposed by one or more telephone companies handling the call. Depending on the length of the fax or audio message, the telephone company charges can be substantial as calls are billed based on the time connected.

Hence, to be able to provide a sender with multiple phone numbers to which to send a message would be desirable, allowing the sender to choose the number which would closest, and, thus, the least expensive, to dial into.

SUMMARY OF THE INVENTION

To provide for the receipt and transmission of audio and fax information by a first user over a circuit switched network such as the PSTN to a second user over a packet switched network such as the Internet, a communications server is connected both to the circuit switched network and a packet switched network.

The communications server contains resources to receive and process incoming audio and facsimile calls from the circuit switched network into a format suitable for transmission over the packet switched network to the second user's address. In addition, a link is first determined between the second user's address on the circuit switched network and the second user's address on the packet switched network, and then an appropriate route to the second user's address on the packet network is determined. With the system being maintained in a distributed and redundant fashion, reliable receipt and transfer of all messages is ensured.

Thus, this electronic messaging system allows for the transfer of messages such as facsimile and audio messages from the circuit switched network to be collected and routed over the packet switched network.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a system diagram of a network configured pursuant to a preferred embodiment of the present invention containing a message server.

FIG. **2** is a block diagram illustrating the message server configured in accordance with the preferred embodiment of the present invention.

FIG. **3** is a flow diagram illustrating the operations of the preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention provides a method and apparatus for allowing the receipt and transmission of audio and fax information between a circuit switched network and a packet switched network. For purposes of explanation, specific embodiments are set forth to provide a thorough understanding of the present invention. However, it will be understood by one skilled in the art, from reading this disclosure, that the invention may be practiced without these details. Further, although the present invention is described through the use of circuit switched and packet switched networks, most, if not all, aspects of the invention apply to all networks in general. Moreover, well-known elements, devices, process steps and the like are not set forth in detail in order to avoid obscuring the present invention.

FIG. **1** contains a block diagram illustrating a system configured in accordance with a preferred embodiment of the present invention containing a communications server **150** connected to a circuit switched network **130** and a wide area network (WAN) **180**. In the preferred embodiment, circuit switched network **130** is a circuit switched network such as the PSTN while WAN **180** is a packet switched network such as the Internet. It is to be noted that circuit switched network **130** can also be a network such as the generalized switched telephone network (GSTN), which encompasses PSTN networks, cellular telephone networks, and the other networks with which they are in communication.

Communications server **150** is connected to circuit switched network **130** via a switch **140** and to WAN **180** through the use of a router **185**. As described in further detail below, in a preferred embodiment, switch **140** and router **185** are interfaced to communications server **150** using two separate hardware interfaces. In an alternate embodiment, switch **140** and router **185** can be interfaced to communications server **150** through the use of one hardware unit.

Connected to circuit switched network **130** is both a telephone unit **110** and a facsimile unit **120**. Telephone unit **110** is a standard telephone capable of converting audio signals into electrical signals suitable for transmission over circuit switched network **130**. Similarly, facsimile unit **120** is a standard facsimile machine capable of transmitting and receiving facsimile messages over circuit switched network **130**. Each of these devices can be connected to circuit switched network **130** using either wired or wireless technology.

Connected to WAN **180** is a database server **195**, a system management unit **197**, a mail server **160**, and a client **190**. Each of these systems communicate with each other and with communications server **150** via WAN **180** using such protocols such as simple network management protocol (SNMP) and hyper-text transport protocol (HTTP)—packetized using a protocol such as the transmission control protocol/internet protocol (TCP/IP).

In the preferred embodiment, each one of database server **195**, system management unit **197**, mail server **160**, and client **190**, are stand-alone computers or workstations containing the hardware and software resources to enable the operation of the present invention. In alternate embodiments, the functions provided by each one of database server **195**, system management unit **197**, mail server **160**, and client **190**, are provided by any number of computer systems.

In the preferred embodiment, mail server **160** is a server providing e-mail receipt and transmission using a protocol such as the simple mail transfer protocol (SMTP) and post office protocol (POP). Moreover, client **190** is configured to be able to communicate over WAN **180** using SMTP or POP in order to retrieve email from mail server **160** or another suitably configured server.

System management unit **197** communicates with communications server **150** to monitor: (1) the processes on communications server **150**; (2) the status of the trunk line connected to communications server **150**; and (3) the connection between the various servers connected to WAN **180**. As described below, if any processes on communications server **150** or connection to the circuit switched network **130** is interrupted, system management unit **197** can allocate resources, or cause the re-routing of a call or message via one or more redundant resources or connections, ensuring that the call or message is routed to the final destination.

Communications server **150** contains user data needed to receive and route incoming messages received from circuit switched network **130**. The same information is also stored on database server **195**. In the preferred embodiment, communications server **150** stores an inbound address, a set of final destination addresses; and an account status for each user. The inbound address corresponds to the telephone number assigned to the user. As further discussed below, the inbound address is the number that a message sender dials on telephone unit **110** or facsimile unit **120** to leave a message for the user. The set of final destination address contain one or more e-mail addresses where the user account status information indicates whether the inbound address is either active and or inactive—i.e, whether the user is able to receive messages using the system.

Database server **195** stores a duplicate copy of the inbound address, the set of final destination addresses; and the account status for each user. Database server **195** also stores additional information for each user such as mailing address and billing information which are not used in the operation of the present invention but are note herein for completeness only. Thus, the information that is stored on communications server **150** is a subset of the information that is stored on database server **195**, and if communications server **150** were to become inoperable or otherwise unable to handle incoming messages, database server **195** can configure another communications server to accept those calls.

In the preferred embodiment, system management unit **197** is responsible for monitoring the status of communications server **150** and re-assigning the users being handled by communications server **150** if communications server malfunctions or becomes overloaded with incoming calls. In the former case, system management unit **197** would re-assign all users being handled by communications server **150** to another communications server. In the latter case, system mananagment unit **197** would only off-load the only those incoming calls for which communications server **150** does not have the available resources to process.

FIG. **2** is a block diagram of communications server **150** configured in accordance with the preferred embodiment of the present invention, containing a processor **151** coupled to a memory subsystem **153** through the use of a system bus **155**. Also coupled to system bus **155** is a network interface **156**; a trunk interface **152**; and a set of fax/voice processing resources **154**. Set of fax/voice processing resources **154** and trunk interface **152** are also coupled to a bus **157**.

Bus **157** is a bus that supports time division multiplex access (TDMA) protocols to optimize the flow of real time traffic between set of fax/voice processing resources **154** and trunk interface **152**.

Memory subsystem **153** is used to store information and programs needed by communications server **150**. The functioning of memory subsystems in computer design are well known to those of ordinary skill in the art and thus will not be further discussed herein.

In the preferred embodiment, trunk interface **152** is a trunk line interface, such as a T-1 or E-1 line, to switch **140** and can handle up to 24 channels of communications. Trunk line signaling is well known to those of ordinary skill in the art of telecommunication and thus will not be further discussed herein except as necessary for describing the invention.

Set of fax/voice processing resources **154** are made up of multiple fax/voice processing cards. Each of these processing cards contain processing units which are capable of receiving and transmitting facsimiles according to established protocols, and which are capable of digitizing voice or other audio data, also according to established protocols. In the preferred embodiment, there are three fax/voice processing cards in set of fax/voice processing resources **154**, each fax/voice processing card containing eight processing units capable of handling a channel from trunk interface **152**. Thus, communications server **150** can communicate on twenty-four channels concurrently.

The storage of destination addresses on both circuit switched network **130** and WAN **180** is controlled by a database located either on communications server **150** or on database server **195**. Keeping this information separate from communications server **150** allows communications server **150** to be a resource that can be allocated on demand. Hence, a number of communications servers could be used, along with one or more database servers, to allow a fully redundant and scalable system. In addition, system management unit **197** monitors the status and connection of all the communication and database servers.

FIG. **3** is a flow diagram illustrating the operations of the preferred embodiment of the present invention when a call

originating from a source on the circuit switched network **130**. For example, either telephone unit **110** or facsimile unit **120** can initiate the call.

In block **400**, an incoming call signal is received by communications server **150** from switch **140**. The incoming call signal is initiated by telephone unit **110** or facsimile unit **120** over circuit switched network **130** and is routed to communications server **150** via switch **140**. Communications server **150** detects the incoming call signal using trunk interface **152**. Operation would continue with block **402**.

Continuing with block **402**, trunk line interface unit **152**, in addition to receives signals to indicate that there is an incoming call from switch **140**, also receives signals indicating the circuit destination address of the incoming call. The destination address is captured by trunk interface **152** and is determined by trunk line signaling using mechanisms such as direct-inward-dial, or dual tone multifrequency (DTMF) tones.

Continuing with block **404**, to determine whether or not to process the incoming call, processor **151** searches the list of inbound addresses contained in memory subsystem **153** for the destination address. If processor **151** finds the destination address in the inbound address list, processor **151** will then look up the account status for the user who owns the inbound address to determine if the account of that user is a valid user account. In an alternate embodiment, the validation is performed through the use of a database maintained by a separate entity such as database server **195**. If the account is found to be inactive, communications server **151** will play a prepared message indicating that the number to which the incoming message was sent is an invalid account.

In block **406**, once the validity of the user account has been established, processor **151** will attempt to allocate one fax/voice processing resource from set of fax/voice processing resources **154** and also determine the availability of other resources required for the receipt and processing of the incoming call. These other resources include the processing capacity of processor **151**, the storage capacity of memory subsystem **153**.

If it is determined that the appropriate resources are not available, then the call will be routed to a different communications server that is capable of allocating the necessary resources. The routing of calls is accomplished by trunk line signaling via switch **140** and is managed by system management unit **197**.

Also, it should be noted that the call will only come from switch **140** to communications server **150** if there are no problems with the line. Otherwise the call will get routed to a different communications server. In the preferred embodiment, fault detection and correction happens in one of two ways. First, on the telephone network side, switch **140** can be set up to independently route a call to another line if it is determined that one of the lines is bad. Second, if communications server **150** detect that the trunk line coming into trunk interface **152** is down, communications server **150** will notify system management unit **197** to reallocate the users for whom communications server **150** is responsible onto another communications server. Thus, system management unit **197** will transfer the duplicate user information contained in database server **195** into a different communications server.

In block **408**, communications server **150** "answers" the incoming call by having trunk interface **152** go "off-hook" on the trunk line.

In block **410**, if the fax/voice processing resource of set of fax/voice processing resources **154** which is processing the call determines that the incoming call is a fax transmission, then operation will continue with block **412**. Otherwise, operation will continue with block **414**. For example, if the call is a fax, a fax protocol is initiated, and the fax is received by one of the fax/voice processing resources of set of fax/voice processing resources **154**. If the call is a voice call, the voice is recorded by one of the fax/voice processing resources of set of fax/voice processing resources **154**.

In block **412**, the fax/voice processing resource of set fax/voice processing resources **154** responsible for processing the incoming call will perform the fax transfer and store the incoming message as a temporary file in memory subsystem **153**. In the preferred embodiment, the incoming fax is saved into a file which follows the group 3 facsimile file format. Operation will then continue with block **416**.

In block **414**, where it is determined that the incoming message is an audio message, the fax/voice processing resource of set of fax/voice processing resources **154** allocated to process the call will initiate an audio recording of the incoming voice message. In the preferred embodiment, the audio message is digitized and stored in memory subsystem **153** as a temporary file in a pulse code modulated format. After the incoming call has been digitized and stored, operation will then continue with block **416**.

In block **416**, trunk interface **152** will terminate the call. Operation will then continue with block **418**.

In block **418**, the incoming message, which has been stored as a temporary file in memory subsystem **153**, is processed by processor **151**. In the preferred embodiment, the temporary file is processed according to the type of the incoming call. If the incoming call was a fax transmission, then the temporary file, which has been stored as a group 3 facsimile file, will be converted into a file which follows the tagged image file format (TIFF), or a format that is suitable for transmission over WAN **180**. Optionally, the temporary fax file can also be compressed at this stage. If the incoming call was an audio message, then the temporary file would be compressed using a compression scheme such as the scheme defined in the global system for mobile-communications (GSM) standard. In alternate operations, compressing and other processing of the incoming message is performed as the same time the incoming message is being received and being placed in memory subsystem **153**.

In block **420**, communications server **150** uses the inbound address to determine the set of final destination addresses, which are destinations on WAN **180** (i.e., the packet switched network), to send the processed incoming message. Communications server **150** then sends an electronic mail (e-mail) with the processed incoming message as an attachment to all the destinations in the set of final destination addreses.

For example, the e-mail containing the attachment is transferred to, and stored in, a server such as mail server **160**, The e-mail is then retrieved by client **190** whenever the user wishes. In an alternate embodiment, client **190** can retrieve the e-mail directly from communications server **150**, without the storing operation of mail server **160**.

While the present invention has been particularly described with reference to the various figures, it should be understood that the figures are for illustration only and should not be taken as limiting the scope of the invention. Many changes and modifications may be made to the invention, by one having ordinary skill in the art, without departing from the spirit and scope of the invention.

What is claimed is:

1. A system comprising:

a set of switches coupled to a circuit switched network for receiving a set of incoming call signals, wherein the incoming call signal includes an inbound address, and wherein a switch in the set of switches redirects an incoming can signal from a first communications server to a second communications server if a first condition occurs; and,

a set of communications servers coupled to the set of switches for receiving the set of incoming call signals, each communications server being coupled to a network and containing a message processing resource configured to process a received audio message into a digital representation, wherein each communications server further comprises a trunk line interface to extract the inbound address and stores the inbound address, a set of final destination addresses and account status, and the message processing resource is further configured to determine, based on the inbound address, a user account and a destination on a packet switched network and send the digital representation to the destination,

wherein the inbound address is assigned to the user account and the outbound address comprises at least one email address.

2. The system of claim 1, where the first condition occurs if the first communications server sends a rejection signal to the switch.

3. The system of claim 1, where the first condition occurs if the first communications server is unable to process the incoming call signal.

4. The system of claim 1, where the incoming call signal signals an incoming call and the first condition occurs if the first communications server is unable to process the incoming call.

5. The system of claim 1, further comprising a system management unit for setting the first condition.

6. The system of claim 1, further comprising a system management unit, and the first condition occurs if the system management unit determines that the second communications server should receive the incoming call signal.

7. The system of claim 1, where the set of switches includes a second switch, and the first communications server is coupled to the switch and the second communications server is coupled to the second switch.

8. The system of claim 7, where the switch redirects the incoming call signal to the second switch.

9. The system of claim 1, where the inbound address is a circuit destination address.

10. The system of claim 1, where the message processing resource is further configured to validate the inbound address.

11. The system of claim 1, where the audio message is a facsimile message and the digital representation of the audio message is a graphics file.

12. The system of claim 1, where the message processing resource further comprises a processor to:

determine if the audio message contains a facsimile message or a voice message; and,

digitize the audio message if the audio message contains the voice message and receive the facsimile message if the audio message contains the facsimile message.

13. A method comprising:

receiving a first incoming call signal destined for a first communications server for processing of an audio message into a digital representation;

determining if a first condition has occurred;

redirecting the first incoming call signal from the first communications server to a second communications server based on the determining of the first condition, wherein the incoming call signal includes an inbound address;

extracting the inbound address;

determining, based on the inbound address, a user account status and a destination on a packet switched network; and,

sending the digital representation to the destination, wherein the inbound address is assigned to the user account and the destination comprises at least one email address.

14. The method of claim 13, where determining the first condition includes determining that the first communications server sends a rejection signal.

15. The method of claim 13, where determining the first condition includes determining that the first communications server is unable to process the incoming call signal.

16. The method of claim 13, where the incoming call signal signals an incoming call and determining the first condition includes determining that the first communications server is unable to process the incoming call.

17. The method of claim 13, where determining the first condition includes determining that a system management unit selects the second communications server for receiving the incoming call signal.

18. The method of claim 13, where redirecting the first incoming call signal includes using a switch to redirect the first incoming signal from the first communication server to the second communication server.

19. The method of claim 13, where the inbound address is a circuit destination address.

20. The method of claim 13, further including validating the inbound address.

21. The method of claim 13, where the audio message is a facsimile message and the digital representation of the audio message is a graphics file.

22. The method of claim 13, further including:

determining if the audio message contains a facsimile message or a voice message; and,

digitizing the audio message if the audio message contains the voice message and receiving the facsimile message if the audio message contains the facsimile message.

* * * * *

EXHIBIT B

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(12) EX PARTE REEXAMINATION CERTIFICATE (6563rd)

United States Patent

Rieley et al.

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(54) METHOD AND APPARATUS FOR TRANSMISSION AND RETRIEVAL OF FACSIMILE AND AUDIO MESSAGES OVER A CIRCUIT OR PACKET SWITCHED NETWORK

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H04M 7/00	(2006.01)
H04M 7/12	(2006.01)
H04M 3/53	(2006.01)
H04M 3/50	(2006.01)

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(58) **Field of Classification Search** ..... None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,106,060	A	8/1978	Chapman, Jr.
4,289,930	A	9/1981	Connolly et al.
4,405,829	A	9/1983	Rivest et al.
4,532,588	A	7/1985	Foster
4,713,780	A	12/1987	Schultz et al.
4,754,428	A	6/1988	Schultz et al.
4,816,653	A	3/1989	Anderl et al.
4,837,798	A	6/1989	Cohen et al.
4,853,961	A	8/1989	Pastor
4,918,722	A	4/1990	Duebren et al.
4,941,170	A	7/1990	Herbst
5,008,814	A	4/1991	Mathur
5,033,079	A	7/1991	Catron et al.
5,065,427	A	11/1991	Godbole
5,068,888	A	11/1991	Scherk et al.
5,091,790	A	2/1992	Silverberg
5,105,184	A	4/1992	Pirani et al.
5,113,430	A	5/1992	Richardson, Jr. et al.
5,113,496	A	5/1992	McCalley et al.
5,115,326	A	5/1992	Burgess et al.
5,127,003	A	6/1992	Doll, Jr. et al.
5,167,011	A	11/1992	Priest
5,175,762	A	12/1992	Kochis et al.
5,193,110	A	3/1993	Jones et al.

(Continued)

FOREIGN PATENT DOCUMENTS

DE	4309072	9/1994
EP	0554456 A1	8/1993
EP	0615368	9/1994

(Continued)

OTHER PUBLICATIONS

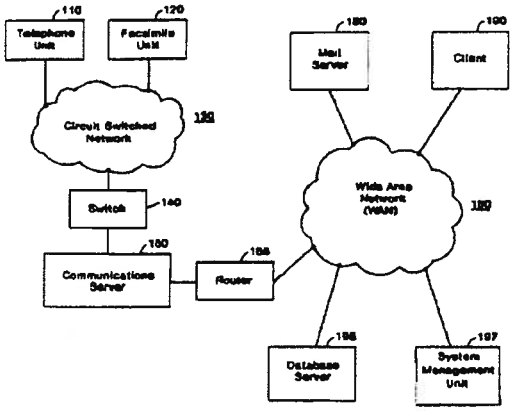
Broadhead, S., "Getting Your Fax Straight: Getting Agead of the Game With Fax Server Technology", Network Computing, Feb. 1998, pp. 46–8, 50, vol. 6, No. 2, Business and Technical Communications, UK.

(Continued)

Primary Examiner—Roland G Foster

(57) **ABSTRACT**

A method and apparatus for accepting an incoming message over a circuit switched network and transmitting it over a packet switched network. The apparatus including means for implementing the steps of receiving an incoming call signal along with a inbound address; determining a user account and a final address on said packet switched network associated with said inbound address; allocating a message processing resource; processing said incoming call into a processed message; and, sending said processed message to said final address.



U.S. PATENT DOCUMENTS

5,195,085	A	3/1993	Bertsch et al.
5,224,156	A	6/1993	Fuller et al.
5,241,594	A	8/1993	Kung
5,247,591	A	9/1993	Baran
5,247,661	A	9/1993	Hager et al.
5,255,312	A	10/1993	Koshishi
5,257,112	A	10/1993	Okada
5,274,635	A	12/1993	Rahman et al.
5,276,869	A	1/1994	Forrest et al.
5,283,887	A	2/1994	Zachery
5,289,472	A	2/1994	Cho
5,291,302	A	3/1994	Gordon et al.
5,291,546	A	3/1994	Giler et al.
5,293,250	A	3/1994	Okamura et al.
5,297,208	A	3/1994	Schlafly et al.
5,299,255	A	3/1994	Iwaki et al.
5,317,628	A	5/1994	Misholi et al.
5,333,266	A	7/1994	Boaz et al.
5,339,156	A	8/1994	Ishii
5,349,636	A	9/1994	Irribarren
5,351,276	A	9/1994	Doll, Jr. et al.
5,355,472	A	10/1994	Lewis
5,367,621	A	11/1994	Cohen et al.
5,379,374	A	1/1995	Ishizaki et al.
5,394,460	A	2/1995	Olson et al.
5,404,231	A	4/1995	Bloomfield
5,406,557	A	4/1995	Baudoin
5,418,908	A	5/1995	Keller et al.
5,424,724	A	6/1995	Williams et al.
5,459,584	A	10/1995	Gordon et al.
5,471,617	A	11/1995	Farrand et al.
5,475,738	A	12/1995	Penzias
5,479,411	A	12/1995	Klein
5,479,491	A	12/1995	Herrero Garcia et al.
5,483,466	A	1/1996	Kawahara et al.
5,483,524	A	1/1996	Lev et al.
5,483,580	A	1/1996	Brandman et al.
5,495,610	A	2/1996	Shing et al.
5,497,373	A	3/1996	Hulen et al.
5,509,123	A	4/1996	Dobbins et al.
5,513,323	A	4/1996	Williams et al.
5,524,137	A	6/1996	Rhee
5,526,353	A	6/1996	Henley et al.
5,530,740	A	6/1996	Irribarren et al.
5,530,852	A	6/1996	Meske, Jr. et al.
5,542,289	A	8/1996	Sharma
5,544,320	A	8/1996	Konrad
5,555,100	A	9/1996	Bloomfield et al.
5,557,659	A	9/1996	Hyde-Thompson
5,559,611	A	9/1996	Bloomfield et al.
5,568,540	A	10/1996	Greco et al.
5,572,643	A	11/1996	Judson
5,590,178	A	12/1996	Murakami et al.
5,604,788	A	2/1997	Tett
5,608,786	A	3/1997	Gordon
5,621,727	A	4/1997	Vaudreuil
5,625,675	A	4/1997	Katsumaru et al.
5,630,060	A	5/1997	Tang et al.
5,630,061	A	5/1997	Richter et al.
5,633,916	A	5/1997	Goldhagen et al.
5,634,005	A	5/1997	Matsuo
5,647,002	A	7/1997	Brunson
5,654,957	A	8/1997	Koyama
5,673,316	A	9/1997	Auerbach et al.
5,675,507	A	10/1997	Bobo, II
5,677,955	A	10/1997	Doggett et al.
5,687,220	A	11/1997	Finnigan
5,689,550	A	11/1997	Garson et al.
5,692,039	A	11/1997	Brankley et al.
5,694,458	A	12/1997	Okada
5,710,883	A	1/1998	Hong et al.
5,712,901	A	1/1998	Meermans
5,712,903	A	1/1998	Bartholomew et al.
5,717,742	A	2/1998	Hyde-Thompson
5,724,410	A	3/1998	Parvulescu et al.
5,727,156	A	3/1998	Herr-Hoyman et al.
5,737,395	A	4/1998	Irribarren
5,737,396	A	4/1998	Garcia
5,742,596	A	4/1998	Baratz et al.
5,751,791	A	5/1998	Chen et al.
5,751,814	A	5/1998	Kafri
5,751,956	A	5/1998	Kirsch
5,768,528	A	6/1998	Stumm
5,774,668	A	6/1998	Choquier et al.
5,781,614	A	7/1998	Brunson
5,781,901	A	7/1998	Kuzma
5,787,175	A	7/1998	Carter
5,790,790	A	8/1998	Smith et al.
5,790,793	A	8/1998	Higley
5,793,972	A	8/1998	Shane
5,805,298	A	9/1998	Ho et al.
5,812,639	A	9/1998	Bartholomew et al.
5,819,295	A	10/1998	Nakagawa et al.
5,870,549	A	2/1999	Bobo, II
5,872,845	A	2/1999	Feder
5,872,926	A	2/1999	Levac et al.
5,893,908	A	4/1999	Cullen et al.
5,903,723	A	5/1999	Beck et al.
5,911,776	A	6/1999	Guck
5,930,493	A	7/1999	Ottessen et al.
5,933,412	A	8/1999	Choudhury et al.
5,933,490	A	8/1999	White et al.
5,937,161	A	8/1999	Mulligan et al.
5,940,476	A	8/1999	Morganstein et al.
5,946,386	A	8/1999	Rogers et al.
5,960,085	A	9/1999	de la Huerga
5,963,618	A	10/1999	Porter
5,987,508	A	11/1999	Agraharam et al.
5,991,292	A	11/1999	Focsaneanu et al.
5,996,006	A	11/1999	Speicher
5,999,594	A	12/1999	Mizoguchi et al.
6,009,173	A	12/1999	Sumner
6,009,469	A	12/1999	Mattaway et al.
6,020,980	A	2/2000	Freeman
6,023,345	A	2/2000	Bloomfield
6,025,931	A	2/2000	Bloomfield
6,028,679	A	2/2000	Murphy
6,032,192	A	2/2000	Wegner et al.
6,035,332	A	3/2000	Ingrassia, Jr. et al.
6,052,367	A	4/2000	Bowater et al.
6,052,442	A	4/2000	Cooper et al.
6,055,530	A	4/2000	Sato
6,061,448	A	5/2000	Smith et al.
6,064,723	A	5/2000	Cohn et al.
6,069,890	A	5/2000	White et al.
6,072,862	A	6/2000	Srinivasan
6,084,892	A	7/2000	Benash et al.
6,084,952	A	7/2000	Beerman, Jr. et al.
6,108,329	A	8/2000	Oyama et al.
6,181,781	B1	1/2001	Porter
6,192,407	B1	2/2001	Smith et al.
6,212,550	B1	4/2001	Segur
6,215,550	B1	4/2001	Baer et al.
6,229,884	B1	5/2001	Toyoda et al.
6,233,318	B1	5/2001	Picard et al.
6,240,454	B1	5/2001	Nepustil
6,259,533	B1	7/2001	Toyoda et al.
6,282,270	B1	8/2001	Porter
6,285,777	B2	9/2001	Kanevsky et al.
6,295,552	B1	9/2001	Shibata
6,301,245	B1	10/2001	Luzeski et al.

6,301,339	B1	10/2001	Staples et al.	
6,304,636	B1	10/2001	Goldberg et al.	
6,330,323	B1 *	12/2001	Gottlieb et al.	379/220.1
6,360,256	B1	3/2002	Lim	
6,411,696	B1	6/2002	Iverson et al.	

FOREIGN PATENT DOCUMENTS

EP	0835021 A1	4/1998
JP	2237338	9/1990
JP	4018844	1/1992
JP	4111557	4/1992
JP	4150351	5/1992
JP	4265040	9/1992
JP	5244292	9/1993
JP	6164645	6/1994
JP	7023057	1/1995
JP	7058845	3/1995
JP	7288668	10/1995
JP	8111692	4/1996
JP	8130601	5/1996
JP	8237294	9/1996
JP	8237297	9/1996
JP	8256235	10/1996
JP	8286991	11/1996
JP	8336053	12/1996
JP	9170288	1/1997
JP	9046369	2/1997
JP	9102798	4/1997
JP	9200251	7/1997
WO	WO 95/31060	11/1995
WO	WO 96/27160	9/1996
WO	WO 96/27967	9/1996
WO	WO 96/34341	10/1996
WO	WO 97/23082 A1	6/1997
WO	WO 98/17041 A2	4/1998
WO	WO 98/23058 A2	5/1998

OTHER PUBLICATIONS

SHAREWARE.COM., "Search Results", Dec. 5, 1996, <http://www.search.shareware.com/code/...mail+fax+&category=All-Categories>.

JFAX Personal Telecom, "Get All Your Voice-Mail and Faxes in Your E-Mail", Dec. 4, 1996, <http://www.jfax.net/>.

JFAX Personal Telecom, "Free Downloads JFAX Communicator Software!", Dec. 4, 1996, <http://www.jfax.net/software.htm/>.

JFAX Personal Telecom, "What the Media Says About JFAX Personal Telecom", Oct. 31, 1996, <http://www.jfax.net/>.

Yahoo, Inc., "NetScan Kofax", Yahoo! Internet Life, Jan. 1997, p. 73, vol. 3, No. 1., ttp://www.yil.com/>.

Netscan, Kofax, "The Easy Way to Share A Scanner", Dec. 13, 1996, <http://www.netscan.kofax.com/>.

Sheng, Guo Zhen, et al., "Intranet-Based Mail Fax Gateway Technology", 1997 IEEE International Conference on Intelligent Processing Systems, Oct. 28-31, 97TH8335 vol. 2 of 2, pp. 1607-1611, Beijing, China.

Public-Key Cryptography Standards (PKCS), An RSA Laboratories Technical Note, Revised Nov. 1, 1993, downloaded from the Internet at www.ftp.rsa.com, on Oct. 1, 1998.

Nakamura, D., "AT&T Introduces Most Comprehensive Fax-to-Data Service" dated Feb. 22, 1996, downloaded from Internet at http://www.att.com/press/0296/960222.ela.html on May 16, 1997.

"Bibliography of Publications on the Andrew User Interface System," downloaded from the internet at ftp.andrew.cmu.edu/pub/AUIS/PAPERS/BIBLIOGRAPHY, on May 13, 2002.

"Biscom Introduces the Efax Machine: the E-mail/Facsimile Solution for the Rest of Us," FAXCOM, Sep. 19, 1996.

"C3 Launches its Advanced ITmail Multi-media Messaging System for Desk Top PC's," Computer and Communications Company Ltd., Jun. 1993.

Rivest, R. "Chaffing and Winnowing: Confidentiality without Encryption," downloaded from the Internet at www, theory.lcs.mit.edu, on Jul. 13, 1999.

Ohio State University, C.S.E., "comp.mail.mime meta-FAQ: Help for MIME problems," downloaded from the Internet at www.cis.ohio-state.edu/text/faq/usenet/mail/mimefaq/part1/faq.html, Jun. 11, 1997.

"comp.mail.mime frequently asked questions list (FAQ) (1/3)," downloaded from the Internet at www.ru-chem-nitz.del-fri/mime/FAQ-1.HTMK, Sep. 4, 1994.

"Composing and Sending MIME Message," downloaded from the Internet at www.gieldasgarage.com/mh/cosemime.htm on Apr. 2, 1999.

"Cryptography Systems," downloaded from the Internet at www.elock.com.

"Digital Note Fax2Net R5S 1—A Beginners Guide to Digital Mail Fax," Digital Mail Limited, Oct. 31, 1996.

Facts on File re Andrew: downloaded from the Internet at www.cs.cmu.edu:80/afs/cs.cmu.edu/project/atk-fip/web/fax-onfile.html.

"Hotmail Introduces hotmail WebCourier Direct Content Delivery Service," Business Wire, pp. 020330123, Mar. 1997.

"How does the S/MIME encryption and digital signature process work?" downloaded from the Internet at www.worldtalk.com, on Jul. 25, 1999.

"How Posta Works," downloaded from the Internet at www.tumbleweed.com/posta/posta.overview.html on Aug. 11, 2005.

J. Duffy, "IBM's SAA Gets Voice: Company to Expand Enterprise Networking Horizons," Computer Systems News, p. 1, May 14, 1990.

"Information Technology—Text and Office Systems—Distributed Office Applications Model: Part 2; Distinguished-object-reference and Associated Procedures," International Standard ISO/IEC 10031-2:1-13, 1991.

"Information Technology—Text and office systems—Distributed-office-applications model—Part 1: General model," International Standard ISO/IEC 10031-1:1-73, 1991 (E).

"Ipswitch Delivers the First Internet-Ready Messaging Server for Windows NT that Allows Access to E-Mail via the Web,"PR Newswire, pp. 1209NEM007 Dec. 9, 1996.

"Frequently Asked Questions", JFax Personal Telecom, downloaded from Internet at www.jfax.net./faq.htm on Oct. 31, 1996.

N. Ballard, "@ The Paperless Office", JFax Personal Telecom, downloaded from the Internet at wwwjfax.net/ballard1.htm on Oct. 31, 1996.

"JFax Personal Telecom—Plug a Phone Into Your E-Mail," downloaded from Internet at www.jfax.com on Oct. 31, 1996.

"Keys and Certificates," downloaded from the Internet at www.elock.com, 1998.

"Lan-Aces, Inc. Announces Expanded Capabilities to Office-Logic Clerk Application," PR Newswire, May-Jun. 1994.

J. Lyle, "Internet Fax Software: Internet Fax Utility Offers Simplified Faxing to E-Mail Addresses", Lumina News, Sep. 3, 1996, downloaded from Internet at http://www.lumina2000.com/lumina/press93.html printed on Jun. 11, 1997.

"Delivering Unified Messaging Solutions on the Internet", Media Mail, Nov. 2, 1996, downloaded from Internet at www.web.archive.org/web/19961219051l3/http://222/medialmail.com on Mar. 2, 2005.

"Methology for Mail Delivery in a Multi-Media Environment," IBM Technical Disclosure Bulletin, Apr. 1993, pp. 507-508.

"Microsoft Messaging Application Pro Interface (MAPI)," downloaded from the Internet at www.mmicrosof-com/win32dev/apiext/mapiwp.html on Mar. 22, 1999.

"New Features in Mosaic 2.0," Internet Publication, downloaded from http://www.Issl.com. Dec. 1994.

"Overview of the Trans-Virtual Enterpriser Server," Product Overview.

"Reading MIME Messages," downloaded from the Internet at www.gieldasgarage.com/mh/cosemime.htm on Apr. 2, 1999.

"S/MIME Frequently Asked Questions," downloaded from the Internet at www/rsa.com, on Jul. 23, 1999.

"S/MIME Frequently Asked Questions," downloaded from the Internet at www.rsa.com, on Nov. 16, 1999.

"S/MIME Or Open PGP? How Will You Secure Your E-mail?" downloaded from the Internet at www.worldtalk.com, 1998.

"ScanFX-Scanning Hardware for Internet E-Mail," Our Business Machines, Inc., OBM's Editorial Resource Chest, Aug. 1996, Irwindale, CA.

J. Kravitz, "SDML-Signed Document Markup Language," Financial Services Technology Consortium, W3C Note Jun. 19, 1998, downloaded from the Internet at www.23.org, on Jun. 19, 1998.

"The Andrew Messages System," downloaded from the Internet at www.cs.cmu.edu/afs/cs.cmu.edu/project/atk-ftpl/web/ams.html on May 12, 1999.

"The Andrew Publication Archive," downloaded from the internet at ftp.andrew.cmu.edu/pub/AUIS/PAPERS/REDME on May 13, 2002.

"Three Pronged Strategy for Octel, as it Integrates VMX and Moves from Core Market to New Territories," Computergram International, Aug. 1995, n.2719, ComputerWire, Inc.

"Web Mail," Information Week, p. 120, Dec. 16, 1996.

"Welcome to the Andrew Consortium," downloaded from the internet at www.cs.cmu.edu:80/afs/cs.cmu.edu/project/atk-ftp/web/andrew-home-html on May 12, 1999.

"Working with AT&T Easylink, An Effective Communication Solution for Business," PC Today 62, May 1995.

"Word Wide Web Frequently Asked Questions," from URL http://sunsite.unc.edu/boutell/faq/www.faq.html, Dec. 9, 1994.

A. Poggio et al., "CCWS: A Computer-Based, Multimedia Information System," Multimedia Communications, pp. 92-103, Oct. 1985.

A. Reinhardt, "Smarter E-Mail Is Coming," BYTE Magazine, pp. 90-108, Mar. 1993.

A. N. Boston et al., "Interactive species distribution reporting, mapping, and modeling using the World Wide Web," Computer Networks and ISDN Systems, 28, pp. 231-238, 1995.

A. Singleton, "The Virtual Storefront," BYTE Magazine, Jan. 1995.

B. Costales, et al., "sendmail," O'Reilly & Associates, Inc., Sebastopol, CA, 1993.

B. Friesenhahn, "Build Your Own WWW Server," BYTE Magazine, Apr. 1995.

B. S. Kaliski Jr., "An Overview of the PKCS Standards," RSA Laboratories Technical Note, RSA Security, Inc. Public-Key Cryptography Standards (PKCS), Revised Nov. 1, 1993.

B. Smith, "Internet with Style," BYTE Magazine, Jan. 1995.

B. Smith, "Making the Internet Connection," BYTE Magazine, Jan. 1995.

B. Wiegel, "Secure External References in Multimedia Email Message," 3rd ACM Conference on Computer and Communications Security, New Delhi, India, Mar. 14-16, 1996.

Borenstein, Nathaniel S., "Internet Multimedia Mail with MIME: Emerging Standards for Interoperability," Upper Layer Protocols, Architectures and Applications, 1992, pp. 183-192. Elsevier Science Publishers B.V. (North-Holland).

C. Ellison, et al., "Default Protecting Secret Keys with Personal Entropy," Mar. 3, 1999.

C. Liu, et al., "Managing Internet Information Services," World Wide Web, Gopher, FTP, and more: 357-359, Dec. 1994.

C. Manros, "New Internet Mail Functionality for Delivery Status Notifications," Messaging Magazine, Jul./Aug. 1995.

C. R. Baudoin, "The Sematech Electronic Mail System," Proceedings of the Digital Equipment Computer Users Society, pp. 221-231, USA, Spring 1989.

D. Rush, "Announce: Voice Mail, Email & Fax Integration Over the Web," Google Groups: biz next newprod, Mar. 19, 1996, http://groups-beta.google.com/group/biznextnewprod/mso/db3c129fdo394667?dmode=source, Mar. 2, 2005.

D. Rush, "Voice Mail Email & Fax Integration Over the Web," Google Groups: biz next newprod, Mar. 25, 1996, http://groups-beta.google.com/group/biznextnewprod/mso/d85b59d49e92318b?dmode=source, Mar. 2, 2005.

E. Spire, 'Fax→E-mail' Google Groups, http://groups-beta.google.com/group/comp.acom.telecom,Dec. 20, 1995.

K. Moore, "MIME (Multipurpose Internet Mail Extensions) Part Two: Message Header Extensions for Non-ASCII Text," Network Working Group, RFC 1522, Sep. 1993.

MHonArc Home Page updated Nov. 17, 1994 and MHonArc software manual published by Earl Hood ehood@convex.com Convex Computer Corporation, Richardson Texas.

R. Schockey, "Fax→E-mail Plus Voice Mail Also?" Google Groups, http://groups-beta.google.com/group/comp.doom.telecom, Dec. 28, 1995.

R. Schockey, "Fax→E-mail Plus Voice Mail Also?" Google Groups, http://groups-beta.google.com/group/comp.doom.telecom/msg/7cb6ab0035e113c2?dmode=source, Dec. 28, 1995.

R. Schockey, "Fax→E-mail→Voice Continued," Google Groups, http://groups-beta.google.com/group/comp.doom.telecom/msg/1a2c73a37bc90e6b?dmode=source, Jan. 9, 1996.

S. Sreenivasan "Cybertimes German Pop Singer Sets Sights on Virtual Office," Sep. 23, 1996, downloaded from The New York Times CyberTime website.

Cope, "Working with . . . Fax Mailbox," *PCTToday*, vol. 8, Issue 9, Sep. 1994.

D. H. Crocker, "Standard for the Format ofARPA Internet Text Message," RFC 822, 1982.

D. W. Connolly, "A Formalism for Internet Information References," downloaded from the Internet at www.w3.org/People/Connolly/drafts/formalism.txt on Feb. 8, 1995.

D. P. Dern, "Applying the Internet," BYTE Magazine, Feb. 1992.

Delrina Advertisement, 1994.

E. Levinson, "Exchanging SGML Documents Using Internet Mail and MIME," Computer Standards & Interfaces, 18, pp. 93–102, 1996.

E. Meyer, et al., "Borealis Image Server," Computer Networks and ISDN Systems, 28 pp. 1123–1137, 1996.

H. Pusch, "Design and implementation of a global reference mechanism for data objects," Computer Standards & Interfaces, 17, pp. 181–192, 1995.

Internet Engineering Task Force, R. Braden (ed.), "Requirements for Internet Hosts–Application and Support," Network Working Group, RFC 1123, Oct. 1989.

J. Davis, et al., "Drop in Publishing With the World Wide Web," Computer Networks and IDSN Systems, 28 pp. 247–255, 1995.

J. December, et al., "The World Wide Wide; Everything You Need to Master the Web!": 180–189–part I and 277–280 (part II), 1994.

J. Donahue, et al., "Walnut: Storing Electronic Mail in a Database," Xerox Park, CSL–85–9, Nov. 1985.

J. K. Reynolds, et al., "The DARPA Experimental Multimedia Mail System," Computer: 92–89, 1985.

J. Klensin, "Simple Mail Transfer Protocol," Internet Draft, draft–ietf–drums–02.txt, May 21, 1996.

J. Myers, et al., "Post Office Protocol—Version 3," Network Working Group, RFC 1725, Nov. 1994.

J. Pan, "Internet Security & Firewall Issues for NIIIP Virtual Enterprise," NIIIP OMB Meeting, Boca Raton, FL, Jan. 23–25, 1996.

J. Peek, et al., "MH & xmh, Email for USOIS &: Programmers," O'Reilly & Associates, Inc., Sebastopol, CA, 1995.

J. Postel, et al., "An Experimental Multimedia Mail System," ACM Transactions on Office Information Systems, vol. 6, No. 1, Jan. 1998.

J. Rosenberg, et al., An Overview of the Andrew Message System; Computer Communications Review, vol. 17:5, pp. 99–108, Apr. 1988.

J. B. Postel, RFC 0821, Simple Mail Transfer Protocol, HTTP://rfo–koeln.de/html, 80 pages, Aug. 1982.

J.K. Reichard, Leveraging E–Mail: PC Magazine: 241, 244 and 245 (May 1995).

Kent, J. "Browsing Electronic Mail: Experiences Interfacing a Mail System to a DBMS," Proceedings of the Fourteenth International Conference on Very Large Data Base, Los Angeles, CA, pp. 112–123, 1988.

J.R Vacca, "Mosaic: Beyond Net Surfing," BYTE Magazine, Jan. 1995.

K. Goldberg, "Beyond the Web: Manipulating the Real World," Computer Networks and IDSN Systems, 28, pp. 209–219, 1995.

K. Hofrichter, et al., "The BERKOM Multimedia–Mail Teleservice," Proceedings of the Fourth Workshop on Future Trends of Distributed Computing Systems, Lisbon, Portugal, pp. 23–30, Sep. 22–24, 1993.

K. Moore, "SMTP Service Extension for Delivery Status Notifications," Network Working Group, Internet–Draft of RFC 1891, Sep. 21, 1995.

K. Moore, et al., "An Extensible Message Format for Delivery Status Notifications," Network Working Group, Internet Draft, Sep. 1995.

K. Sollins et al., "Functional Requirements for Uniform Resources Names," Network Working Group, RFC 1737 Dec. 1994.

K.M. Savetz, "Magazines Without Paper," BYTE Magazine, Sep. 1993.

K.S. Morris, "A Technical Overview of MIME," Web Developer's Journal Archives, Mar. 1995.

M. Grand, "MIME Overview," downloaded from the Internet at www.mindspring.com/mgrand/mime.html, revised Oct. 26, 1993.

M. Rio, et al., "A framework for broadcasting and management of URIs," Computer Networks and ISDN Systems, 28, pp. 535–542, 1996.

M. Sherman, et al., "Buildings Hypertext on a Multimedia Toolkit: An Overview of Andres Toolkit Hypermedia Facilities," Proceedings of the First European Conference on Hypertext, pp. 13–24, France, Nov. 1990.

M. Sherman, et al., "Allocation of User–Interface Resources in the Andrew Toolkit," International Conference on Multimedia information Systems, pp. 161–272, 1991.

N. Borenstein et al., "MIME: Mechanisms for Specifying and Describing the Format of Internet Message Bodies," Nework Working Group, REC 1341, Jun. 1992.

N. Borenstein, "MIME (Multipurpose Internet Mail Extensions) Part One: Mechanisms for Specifying and Describing the Format of Internet Message Bodies," Network Working Group, RFC 1521, Sep. 1993.

N. Borenstein, et al., "A Multi–media Message System for Andrew," USENIX Winter Conference, Dallas, TX, pp. 37–42, Feb. 9–12, 1988.

N. Freed, et al., "Definition of the URL MIME External–Body Access–Type," Network Working Group, Internet Draft of RFC 2017 (Apr. 11, 1995) see also N. Freed et al., "Definition of the URL MIME External–Body Access–Type," Network Working Group, RFC 2017, Oct. 1996.

Novell Announces "Softsolutions" 4.1," PR Newswire, New Orleans, LA, May 9, 1995.

R.J. Vetter et al., "Mosaic, HTML, and the World Wide Web," IEEE Computer, 27, 1994.

S. Baker, "Hypertext Browsing on the Internet," UNIX Review: 21–27, 1994.

S. Baker, "Mosaic–Surfing at Home and Abroad," Meet the Shadow Future: 159–163, 1994.

S. Bradner, "The Internet Standards Process—Revision 3," Network Working Group, RFC 2026, 1996.

S. J. Vaughan–Nichols, "Internet Publishing Tools Proliferate," BYTE Magazine, Mar. 1995.

S. Sakata, et al., "A Distributed Interoffice Mail System," Multimedia Communications, pp. 106–116, Oct. 1985.

S.B. Jones, "Caught in the World Wide Web: MIT Moves Computer Documentation Online," Meet the Shadow Future: 187–189, 1994.

S.J. Vaughan-Nichols, "The Web Means Business," BYTE Magazine, Nov. 1994.

Schwartz, Barry K. and Stephen B. Weinstein, "Dual-Media Messaging Using Screen Telephone on the Telephone Network," IEEE International Conference on Communications '93, May 23-26, 1993, pp. 1183-1188, Technical Program, Conference Record, vol. 2/3.

T. Berners-Lee, "Universal Resources Identifier in WWW. A Unifying Syntax for the Expression and Address of Objects on the Network as used in the World-Wide-Web," Network Working Group, RFC 1630, Jun. 1994.

T. Berners-Lee, et al., "Hypertext Markup Language (HTML): A Representation of Textual Information and Metainformation for Retrieval and Interchange," Internet Draft, IIIR Working Group, 1993.

T. Berners-Lee, et al., "Hyptertext Markup Language-2.0," Network Working Group, RFC 1866, Nov. 1995.

T. Berners-Lee, et al., "Uniform Resource Locators (URL)," Network Working Group, RFC 1738, Dec. 1994.

T. W. Yan, et al., "From user access patterns to dynamic hypertext linking," Computer Networks and ISDN Systems, 28 pp. 1007-1014, 1996.

University of Cambridge Statistical Laboratory, "Using Mosaic for Xwindows," Internet Publication, Jul. 1994, downloaded from http://www.statslab.cam.ac.uk.

V. Gay et al., "Conception of a Multimedia Electronic Mail Based on Standards," Proceedings of the Fourth Workshop on Future Trends of Distributed Computing Systems, Sep. 22-24, 1993.

V.S. Wheatman, "Sorting Through the Secure Messaging Maze," Messaging Magazine, downloaded from the Internet at www.ema.org/html/pubs/nunv4n2/msgmaze.htm, Mar.-Apr. 1998.

Warren, "Voice/fax Combos," *Computer Technology*Sep./Oct. 1994, p. 88.

E. Moeller, et al., "The BERKOM multimedia-mail teleservice," Computer Communications, vol. 18:2, pp. 89-102, Feb. 1995.

G. Vaudreuil, "The Multipart/Report Content Type for the Reporting of Mail System Administrative Messages," Network Working Group, Internet Draft, Sep. 1995.

G. Vaudreuil, "Enhanced Mail System Status Codes," Network Working Group, Internet Draft, Jun. 1995.

"Plaintiff's Opposition claim Construction Brief" in *j2 Global Communications, Inc.* v. *Venali, Inc.* CV 04-1172 (DDP) (AJWx).

"Brief in Opposition to Plaintiff J2's Opening Claim Construction Brief" in *j2 Global Communications, Inc.*, v. *Venali, Inc.* CV 04-1172 (DDP) (AJWx).

"Plaintiff's Opening Claim Construction Brief" in j2 Global Communications, Inc., CV 04-1172 (DDP) (AJWx).

"Opening Claim Construction Brief" in *j2 Global Communication, Inc.* v. *Venali, Inc.*, CV 04-1172 (DDP) (AJWx).

"Plaintiff's Opening Markman Brief" in *j2 Global Communication, Inc.* v. *CallWave, Inc.*, CA 04-7068 DDP AJWx.

"Plaintiff's Opposition Markman Brief" in *j2 Global Communications, Inc.* v. *CallWave, Inc.*, CA 04-7068 DDP AJWx.

"Defendant CallWave, Inc.'s Opening Claim Construction Brief" in *j2 Global Communications, Inc.* v. *CallWave, Inc.*, CA 04-7068 DDP AJWx.

"Defendent CallWave Opposition to Plaintiff j2's Opening Markman Brief" in *j2 Global Communications, Inc.* v. *CallWave, Inc.*, CA 04-7068 DDP AJWx.

"Declaration of Professor Walter Scacchi Regarding Defendant CallWave, Inc.'s Opening Claim Construction Brief" in *j2 Global Communications, Inc.* v. *CallWave, Inc.*, CA 04-7068 VBKx.

Stuart Melnitsky, Fax Server Face Off, in Network World, Apr. 15, 1996, pp. 43-45.

Stephen Loudermilk, Trio Set to Roll Out Fax Gear for LANs, in PC Week, Aug. 17, 1992, pp. 47-48.

Wayne Rash, The Fax of the Matter, in Information Week, May 20, 1996.

Yvonee L. Lee, Vendors Showcase Integrated Telepony Solutions, in Infoworld, at vol. 18, No. 10, p. 18 (Mar. 4, 1996).

Author Unknown, Call and Voice Processing PC Board Roundup (Buyers Guide), in Teleconnect, Dec. 1995, v13, n12, pp. 1-6.

Andrew Eberle, The Path Taken: Inbound Routing, in Network World, p. 101.

Chance Fullner et al., A TCP/IP Network Facsimile System Built from Publicly Available Software, in Association for Computing Machinery (ACM), 1992. ref. No. ACM 089791-472-4/92/0002/525, pp. 525-529.

Ed Liebowitz, The Dialogic VAR Parade; Open Voice Processing for Art Dealers, the Blind, the Dallas Cowboys and the RBOCs, in Teleconnect, Apr. 1993, v11, n4, p. 40(3).

Paul Kinnucan, What's New in the Fax World, in Systems Integration, Feb. 1990, v23, n2, p. 50(7).

* cited by examiner

EX PARTE REEXAMINATION CERTIFICATE ISSUED UNDER 35 U.S.C. 307

THE PATENT IS HEREBY AMENDED AS INDICATED BELOW.

Matter enclosed in heavy brackets [ ] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in italics indicates additions made to the patent.

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1 and 13 are determined to be patentable as amended.

Claims 2–12 and 14–22, dependent on an amended claim, are determined to be patentable.

New claims 23–40 are added and determined to be patentable.

1. A system comprising:

a set of switches coupled to a circuit switched network for receiving a set of incoming call signals, wherein [the] *each* incoming call signal includes an inbound address *uniquely associated with a user account and at least one destination address on a packet switched network*, and wherein a switch in the set of switches redirects an incoming *call* signal, *including the inbound address*, from a first communications server to a second communications server if a first condition occurs; and,

a set of communications servers coupled to the set of switches for receiving the set of incoming call signals, each communications server being coupled to a *packet switched* network and containing a message processing resource configured to process a received audio message *contained within a particular one of the incoming call signals* into a digital representation, wherein each communications server further comprises a trunk line interface to extract [the] *a particular* inbound address *from the particular one of the incoming call signals* and *wherein the second communications server* stores the *particular* inbound address[,a set of final destination addresses] *and the at least one destination address* and account status *information uniquely associated with the particular inbound address and the user account*, and the message processing resource is further configured to determine, based on the *particular* inbound address, [a] *the* user account and [a] *the at least one* destination *address* on [a] *the* packet switched network and *to* send the digital representation to the *at least one* destination *address*,

wherein the *particular* inbound address is assigned to the *particular* user account and the [outbound address] *at least one destination address* comprises at least one email address.

13. A method comprising:

receiving a first incoming call signal destined for a first communications server for processing of an audio message into a digital representation;

determining if a first condition has occurred;

redirecting the first incoming call signal from the first communications server to a second communications server based on the determining of the first condition, wherein the *first* incoming call signal includes [an] *a particular* inbound address *uniquely associated with a user account and at least one destination address on a packet switched network, and wherein the particular inbound address remains unchanged during the redirecting*;

extracting the *particular* inbound address;

determining, based on the *particular* inbound address, a user account status and [a] *the at least one* destination *address* on [a] *the* packet switched network; and,

sending the digital representation to the *at least one* destination *address*, wherein the *particular* inbound address is *uniquely* assigned to the user account and the *at least one* destination *address* comprises at least one email address.

23. A method comprising:

receiving a first incoming call signal destined for a first communications server for processing of an audio message into a digital representation;

using a system management unit to communicate with the first communications server to determine if a first condition has occurred;

using the system management unit to re-allocate resources by redirecting the first incoming call signal from the first communications server to a second communications server based on the determining of the first condition, wherein the first incoming call signal includes a particular inbound address uniquely associated with a user account and at least one destination address on a packet switched network, and wherein the particular inbound address remains unchanged during the redirecting;

extracting the particular inbound address;

determining, based on the particular inbound address, a user account status and the at least one destination address on the packet switched network; and,

sending the digital representation to the at least one destination address, wherein the particular inbound address is uniquely assigned to the user account, the at least one destination address comprises at least one email address and the system management unit ensures that the digital representation is routed to the at least one email address.

24. The method of claim 23, where the audio message is a facsimile message and the digital representation of the audio message is a graphics file.

25. The method of claim 23, further including:

determining if the audio message contains a facsimile message or a voice message; and

digitizing the audio message if the audio message contains the voice message and receiving the facsimile message if the audio message contains the facsimile message.

26. A method comprising:

receiving a first incoming call signal destined for a first communications server for processing of an audio message into a digital representation;

determining if a first condition has occurred;

redirecting the first incoming call signal from the first communications server to a second communications server based on the determining of the first condition, wherein the first incoming call signal includes a particular inbound address uniquely associated with a user account and at least one destination address on a

packet switched network, and wherein the particular inbound address remains unchanged during the redirecting;

re-assigning all users being handled by the first communications server to the second communications server if the first condition includes a malfunction of the first communications server;

off-loading only incoming calls for which the first communications server does not have available resources to process if the first condition includes an overloading of the first communications server;

extracting the particular inbound address;

determining, based on the particular inbound address, a user account status and the at least one destination address on the packet switched network; and

sending the digital representation to the at least one destination address, wherein the particular inbound address is uniquely assigned to the user account and the at least one destination address comprises at least one email address.

27. The method of claim 26, where the audio message is a facsimile message and the digital representation of the audio message is a graphics file.

28. The method of claim 26, further including:

determining if the audio message contains a facsimile message or a voice message; and

digitizing the audio message if the audio message contains the voice message and receiving the facsimile message if the audio message contains the facsimile message.

29. A method comprising:

receiving a first incoming call signal destined for a first communications server for processing of an audio message into a digital representation;

determining if a first condition has occurred;

using a database server to configure a second communications server to accept the first incoming call signal based on the determining of the first condition;

redirecting the first incoming call signal from the first communications server to the second communications server based on the determining of the first condition, wherein the first incoming call signal includes a particular inbound address uniquely associated with a user account and at least one destination address on a packet switched network, and wherein the particular inbound address remains unchanged during the redirecting;

extracting the particular inbound address;

determining, based on the particular inbound address, a user account status and the at least one destination address on the packet switched network; and,

sending the digital representation to the at least one destination address, wherein the particular inbound address is uniquely assigned to the user account, the at least one destination address comprises at least one email address, the database server stores a duplicate copy of the particular inbound address, the email address and the account status for a plurality of users, and the first and second communications servers store a subset of information stored on the database server.

30. The method of claim 29, where the audio message is a facsimile message and the digital representation of the audio message is a graphics file.

31. The method of claim 29, further including:

determining if the audio message contains a facsimile message or a voice message; and

digitizing the audio message if the audio message contains the voice message and receiving the facsimile message if the audio message contains the facsimile message.

32. A system comprising:

a system management unit to communicate with a first communications server to determine if a first condition has occurred;

a set of switches coupled to a circuit switched network for receiving a set of incoming call signals, wherein a particular one of the incoming call signals includes a particular inbound address uniquely associated with a user account and at least one destination address on a packet switched network, and wherein the system management unit re-allocates resources by causing a switch in the set of switches to redirect the particular one of the incoming call signals, including the particular inbound address, from the first communications server to a second communications server if the first condition occurs; and,

a set of communications servers coupled to the set of switches for receiving the set of incoming call signals, each communications server being coupled to a packet switched network and containing a message processing resource configured to process a received audio message contained within the particular incoming call signal into a digital representation, wherein each communications server further comprises a trunk line interface to extract the particular inbound address from the particular one of the incoming call signals and wherein the second communications server stores the particular inbound address and the at least one destination address and account status information uniquely associated with the particular inbound address, and the message processing resource is further configured to determine, based on the particular inbound address, the user account and the at least one destination address on the packet switched network and to send the digital representation to the at least one destination address,

wherein the particular inbound address is uniquely assigned to the user account, the at least one destination address comprises at least one email address and the system management unit ensures that the digital representation is routed to the at least one email address.

33. The system of claim 32, where the audio message is a facsimile message and the digital representation of the audio message is a graphics file.

34. The system of claim 32, where the message processing resource further comprises a processor to:

determine if the audio message contains a facsimile message or a voice message; and,

digitize the audio message if the audio message contains the voice message and receive the facsimile message if the audio message contains the facsimile message.

35. A system comprising:

a set of switches coupled to a circuit switched network for receiving a set of incoming call signals, wherein a particular one of the incoming call signals includes a particular inbound address uniquely associated with a user account and at least one destination address on a packet switched network, and wherein a switch in the set of switches redirects the particular one of the incoming call signals, including the particular inbound address, from a first communications server to a second communications server if a first condition occurs;

a system management unit to re-assign all users being handled by the first communications server to the second communications server if the first condition includes a malfunction of the first communications server, and to off-load only incoming calls for which the first communications server does not have available resources to process if the first condition includes an overloading of the first communications server; and,

a set of communications servers coupled to the set of switches for receiving the set of incoming call signals, each communications server being coupled to a packet switched network and containing a message processing resource configured to process a received audio message contained within the particular one of the incoming call signals into a digital representation, wherein each communications server further comprises a trunk line interface to extract the particular inbound address from the particular one of the incoming call signals and wherein the second communications server stores the particular inbound address and the at least one destination address and account status information uniquely associated with the particular inbound address, and the message processing resource is further configured to determine, based on the particular inbound address, the user account and the at least one destination address on the packet switched network and to send the digital representation to the at least one destination address,

wherein the particular inbound address is uniquely assigned to the user account and the at least one destination address comprises at least one email address.

36. The system of claim 35, where the audio message is a facsimile message and the digital representation of the audio message is a graphics file.

37. The system of claim 35, where the message processing resource further comprises a processor to:

determine if the audio message contains a facsimile message or a voice message; and,

digitize the audio message if the audio message contains the voice message and receive the facsimile message if the audio message contains the facsimile message.

38. A system comprising:

a set of switches coupled to a circuit switched network for receiving a set of incoming call signals, wherein a particular one of the incoming call signals includes a particular inbound address uniquely associated with a user account and at least one destination address on a packet switched network, and wherein a switch in the set of switches redirects the particular one of the incoming call signals, including the particular inbound address, from a first communications server to a second communications server if a first condition occurs;

a database server to configure the second communications server to accept the particular one of the incoming call signals based on a determining of the first condition; and,

a set of communications servers coupled to the set of switches for receiving the set of incoming call signals, each communications server being coupled to a packet switched network and containing a message processing resource configured to process a received audio message contained within the particular one of the incoming call signals into a digital representation, wherein each communications server further comprises a trunk line interface to extract the particular inbound address from the particular one of the incoming call signals and wherein the second communications server stores the particular inbound address and the at least one destination addresses and account status information uniquely associated with the particular inbound address, and the message processing resource is further configured to determine, based on the particular inbound address, the user account and the at least one destination address on the packet switched network and to send the digital representation to the at least one destination address,

wherein the particular inbound address is uniquely assigned to the user account, the at least one destination address comprises at least one email address, the database server stores a duplicate copy of the particular inbound address, the email address and the account status for a plurality of users, and the first and second communications servers store a subset of information stored on the database server.

39. The system of claim 38, where the audio message is a facsimile message and the digital representation of the audio message is a graphics file.

40. The system of claim 38, further including:

determining if the audio message contains a facsimile message or a voice message; and,

digitizing the audio message if the audio message contains the voice message and receiving the facsimile message if the audio message contains the facsimile message.

* * * * *

EXHIBIT C

US006350066B1

(12) **United States Patent**
Bobo, II

(10) **Patent No.: US 6,350,066 B1**
(45) **Date of Patent: Feb. 26, 2002**

(54) **SYSTEMS AND METHODS FOR STORING, DELIVERING, AND MANAGING MESSAGES**

(76) Inventor: **Charles R. Bobo, II**, 569 Elmwood Dr. NE., Atlanta, GA (US) 30306

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/186,595**

(22) Filed: **Nov. 5, 1998**

Related U.S. Application Data

(63) Continuation of application No. 08/944,741, filed on Oct. 6, 1997, now Pat. No. 5,870,549, which is a continuation-in-part of application No. 08/431,716, filed on Apr. 28, 1995, now Pat. No. 5,675,507.

(51) **Int. Cl.**[7] **H04N 01/413**
(52) **U.S. Cl.** **395/200.36**; 395/200.32
(58) **Field of Search** 395/200.32, 200.49, 395/200.57, 200.61, 200.68, 200.36

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,106,060	A	8/1978	Chapman, Jr.
4,918,722	A	4/1990	Duehren et al.
5,033,079	A	7/1991	Catron et al.
5,065,427	A	11/1991	Godbole
5,068,888	A	11/1991	Scherk et al.
5,091,790	A	2/1992	Silverberg
5,115,326	A	5/1992	Burgess et al.
5,175,762	A	12/1992	Kochis et al.
5,247,591	A	9/1993	Baran
5,255,312	A	10/1993	Koshiishi
5,257,112	A	10/1993	Okada
5,291,302	A	3/1994	Gordon et al.
5,291,546	A	3/1994	Giler et al.
5,317,628	A	5/1994	Misholi et al.
5,333,266	A	7/1994	Boaz et al.
5,349,636	A	9/1994	Irribarren
5,404,231	A	4/1995	Bloomfield
5,459,584	A	10/1995	Gordon et al.
5,479,411	A	12/1995	Klein
5,483,580	A	1/1996	Brandman et al.
5,497,373	A	3/1996	Hulen et al.
5,526,353	A	6/1996	Henley et al.
5,555,100	A	9/1996	Bloomfield et al.
5,559,611	A	9/1996	Bloomfield et al.
5,608,786	A	3/1997	Gordon
5,675,507	A	10/1997	Bobo, II
5,737,396	A	4/1998	Garcia
5,870,549	A	2/1999	Bobo, II

FOREIGN PATENT DOCUMENTS

WO	WO 96/34341	10/1996

OTHER PUBLICATIONS

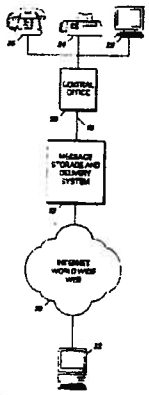
Delrina Advertisement, 1994.
"Working with...Fax Mailbox"PCToday by Jim Cope (September 1994, vol. 8, Issue 9).
Voice/Fax Combos by Stuart Warre, *Computer Telephony*, Sep./Oct. 1994, p. 88.

Primary Examiner—Thomas R. Peeso
(74) *Attorney, Agent, or Firm*—Geoff I. Sutcliffe; Kilpatrick Stockton LLP

(57) **ABSTRACT**

A Message Storage and Deliver System (MSDS) is connected to the public switched telephone network (PSTN) and receives incoming calls with these calls being facsimile, voice, or data transmissions. The MSDS detects the type of call and stores the message signal in a database. The MSDS is also connected to the Internet and has a hyper-text transfer protocol deamon (HTTPD) for receiving requests from users. The HTTPD forwards requests for certain files or messages to a network server which transmits at least part of the message to the HTTPD and then to the user. In addition to requests for certain documents, the HTTPD may also receive a request in the form of a search query. The search query is forwarded from the HTTPD to an application program for conducting the search of the database. The results of the search are forwarded through the HTTPD to the user. The user may then select one or more files or messages from the search results and may save the search for later reference.

35 Claims, 18 Drawing Sheets



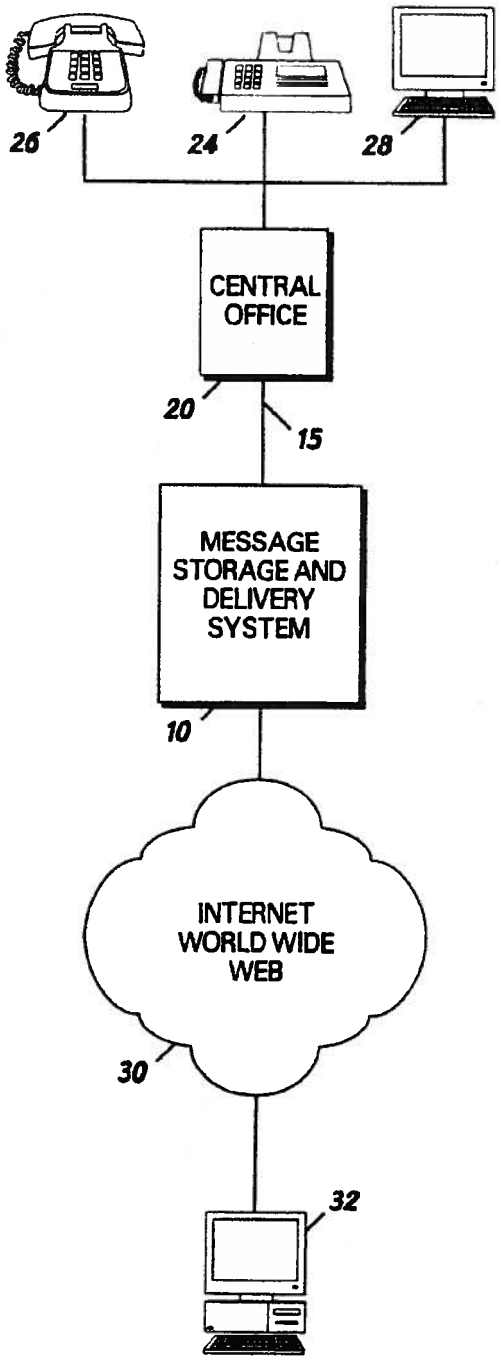

26
24
28
CENTRAL OFFICE
20
15
MESSAGE STORAGE AND DELIVERY SYSTEM
10
INTERNET WORLD WIDE WEB
30
32

FIG 1

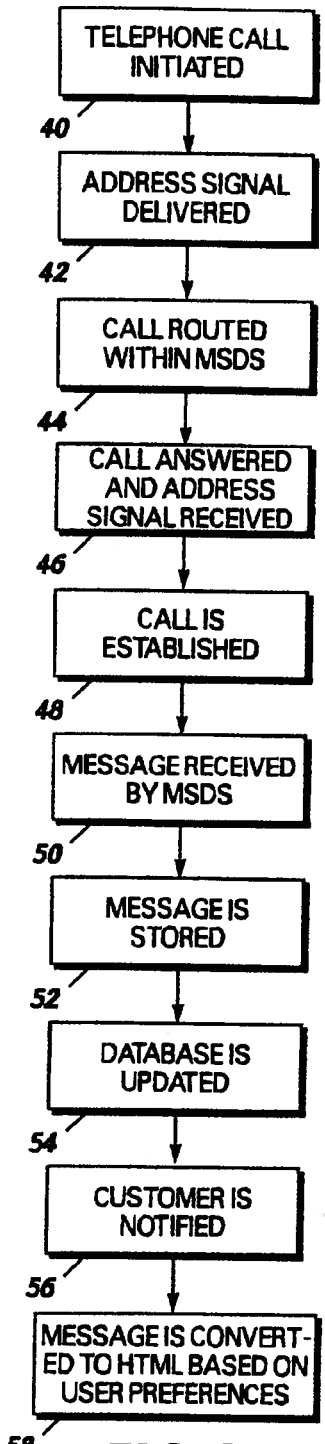

TELEPHONE CALL INITIATED
40
ADDRESS SIGNAL DELIVERED
42
CALL ROUTED WITHIN MSDS
44
CALL ANSWERED AND ADDRESS SIGNAL RECEIVED
46
CALL IS ESTABLISHED
48
MESSAGE RECEIVED BY MSDS
50
MESSAGE IS STORED
52
DATABASE IS UPDATED
54
CUSTOMER IS NOTIFIED
56
MESSAGE IS CONVERTED TO HTML BASED ON USER PREFERENCES
58

FIG 2

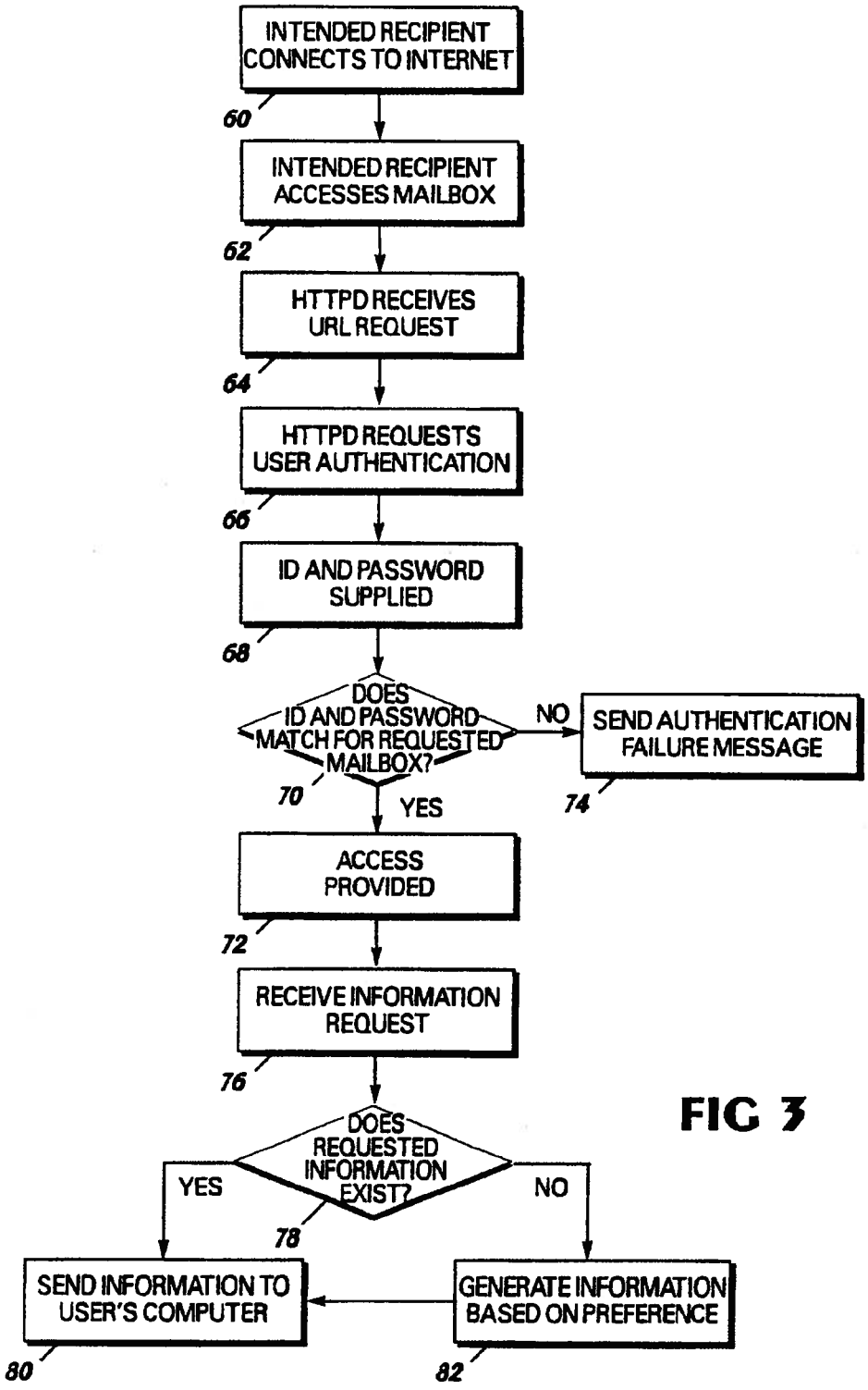

INTENDED RECIPIENT CONNECTS TO INTERNET
60
INTENDED RECIPIENT ACCESSES MAILBOX
62
HTTPD RECEIVES URL REQUEST
64
HTTPD REQUESTS USER AUTHENTICATION
66
ID AND PASSWORD SUPPLIED
68
DOES ID AND PASSWORD MATCH FOR REQUESTED MAILBOX?
70
NO
SEND AUTHENTICATION FAILURE MESSAGE
74
YES
ACCESS PROVIDED
72
RECEIVE INFORMATION REQUEST
76
DOES REQUESTED INFORMATION EXIST?
78
YES
NO
SEND INFORMATION TO USER'S COMPUTER
80
GENERATE INFORMATION BASED ON PREFERENCE
82

FIG 3

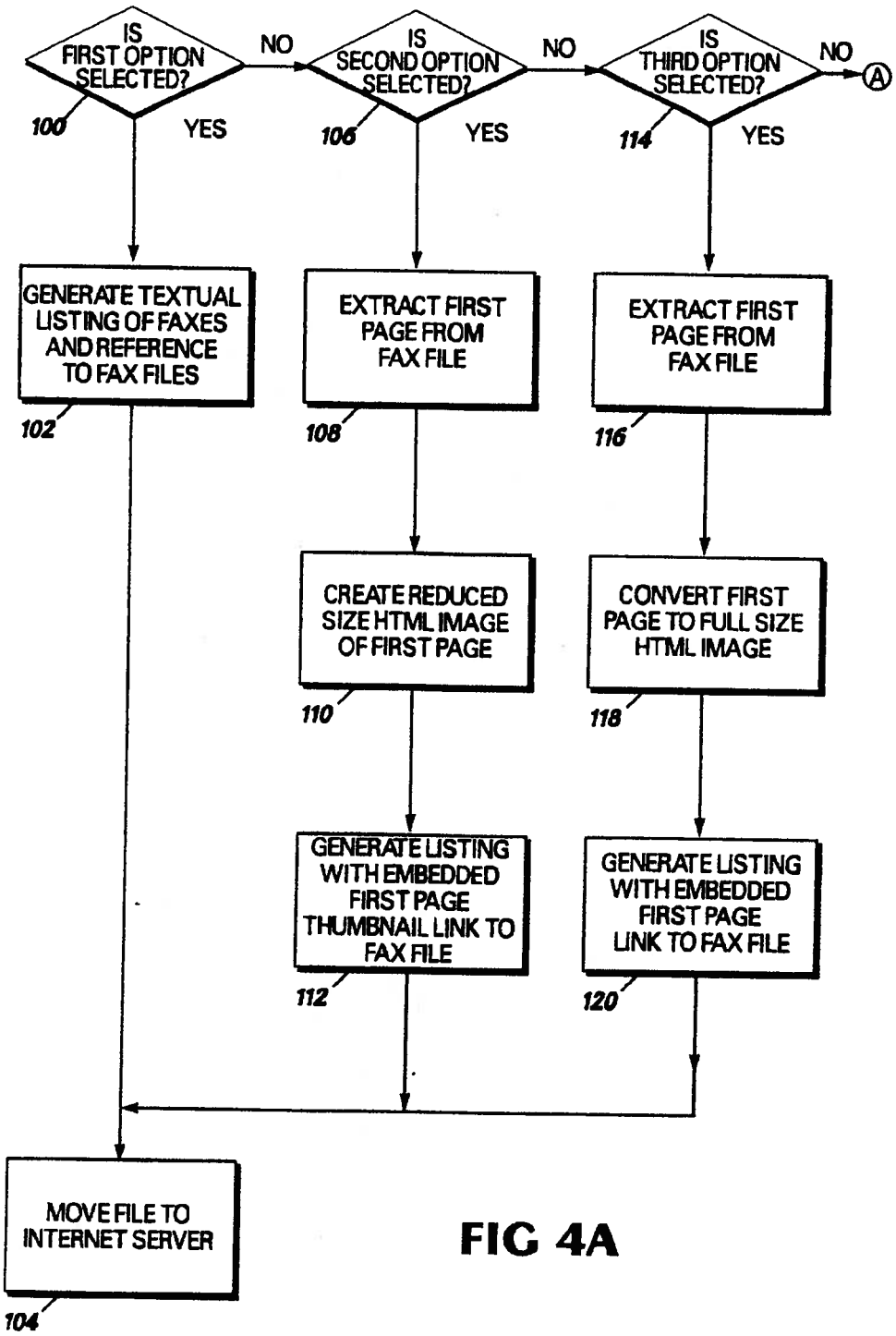

IS FIRST OPTION SELECTED?
100
NO
YES
IS SECOND OPTION SELECTED?
106
NO
YES
IS THIRD OPTION SELECTED?
114
NO
YES
A
GENERATE TEXTUAL LISTING OF FAXES AND REFERENCE TO FAX FILES
102
EXTRACT FIRST PAGE FROM FAX FILE
108
EXTRACT FIRST PAGE FROM FAX FILE
116
CREATE REDUCED SIZE HTML IMAGE OF FIRST PAGE
110
CONVERT FIRST PAGE TO FULL SIZE HTML IMAGE
118
GENERATE LISTING WITH EMBEDDED FIRST PAGE THUMBNAIL LINK TO FAX FILE
112
GENERATE LISTING WITH EMBEDDED FIRST PAGE LINK TO FAX FILE
120
MOVE FILE TO INTERNET SERVER
104

FIG 4A

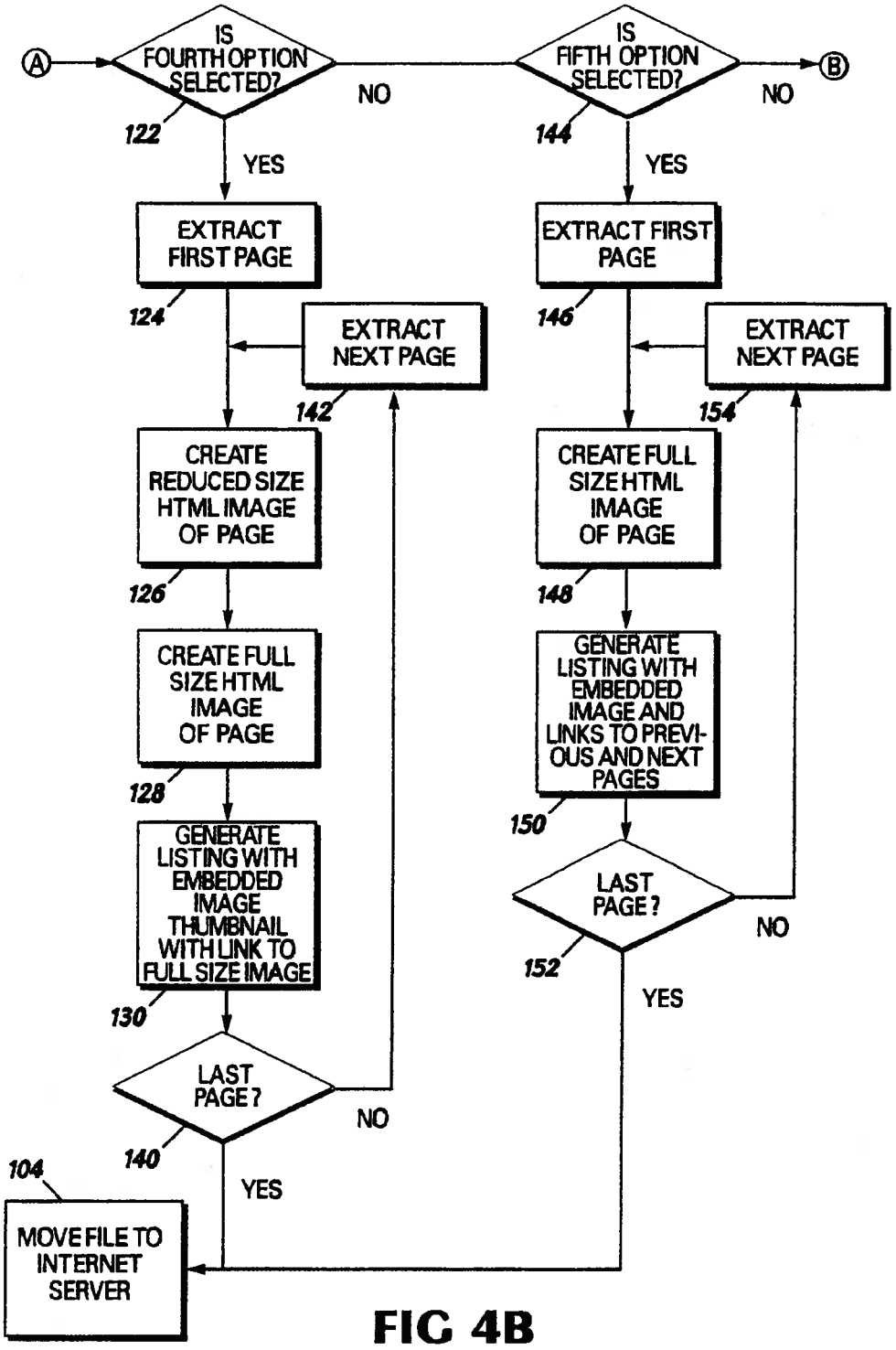

A
IS FOURTH OPTION SELECTED?
122
NO
YES
EXTRACT FIRST PAGE
124
EXTRACT NEXT PAGE
142
CREATE REDUCED SIZE HTML IMAGE OF PAGE
126
CREATE FULL SIZE HTML IMAGE OF PAGE
128
GENERATE LISTING WITH EMBEDDED IMAGE THUMBNAIL WITH LINK TO FULL SIZE IMAGE
130
LAST PAGE?
140
NO
YES
104
MOVE FILE TO INTERNET SERVER
IS FIFTH OPTION SELECTED?
144
NO
B
YES
EXTRACT FIRST PAGE
146
EXTRACT NEXT PAGE
154
CREATE FULL SIZE HTML IMAGE OF PAGE
148
GENERATE LISTING WITH EMBEDDED IMAGE AND LINKS TO PREVI-OUS AND NEXT PAGES
150
LAST PAGE?
152
NO
YES

FIG 4B

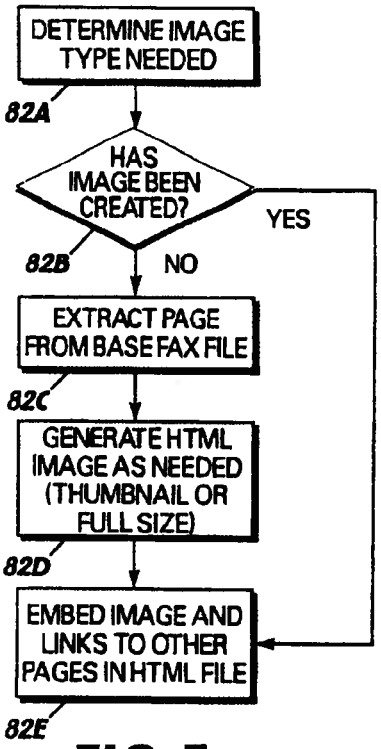

DETERMINE IMAGE TYPE NEEDED
82A
HAS IMAGE BEEN CREATED?
YES
82B
NO
EXTRACT PAGE FROM BASE FAX FILE
82C
GENERATE HTML IMAGE AS NEEDED (THUMBNAIL OR FULL SIZE)
82D
EMBED IMAGE AND LINKS TO OTHER PAGES IN HTML FILE
82E

FIG 5

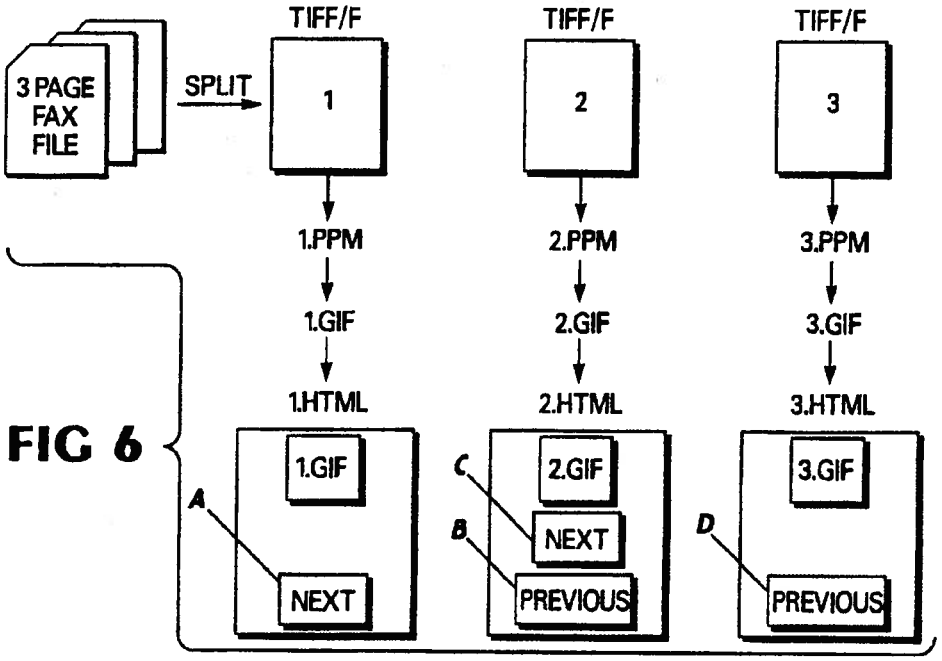

3 PAGE FAX FILE
SPLIT
TIFF/F
1
2
3
1.PPM
2.PPM
3.PPM
1.GIF
2.GIF
3.GIF
1.HTML
2.HTML
3.HTML
1.GIF
2.GIF
3.GIF
A
NEXT
C
NEXT
B
PREVIOUS
D
PREVIOUS

FIG 6

Fax from (404)249-6801

Received on May 31, 1995 at 1:58 PM
Page 1 of 3

NetOffice, Inc.

From: Charles R. Bobo, II.
Pages: 3
Date: May 31, 1995

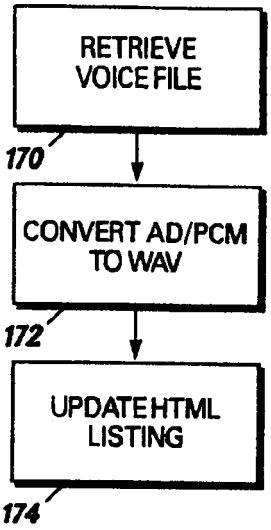


FIG 8

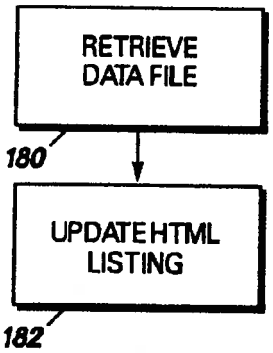


FIG 9

Next Page

Return to Fax Listing
This page was automatically generated by FaxWeb(tm) On May 31, 1995 at 2:05pm.
©1995 NetOffice, inc.

NetOffice, inc.
PO Box 7115
Atlanta, GA 30357
info@netoffice.com

FIG 7

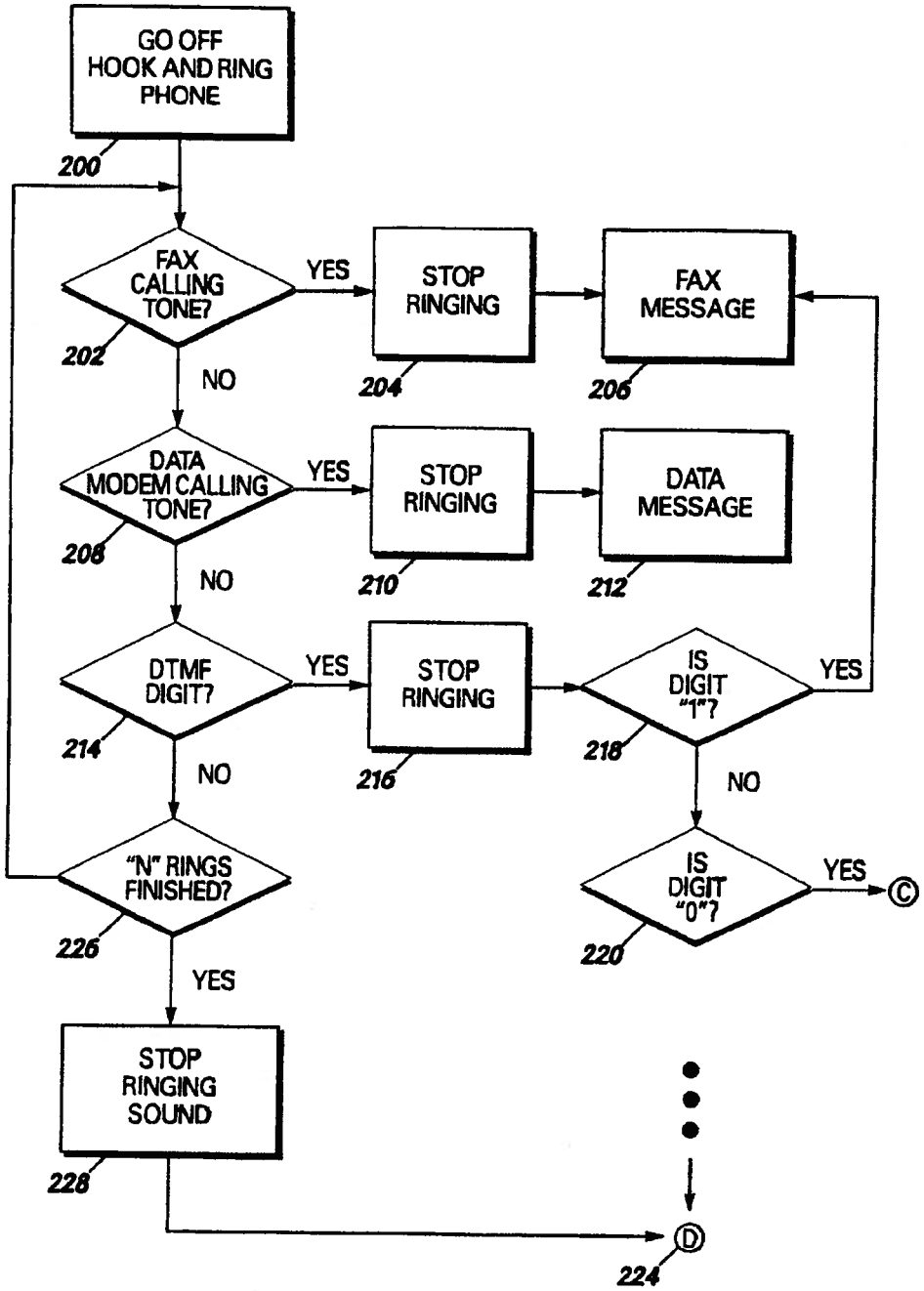

GO OFF HOOK AND RING PHONE
200
FAX CALLING TONE?
202
YES
STOP RINGING
204
FAX MESSAGE
206
NO
DATA MODEM CALLING TONE?
208
YES
STOP RINGING
210
DATA MESSAGE
212
NO
DTMF DIGIT?
214
YES
STOP RINGING
216
IS DIGIT "1"?
218
YES
NO
"N" RINGS FINISHED?
226
IS DIGIT "0"?
220
YES
C
YES
STOP RINGING SOUND
228
D
224

FIG 10

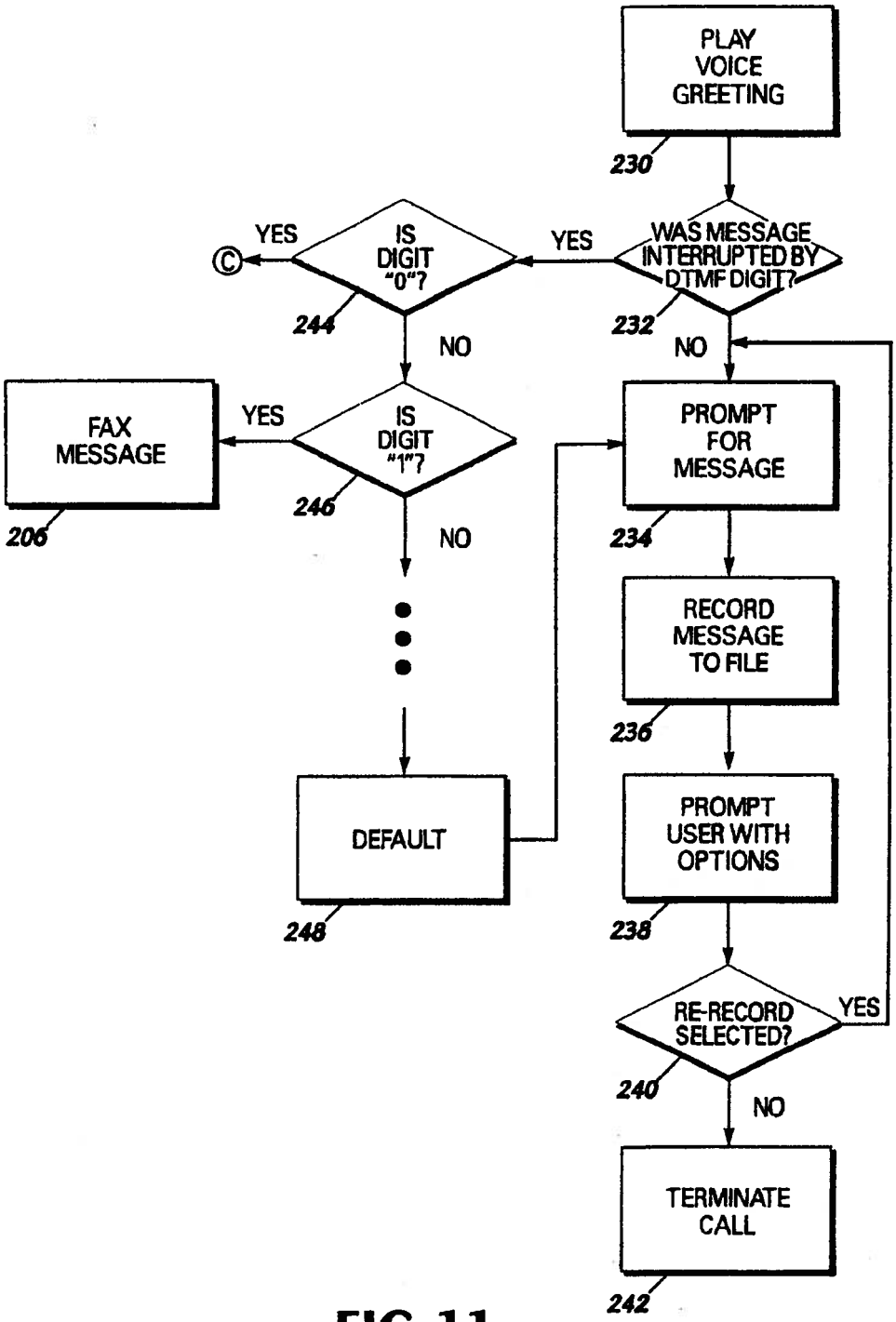

PLAY VOICE GREETING
230
WAS MESSAGE INTERRUPTED BY DTMF DIGIT?
232
YES
NO
IS DIGIT "0"?
244
YES
©
NO
IS DIGIT "1"?
246
YES
FAX MESSAGE
206
NO
PROMPT FOR MESSAGE
234
RECORD MESSAGE TO FILE
236
PROMPT USER WITH OPTIONS
238
RE-RECORD SELECTED?
240
YES
NO
TERMINATE CALL
242
DEFAULT
248

FIG 11

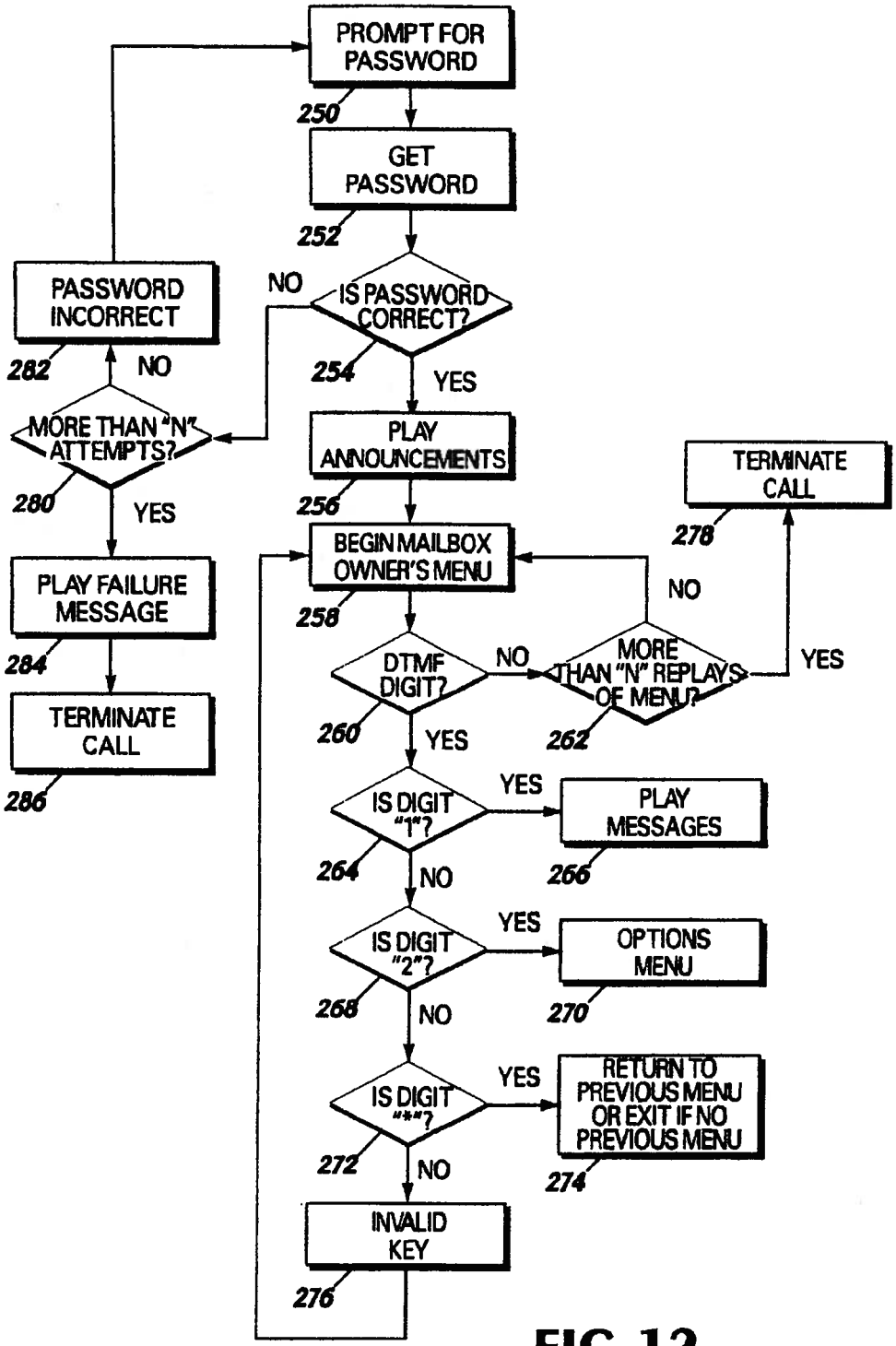

PROMPT FOR PASSWORD
250
GET PASSWORD
252
IS PASSWORD CORRECT?
254
NO
YES
PASSWORD INCORRECT
282
NO
MORE THAN "N" ATTEMPTS?
280
YES
PLAY FAILURE MESSAGE
284
TERMINATE CALL
286
PLAY ANNOUNCEMENTS
256
BEGIN MAILBOX OWNER'S MENU
258
DTMF DIGIT?
260
NO
YES
MORE THAN "N" REPLAYS OF MENU?
262
NO
YES
TERMINATE CALL
278
IS DIGIT "1"?
264
YES
PLAY MESSAGES
266
NO
IS DIGIT "2"?
268
YES
OPTIONS MENU
270
NO
IS DIGIT "*"?
272
YES
RETURN TO PREVIOUS MENU OR EXIT IF NO PREVIOUS MENU
274
NO
INVALID KEY
276

FIG 12

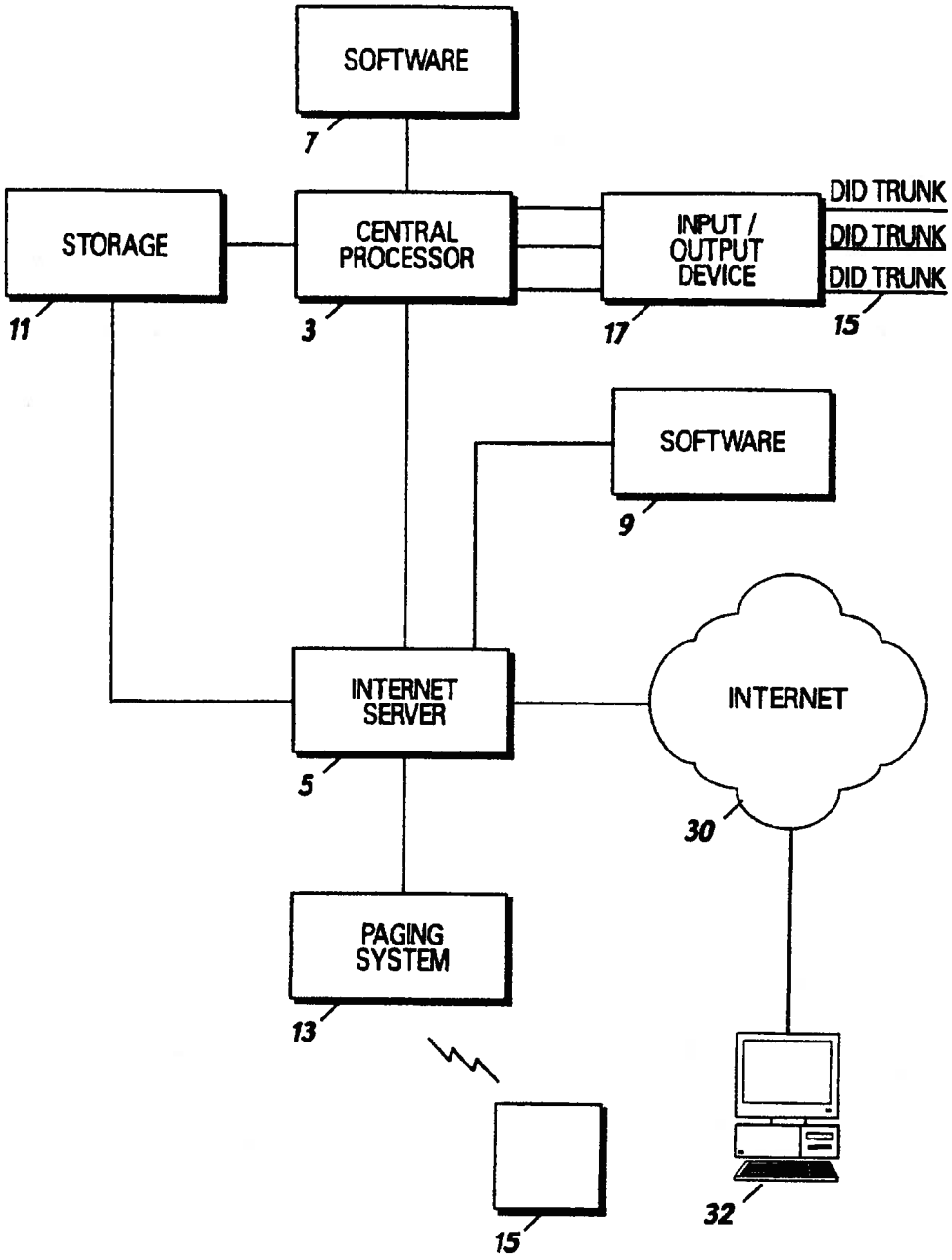

SOFTWARE
7
STORAGE
11
CENTRAL PROCESSOR
3
INPUT / OUTPUT DEVICE
17
DID TRUNK
DID TRUNK
DID TRUNK
15
SOFTWARE
9
INTERNET SERVER
5
INTERNET
30
PAGING SYSTEM
13
15
32

FIG 13

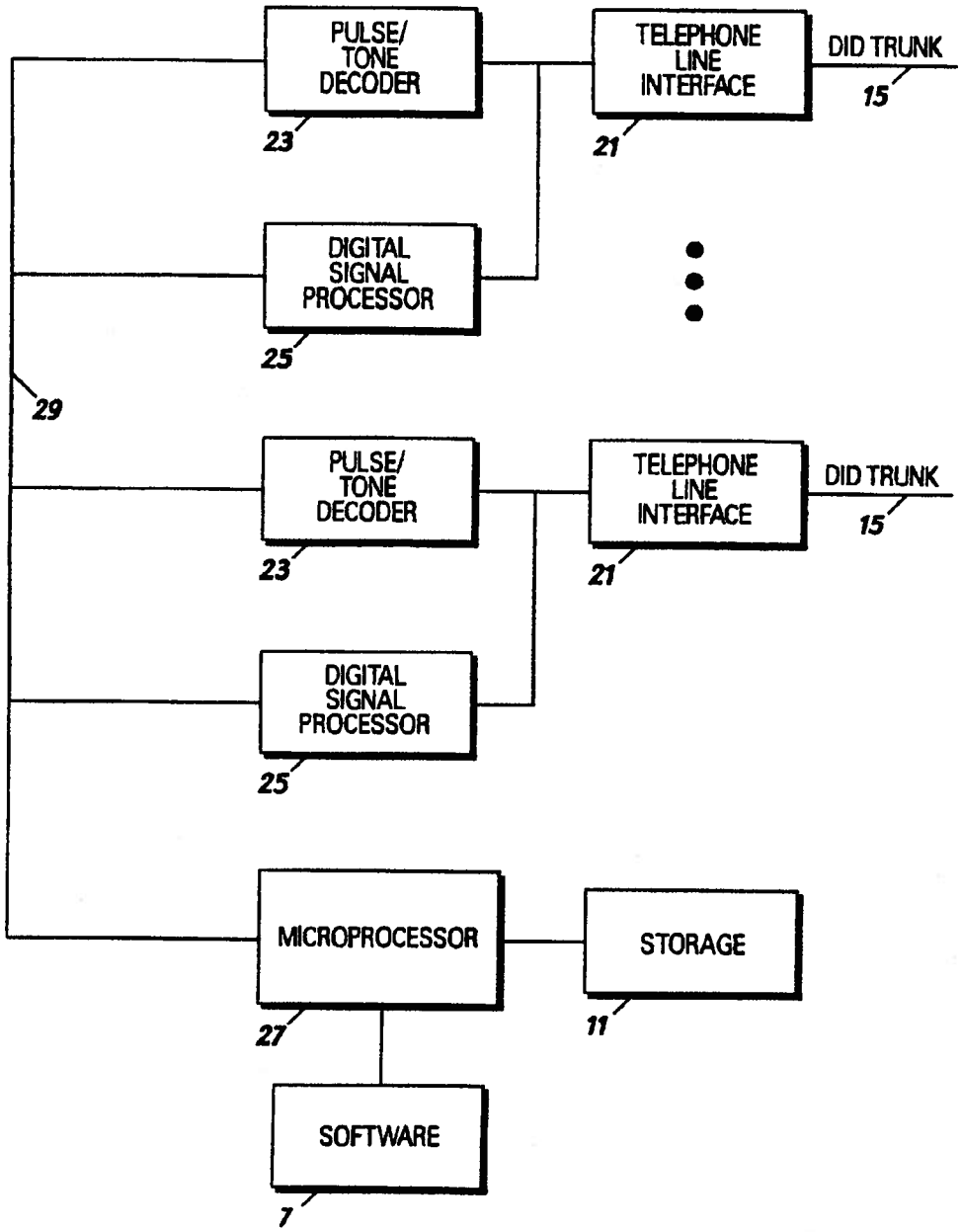

PULSE/
TONE
DECODER
23
TELEPHONE
LINE
INTERFACE
21
DID TRUNK
15
DIGITAL
SIGNAL
PROCESSOR
25
29
PULSE/
TONE
DECODER
23
TELEPHONE
LINE
INTERFACE
21
DID TRUNK
15
DIGITAL
SIGNAL
PROCESSOR
25
MICROPROCESSOR
27
STORAGE
11
SOFTWARE
7

FIG 14

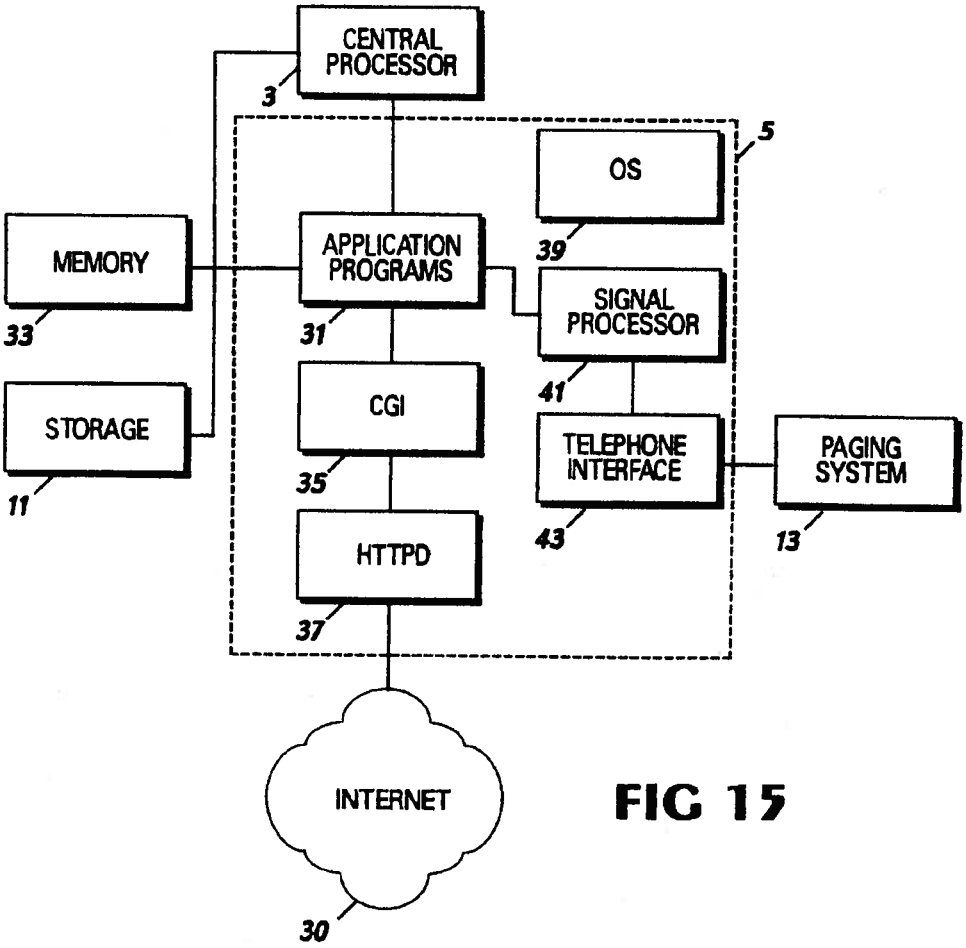


FIG 15

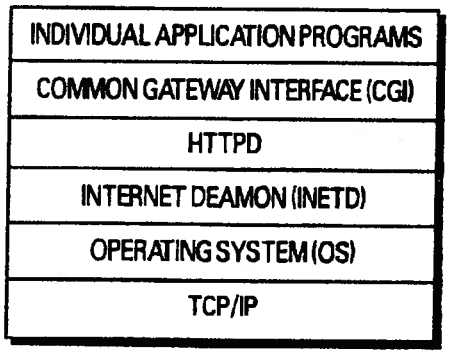


FIG 16A

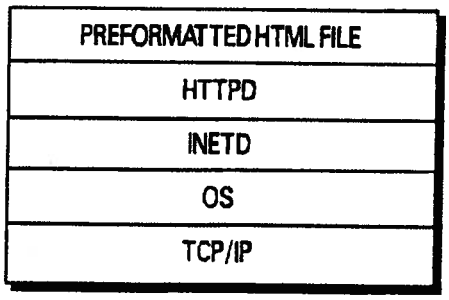


FIG 16B

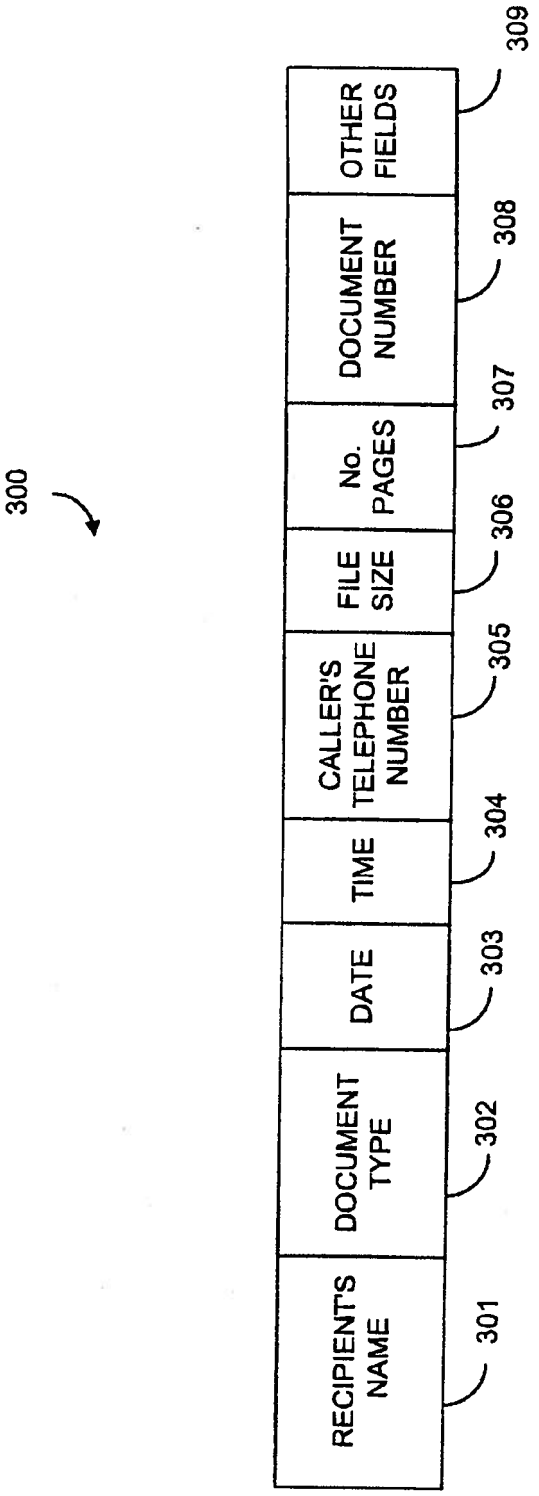

300
RECIPIENT'S NAME
301
DOCUMENT TYPE
302
DATE
303
TIME
304
CALLER'S TELEPHONE NUMBER
305
FILE SIZE
306
No. PAGES
307
DOCUMENT NUMBER
308
OTHER FIELDS
309

FIG. 17

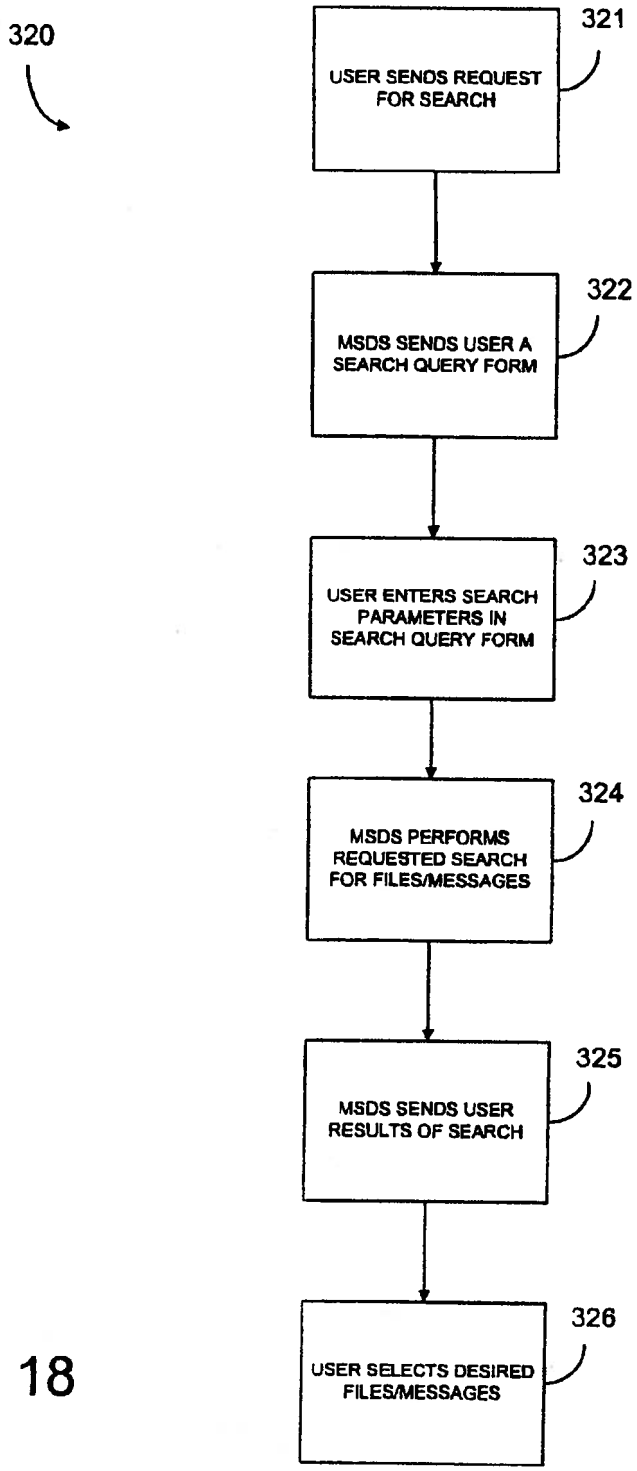

320
USER SENDS REQUEST FOR SEARCH
321
MSDS SENDS USER A SEARCH QUERY FORM
322
USER ENTERS SEARCH PARAMETERS IN SEARCH QUERY FORM
323
MSDS PERFORMS REQUESTED SEARCH FOR FILES/MESSAGES
324
MSDS SENDS USER RESULTS OF SEARCH
325
USER SELECTS DESIRED FILES/MESSAGES
326

FIG. 18

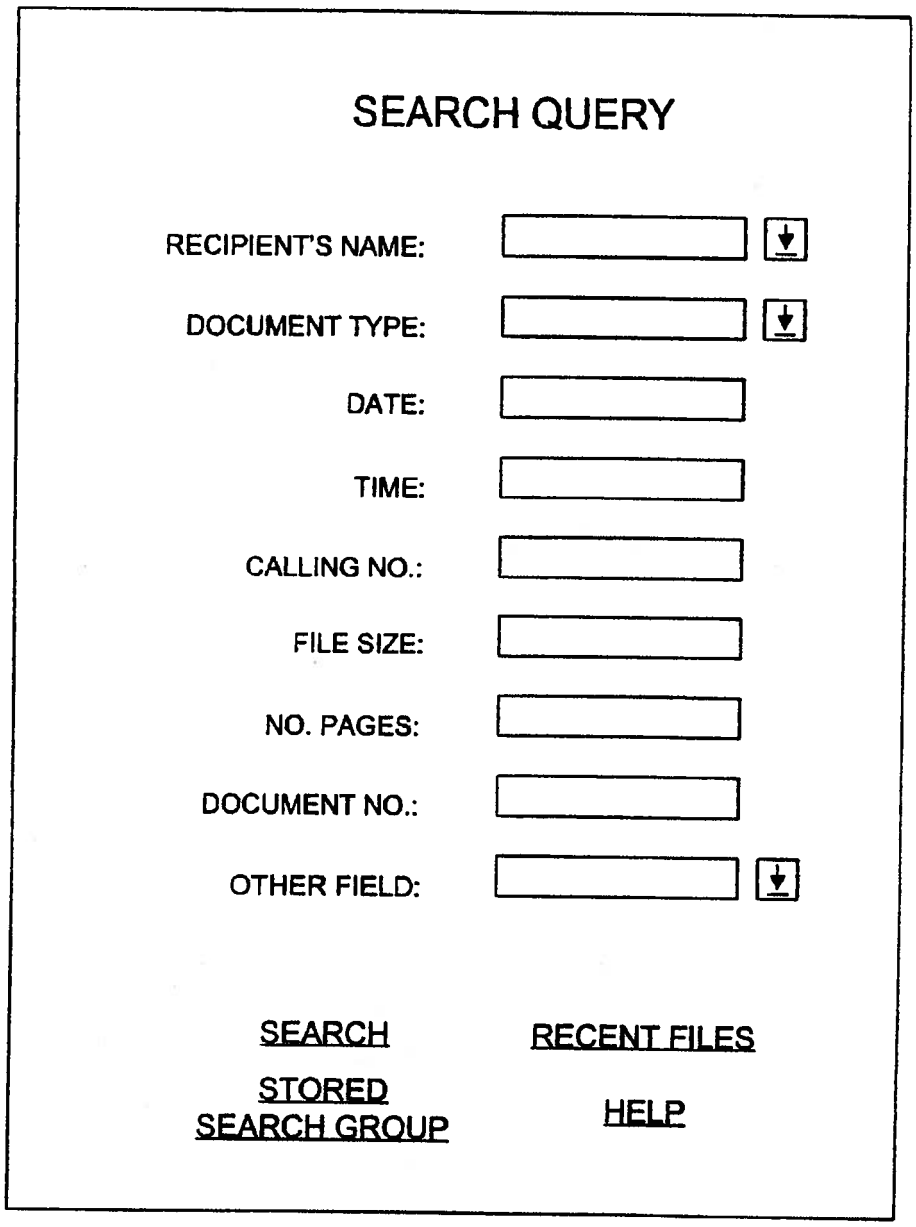

SEARCH QUERY
RECIPIENT'S NAME:
DOCUMENT TYPE:
DATE:
TIME:
CALLING NO.:
FILE SIZE:
NO. PAGES:
DOCUMENT NO.:
OTHER FIELD:
SEARCH
RECENT FILES
STORED SEARCH GROUP
HELP

FIG. 19

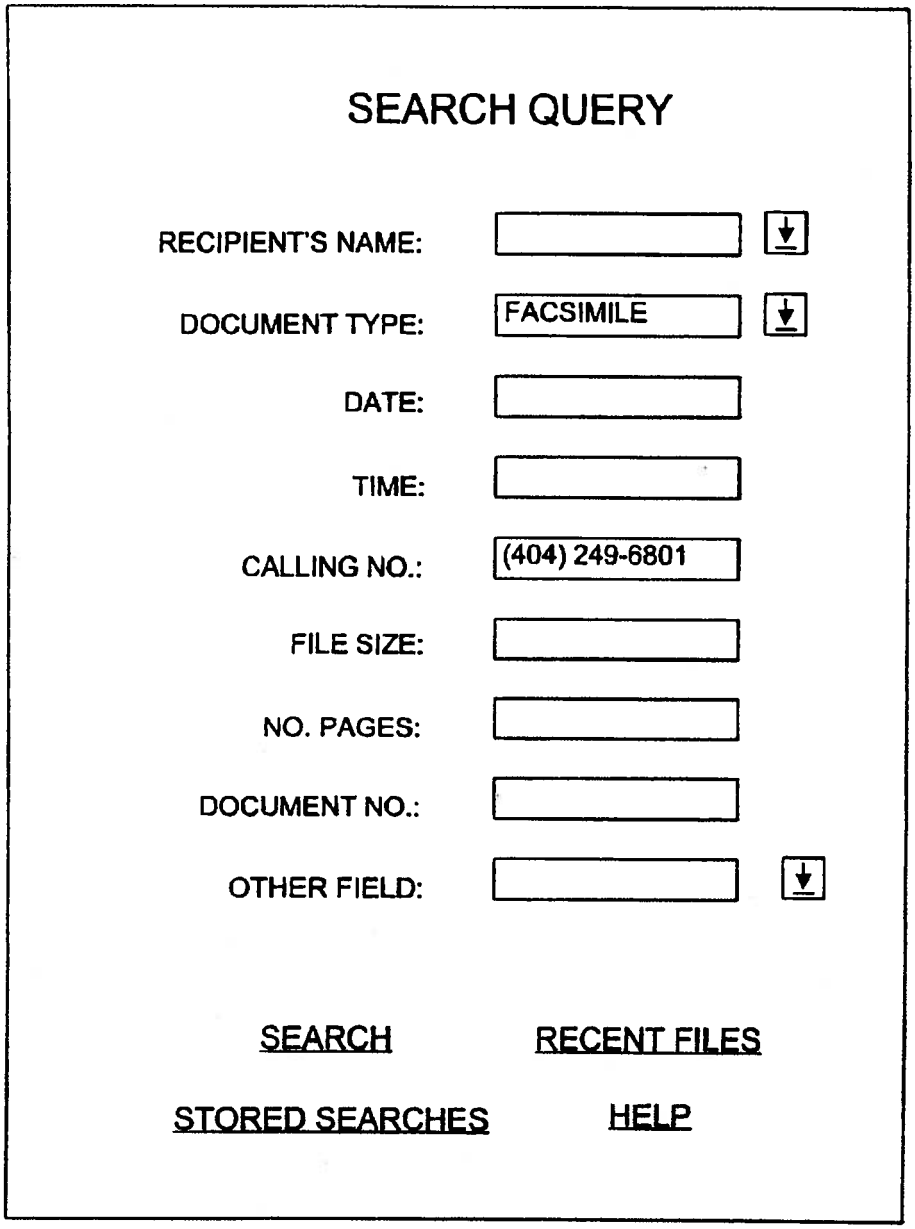

SEARCH QUERY
RECIPIENT'S NAME:
DOCUMENT TYPE:
FACSIMILE
DATE:
TIME:
CALLING NO.:
(404) 249-6801
FILE SIZE:
NO. PAGES:
DOCUMENT NO.:
OTHER FIELD:
SEARCH
RECENT FILES
STORED SEARCHES
HELP

FIG. 20

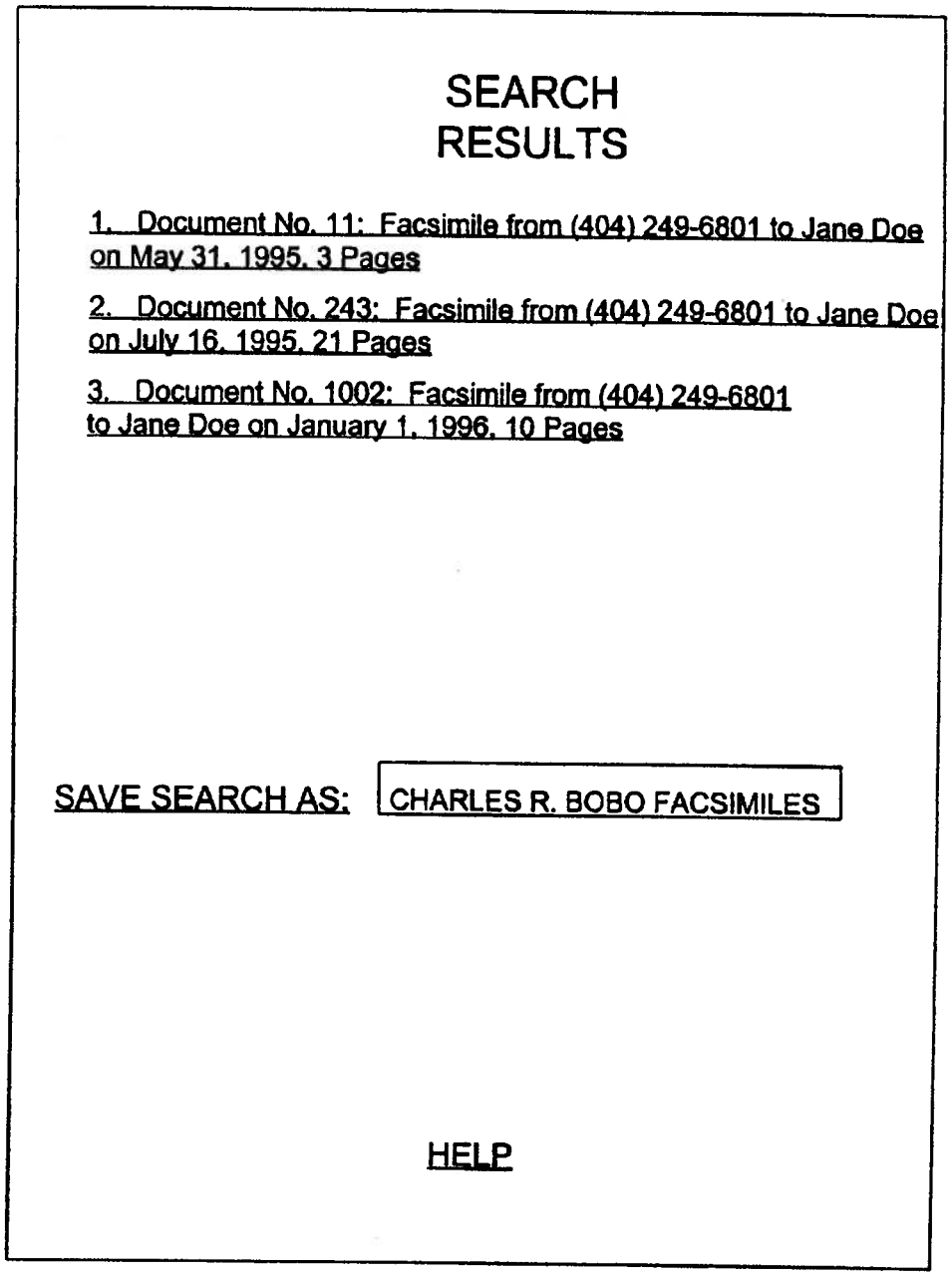

SEARCH
RESULTS
1. Document No. 11: Facsimile from (404) 249-6801 to Jane Doe on May 31, 1995, 3 Pages
2. Document No. 243: Facsimile from (404) 249-6801 to Jane Doe on July 16, 1995, 21 Pages
3. Document No. 1002: Facsimile from (404) 249-6801 to Jane Doe on January 1, 1996, 10 Pages
SAVE SEARCH AS:
CHARLES R. BOBO FACSIMILES
HELP

FIG. 21

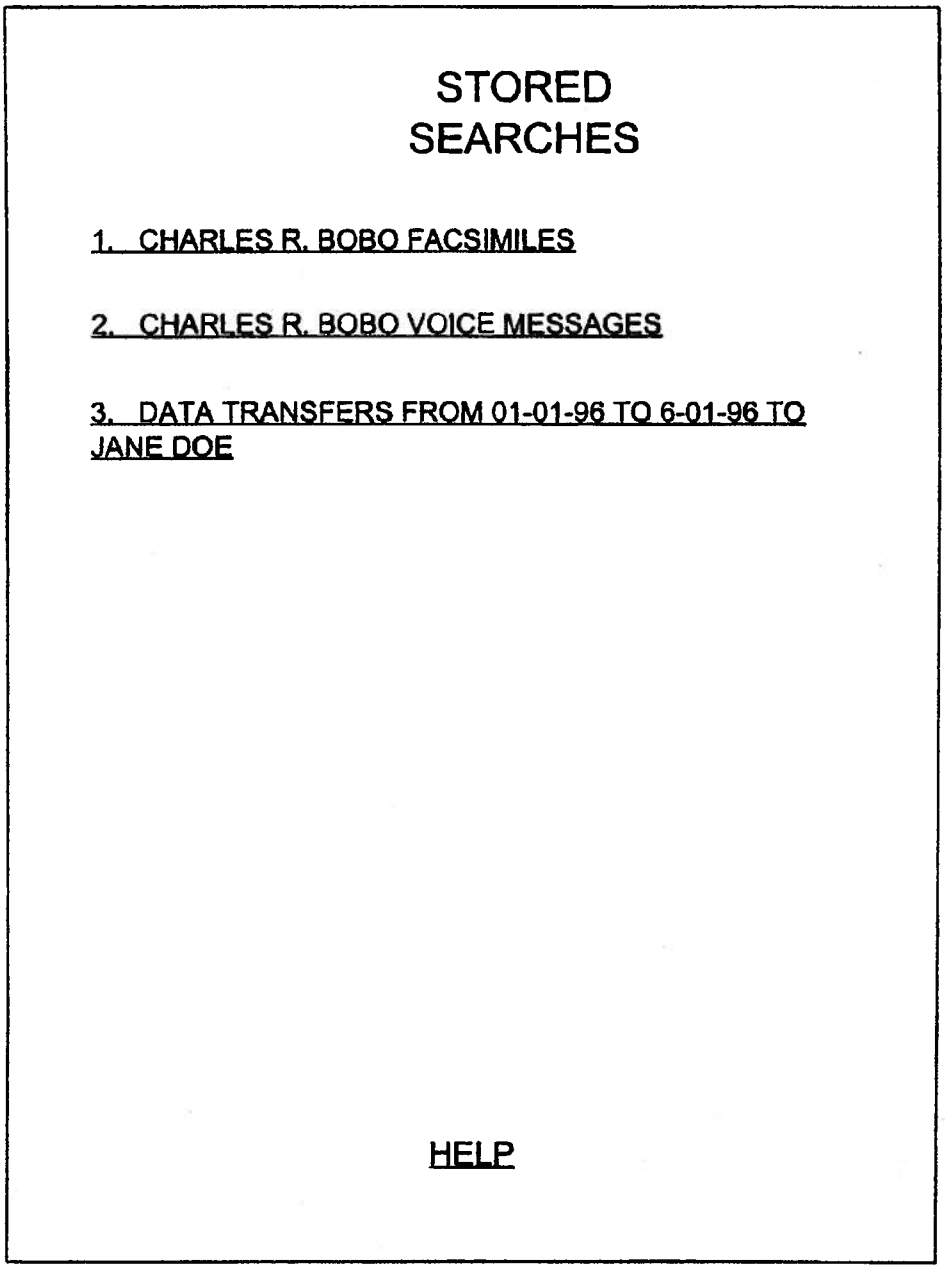

STORED
SEARCHES
1. CHARLES R. BOBO FACSIMILES
2. CHARLES R. BOBO VOICE MESSAGES
3. DATA TRANSFERS FROM 01-01-96 TO 6-01-96 TO JANE DOE
HELP

FIG. 22

SYSTEMS AND METHODS FOR STORING, DELIVERING, AND MANAGING MESSAGES

This application is a continuation of U.S. Ser. No. 08/944,741 filed on Oct. 6, 1997, now allowed U.S. Pat. No. 5,870,549, which is a continuation-in-part of U.S. patent application Ser. No. 08/431,716, filed Apr. 28, 1995 U.S. Pat. No. 5,675,507.

FIELD OF THE INVENTION

This invention relates to system(s) and method(s) for storing and delivering messages and, more particularly, to system(s) and method(s) for storing messages and for delivery the messages through a network, such as the Internet, or a telephone line to an intended recipient. In another aspect, the invention relates to system(s) and method(s) for storing, delivering, and managing messages or other files, such as for archival purposes or for document tracking.

BACKGROUND OF THE INVENTION

Even though the facsimile machine is heavily relied upon by businesses of all sizes and is quickly becoming a standard piece of office equipment, many businesses or households cannot receive the benefits of the facsimile machine. Unfortunately, for a small business or for a private household, a facsimile machine is a rather expensive piece of equipment. In addition to the cost of purchasing the facsimile machine, the facsimile machine also requires toner, paper, maintenance, as well as possible repairs. These expenses may be large enough to prevent many of the small businesses and certainly many households from benefiting from the service that the facsimile machine can provide. For others who are constantly traveling and who do not have an office, it may be impractical to own a facsimile machine. In fact, the Atlanta Business Chronicle estimates that 30% of the small businesses do not have any facsimile machines. Therefore, many businesses and households are at a disadvantage since they do not have access to a facsimile machine.

Because a facsimile machine can be such an asset to a company and is heavily relied upon to quickly transmit and receive documents, a problem exists in that the machines are not always available to receive a facsimile message. At times, a facsimile machine may be busy receiving another message or the machine may be transmitting a message of its own. During these times, a person must periodically attempt to send the message until communication is established with the desired facsimile machine. This inability to connect with a facsimile machine can be frustrating, can consume quite a bit of the person's time, and prevent the person from performing more productive tasks. While some more advanced facsimile machines will retry to establish communication a number of times, a person will still have to check on the facsimile machine to ensure that the message was transmitted or to re-initiate the transmission of the message.

In addition to labor costs and a reduction in office efficiency, a facsimile machine may present costs to businesses that are not readily calculated. These costs include the loss of business or the loss of goodwill that occurs when the facsimile machine is not accessible by another facsimile machine. These costs can occur for various reasons, such as when the facsimile machine is out of paper, when the machine needs repairing, or when the facsimile machine is busy with another message. These costs occur more frequently with some of the smaller businesses, who are also less able to incur these expenses, since many of them have

a single phone line for a telephone handset and the facsimile machine and thereby stand to lose both telephone calls and facsimile messages when the single line is busy. In fact, the Atlanta Business Chronicle estimated that fewer than 5% of the small businesses have 2 or more facsimile machines. Many of the larger companies can reduce these losses by having more than one facsimile machine and by having calls switched to another machine when one of the machines is busy. These losses, however, cannot be completely eliminated since the machines can still experience a demand which exceeds their capabilities.

A main benefit of the facsimile machine, namely the quick transfer of documents, does not necessarily mean that the documents will quickly be routed to the intended recipient. The facsimile machines may be unattended and a received facsimile message may not be noticed until a relatively long period of time has elapsed. Further, even for those machines which are under constant supervision, the routing procedures established in an office may delay the delivery of the documents. It is therefore a problem in many offices to quickly route the facsimile message to the intended recipient.

The nature of the facsimile message also renders it difficult for the intended recipient to receive a sensitive message without having the message exposed to others in the office who can intercept and read the message. If the intended recipient is unaware that the message is being sent, other people may see the message while it is being delivered or while the message remains next to the machine. When the intended recipient is given notice that a sensitive message is being transmitted, the intended recipient must wait near the facsimile machine until the message is received. It was therefore difficult to maintain the contents of a facsimile message confidential.

In an office with a large number of employees, it may also be difficult to simply determine where the facsimile message should be routed. In light of this difficulty, some systems have been developed to automatically route facsimile messages to their intended recipient. One type of system, such as the one disclosed in U.S. Pat. No. 5,257,112 to Okada, can route an incoming call to a particular facsimile machine based upon codes entered with telephone push-buttons by the sender of the message. Another type of system, such as the one disclosed in U.S. Pat. No. 5,115,326 to Burgess et al. or in U.S. Pat. No. 5,247,591 to Baran, requires the sender to use a specially formatted cover page which is read by the system. This type of system, however, burdens the sender, who may very well be a client or customer, by requiring the sender to take special steps or additional steps to transmit a facsimile message. These systems are therefore not very effective or desirable.

Another type of routing system links a facsimile machine to a Local Area Network (LAN) in an office. For instance, in the systems disclosed in the patents to Baran and Burgess et al., after the system reads the cover sheet to determine the intended recipient of the facsimile message, the systems send an E-mail message to the recipient through the local network connecting the facsimile machine to the recipient's computer. Other office systems, such as those in U.S. Pat. No. 5,091,790 to Silverberg and U.S. Pat. No. 5,291,546 to Giler et al., are linked to the office's voice mail system and may leave a message with the intended recipient that a facsimile message has been received. Some systems which are even more advanced, such as those in U.S. Pat. No. 5,317,628 to Misholi et al. and U.S. Pat. No. 5,333,266 to Boaz et al., are connected to an office's local network and provide integrated control of voice messages, E-mail messages, and facsimile messages.

The various systems for routing facsimile messages, and possibly messages of other types received in the office, are very sophisticated and expensive systems. While these office systems are desirable in that they can effectively route the messages at the office to their intended recipients, the systems are extremely expensive and only those companies with a great number of employees can offset the costs of the system with the benefits that the system will provide to their company. Thus, for most businesses, it still remains a problem to effectively and quickly route messages to the intended recipients. It also remains a problem for most businesses to route the messages in a manner which can preserve the confidential nature of the messages.

Even for the businesses that have a message routing system and especially for those that do not have any type of system, it is usually difficult for a person to retrieve facsimile messages while away from the office. Typically, a person away on business must call into the office and be informed by someone in the office as to the facsimile messages that have been received. Consequently, the person must call into the office during normal business hours while someone is in the office and is therefore limited in the time that the information in a facsimile message can be relayed.

If the person away on business wants to look at the facsimile message, someone at the office must resend the message to a facsimile machine accessible to that person. Since this accessible machine is often a facsimile machine at another business or at a hotel where the person is lodging, it is difficult for the person to receive the facsimile message without risking disclosure of its contents. Further, since someone at the person's office must remember to send the message and since someone at the accessible facsimile machine must route the message to the person away from the office, the person may not receive all of the facsimile messages or may have to wait to receive the messages.

The retrieval of facsimile messages, as well as voice mail messages, while away from the office is not without certain costs. For one, the person often must incur long distance telephone charges when the person calls the office to check on the messages and to have someone in the office send the messages to another facsimile. The person will then incur the expenses of transmitting the message to a fax bureau or hotel desk as well as the receiving location's own charges for use of their equipment. While these charges are certainly not substantial, the charges are nonetheless expenses incurred while the person is away from the office.

Overall, while the facsimile machine is an indispensable piece of equipment for many businesses, the facsimile machine presents a number of problems or costs. Many businesses or households are disadvantaged since they are unable to reap the benefits of the facsimile machine. For the businesses that do have facsimile machines, the businesses must incur the normal costs of operating the facsimile machine in addition to the costs that may be incurred when the facsimile machine or machines are unable to receive a message. Further, the facsimile messages may not be efficiently or reliably routed to the intended recipient and may have its contents revealed during the routing process. The costs and problems in routing a facsimile message are compounded when the intended recipient is away from the office.

Many of the problems associated with facsimile messages are not unique to just facsimile messages but are also associated with voice mail messages and data messages. With regard to voice messages, many businesses do not have voice mail systems and must write the message down. Thus, the person away from the office must call in during normal office hours to discover who has called. The information in these messages are usually limited to just the person who called, their number, and perhaps some indication as to the nature of the call. For those businesses that have voice mail, the person away from the office must call in and frequently incur long distance charges. Thus, there is a need for a system for storing and delivery voice messages which can be easily and inexpensively accessed at any time.

With regard to data messages, the transmission of the message often requires some coordination between the sender and the recipient. For instance, the recipient's computer must be turned on to receive the message, which usually occurs only when someone is present during normal office hours. Consequently, the recipient's computer is usually only able to receive a data message during normal office hours. Many households and also businesses may not have a dedicated data line and must switch the line between the phone, computer, and facsimile. In such a situation, the sender must call and inform the recipient to switch the line over to the computer and might have to wait until the sender can receive the message. The retransmission of the data message to another location, such as when someone is away from the office, only further complicates the delivery. It is therefore frequently difficult to transmit and receive data messages and is also difficult to later relay the messages to another location.

A standard business practice of many companies is to maintain records of all correspondence between itself and other entities. Traditionally, the correspondence that has been tracked and recorded includes letters or other such printed materials that is mailed to or from a company to the other entity. Although tracking correspondence of printed materials is relatively easy, non-traditional correspondence, such as facsimile messages, e-mail messages, voice messages, or data messages, are more difficult to track and record.

For example, facsimile messages may be difficult to track and record since the messages may be received on thermal paper, which suffers from a disadvantage that the printing fades over time. Also, accurate tracking of facsimile messages is difficult since the facsimile messages may only be partially printed at the facsimile machine or the messages may be lost or only partially delivered to their intended recipients. Facsimile messages also present difficulties since they are often delivered within an organization through different channels than ordinary mail and thus easily fall outside the normal record keeping procedures of the company.

Voice mail messages are also difficult to track and record. Although voice messages can be saved, many voice mail servers automatically delete the messages after a certain period of time. To maintain a permanent record of a voice message, the voice message may be transcribed and a printed copy of the message may be kept in the records. This transcribed copy of the voice message, however, is less credible and thus less desirable than the original voice message since the transcribed copy may have altered material or may omit certain portions of the message.

In addition to facsimile and voice mail messages, data messages are also difficult to track and record. A download or upload of a file may only be evident by the existence of a file itself. A file transfer procedure normally does not lend itself to any permanent record of what file was transferred, the dialed telephone number, the telephone number of the computer receiving the file, the time, or the date of the

transfer. It is therefore difficult to maintain accurate records of all data transfers between itself and another entity.

SUMMARY OF THE INVENTION

It is an object of the invention to reliably and efficiently route messages to an intended recipient.

It is another object of the invention to route messages to the intended recipient while maintaining the contents of the message confidential.

It is another object of the invention to enable the intended recipient to access the messages easily and with minimal costs.

It is a further object of the invention to permit the simultaneous receipt of more than one message on behalf of the intended recipient.

It is a further object of the invention to enable the intended recipient of a message to access the message at any time and at virtually any location world-wide.

It is yet a further object of the invention to enable the intended recipient of a message to browse through the received messages.

It is yet a further object of the invention to quickly notify an intended recipient that a message has been received.

It is still another object of the invention to receive messages of various types.

It is still another object of the invention to deliver messages according to the preferences of the intended recipient.

It is still a further object of the invention to record and track correspondence, such as facsimile messages, voice mail messages, and data transfers.

Additional objects, advantages and novel features of the invention will be set forth in the description which follows, and will become apparent to those skilled in the art upon reading this description or practicing the invention. The objects and advantages of the invention may be realized and attained by the appended claims.

To achieve the foregoing and other objects, in accordance with the present invention, as embodied and broadly described herein, a system and method for storing and delivering messages involves receiving an incoming call and detecting an address signal associated with the incoming call, the address signal being associated with a user of the message storage and delivery system. A message accompanied with the address signal is then received and converted from a first file format to a second file format. The message is stored in the second file format within a storage area and is retrieved after a request has been received from the user. At least a portion of the message is then transmitted to the user over a network with the second file format being a mixed media page layout language.

In another aspect, a network message storage and delivery system comprises a central processor for receiving an incoming call, for detecting an address signal on the incoming call, for detecting a message on the incoming call, and for placing the message in a storage area. The address signal on the incoming call is associated with a user of the network message storage and delivery system. A network server receives the message from the storage area, converts the message into a mixed media page layout language, and places the message in the storage area. When the network server receives a request from the user over the network, the network server transmits at least a portion of the message over the network to the user.

Preferably, the network storage and delivery system can receive facsimile messages, data messages, or voice messages and the network is the Internet. The messages are converted into a standard generalized mark-up language and the user is notified that a message has arrived through E-mail or through a paging system. A listing of the facsimile messages may be sent to the user in one of several formats. These formats include a textual only listing or a listing along with a full or reduced size image of the first page of each message. A full or reduced size image of each page of a message in the listing may alternatively be presented to the user.

According to a further aspect, the invention relates to a system and method for managing files or messages and involves storing message signals in storage and receiving requests from a user for a search. The search preferably comprises a search query that is completed by a user and supplied to a hyper-text transfer protocol deamon (HTTPD) in the system. The HTTPD transfers the request through a common gateway interface (CGI) to an application program which conducts the search. The results of the search are preferably returned through the HTTPD to the computer in the form of a listing of all messages or files satisfying the search parameters. The user may then select one or more of the listed messages or files and may save the search for later references.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in, and form a part of, the specification, illustrate an embodiment of the present invention and, together with the description, serve to explain the principles of the invention. In the drawings:

FIG. **1** is a block diagram illustrating the connections of a message storage and delivery system MSDS;

FIG. **2** is an overall flow chart of operations for transmitting a message to the MSDS of FIG. 1;

FIG. **3** is an overall flow chart of operations for receiving a message stored at the MSDS of FIG. 1;

FIGS. **4**(A) and (B) are flowcharts of operations for generating HTML files according to user preferences;

FIG. **5** is a flowchart of operations for generating requested information;

FIG. **6** is a flowchart of operations for converting a facsimile message into HTML files;

FIG. **7** is an exemplary display of a first page of a facsimile message according to a fourth display option;

FIG. **8** is a flowchart of operations for converting a voice message into an HTML file;

FIG. **9** is a flowchart of operations for converting a data message into an HTML file;

FIG. **10** is a flowchart of operations for detecting a type of call received at the MSDS **10**;

FIG. **11** is a flowchart of operations for receiving voice messages;

FIG. **12** is a flowchart of operations for interacting with an owner's call;

FIG. **13** is a more detailed block diagram of the MSDS **10**;

FIG. **14** is a block diagram of the central processor in FIG. **13**;

FIG. **15** is a block diagram of the Internet Server of FIG. **13**;

FIGS. **16**(A) and **16**(B) depict possible software layers for the Internet Server of FIG. **13**;

FIG. **17** is a diagram of a data entry for a message signal;

FIG. **18** is a flowchart of a process for sending a search query, for conducting a search, and for returning results of the search to a computer through the Internet;

FIG. **19** is an example of a search query form for defining a desired search;

FIG. **20** is an example of a completed search query;

FIG. **21** is an example of a set of search results returned to the computer in response to the search query of FIG. **20**; and

FIG. **22** is an example of a listing of stored searches.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference will now be made in detail to the preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings.

With reference to FIG. **1**, a message storage and delivery system (MSDS) **10** is connected to a central office **20** of the telephone company through at least one direct inward dialing (DID) trunk **15**. With each call on the DID trunk **15**, an address signal indicating the telephone number being called is provided to the MSDS **10**. The DID trunk **15** can carry a large number of telephone numbers or addresses. Preferably, the DID trunk **15** comprises a number of DID trunks **15** connected in parallel between the central office **20** and the MSDS **10** so that the MSDS **10** can simultaneously receive more than one call and, moreover, can simultaneously receive more than one call for a single telephone number or address.

The central office **20** is connected to a number of third parties. For instance, the central office **20** may be connected to a facsimile machine **24**, a telephone set **26**, and to a computer **28** with each connection being made through a separate telephone line. While a single computer **28** is shown in the figure, the single computer **28** may actually represent a local area network which is connected through the central office **20** to the MSDS **10**. Although the facsimile machine **24**, telephone set **26**, and computer **28** have been shown on separate lines, it should be understood that one or more of these devices could share a single line.

The MSDS **10** is also connected to a network, preferably the Internet World Wide Web **30**. Although the Internet **30** has been shown as a single entity, it should be understood that the Internet **30** is actually a conglomeration of computer networks and is a constantly evolving and changing structure. The MSDS **10** therefore is not limited to the current structure or form of the Internet **30** but encompasses any future changes or additions to the Internet **30**. Further, the MSDS **10** is shown as being directly connected to the Internet **30**, such as through its own node or portal. The MSDS **10**, however, may be practiced with any suitable connection to the Internet **30**, such as through an intermediate Internet access provider.

With reference to FIG. **2** depicting an overall operation of the invention, a telephone call directed to a number-serviced by the MSDS **10** is initiated at step **40** by a third party, for instance, through the facsimile machine **24**, telephone set **26**, or computer **28**. The incoming telephone call may therefore carry a facsimile message, a voice message, or a data message. At step **42**, the address signal associated with the initiated call is routed through the central office **20**, over the DID trunk **15**, and to the MSDS **10**.

When the call reaches the MSDS **10**, the call is routed within the MSDS **10** in a manner that will be described in more detail below with reference to FIG. **13**. At step **46**, the MSDS **10** answers the telephone call and receives the address signal from the DID trunk **15**. Next, at step **48**, the call is established between the MSDS **10** and the third party and, at step **50**, the MSDS **10** receives the message transmitted over the telephone line. The message is stored at step **52**, a database within the MSDS **10** is updated at step **54**, and the intended recipient of the message is notified at step **56**. The intended recipient of the message uses the services provided by the MSDS **10** and will hereinafter be referred to as a user. At step **58**, the message is converted into hyper-text mark-up language (HTML).

After the MSDS **10** receives a message for one of its users, the user can then communicate with the MSDS **10** at any time and at any location by connecting to the Internet World Wide Web **30** and retrieving the message stored within the MSDS **10**. With reference to FIG. **3**, at step **60** the user first connects to the Internet **30**, such as through a personal computer **32** which may be connected to the Internet **30** in any suitable manner, such as through its own portal or node or through some intermediate access provider. The personal computer **32** is not limited to a single computer but may instead comprise a network of computers, such as a local area network within an office.

Once connected with the Internet **30**, at step **62**, the user accesses with a hyper-text browser the Universal Resource Locator (URL) associated with his or her MSDS **10** mailbox. The computer **32** may use any suitable hypertext browser, such as Netscape, to access the mailbox. A Hypertext Transfer Protocol Deamon (HTTPD) within the MSDS **10** receives the URL request at step **64** and, at step **66**, requests user authentication. The user then supplies his or her ID and password at step **68** and, if found valid at step **70**, the MSDS **10** provides the computer **32** with access to the mailbox at step **72**. If the ID and password are invalid, as determined at step **70**, then the HTTPD sends the computer **32** an authentication failure message at step **74**.

After the user gains access to the mailbox at step **72**, the user can request information stored within the MSDS **10**. The MSDS **10** receives the request at step **76** and, at step **78**, determines whether the information exists. As is common practice, the MSDS **10** also determines the validity of the request at step **78**. The request from the user will include the mailbox number for the user, the message identifier, display preferences, and, if the message is a facsimile message, a page identifier. If for any reason the request is invalid, such as when a hacker is attempting to gain access to privileged information, the request for the information will be terminated.

If the requested information is available, then at step **80** the information is transmitted through the Internet **30** to the user's computer **32**. If, on the other hand, the information does not exist, then at step **82** the MSDS **10** will generate the requested information and then send the information to the user's computer through the Internet **30** at step **80**.

Prior to gaining access to the mailbox at step **72**, the user is preferably sent a greeting page or other such type of information which permits the user to learn about the services provided by the MSDS **10**, open an account with the MSDS **10**, or gain access to an account. Once access is provided at step **72**, the user is provided with information indicating the total number of messages stored in his or her mailbox within the MSDS **10**. Preferably, the information sent by the MSDS **10** indicates the total number of messages for each type of message and also the total number of saved messages versus the total number of new messages.

The user is also preferably given the option at this step to change account information. The account information might

include the E-mail address for the user, the manner in which messages are to be reviewed, the user's pager information, as well as other user preferences. The display options and other user preferences will be discussed in further detail below.

The general information HTML file which indicates the total number of different messages is provided with a number of anchors, which are also termed links or references. In general, an anchor permits a user on the computer **32** to retrieve information located on another file. For instance, an anchor to a listing of facsimile messages is preferably provided on the display of the total number of messages. When the user selects the anchor for the facsimile list, the MSDS **10** pulls up and displays the file containing the list of facsimiles, such as a file "faxlist.html." The other types of messages, such as voice messages and data messages, would have similar anchors on the general information page directed to their respective HTML listing files.

When a new message is received at step **54** in FIG. **2**, the user's mailbox is updated to display the total number and types of messages. The MSDS **10** might also update other files in addition to the total listing of messages. Additionally, at this time, the MSDS **10** sends an E-mail message to the user's computer **32** to inform the user of the newly arrived message. The MSDS **10** could also send notice to the user through a paging system so that the user receives almost instantaneous notice that a message is received.

The MSDS **10** also generates additional information according to the user's preferences. These preferences on how the MSDS **10** is configured for the user include options on how the messages are reviewed. With facsimile messages, for instance, the user can vary the amount or the type of information that will be supplied with the listing of the facsimile messages by selecting an appropriate option. Other options are also available so that the user can custom fit the MSDS **10** to the user's own computer **32** or own personal preferences.

For instance, when a facsimile message is received, the MSDS **10**, at step **54**, will update the total listing of all messages to indicate the newly received message and may additionally generate the HTML files for the newly received facsimile message according to the user's preferences. When the user later requests information on the message at step **76**, the HTML information has already been generated and the MSDS **10** may directly send the requested information to the user at step **80**. If, on the other hand, the user desires to view the message according to one of the other options, the MSDS **10** will generate the HTML files at step **82** according to that other option at the time of the request.

A first option available to the user for viewing a facsimile message is a textual only listing of the messages. The information on the textual listing preferably includes the date and time that the message was received at the MSDS **10**, the telephone number from where the message was transmitted, the number of pages, the page size, and the size of the message in bytes. The messages, of course, could be listed with other types of information. When the user selects one of the facsimile messages on the list, a request is sent to the HTTPD within the MSDS **10** causing the message to be downloaded via the Internet **30** to the user's computer **32**. Once the message is received by the computer **32**, the message can be displayed, printed, or saved for further review.

The second through fifth options allow the user to preview an image of the facsimile message before having the message downloaded from the MSDS **10** through the Internet **30** and to the computer **32**. The second option permits the user to view the list of messages with a reduced size image of the cover page next to each entry on the list. When the user selects one of the messages on the list, the selected facsimile message is transmitted through the Internet **30** to the computer **32**. The user may also scroll through the listings if all of the message cannot be displayed at one time on the computer **32**.

The third option provides the user with a full size view of the cover page of each facsimile message. The user can quickly scroll through the cover pages of each message without downloading the entire message to the computer **32**. The full size view of the cover pages permit the user to clearly discern any comments that may be placed on the cover page, which may not be possible from just a reduced image of the cover page available through the second option.

The fourth option provides the user with a reduced size image of each page and permits the user to scroll through the entire message. The user can therefore read the entire facsimile message on screen before the message is downloaded onto the computer **32**. With this option, the user can go through the pages of the facsimile message and can also skip to the next message or previous message. Additionally, the user has the option of enlarging a page to a full size view of the page. When one of the messages is selected, as with the other options, the HTTPD within the MSDS **10** causes the facsimile message to be transmitted through the Internet **30** to the user's computer **32**.

With a fifth option, a full size image of each page is transmitted to the user's computer **32**. The user can scroll through the pages of the facsimile message and easily read the contents of each page. If the user wants the message downloaded to the computer **32**, the user selects the message and the HTTPD within the MSDS **10** transmits the message to the user's computer **32** through the Internet **30**.

As discussed above, after the database is updated at step **54**, the MSDS **10** will generate additional information based upon the option selected for displaying the facsimile messages. More specifically, as shown in FIG. **4**(A), if the first option has been selected, as determined at step **100**, then at step **102** the MSDS **10** will generate the textual listing of the facsimile messages with anchors or references to the respective facsimile files. The HTML files are then moved to an Internet Server at step **104**.

If the first option is not selected, the MSDS **10** next determines whether the second option has been selected at step **106**. With the second option, the facsimile messages are listed along with a reduced size image of the cover page. To generate this information, the cover page is extracted from the facsimile file at step **108** and a reduced size HTML image of the cover page is created at step **110**. At step **112**, a listing of the facsimile messages is generated with a thumbnail view of each cover page linked to its respective facsimile file. The generated HTML files are then sent to the Internet Server at step **104**.

When the third option is selected, as determined at step **114**, a full size image of the cover page is sent to the computer **32**. The full size image of the cover page is generated by first extracting the cover page from the facsimile file at step **116**. Next, the cover page is converted into a full size HTML image at step **118** and, at step **120**, the listing is generated with the embedded cover page linked to the facsimile file.

If, at step **122**, the fourth option is determined to be selected, then a reduced size image of each page is provided to the user with the option of enlarging the page to view the

contents of the page more clearly. With reference to FIG. 4(B), the information necessary for the third option is produced by first extracting the first page of the facsimile message at step **124**. A reduced size HTML image is created at step **126** and then a full size HTML image is created at step **128**. At step **130**, the listing is generated with embedded thumbnail images of the pages with links to the full size images. If the page is not the last page, as determined at step **140**, then the next page is extracted at step **142** and steps **126** to **130** are repeated to generate the HTML files for the other pages of the facsimile message. After the last page has been converted into an HTML file according to the third option, the files are moved onto the Internet Server at step **104**.

At step **144**, the MSDS **10** determines whether the fifth option has been selected. The fifth option provides the user with a full size image of each page of the facsimile message. While only five options have been discussed, the invention may be practiced with additional options. Consequently, with additional options and with the fourth option not being selected, the MSDS **10** would next determine whether one of the additional options have been selected. With the preferred embodiment of the invention having only five options, however, the MSDS **10** will assume that the fifth option has been selected if none of the first four options were found to be selected.

The information necessary to display the pages of the facsimile message according to the fifth option is generated by first extracting the first page of the facsimile message at step **146**. At step **148**, a full size HTML image of the page is created and, at step **150**, a listing is generated with an embedded image and links to previous and next pages. When the page is not the last page, as determined at step **152**, the MSDS **10** extracts the next page and generates the HTML file for that page. After all pages have been converted into HTML files according to the fourth option, the files are sent to the Internet Server at step **104**.

While FIGS. 4(A) and (B) describe the operations of the MSDS **10** at the time a message is received, FIG. **5** depicts an overall flowchart of operations for the MSDS **10** when the user requests a page of information in a display format other than the user's preferred option of displaying the message. FIG. **5** is therefore a more detailed explanation of how the MSDS **10** generates the necessary information at step **82** of FIG. **3**.

In general, as shown in FIG. **5**, the MSDS **10** first determines the type of image that is needed at step **82***a*. For example, at this step, the MSDS **10** will determine whether images are unnecessary, whether an image of just the cover page is necessary, whether an image is needed for every page, and whether the image needs to be a full size, a reduced size, or both full and reduced sized images. At step **82***b*, the MSDS **10** determines whether the image has already been created. If the image has not been created, then at step **82***c* the MSDS **10** will extract the page from the base facsimile file and, at step **82***d*, generate the required HTML image. As discussed above, the required image may be for just the cover page, for all the pages, and may be a full size and/or a reduced size image of the page. At step **82***e*, the image is embedded with links or anchors to other HTML files. These links or anchors might be references to the next and previous pages and also to the next and previous facsimile messages. Finally, the HTML file having the embedded image and links is sent to the user at step **80** in FIG. **3**.

The process for converting a facsimile message into HTML files according to the fifth option will be described with reference to FIG. **6**. This process will occur at step **54** when the message is received and when the fifth option is the user's preferred option of displaying the messages. It should be understood that a similar type of process will also occur when the user requests a page of information according to the fifth option when the user is retrieving a facsimile message and the fifth option is not the user's preferred option. The conversion processes according to the other options will become apparent to those skilled in the art and will therefore not be discussed in further detail.

With reference to FIG. **6**, when the facsimile message is received, the message is in a Tagged Image File Format/Facsimile (TIFF/F) and each page of the facsimile message is split into a separate file. Each page of the facsimile message is then converted from the TIFF/F format into a Portable Pixel Map (PPM) format. The PPM files are next converted into separate Graphic Interchange Format (GIF) files and then into separate HTML files. Thus, each page of the facsimile message is converted into a separate HTML file. The TIFF/F files may be converted into PPM with an available software package entitled "LIBTIFF" and the PPM files may be converted into GIF files with an available software package found in "Portable Pixel Map Tools."

The invention is not limited to this exact conversion process or to the particular software packages used in the conversion process. For instance, the TIFF/F files may be converted into another portable file format, through any other type of intermediate format, or may be converted directly into the GIF format. Further, instead of GIF, the facsimile messages may be converted into JPEG, BMP, PCX, PIF, PNG, or any other suitable type of file format.

The files may be identified with any suitable filename. In the preferred embodiment, the files for each user are stored in a separate directory assigned to just that one user because an entire directory for a given user generally can be protected easier than the individual files. The memory, however, may be organized in other ways with the files for a single user being stored in different directories. The first part of the filename is a number preferably sequentially determined according to the order in which messages arrive for that user. The preferred naming convention for ending the filenames is depicted in FIG. **6**. Each page of the facsimile message is saved as a separate file with an extension defined by the format of the file. Thus, the files will end with an extension of ".TIFF," ".PPM," ".GIF," or ".HTML" according to the format of the particular file. In the example shown, the separate pages have filenames which end with the respective page number, for instance, the first page ends with a "1." The files, however, are preferably terminated with a letter or multiples letters to indicate the order of the pages. For instance, page 1 might have an ending of "aa," page 2 might have an ending of "ab," etc. The invention, however, is not limited to the disclosed naming convention but encompasses other conventions that will be apparent to those skilled in the art.

As shown in FIG. **6**, in addition to the GIF files representing the pages of the facsimile message, the HTML files include a number of anchors or references. In the example shown, the first HTML file has an anchor a for the "Next Page." Anchor a is defined as a=<A HREF="2.html">Next Page and will therefore reference the second HTML file when a user selects the "Next Page." The second HTML file has an anchor b for the "Previous Page" and an anchor c for the "Next Page" and the third HTML file has an anchor d for the "Previous Page." With these particular HTML files, the user can scroll through each page of the facsimile message and view a full size image of the page.

Each HTML file preferably contains anchors in addition to those relating to "Next Page" and "Previous Page." For instance, each HTML file may contain an anchor to the next facsimile message, an anchor to the previous facsimile message, and an anchor to return to the facsimile list. The HTML files preferably contain anchors relating to "Save" and "Delete." When the "Save" anchor is selected, the user would be able to save the message under a more descriptive name for the message. The "Delete" anchor is preferably followed by a inquiry as to whether the user is certain that he or she wants to delete the message. Other anchors, such as an anchor to the general listing, will be apparent to those skilled in the art and may also be provided.

FIG. **7** provides an example of a display according to the fifth option for the first page of the facsimile message shown in FIG. **6**. The headings of the display provide information on the telephone number from where the message was sent, the date and time the message was received at the MSDS **10**, and an indication of the page of the message being displayed. The main portion of the display is the full size image of the page. At the bottom of the display, an anchor or link is provided to the "Next Page" and another anchor is provided to the "Return to Fax Listing." Additional information may also be provided on the display, is such as a link to a company operating the MSDS **10**.

An example of the "1.html" file for generating the display shown in FIG. **7** is shown below in Table 1.

```
<HTML>
<HEAD>
<TITLE>Fax Received on May 31, 1995 at 1:58 PM from
  (404) 249 6801; Page 1 of 3</TITLE>
</HEAD>
<BODY>
<H1>Fax from (404) 249-6801 </H1>
<H2>Received on May 31, 1995 at 1:58 PM</H2>
<H2>Page 1 of 3</H2>
<IMG SRC="1.gif">
<P>
<A HREF="2.html">Next Page</a>
<HR>
<A HREF="faxlist.html">Return to Fax Listing</A>
<P>
This page was automatically generated by Fax Web(tm)
  on May 31, 1995 at 2:05 PM.
<P>
&copy; 1995 NetOffice, Inc.
<HR>
<Address>
<A HREF="http://www.netoffice.com/">NetOffice,
  Inc.</A><BR>
PO Box 7115<BR>Atlanta, GA 30357<BR>
<A HREF=
  "mailto:info@netoffice.com">info@netoffice.com</
  A>
</Address>
</BODY>
</HTML>
```

TABLE 1

As is apparent from the listing in Table 1, the image file "1.gif" for the first page is embedded into the HTML file "1.html." Also apparent from the listing is that the anchor for "Next Page" directs the MSDS **10** to the second page of the facsimile message having the filename "2.html" and the anchor for "Return to Fax Listing" directs the MSDS **10** to the filename "faxlist.html" containing the list of facsimile messages.

A process for converting a voice message into an HTML file is illustrated in FIG. **8**. The voice message is originally stored in a VOX format or an AD/PCM format and is retrieved at step **170**. The voice message is then converted either into an AU format or WAV format in accordance with the user's preference, which is stored in memory. Preferably, the message is preferably in the AD/PCM format originally and is converted in WAV, but the voice files may alternatively be stored and converted in file formats other than the ones disclosed, such as RealAudio (RA).

At step **174**, the listing of all of the voice messages is then updated to include a listing of the newly received voice message and an anchor to the voice message. For instance, the original voice message may be stored with filename "1.vox" and is converted into WAV and stored with a filename "1.wav." The HTML file "voicelist.html" which contains a list of all voice messages would then have an anchor to the filename "1.wav" along with identifying information for the voice message, such as when the message was received.

The listing of the voice messages may have additional anchors or references. For instance, each voice message may have an anchor directing the MSDS **10** to a file which contains a short sampling of the message. Thus, when the user selects this anchor, the user could receive the first 5 seconds of the message or some other predefined number of seconds. As with the listing of facsimile messages, the listing of the voice messages also preferably has anchors to "Save" and "Delete."

FIG. **9** illustrates a process for converting a data message into HTML. At step **180**, the data file is retrieved from a database and at step **182** the HTML file containing the list of data messages is updated to include a listing of the newly received message along with identifying information. For instance, the HTML file for the listing "datalist.html" would be updated to include an anchor to a data file "file 1.1" and would have information such as the time and date that the data was transmitted, the size of the data file, as well as additional identifying information.

Because the MSDS **10** can receive messages of various types, such as a facsimile message, voice message or data message, the MSDS **10** must be able to determine the type of message that is being sent over the DID trunk **15**. With reference to FIG. **10**, when an incoming call is received, the MSDS **10** goes off hook at step **200** and starts to generate a ringing sound. If, at step **202**, a facsimile calling tone is detected, then the ringing sound is stopped at step **204** and the message is received as a facsimile message at step **206**. Similarly, when a data modem calling tone is detected at step **208**, the ringing sound is stopped at step **210** and the message is identified as a data message at step **212**.

If the MSDS **10** detects a DTMF digit at step **214**, the ringing sound is stopped at step **216** and the MSDS **10** then determines which digit was pressed. When the digit is a "1," as determined at step **218**, the message is identified as a facsimile message. The MSDS **10** will thereafter receive and store the facsimile message in the manner described above with reference to FIG. **2**. If the digit is identified as a "0" at step **220**, the call is identified as an owner's call and will be processed in a manner that will be described below with reference to FIG. **12**. As will be apparent, other digits may cause the MSDS **10** to take additional steps. If any other

DTMF digit is pressed, at step **224** the MSDS **10** activates a voice call system, which will be described in more detail below with reference to FIG. **11**.

With step **226**, the MSDS **10** will enter a loop continuously checking for a facsimile calling tone, a data modem calling tone, or for a DTMF digit. If after n rings none of these tones or digits has been detected, the ringing sound is stopped at step **228** and the voice call system is activated at step **224**.

With reference to FIG. **11**, when a fax calling tone or modem calling tone is not detected, the voice call system begins at step **230** by playing a voice greeting. If the greeting was not interrupted by a DTMF digit as determined at step **232**, then the caller is prompted for the voice message at step **234** and, at step **236**, the voice message is recorded and stored in memory. At step **238**, the caller is prompted with a number of options, such as listening to the message, saving the message, or re-recording the message. Since the selection of these options with DTMF digits will be apparent to those skilled in the art, the details of this subroutine or subroutines will not be described in flurther detail. When the caller wishes to re-record the message, as determined at step **240**, the caller is again prompted for a message at step **234**. If the caller does not wish to re-record the message, the call is terminated at step **242**.

If the voice greeting is interrupted by a DTMF digit, as determined at step **232**, then the MSDS **10** ascertains which digit has been pressed. At step **244**, if the digit is a "0," the MSDS **10** detects that the call is an owner's call. When the digit is a "1," the MSDS **10** is informed at step **206** that the call carries a facsimile message. As discussed above with reference to FIG. **10**, other DTMF digits may cause the MSDS **10** to take additional steps. If an invalid digit is pressed, by default at step **248** the routine returns to step **234** of prompting the caller for a message.

It should be understood that the invention is not limited to the specific interactive voice response system described with reference to FIG. **11**. As discussed above, the invention may be responsive to DTMF digits other than just a "0" and a "1." Further variations or alterations will be apparent to those skilled in the art.

With reference to FIG. **12**, when the call is considered an owner's call, the caller is first prompted for the password at step **250**. The password is received at step **252** and, if found correct at step **254**, a set of announcements are played to the owner. These announcements would preferably inform the owner of the number of new messages that have been received, the number of saved messages, the number of facsimile message, the number of data messages, and the number of voice messages. Other announcements, of course, could also be made at this time.

At step **258**, the owner then receives a recording of the owner's menu with the appropriate DTMF digit for each option. For instance, the DTMF digit "1" may be associated with playing a message, the DTMF digit "2" may be associated with an options menu, and the DTMF digit "*" may be associated with returning to a previous menu or terminating the call if no previous menu exists.

A DTMF digit is detected at step **260** and the appropriate action is taken based upon the digit received. Thus, if the digit is determined to be a "1" at step **264**, the owner can play a message at step **266**. At step **266**, the owner is preferably greeted with a menu giving the owner the options of playing or downloading new messages, saved messages, facsimile messages, data messages, or voice messages. As should be apparent to those skilled in the art, the owner may receive one or more menus at step **266** and the owner may enter one or more DTMF digits in order to play or download a particular message.

If, instead, the digit is determined to be a "2" at step **268**, then the owner receives an options menu at step **270**. With the options menu, the owner can enter or change certain parameters of the MSDS **10**. For instance, the owner can change his or her password, the owner can change the manner in which facsimile messages are displayed on the computer **32**, the owner can change the image file format from GIF to another format, the owner can select the file formats for the voice messages, as well as other options.

If the "*" DTMF digit is received, as determined at step **272**, then the owner is returned to a previous menu. The "*" digit is also used to terminate the call when the owner has returned to the initial menu. The "*" digit is therefore universally recognized by the MSDS **10** throughout the various menus as a command for returning to a previous menu.

If the owner enters a DTMF digit that is not being used by the MSDS **10**, the owner receives an indication at step **276** that the key is invalid and the owner is then again provided with the owner's menu at step **258**. When the owner does not enter a DTMF digit while the owner's menu is being played, as determined at step **260**, the menu will be replayed n times. Once the menu has been replayed n times, as determined at step **262**, then the call will be terminated at step **278**.

If the password is incorrect, as determined at step **254**, then the MSDS **10** checks whether the user has made more than "n" attempts at step **280**. If "n" attempts have not been made, then a password incorrect message will be displayed to the user at step **282** and the user will once again be prompted for the password at step **250**. When the user has made "n" attempts to enter the correct password, the MSDS **10** will play a failure message to the user at step **284** and then terminate the call at step **286**. The specific number "n" may be three so that the call is terminated after three failed attempts.

The owner's menu may be responsive to an additional number of DTMF digits and may be structured in other ways. For instance, separate DTMF digits may direct the owner to the respective types of messages, such as a facsimile message, data message, or voice message. Also, separate DTMF digits may direct the owner to a recording of new messages or to a recording of saved messages. Other variations will be apparent to those skilled in the art.

A more detailed diagram of the MSDS **10** is shown in FIG. **13**. As shown in the figure, a plurality of DID trunks **15** are received by an input/output device **17** and are then sent to a central processor **3**. The number of DID trunks **15** may be changed to any suitable number that would be necessary to accommodate the anticipated number of telephone calls that may be made to the MSDS **10**. The input/output device **17** routes a call on one of the DID trunks **15** to an open port of the central processor **3** and is preferably a DID Interface Box manufactured by Exacom.

The central processor **3** receives the calls on the DID trunks **15** and stores the messages in storage **11** in accordance with software **7**. Preferably, a separate directory in storage **11** is established for each user having an account on the MSDS **10** so that all of the messages for a single user will be stored in the same directory. It should be understood that the number of processors within the central processor **3** is dependent upon the number of DID trunks **15**. With a greater number of DID trunks **15** capable of handling a larger number of telephone calls, the central processor **3** may actually comprise a number of computers. The input/output device **17** would then function to route incoming calls to an available computer within the central processor **3**.

A more detailed diagram of the central processor **3** is shown in FIG. **14**. The central processor **3** comprises a telephone line interface **21** for each DID trunk **15**. The telephone interface **21** provides the ringing sounds and other communication interfacing with the telephone lines. The signals from the telephone interface **21** are routed to a pulse/tone decoder **23** and to a digital signal processor (DSP) **25**. The pulse/tone decoder **23** detects the address signal off of an incoming call and sends the address signal onto a bus **29** to a microprocessor **27**. The DSP performs the necessary signal processing on the incoming calls and routes the processed signals to the microprocessor **27**.

The microprocessor **27** will then read the address signal from the pulse/tone decoder **23** and store the message from the DSP **25** in an appropriate directory in storage **11**. As discussed above, the central processor **3** may comprise a number of computers or, more precisely, a number of microprocessors **27** with each microprocessor **27** handling the calls from a certain number, such as four, DID trunks **15**. The microprocessor **27** may comprise any suitable microprocessor, but is preferably at least a 486 PC.

In addition to handling incoming calls and storing the messages in storage **11**, the central processor **3** also coordinates the interactive voice response system of the MSDS **10**. The software **7** would incorporate the flowcharts of operations for receiving a message shown in FIG. **3**, for detecting the type of message on an incoming call shown in FIG. **10**, for receiving voice messages shown in FIG. **11**, and for receiving an owner's call shown in FIG. **12**. Based upon the above-referenced flowcharts and the respective descriptions, the production of the software **7** is within the capability of one of ordinary skill in the art and will not be described in any further detail.

The Internet Server **5** is connected to the central processor **3**, such as through a local area network, and also has access to the storage **11**. The Internet Server **5** performs a number of functions according to software **9**. For instance, the Internet Server **5** retrieves the data files stored in storage **11** by the central computer **3** and converts the files into the appropriate HTML files. The converted HTML files are then stored in storage **11** and may be downloaded to the computer **32** through the Internet **30**. The Internet Server **5** also handles the requests from the computer **32**, which might require the retrieval of files from the storage **11** and possibly the generation of additional HTML files.

The software **9** for the Internet Server **5** would therefore incorporate the flowchart of operations for generating HTML files according to user preferences shown in FIG. **4**, for generating requested information from a user shown in FIG. **5**, for converting facsimile messages into HTML shown in FIG. **6**, for converting voice messages into HTML shown in FIG. **8**, and for converting data messages into HTML shown in FIG. **9**. Based upon the abovereferenced flowcharts and their respective descriptions, the production of the software **9** is within the capability of one of ordinary skill in the art and need not be described in any further detail.

Nonetheless, a more detailed block diagram of the Internet Server **5** is shown in FIG. **15**. The Internet Server **5** runs on a suitable operating system (OS) **39**, which is preferably Windows NT. The Internet Server **5** has a number of application programs **31**, such as the ones depicted in the flowcharts discussed above, for communicating with the central processor **3** and for accessing data from storage **11** and also from memory **33**.

The memory **33**, inter alia, would contain the data indicating the preferences of each user. Thus, for example, when a facsimile message in the TIFF/F format is retrieved by the Internet Server **5**, the Internet Server **5** would ascertain from the data in memory **33** the preferred option of displaying the facsimile message and would generate the appropriate HTML files.

All interfacing with the Internet **30** is handled by the HTTPD **37**, which, in the preferred embodiment, is "Enterprise Server" from NetScape Communications Corp. Any requests from users, such as a request for a file, would be handled by the HTTPD **37**, transferred through the CGI **35**, and then received by the application programs **31**. The application programs **31** would then take appropriate actions according to the request, such as transferring the requested file through the CGI **35** to the HTTPD **37** and then through the Internet **30** to the user's computer **32**.

The Internet Server **5** may be connected to a paging system **13**. Upon the arrival of a new message, in addition to sending an E-mail message to the user's mailbox, the Internet Server **13** may also activate the paging system **13** so that a pager **15** would be activated. In this manner, the user could receive almost instantaneous notification that a message has arrived.

The paging system **13** is preferably one that transmits alphanumeric characters so that a message may be relayed to the user's pager **15**. The Internet Server **5** therefore comprises a signal processor **41** for generating signals recognized by the paging system **13** and a telephone interface **43**. The signal processor **41** preferably receives information from the application programs **31** and generates a paging message in a paging file format, such as XIO/TAP. The telephone interface **43** would include a modem, an automatic dialer, and other suitable components for communicating with the paging system **13**.

The information from the application programs **31** may simply notify the user of a message or may provide more detailed information. For instance, with a facsimile message, the information from the application programs **31** may comprise CSI information identifying the sender's telephone number. The user would therefore receive a message on the pager **15** informing the user that a facsimile message was received from a specified telephone number. The amount and type of information that may be sent to the user on the pager **15** may vary according to the capabilities of the paging system **13** and may provide a greater or lesser amount of information than the examples provided.

The Internet Server **5** is not limited to the structure shown in FIG. **15** but may comprise additional components. For instance, the HTTPD **37** would be linked to the Internet **30** through some type of interface, such as a modem or router. The Internet Server **5** may be connected to the Internet **30** through typical phone lines, ISDN lines, a T1 circuit, a T3 circuit, or in other ways with other technologies as will be apparent to those skilled in the art.

Furthermore, the Internet Server **5** need not be connected to the Internet **30** but may be connected to other types of networks. For instance, the Internet Server **5**, or more generally the network Server **5**, could be connected to a large private network, such as one established for a large corporation. The network Server **5** would operate in the same manner by converting messages into HTML files, receiving requests for information from users on the network, and by transmitting the information to the users.

Also, at least one interface circuit would be located between the Internet Server **5** and the central processor **3** in order to provide communication capabilities between the Internet Server **5** and the central processor **3**. This network interface may be provided within both the Internet Server **5** and the central processor **3** or within only one of the Internet Server **5** or central processor **3**.

Examples of the Internet Server **5** software layers are shown in FIGS. **16**(A) and **16**(B), with FIG. **16**(A) representing the Internet Server **5** in an asynchronous mode of communication and FIG. **16**(B) representing the Internet **5** in a synchronous mode of communication. As shown in the figures, the software **9** for the Internet Server **5** may additional comprise an Internet Deamon for running the HTTPD **37**. The software **9** for the Internet Server **5** would also include TCP/IP or other transport layers. Moreover, while the authentication is provided through the HTTPD **37**, the authentication of the user's password and ID may be supplemented or replaced with other ways of authentication.

The term synchronous has been used to refer to a mode of operation for the MSDS **10** in which the all possible HTML files for a message are generated at the time the message is received. The HTML files may be generated by the central processor **3** or by the application programs **31**. When a request for information is then later received by the HTTPD **37**, the information has already been generated and the HTTPD **37** only needs to retrieve the information from storage **11** and transmit the information to the user's computer **32**. With a synchronous mode of operation, the CGI **35** would be unnecessary.

The MSDS **10** preferably operates according to an asynchronous mode of operation. In an asynchronous mode of operation, information requested by the user may not be available and may have to be generated after the request. The asynchronous mode of operation is preferred since fewer files are generated, thereby reducing the required amount of storage **11**. Because the information requested by a user may not be available, some anchors cannot specify the filename, such as "2.html," but will instead contain a command for the file. For instance, an anchor may be defined as <AIIREF= "/faxweb/users/2496801/viewpage. cgi?FAX_NUM= 1&PAGE=1&VIEW_MODE=FULL"> for causing the CGI **35** to run a viewpage program so that page 1 of facsimile message 1 will be displayed in a full size image. The CGI **35** will generate the requested information when the information has not been generated, otherwise the CGI **35** will retrieve the information and relay the information to the HTTPD **37** for transmission to the user.

With the invention, the MSDS **10** can reliably receive voice, facsimile, and data messages for a plurality of users and can receive more than one message for a user at a single time. The messages are stored by the MSDS **10** and can be retrieved at the user's convenience at any time by connecting to the Internet **30**. The Internet World Wide Web **30** is a constantly expanding network that permits the user to retrieve the messages at virtually any location in the world. Since the user only needs to incur a local charge for connecting to the Internet **30**, the user can retrieve or review messages at a relatively low cost.

Even for the user's at the office or at home, the MSDS **10** provides a great number of benefits. The user would not need a facsimile machine, voice mail system, or a machine dedicated for receiving data messages. The user also need not worry about losing part of the message or violating the confidential nature of the messages. The user, of course, can still have a facsimile machine and dedicated computer for data messages. The MSDS **10**, however, will permit the user to use the telephone company's "call forwarding" feature so that messages may be transferred to the MSDS **10** at the user's convenience, such as when the user is away from the office.

The software **7** and software **9** are not limited to the exact forms of the flowcharts shown but may be varied to suit the particular hardware embodied by the invention. The software may comprise additional processes not shown or may combine one or more of the processes shown into a single process. Further, the software **7** and **9** may be executed by a single computer, such as a Silicon Graphics Workstation, or may be executed by a larger number of computers.

The facsimile messages preferably undergo signal processing so that the images of the facsimile messages are converted from a two tone black or white image into an image with a varying gray scale. As is known in the art, a gray scale image of a facsimile message provides a better image than simply a black or white image of the message. The signal processing may comprise any suitable standard contrast curve method of processing, such as anti-aliasing or a smoothing filter. The signal processing may occur concurrently with the conversion from TIFF/F to GIF and is preferably performed for both full and reduced size images of the facsimile messages.

Furthermore, the user may be provided with a greater or fewer number of options in displaying or retrieving messages. The options are not limited to the exact forms provided but may permit the user to review or retrieve the messages in other formats. The options may also permit a user to join two or messages into a single message, to delete portions of a message, or to otherwise the contents of the messages. Also, the various menus provided to the user over the telephone may have a greater number of options and the MSDS **10** may accept responses that involve more than just a single DTMF digit.

The specific DTMF digits disclosed in the various menus are only examples and, as will be apparent to those skilled in the art, other digits may be used in their place. For instance, a "9" may be used in the place of a "*" in order to exit the menu or to return to a previous menu. Also, the DTMF digits may be changed in accordance with the user's personal convention. If the user had a previous voice mail system, the user could customize the commands to correspond with the commands used in the previous system in order to provide a smooth transition to the MSDS **10**.

The MSDS **10** may restrict a user to only certain types of messages. For instance, a user may want the MSDS **10** to store only facsimile messages in order to reduce costs of using the MSDS **10**. In such a situation, the MSDS **10** would perform an additional step of checking that the type of message received for a user is a type of message that the MSDS **10** is authorized to receive on the user's behalf. When the message is an unauthorized type of message, the MSDS **10** may ignore the message entirely or the MSDS **10** may inform the user that someone attempted to send a message to the MSDS **10**.

Moreover, the MSDS **10** has been described as having the central processor **3** for handling incoming calls and the Internet Server **10** for interfacing with the Internet **30**. The invention may be practiced in various ways other than with two separate processors. For instance, the central processor **3** and the Internet Server **5** may comprise a single computer or workstation for handling the incoming calls and for interfacing with the Internet **30**. The MSDS **10** may convert the messages into HTML files prior to storing the messages. Also, the central processor **3** may communicate with the paging system **13** instead of the Internet Server **5**. Additionally, as discussed above, the central processor **3** may comprise a number of microprocessors **27** for handling a large number of DID trunks.

The invention has been described as converting the messages into HTML and transmitting the HTML files over the Internet **30** to the computer **32**. The HTML format, however, is only the currently preferred format for exchanging infor-

mation on the Internet **30** and is actually only one type of a Standard Generalized Mark-Up Language. The invention is therefore not limited to the HTML format but may be practiced with any type of mixed media page layout language that can be used to exchange information on the Internet **30**.

SGML is not limited to any specific standard but encompasses numerous dialects and variations in languages. One example of an SGML dialect is virtual reality mark-up language (VRML) which is used to deliver three dimensional images through the Internet. As another example, the computer **32** for accessing the MSDS **10** through the Internet **30** may comprise a handheld device. A handheld device is generally characterized by a small display size, limited input capabilities, limited bandwidth, and limited resources, such as limited amount of memory, processing power, or permanent storage. In view of these limited capabilities, a handheld device markup language (HDML) has been proposed to provide easy access to the Internet **30** for handheld devices. The SGML information transmitted by the MSDS **10** to the computer **32** may therefore comprise HDML information suitable for a handheld device or may comprise VRML.

As another example, Extensible Mark-Up Language (XML) is an abbreviated version of SGML, which makes it easier to define document types and makes it easier for programmers to write programs to handle them. XML omits some more complex and some less-used parts of the standard SGML in return for the benefits of being easier to write applications for, easier to understand, and more suited to delivery and inter-operability over the Web. Because XML is nonetheless a dialect of SGML, the MSDS **10** therefore encompasses the translation of facsimile, voice, and data messages into XML, including all of its dialects and variations, and the delivery of these messages to computers **32** through the Internet **30**.

As a further example, the MSDS **10** encompasses the use of "dynamic HTML."'Dynamic HTML" is a term that has been used to describe the combination of HTML, style sheets, and scripts that allows documents to be animated. The Document Object Model (DOM) is a platform-neutral and language neutral interface allowing dynamic access and updating of content, structure, and style of documents. The MSDS **10** may therefore include the use of the DOM and dynamic HTML to deliver dynamic content to the computer **32** through the Internet **30**.

The MSDS **10** is also not limited to any particular version or standard of HTTP and thus not to any particular hypertext transfer protocol deamon **37**. In general, HTTP is a data access protocol run over TCP and is the basis of the World Wide Web. HTTP began as a generic request-response protocol, designed to accommodate a variety of applications ranging from document exchange and management to searching and forms processing. Through the development of HTTP, the request for extensions and new features to HTTP has exploded; such extensions range from caching, distributed authoring and content negotiation to various remote procedure call mechanisms. By not having a modularized architecture, the price of new features has been an overly complex and incomprehensible protocol. For instance, a Protocol Extension Protocol (PEP) is an extension mechanism for HTTP designed to address the tension between private agreement and public specification and to accommodate extension of HTTP clients and servers by software components. Multiplexing Protocol (MUX) is another extension that introduces asynchronous messaging support at a layer below HTTP. As a result of these drawbacks of HTTP, a new version of HTTP, namely HTTP-NG, has been proposed and its purpose is to provide a new architecture for the HTTP protocol based on a simple, extensible distributed object-oriented model. HTTP-NG, for instance, provides support for commercial transactions including enhanced security and support for on-line payments. Another version of HTTP, namely S-HTTP, provides secure messaging. The MSDS **10** and the HTTPD **37** may incorporate these versions or other versions of HTTP.

In addition to different versions of HTTP, the HTTPD **37** of the MSDS **10** may operate with other implementations of HTTP. For instance, the W3C's has an implementation of HTTP called "Jigsaw." Jigsaw is an HTTP server entirely written in Java and provides benefits in terms of portability, extensibility, and efficiency. The MSDS **10** may employ Jigsaw or other implementations of HTTP.

With regard to the transmission of messages to the user's computer **32**, the MSDS **10** permits the user to sample the voice message or to preview the facsimile message without requiring the MSDS **10** to transmit the entire message to the computer **32**. This sampling ability is a significant benefit since the transmission of the entire message would frequently tie up the computer **32** for a rather long period of time. Thus, with the preview or sample feature, the user can determine whether the user needs the message transmitted to the computer **32**.

If the user does decide that the entire message needs to be transmitted, as stated above, the user's computer **32** might be receiving the message for a relatively long period of time. After the entire message has been received, the user then has the options of viewing, listening, retrieving, or saving the message. As an alternative, the user's computer may instead indicate the contents of the message to the user as the message is being received.

For instance, with a voice message, the user's computer **32** could send the message to an audio speaker as the message is being received. In this manner, the message would be played in real time and the user would not need to wait until the entire message is received before listening to the message. In order to play the messages in real time, the messages are preferably in the RealAudio (RA) format, which the user can select as the preferred file format for voice messages.

In operation, the MSDS **10** would transmit an HTML file containing an RA file. If the user selects the RA file with the browser on the computer **32**, the browser will activate a program for use with RA files. The operations and functioning of this program will be apparent to those skilled in the art and will be available as a separate software package or will be incorporated within a browser program. The RA program will request the RA data file containing the message from the MSDS **10** and, as the RA file is being received at the computer **32**, this program will play the message in real time.

The MSDS **10** and the user's computer **32** could also be arranged so that each page or even line of a facsimile message could be displayed as the computer **32** receives the facsimile message. Further, although the transmission of a data message is relatively fast in comparison to a voice or facsimile message, the computer **32** could also be programmed to permit access to the data message as the message is being received.

The invention has been described as storing and transmitting voice messages. It should be understood that the voice message would probably be the most often type of audio message stored at the MSDS **10**. The invention, however, may be used with any type of audio message and is in no way limited to just voice messages.

According to another aspect of the invention, the MSDS **10** may be used as a file repository serving as an archive for a particular user or group of users. As described above, the MSDS **10** may maintain a list of all messages for a particular user which is displayed to the user when the user access his or her mailbox. The MSDS **10** may store all messages, whether they are voice, facsimile, or data, for a user in the database indefinitely. The MSDS **10** may therefore be relied upon by a user to establish the authenticity of a message and the existence or absence of a particular message. Through the MSDS **10**, a user can therefore maintain an accurate record of all received email messages, facsimile messages, and data transfers.

In addition to serving as a file depository, the MSDS **10** may also function as a document management tool. As described above with reference to FIG. **2**, when the MSDS **10** receives a message, the MSDS **10** updates a database with information on the message. This information includes the type of message, whether it is a facsimile message, voice message, or data message, the time and date at which the message was received, the size of the file, such as in bytes, the telephone number of the caller leaving the message, as well as other information, such as the number of pages of a facsimile message. Because the telephone number called is unique for each user, the information also includes the intended recipient of the message.

An example of a data entry **300** in storage **11** for a message is shown in FIG. **17**. The data entry **300** represents the entry for just a single message with each message having a separate data entry **300**. Preferably, the data entries **300** are stored in a relational database and may be searched through a structured query language (SQL).

As shown in FIG. **17**, the data field **300** for a message may comprise numerous data fields for describing the message. One of these data fields may comprise a field **301** for indicating the name of the person receiving the message. As will be appreciated by those skilled in the art, the person may be identified in numerous ways, such as by a portion of the person's name or by a unique number. Another field **302** in the data entry **300** indicates the type of the document, such as whether the document is a facsimile message, voice message, or data transfer, and fields **303** and **304** respectively indicate the date and time that the message was received by the MSDS **10**. The telephone number of the caller is indicated in field **305** while the size of the message, which may be measured in bytes, is indicated in field **306** and the number of pages of the message is indicated in field **307**. A document number for uniquely identifying the message is indicated in field **308**. As discussed above, the files or messages received for a particular user may be numbered sequentially in the order that they are received by the MSDS **10**. The files and messages, however, may be numbered or identified in other ways, such as by a combination of numbers with an identifier for the date when the message was received. Also, the documents number or identifier may be unique for each file or message directed to a user or, alternatively, may be unique for each file or message directed to a plurality of users, which is advantageous when the MSDS **10** tracks documents for an entire company or other group of users.

In addition to fields **301** to **308**, the data entry **300** for a message or file may have other fields **309** for describing or documenting the message or file. The other fields **309**, for instance, may be used to identify the type of storage that a message should receive. The messages or files may have different lengths of time that the message is stored before being automatically deleted. The type of storage, such as whether the full text of the message is stored, may also be indicated by field **309**. Another example of a trait that may be contained within the other field **309** is security. At times, a user may desire and may be granted access to another person's mailbox, such when the MSDS **10** tracks documents for an entire company. By designating a message or file as secure in field **309**, a user may restrict or deny access to that message or file by other users. The other fields **309** may also be used by a user to customize the MSDS **10** according to his or her own desires. For instance, if the user is a company, the company may want to classify messages according to the division at which the message is directed, such as one code for marketing, one for sales, one for engineering, and one for legal.

As another example of a use of one of the other fields **309**, a user can input notes in the other field **309**. When a user initially receives a data entry **300**, the entry **300**, for instance, may include data in all fields **301** to **308** except field **309**, which has been left blank. The user can then input his or her notes in the other field. An initial data entry **300** may include the field **305** for the caller's telephone number which contains the digits for the calling number. The user, however, may not readily recognize the caller from just reading the telephone number listed in field **305**. To more clearly indicate the caller, the user may input notes in field **309** to identify the caller's name. Alternatively, the notes in field **309** may reflect part or all of the contents of the message. The user may receive a large document or message and may input a brief description of the document or message in the field **309**. As another example, the recipient of the message may read the message or document and discover that the caller is requesting some service or goods from the recipient, such as a request for certain documents or delivery of a certain quantity of goods. The recipient may read the document or message and place somes notes in the field **309** to indicate the type of follow-up service or action that needs to be taken. An assistant to the recipient can then view the notes in field **309** and take appropriate steps to ensure that the requested service or goods are delivered. If the data entry is security protected, one of the other fields **309**, as discussed above, may grant the assistant limited access to just the field **309** or may grant more expansive access whereby the assistant can view fields **301** to **309** as well as the actual document or message. The fields **309** may serve various other purposes, as will be apparent to those skilled in the art.

FIG. **18** illustrates a process **320** for using the MSDS **10** for document management purposes. With reference to FIG. **18**, a user sends a search request to the MSDS **10** for a particular document or set of documents at step **321**. The user may issue this request with the computer **32** by clicking on a link, such as a link to "Search Documents," which may be presented to the user by the MSDS **10** after the user has been granted accesses to his or her mailbox at step **72** shown in FIG. **3**. The MSDS **10** may present the user with the option to search the document archives at other times, such as when the user first attempts to access the mailbox at step **62**, or when the URL received by the HTTPD **37** from computer **32** points toward the document archives.

In response to this request, the HTTPD **37** sends the user a search query form at step **322** to allow the user to define a desired search. An example of a search query form is shown in FIG. **19**. The search query form may include an entry for each of the data fields **301** to **309** in the data entry **300**. For instance, the user may input one or more names for a recipient and have the MSDS **10** search for all messages or files directed to just those recipients. The user may also

indicate the type of document, such as whether it is a facsimile, voice message or data file. The search query form also has entries for the date or time, which preferably accept ranges of times and dates, and an entry for the telephone number of the caller to the MSDS **10**. The search query form may also include an entry for the size of the file or for the number of pages, which is relevant if the message is a facsimile message. The search query form may also include an entry for the document number, which may accept a range of document numbers, and also an entry for another field.

At step **323**, the user enters the search parameters in the search query form with computer **32** and returns the information to the MSDS **10** through the Internet **30**. The user may define the search about any one data field or may define the search about a combination of two or more data fields. For instance, as reflected in the completed search query form shown in FIG. **20**, a user may define a search by designating the document type as a facsimile and the calling number as (404) 249-6801. Once the user has finished defining the search, the user then selects the "SEARCH" link shown at the bottom of the screen whereby the user's computer **32** would send the completed search query form through the Internet **30** to the HTTPD **37** of the MSDS **10**.

At step **324**, the HTTPD **37** receives the completed search query form and, through CGI **35**, invokes one or more of the application programs **31** for performing the desired search for any files or messages falling within the parameters of the search. The results of the search are passed from the application programs **31** through the CGI **35** to the HTTPD **37** and, at step **325**, are returned to the user through the Internet **37**. Preferably, the MSDS **10** returns the search results in the form of a listing of all files or messages contained within the search parameters, although the MSDS **10** may return the results in other ways.

An example of the search results of the query shown in FIG. **20** is shown in FIG. **21**. As discussed above, the parameters of the search were all facsimile messages from telephone is number (404) 249-6081. With reference to FIG. **21**, this query resulted in three messages being discovered. The first document has a document number **11** and is described as being a facsimile from the designated telephone number to Jane Doe on May 31, 1995, and consists of three pages. This first-listed document is an example of the facsimile shown in FIG. **7**. The other two documents respectively correspond to document numbers 243 and 1,002 and are also from the designated telephone number.

At step **326**, the user selects the desired file or message from the listing of messages and files. For instance, by clicking on the first listed document, namely document number **11**, the computer **32** sends a request to the MSDS **10** for a viewing of that document and, in response, the MSDS **10** provides a viewing of the document according to the user defined preferences. As described above, the user may receive a reduced size image of the first page, a full size image of the first page, reduced size images of all pages, or full size images of all pages of the facsimile message. Thus, if the user selected the fourth display option as the user defined preference, the MSDS **10** would return an image of the first page of the facsimile, such as the one depicted in FIG. **7**.

At step **326**, the user may also have the MSDS **10** save the search results. For instance, as shown in FIG. **21**, the user may input the name of "CHARLES R. BOBO FACSIMILES" as the name for the search. By clicking on the "SAVE SEARCH AS" link, the name of the search is provided from the computer **32** to the MSDS **10**. At the MSDS **10**, the HTTPD **37** transfers the information from the computer **32** to the CGI **35** and the CGI **35** is invokes an application program **31** to store the results of the search in storage **11** under the designated name. The invoked application program **31** preferably does not store the contents of all messages but rather stores a listing of the search results in the storage **11**.

The results of a search may be stored in storage **11** as either a closed search or an open search. If the MSDS **10** saves the results of a search as an open search, then the files or messages in that named search may be updated with recent files or messages falling within the particular search parameters for the search. On the other hand, a closed search is one in which the files or messages in the named search are limited to those existing at the time of the search. For example, if the MSDS **10** saved the search results shown in FIG. **21** as a closed search, then any retrieval of the "CHARLES R. BOBO FACSIMILES" would result in only the three listed documents. If, on the other hand, the search named as the "CHARLES R. BOBO FACSIMILES" was saved by the MSDS **10** as an open search, then the MSDS **10** would reactivate the search query shown in FIG. **20** in response to a request by the computer **32** for that search in order to obtain all facsimile messages from that particular telephone number, including those received after the initial saving of the search results.

With reference to FIG. **19**, rather than defining a new search, the user may click on the "STORED SEARCHES" link in order to receive the results of a previously performed search. For example, by clicking on this link, the MSDS **10** may return a listing of searches stored for that particular user, such as the searches shown in FIG. **22**. As shown in this figure, the "CHARLES R. BOBO FACSIMILES" is included within the list of stored searches. If the user then selected the "CHARLES R. BOBO FACSIMILES" search, the user may then be presented with the listing of facsimiles shown in FIG. **21**, possibly including recent additions to the search group.

With reference to FIG. **19**, the MSDS **10** may also provide a user with a link to "RECENT FILES" at step **322**. By selecting this link, the MSDS **10** may return a listing of all facsimile, voice, and data messages received with a particular period of time, such as the last month. By placing the "RECENT FILES" link on the search query form rather than in the listing of "STORED SEARCHES," the user can quickly turn to the most recent files and messages. The search query form may contain other such easy-access links, such as a link to the last search performed by the MSDS **10** on behalf of the user.

The messages or files received by the MSDS **10** need not arrive from a third party. In other words, the MSDS **10** may be used as a file repository or as a file manager for documents generated by the user itself. The user may call the designated telephone number for receiving messages and transmit voice messages, data messages, or facsimile messages and have the MSDS **10** document the receipt and content of these messages. A user may easily use a facsimile machine as a scanner for entering documents into the storage **11** of the MSDS **10**.

The MSDS **10** may have applications in addition to those discussed-above with regard to serving as a message deliverer, file repository, and file manager. For instance, the MSDS **10** may perform some additional processing on the incoming calls prior to forwarding them to the user. For voice messages, this processing may involve transcribing the message and then returning the transcribed messages to the user. The MSDS **10** may therefore be viewed as offering secretarial assistance which may be invaluable to small

companies or individuals who cannot afford a secretary or even to larger businesses who may need some over-flow assistance. The transcription may be provided by individuals located in any part of the world or may be performed automatically by a speech-to-text recognition software, such as Voice Type from IBM.

Another type of processing that the MSDS **10** may provide is translation services. The incoming call, whether it is a voice, facsimile, or data message, can be converted into SGML and then forwarded first to a translator. Given the reach of the Internet, the translator may be located virtually anywhere in the world and can return the translated document via the Internet to the MSDS **10**. The MSDS **10** can notify the user that the translation has been completed through email, voice mail, pager, facsimile, or in other ways. The user would then connect to the Internet and retrieve the translated document. The translation services of the MSDS **10** may also provide transcription of the message, such as with speech-to-text recognition software.

The foregoing description of the preferred embodiments of the invention have been presented only for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form disclosed. Many modifications and variations are possible in light of the above teaching.

The embodiments were chosen and described in order to explain the principles of the invention and their practical application so as to enable others skilled in the art to utilize the invention and various embodiments and with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention only be limited by the claims appended hereto.

I claim:

1. A system for receiving and storing a message signal directed to an intended recipient and for relaying the message signal to a computer, comprising:

a telephone interface for receiving an incoming call from a public switched telephone network, the incoming call including the message signal;

a central processor for receiving the message signal from the telephone interface and for storing the message signal in a storage medium;

a hyper-text transfer protocol deamon for receiving a request for the message signal from the computer and for forwarding the request to a network server, the request from the computer being formatted in a hyper-text transfer protocol; and

the network server, in response to receiving the request from the hyper-text transfer protocol deamon, forwarding at least a part of the message signal to the hyper-text transfer protocol deamon;

wherein the hyper-text transfer protocol deamon transmits at least part of the message signal to the computer.

2. The system as set forth in claim **1**, wherein the network server converts the message signal from a first file format into a standard generalized mark-up language.

3. The system as set forth in claim **1**, wherein the central processor converts the message signal from a first file format into a standard generalized mark-up language.

4. The system as set forth in claim **1**, wherein the hyper-text transfer protocol deamon transmits the message in a hyper-text mark-up language.

5. The system as set forth in claim **1**, wherein the hyper-text transfer protocol deamon transmits the message in a hand-held device mark-up language.

6. The system as set forth in claim **1**, wherein the hyper-text transfer protocol deamon transmits the message in an extensible mark-up language.

7. The system as set forth in claim **1**, wherein the hyper-text transfer protocol deamon transmits the message in a virtual reality mark-up language.

8. The system as set forth in claim **1**, wherein the hyper-text transfer protocol deamon receives the request from the computer through the Internet.

9. The system as set forth in claim **1**, wherein the hyper-text transfer protocol deamon receives the request from the computer through an intranet.

10. The system as set forth in claim **1**, wherein the telephone interface receives an address signal as part of the incoming call and the central processor stores the message signal in a directory associated with that address signal.

11. The system as set forth in claim **1**, wherein the message signal comprises a facsimile transmission.

12. The system as set forth in claim **1**, wherein the message signal comprises a voice message.

13. The system as set forth in claim **1**, wherein the message signal comprises a data file.

14. The system as set forth in claim **1**, wherein the request sent from the computer to the hyper-text transfer protocol deamon comprises a search query specifying at least one search parameter for a desired search, the hyper-text transfer protocol deamon transfers the search query to the network server, the network server performs the desired search by identifying all message signals satisfying the at least one search parameter, and the hyper-text transfer protocol deamon sends results of the desired search to the computer.

15. The system as set forth in claim **14**, wherein the central processor stores a data entry for each message signal.

16. The system as set forth in claim **15**, wherein the data entry comprises a plurality of fields for identifying the message signal.

17. The system as set forth in claim **15**, wherein the central processor stores the data entry in a relational database.

18. The system as set forth in claim **14**, wherein the central processor returns a listing of all message signals contained within the desired search to the hyper-text transfer protocol deamon and the hyper-text transfer protocol deamon sends the list to the computer.

19. A method for receiving and storing a message signal directed to an intended recipient and for relaying the message signal to a computer, comprising the steps of:

receiving an incoming call from a public switched telephone network, the incoming call including the message signal;

storing the message signal in a storage medium;

receiving, at a hyper-text transfer protocol deamon, a request for the message signal from the computer and forwarding the request to a network server;

forwarding at least a part of the message signal from the network server to the hyper-text transfer protocol deamon; and

transmitting at least part of the message signal from the hyper-text transfer protocol deamon to the computer.

20. The method as set forth in claim **19**, further comprising a step of converting the request from a first file format into a standard generalized mark-up language.

21. The method as set forth in claim **19**, wherein the step of receiving the request comprises a step of receiving the request in a standard generalized mark-up language.

22. The method as set forth in claim **19**, wherein the step of receiving the request comprises a step of receiving the request in a hyper-text mark-up language.

23. The method as set forth in claim **19**, where in the step of receiving the request comprises a step of receiving the request in a hand-held mark-up language.

24. The method as set forth in claim 19, wherein the step of receiving the request comprises a step of receiving the request in an extensible mark-up language.

25. The method as set forth in claim 19, wherein the step of receiving the request comprises a step of receiving the request in a virtual reality mark-up language.

26. The method as set forth in claim 19, wherein the step of receiving the call comprises a step of receiving a facsimile transmission.

27. The method as set forth in claim 19, wherein the step of receiving the call comprises a step of receiving a voice message.

28. The method as set forth in claim 19, wherein the step of receiving the call comprises a step of receiving a data file.

29. The method as set forth in claim 19, wherein the step of receiving the request comprises a step of receiving the request through the Internet.

30. The method as set forth in claim 19, wherein the step of receiving the request comprises a step of receiving the request through an intranet.

31. The method as set forth in claim 19, wherein the step of receiving the request comprises a step of receiving a search query from the computer with the search query specifying at least one search parameter for a desired search and the method further comprises the steps of performing the desired search through the storage and returning results of the desired search to the computer.

32. The method as set forth in claim 31, further comprising a step of storing a data entry in the storage for each message signal received.

33. The method as set forth in claim 31, wherein the step of returning the results comprises a step of returning a listing of all message signals contained within the desired search.

34. The method as set forth in claim 31, further comprising a step of saving the results of the desired search in the storage.

35. A computer-readable medium for storing software for use in storing and delivering a message signal, the software for use in performing the steps of:

receiving an incoming call from a public switched telephone network, the incoming call including the message signal;

storing the message signal in a storage medium;

receiving, at a hyper-text transfer protocol deamon, a request for the message signal from the computer and forwarding the request to a network server;

forwarding at least a part of the message signal from the network server to the hyper-text transfer protocol deamon; and

transmitting at least part of the message signal from the hyper-text transfer protocol deamon to the computer.

* * * * *

EXHIBIT D

US006350066C1

(12) EX PARTE REEXAMINATION CERTIFICATE (6802nd)
United States Patent
Bobo, II

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(45) Certificate Issued: May 5, 2009

(54) SYSTEMS AND METHODS FOR STORING, DELIVERING, AND MANAGING MESSAGES

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Related U.S. Application Data

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G06F 15/16 (2006.01)
H04N 1/413 (2006.01)

(52) **U.S. Cl.** 709/206; 709/202
(58) **Field of Classification Search** ..... None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,106,060	A	8/1978	Chapman, Jr.	358/402
4,289,930	A	9/1981	Connolly et al.	345/169
4,405,829	A	9/1983	Rivest et al.	380/30
4,532,588	A	7/1985	Foster	709/238
4,713,780	A	12/1987	Schultz et al.	709/206
4,754,428	A	6/1988	Schultz et al.	709/246
4,816,653	A	3/1989	Anderl et al.	235/380
4,837,798	A	6/1989	Cohen et al.	379/88.14
4,853,961	A	8/1989	Pastor	713/176
4,918,722	A	4/1990	Duehren et al.	379/100.11
4,941,170	A	7/1990	Herbst	
5,008,814	A	4/1991	Mathur	709/221
5,033,079	A	7/1991	Catron et al.	379/93.14
5,065,427	A	11/1991	Godbole	379/100.15
5,068,888	A	11/1991	Scherk et al.	379/100.11
5,091,790	A	2/1992	Silverberg	358/434
5,105,184	A	4/1992	Pirani et al.	345/629

(Continued)

FOREIGN PATENT DOCUMENTS

AU	755321	4/2003
EP	0 615 368 A2	2/1994
WO	WO 1994006230	9/1992
WO	WO 1995001040	6/1993
WO	WO 1995006386	8/1993
WO	WO 1995020288	1/1994
WO	WO 96/34341	10/1996
WO	WO 97/09682	3/1997

OTHER PUBLICATIONS

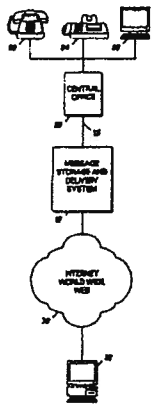
D. Nakamura, "AT&T Introduces Most Comprehensive Fax-to-Data Service" dated Feb. 22, 1996, downloaded from Internet at http://www.att.com/press/0296/960222.ela.html on May 16, 1997.

(Continued)

Primary Examiner—Joseph R. Pokrzywa

(57) **ABSTRACT**

A Message Storage and Deliver System (MSDS) is connected to the public switched telephone network (PSTN) and receives incoming calls with these calls being facsimile, voice, or data transmissions. The MSDS detects the type of call and stores the message signal in a database. The MSDS is also connected to the Internet and has a hyper-text transfer protocol deamon (HTTPD) for receiving requests from users. The HTTPD forwards requests for certain files or messages to a network server which transmits at least part of the message to the HTTPD and then to the user. In addition to requests for certain documents, the HTTPD may also receive a request in the form of a search query. The search query is forwarded from the HTTPD to an application program for conducting the search of the database. The results of the search are forwarded through the HTTPD to the user. The user may then select one or more files or messages from the search results and may save the search for later reference.



U.S. PATENT DOCUMENTS

5,113,430	A		5/1992	Richardson, Jr. et al.
5,115,326	A		5/1992	Burgess et al. 358/440
5,127,003	A		6/1992	Doll, Jr. et al.
5,167,011	A		11/1992	Priest 706/62
5,175,762	A		12/1992	Kochis et al. 379/100.01
5,193,110	A		3/1993	Jones et al.
5,195,085	A		3/1993	Bertsch et al.
5,224,156	A		6/1993	Fuller et al.
5,241,594	A		8/1993	Kung 713/151
5,247,591	A		9/1993	Baran 382/179
5,247,661	A		9/1993	Hager et al. 707/104.1
5,255,312	A		10/1993	Koshiishi 379/100.15
5,257,112	A		10/1993	Okada 358/402
5,276,869	A		1/1994	Forrest et al. 709/206
5,283,887	A		2/1994	Zachery 715/513
5,291,302	A		3/1994	Gordon et al. 358/400
5,291,546	A		3/1994	Giler et al. 379/93.11
5,293,250	A		3/1994	Okumura et al. 358/402
5,297,208	A		3/1994	Schlafly et al. 380/261
5,317,628	A		5/1994	Misholi et al. 379/88.14
5,333,266	A		7/1994	Boaz
5,339,156	A		8/1994	Ishii
5,349,636	A		9/1994	Irribarren 379/88.15
5,351,276	A		9/1994	Doll, Jr. et al.
5,355,472	A		10/1994	Lewis 707/101
5,367,621	A		11/1994	Cohen et al. 715/501.1
5,379,374	A		1/1995	Ishizaki et al. 715/759
5,394,460	A		2/1995	Olson et al.
5,404,231	A		4/1995	Bloomfield 358/400
5,406,557	A		4/1995	Baudoin
5,418,908	A		5/1995	Keller et al. 709/206
5,424,724	A		6/1995	Williams et al. 370/403
5,448,626	A		9/1995	Kajiya
5,452,289	A		9/1995	Sharma et al.
5,459,584	A		10/1995	Gordon et al. 358/434
5,471,617	A		11/1995	Ferrand et al. 718/100
5,475,738	A		12/1995	Penzias
5,479,411	A		12/1995	Klein
5,483,466	A		1/1996	Kawahara et al. 709/203
5,483,580	A		1/1996	Brandman et al. 379/88.13
5,488,651	A		1/1996	Giler
5,495,610	A		2/1996	Shing et al. 709/221
5,497,373	A		3/1996	Hulen et al. 370/259
5,509,123	A		4/1996	Dobbins et al. 709/243
5,513,323	A		4/1996	Williams et al. 709/246
5,517,556	A		5/1996	Pounds
5,524,137	A		6/1996	Rhee
5,526,353	A		6/1996	Henley et al. 370/392
5,530,740	A		6/1996	Irribarren et al.
5,530,852	A		6/1996	Meske, Jr. et al. 709/206
5,544,320	A		8/1996	Konrad 709/203
5,548,789	A		8/1996	Nakanura
5,555,100	A		9/1996	Bloomfield et al. 358/402
5,557,659	A	*	9/1996	Hyde-Thomson 379/88.13
5,559,611	A		9/1996	Bloomfield et al. 358/407
5,559,721	A		9/1996	Ishii
5,572,643	A		11/1996	Judson 709/218
5,590,178	A		12/1996	Murakami et al.
5,608,446	A		3/1997	Carr et al.
5,608,786	A		3/1997	Gordon
5,608,874	A		3/1997	Ogawa
5,621,727	A		4/1997	Vaudreuil
5,625,675	A		4/1997	Katsumaru et al.
5,633,916	A		5/1997	Goldhagen et al.
5,647,002	A		7/1997	Brunson
5,654,957	A		8/1997	Koyama
5,673,316	A		9/1997	Auerbach et al. 705/51
5,675,507	A	*	10/1997	Bobo, II 709/206
5,677,955	A		10/1997	Doggett et al. 705/76
5,687,220	A		11/1997	Finnigan
5,689,550	A		11/1997	Garson et al.
5,692,039	A		11/1997	Brankley et al.
5,694,458	A		12/1997	Okada
5,710,883	A		1/1998	Hong et al. 709/246
5,712,901	A		1/1998	Meermans
5,712,903	A		1/1998	Bartholomew et al.
5,717,742	A		2/1998	Hyde-Thomson
5,724,410	A		3/1998	Parvulescu et al.
5,727,156	A		3/1998	Herr-Hoyman et al. 709/219
5,732,219	A	*	3/1998	Blumer et al. 709/227
5,737,395	A		4/1998	Irribarren
5,737,396	A		4/1998	Garcia 379/88.16
5,737,533	A	*	4/1998	de Hond 709/219
5,742,596	A		4/1998	Baratz et al.
5,742,905	A		4/1998	Pepe
5,751,814	A		5/1998	Kafri 713/152
5,751,956	A		5/1998	Kirsch 709/203
5,768,528	A		6/1998	Stumm 709/231
5,771,354	A		6/1998	Crawford
5,781,901	A		7/1998	Kuzma 707/10
5,787,175	A		7/1998	Carter 713/165
5,790,790	A		8/1998	Smith et al. 709/206
5,790,793	A		8/1998	Higley 709/218
5,793,972	A		8/1998	Shane 709/219
5,805,298	A		9/1998	Ho et al.
5,812,639	A		9/1998	Bartholomew et al.
5,819,092	A	*	10/1998	Ferguson et al. 717/113
5,819,295	A		10/1998	Nakagawa et al. 707/203
5,838,906	A	*	11/1998	Doyle et al. 715/205
5,848,413	A		12/1998	Wolff
5,870,549	A		2/1999	Bobo, II 709/206
5,893,908	A		4/1999	Cullen et al. 707/5
5,903,723	A		5/1999	Beck et al. 709/200
5,911,776	A		6/1999	Guck
5,930,493	A		7/1999	Ottesen et al.
5,933,490	A		8/1999	White et al.
5,937,041	A	*	8/1999	Cardillo et al. 379/93.25
5,946,386	A		8/1999	Rogers et al.
5,960,085	A		9/1999	de la Huerga 340/5.61
5,963,618	A		10/1999	Porter
5,963,892	A		10/1999	Tanaka et al.
5,970,490	A	*	10/1999	Morgenstern 707/10
5,991,292	A		11/1999	Focsaneanu et al.
5,996,006	A		11/1999	Speicher
5,999,594	A		12/1999	Mizoguchi et al.
6,009,173	A		12/1999	Sumner 713/156
6,009,469	A		12/1999	Mattaway et al.
6,020,980	A		2/2000	Freeman
6,035,332	A		3/2000	Ingrassia, Jr. et al. 709/224
6,052,367	A		4/2000	Bowater et al.
6,055,530	A		4/2000	Sato 707/3
6,061,448	A		5/2000	Smith et al. 380/282
6,072,862	A		6/2000	Srinivasan
6,084,892	A		7/2000	Benash et al.
6,108,329	A		8/2000	Oyama et al.
6,181,781	B1		1/2001	Porter
6,192,407	B1		2/2001	Smith et al. 709/229
6,282,270	B1		8/2001	Porter
6,295,552	B1		9/2001	Shibata
6,314,425	B1		11/2001	Serbinis et al. 707/10
6,350,066	B1		2/2002	Bobo, II 709/206
6,564,321	B2		5/2003	Bobo, II 713/168
6,643,034	B1		11/2003	Gordon
6,948,070	B1		9/2005	Ginter et al.
2001/0014910	A1		8/2001	Bobo, II 709/206

OTHER PUBLICATIONS

Biscom, "Biscom Introduces the E-fax Machine: the E-mail/Facsimile Solution 'for the Rest of Us,'" FAXCOM, Sep. 19, 1996.

"C3 Launches its Advanced ITmail Multi-media Messaging System for Desk Top PC's," Computer and Communications Company Ltd., Jun. 1993.

Ohio State University, C.S.E., "comp.mail.mime meta-FAQ: Help for MIME problems," downloaded from the Internet at www.cis.ohio-state.edu/text/faq/usenet/mail/mimefaq/partl_/faq._html, Jun. 11, 1997.

"Digital Note Fax2Net R5S 1—A Beginners Guide to Digital Mail Fax;" Digital Mail Limited, Oct. 31, 1996.

J. Duffy, "IBM's SAA Gets Voice: Company to Expand Enterprise Networking Horizons," Computer Systems News, p. 1, May 14, 1990.

"Frequently Asked Questions", JFax Personal Telecom, downloaded from Internet at www.jfax.net/faq.htm on Oct. 31, 1996.

N. Ballard, "@ The Paperless Office", JFax Personal Telecom, downloaded from the Internet at wwwjfax.net/ballard1.htm on Oct. 31, 1996.

J. Lyle, "Internet Fax Software: Internet Fax Utility Offers Simplified Faxing to E-Mail Addresses", Lumina News, Sep. 3, 1996, downloaded from Internet at http://www.lumina2000.com/lumina/press93.html printed on Jun. 11, 1997.

"Delivering Unified Messaging Solutions on the Internet", Media Mail, Nov. 2, 1996, downloaded from Internet at www.web.archive.org/web/19961219051 13/http://media-mail.com on Mar. 2, 2005.

"Methodology for Mail Delivery in a Multi-Media Environment," IBM Technical Disclosure Bulletin, Apr. 1993, pp. 507-508.

"PKCS #7: Cryptographic Message Syntax Standard," RSA Laboratories Technical Note, Version 1.5, RSA Security, Inc., Nov. 1, 2993.

"ScanFX-Scanning Hardware for Internet E-Mail," Our Business Machines, Inc., OBM's Editorial Resource Chest, Aug. 1996, Irwindale, CA.

J. Kravitz, "SDML—Signed Document Markup Language," Financial Services Technology Consortium, W3C Note Jun. 19, 1998, downloaded from the Internet at www.23.org, on Jun. 19, 1998.

"Three Pronged Strategy for Octel, as it Integrates VMX and Moves from Core Market to New Territories," Computergram International, Aug. 1995, n.2719, ComputerWire, Inc.

D. Rush, "Announce: Voice Mail, Email & Fax Integration Over the Web," Google Groups: biz.next.newprod, Mar. 19, 1996, http://groups-beta.google.com/group/biz.next.newprod/mso/db3c129fdo394667?dmode=source, Mar. 2, 2005.

D. Rush, "Voice Mail Email & Fax Integration Over the Web," Google Groups: biz.next.newprod, Mar. 25, 1996, http://groups-beta.google.com/group/biz.next.newprod/mso/b85b9d49e92318b?mode=source, Mar. 2, 2005.

E Spire, "Fax—>E-mail" Google Groups, http://groups-beta.google.com/group/comp.acom.telecom,Dec. 20, 1995.

K. Moore, "MIME (Multipurpose Internet Mail Extensions) Part Two: Message Header Extensions for Non-ASCII Text," Network Working Group, RFC 1522, Sep. 1993.

MHonArc Home Page updated Nov. 17, 1994 and MHonArc software manual published by Earl Hood ehood@convex.com Convex Computer Corporation, Richardson Texas.

R. Schockey, "Fax—>E-mail Plus Voice Mail Also?" Google Groups, http://groups-beta.google.com/group/comp.dcom.telecom, Dec. 28, 1995.

R. Schockey, "Fax—>E-mail Plus Voice Mail Also?" Google Groups, http://groups-beta.google.com/group/comp.dcom.telecom/msg/7cb6ab0035e113c2?dmode=source, Dec. 28, 1995.

R. Schockey, "Fax—>E-mail—>Voice Continued," Google Groups, http://groups-beta.google.com/group/comp.dcom.telecom/msg/1a2c73a37bc90e6b?dmode=source, Jan. 9, 1996.

S. Sreenivasan "Cybertimes German Pop Singer Sets Sights on Virtual Office," Sep. 23, 1996, downloaded from the New York Times CyberTime website.

"Plaintiff's Opening Markman Brief" in *j2 Global Communications, Inc.* v. *CallWave, Inc.*, CA 04-7068 DDP AJWx.

"Plaintiff's Opposition Markman Brief" in *j2 Global Communications, Inc.* v. *CallWave, Inc.*, CA 04-7068 DDP AJWx.

"Defendant CallWave, Inc.'s Opening Claim Construction Brief" in *j2 Global Communications, Inc.* v. *CallWave, Inc.*, CA 04-7068 DDP AJWx.

"Defendant CallWave's Opposition to Plaintiff j2's Opening Markman Brief" in *j2 Global Communications, Inc.* v. *CallWave, Inc.*, CA 04-7068 DDP AJWx.

"Plaintiff's Opposition claim Construction Brief" in *j2 Global Communications, Inc.* v. *Venali, Inc.*, CV 04-1172 (DDP) (AJWx).

"Brief in Opposition to Plaintiff J2's Opening Claim Construction Brief" in *j2 Global Communications, Inc.* v. *Venali, Inc.*, CV 04-1172 (DDP) (AJWx).

"Opening Claim Construction Brief" in *j2 Global Communications, Inc.* v. *Venali, Inc.*, CV 04-1172 (DDP) (AJWx).

Docket report from CV 04-1172 (DDP) (AJWx).

Nakagawa et al., *Development of a Network Model for the Total Health Care Management on Multi-vendor Environment*, in Multimedia Communications, 1994, Multimedia '94, 5th IEEE COMSOC Int'l Workshop, pp. 5/2/1-5/2/4 (workshop occurred May 16-19, 1994).

Sanjiv P. Patel, *The Multimedia Fax-MIME Gateway*, in IEEE Multimedia 1(4), pp. 64-70 (Winter 1994).

Larry M. Edwards, *E-Mail: Industry is Posting Impressive Gains*, in San Diego Business Journal, pp. 1 and 17-18 (Mar. 7, 1994).

Author Unknown, *Lotus Executive Details Notes' Work Flow Strategy; Pinches Notes as a platform for Third-Party Products*, in Network World, p. 27 (Sep. 6, 1993).

Paul Kinnucan, *What's New in the Fax World*, in Systems Integration, vol. 23, No. 2 at 50 (Feb. 1990).

Author Unknown, *Delrina WinFax Pro 4.0 Focuses on Ease of Use*, Newsbytes, Post-Newsweek Business Information, Inc., (Mar. 15, 1994).

David Morgenstern, *DynaWeb Server Holds SGML Books: Web Server Queries, Converts to HTML*, in MacWeek, vol. 8, No. 28 at 12 (Jul. 11, 1994).

Gord Nickerson, *WorldWideWeb: hypertext from CERN*, Computers in Libraries, vol. 12, No. 11, p. 75 (1992).

Mario J. Silva and Randy H. Katz, *The case for Design Using the World Wide Web*, in 32nd ACM/IEEE Design Automation Conference, (1995).

Barry Fenn and Hermann Maurer, *Harmony on an Expanding Net*, ACM Interactions, pp. 27-38 (Oct. 1994).

MIME (Multipurpose Internet Mail Extension) Part One: "Mechanisms for Specifying and Describing the Format of Internet Message Bodies", Internet RFC 1341 and 1521, Sep. 1993.

MIME (Multipurpose Internet Mail Extension) Part Two: "Message Header Extensions got Non-ASCII Text", Internet RFC 1342, Sep. 1993.
Patel, Henderson and Georganas, The Multimedia Fax-MIME Gateway, IEEE Multimedia, 1994.
"Hypertext Markup Language (HTML), A Representation of Textual Information and MetaInformation for Retrieval and Interchange," Draft version, Jun. 1993.
"Lotus Turns up the Heat on Microsoft Exchange Rival," Network Week, Jan. 27, 1995.
"Novell Inc. to Demonstrate Alex, a Universal In-box That Will Accept and Store Email, Voice mail and Faxes," Computer Reseller News, Feb. 6, 1995.
"JFAX Personal Telecom—Plug a Phone Into Your E-Mail", downloaded from the Internet at www.jfax.com, on Oct. 31, 1996.
Public-Key Cryptography Standards (PKCS) , Revised Nov. 1, 1993, downloaded from the Internet at www.ftp.rsa.com, on Oct. 1, 1998.
"Wide Area Networking Puts Remote Offices On-Line," Managing Office Technology, Sep. 1994, pp. 49-50, 52, vol. 39, USA.
M. Pop, "Comparative Study of Electronic Mail Systems," May 30, 1994.
H. Chan et al., "Integrated Telephone/Fax/Paging/Email Services over ATM/MAN-based Personal Communication Networks," Department of Electrical and Computer Engineering, The University of British Columbia, Vancouver, B. C., Canada.
Supplementary European Serach Report in European Patent Application No. EP 98 95 0859, Jun. 3, 2005.
International Search Report in International Application No. PCT/US98/20732, Jan. 25, 1999.
International Search Report in International Application No. PCT/US96/05910, Jul. 18, 1996.
Fax Mailbox, PC Today, Sep. 1994.
Multimedia Fax-MIME Interworking, Patel, Henderson and Georganas, IEEE, 1994.
IBM Software Allows Phone Messages to be Retrieved Via Internet World Wide Web, press release, Nov. 28, 1995 (announcing product release)
MSN Hotmail Continues to Grow Faster than Any Media Company in History, press release, Feb. 8, 1999 (referencing Jul. 4, 1996 launch of Hotmail, which permitted users to access e-mail accounts through web browsers).
B.S. Kaliski Jr., "An Overview of the PKCS Standards," RSA Laboratories Technical Note, RSA Security, Inc. Public-Key Cryptography Standards (PKCS), Revised Nov. 1, 1993.
"Keys and Certificates," downloaded from the Internet at www.elock.com.
"Cryptography Systems," downloaded from the Internet at www.elock.com.
"How does the S/MIME encryption and digital signature process work?" downloaded from the Internet at www.worldtalk.com, on Jul. 25, 1999.
C. Ellison, et al., "Default Protecting Secret Keys with Personal Entropy," Mar. 3, 1999.
"Chaffing and Winnowing: Confidentiality without Encryption," downloaded from the Internet at www.theory.lcs.mit.edu, on Jul. 13, 1999.
"S/MIME Or OpenPGP? How Will You Secure Your E-mail?" downloaded from the Internet at www.worldtalk.com.
"S/MIME Frequently Asked Questions," downloaded from the Internet at www.rsa.com, on Jul. 23, 1999.
"S/MIME Frequently Asked Questions," downloaded from the Internet at www.rsa.com, on Nov. 16, 1999.
"SDML-Signed Document Markup Language," W3C Note Jun. 19, 1998, downloaded from the Internet at www.23.org, on Oct. 28, 1998.
C. R. Baudoin, "The Sematech Electronic Mail System," Proceedings of the Digital Equipment Computer Users Society, pp. 221-231, U.S.A., Spring 1989.
N. Borenstein, et al., "A Multi-media Message System for Andrew," USENIX Winter Conference, Dallas, TX, pp. 37-42, Feb. 9-12, 1988.
J. Donahue, et al., "Walnut: Storing Electronic Mail in a Database," XEROX Park, CSL-85-9, Nov. 1985.
K. Hofrichter, et al., "The BERKOM Multimedia-Mail Teleservice," Proceedings of the Fourth Workshop on Future Trends of Distributed Computing Systems, Lisbon, Portugal, pp. 23-30, Sep. 22-24, 1993.
J. K. Reichard, "Leveraging E-Mail," PC Magazine: 241, 244 and 245 (May 1995), et al., "Browsing Electronic Mail: Experiences Interfacing a Mail System to a DBMS," Proceedings of the Fourteenth International Conference on Very Large Data Bases, Los Angeles, CA, pp. 112-123, 1988.
E. Moeller, et al., "The BERKOM multimedia-mail teleservice," Computer Communications, vol. 18:2, pp. 89-102, Feb. 1995.
J. Pan, "Internet Security & Firewall Issues for NIIIP Virtual Enterprise," NIIIP OMB Meeting, Boca Raton, FL, Jan. 23-25, 1996.
A. Poggio, et al., "CCWS: A Computer-Based, Multimedia Information System, Multimedia Communications," pp. 92-103, Oct. 1985.
A. Reinhardt, "Smarter E-Mail Is Coming," Byte Magazine, pp. 90-108, Mar. 1993.
J. Rosenberg, et al., "An Overview of the Andrew Message System," Computer Communications Review, vol. 17:5, pp. 99-108, Apr. 1988.
S. Sakata, et al., "A Distributed Interoffice Mail System," Multimedia Communications, pp. 106-116, Oct. 1985.
S. J. Vaughan-Nichols, "Internet Publishing Tools Proliferate," Byte Magazine, Mar. 1995.
"Microsoft Messaging Application Pro Interface (MAPI)," downloaded from the Internet at www.mmicrosoft.com/win32dev/apiext/mapiwp.html.
"Novell Announces ¤Softsolutions¤ 4.1", PR Newswire, New Orleans, LA, May 9, 1995.
"How Posta Works", downloaded from the Internet at www.tumbleweed.com/posta/posta_overview.html.
"Overview of the Trans-Virtual Enterpriser Server," Product Overview.
V. Gay, et al. "Conception of a Multimedia Electronic Mail Based on Standards," Proceedings of the Fourth Workshop on Future Trends of Distributed Computing Systems, Sep. 22-24, 1993.
J. Postel, et al., "An Experimental Multimedia Mail System," ACM Transactions on Office Information Systems, vol. 6, No. 1, Jan. 1988.
"Web Mail", InformationWeek, pp. 120, Dec. 16, 1996.
"Ipswitch Delivers the First Internet-Ready Messaging Server for Windows NT That Allows Access to E-mail via the Web". PR Newswire, pp. 1209NEM007, Dec. 9, 1996.
"Hotmail Introduces Hotmail WebCourier Direct Content Delivery Service", Business Wire, pp. 02030123, Mar. 1997.

J. B. Postel, RFC0821, Simple Mail Transfer Protocol, HTTP://rfc-koeln.de/html, 80 pages, Aug. 1982.
M. Sherman, et al., "Allocation of User-Interface Resources in the Andrew Toolkit," International Conference on Multimedia Information Systems, pp. 261-272, 1991.
M. Sherman, et al., "Building Hypertext on a Multimedia Toolkit: An Overview of Andrew Toolkit Hypermedia Facilities," Proceedings of the First European Conference on Hypertext, pp. 13-24, France, Nov. 1990.
V. S. Wheatman, "Sorting Through the Secure Messaging Maze," Messaging Magazine, downloaded from the Internet at www.cma.org/html/pubs/mmv4n2/msgmaze.htm, Mar.-Apr. 1998.
"The Andrew Messages System," downloaded from the Internet at www.cs.cmu.edu/afs/cs.cmu.edu/project/atk-ftp/web/ams.html.
"Facts on File re: Andrew," downloaded from the Internet at www.cs.cmu.edu:80/afs/cs.cmu.edu/project/atk-ftp/web/faxonfile.html.
"Welcome to the Andrew Consortium," www.cs.cmu.edu:80/afs/cs.cmu.edu/project/atk-ftp/web/andrew-home.html.
"The Andrew Publication Archive," ftp.andrew.cmu.edu/pub/AUIS/PAPERS/README.
"Bibliography of Publications on the Andrew User Interface System," ftp.andrew.cmu.edu/pub/AUIS/PAPERS/BIBLIOGRAPHY.
J. Peek, et al., "MH & xmh, Email for Users & Programmers," O' Reilly & Associates, Inc., Sebastopol, CA, 1995.
B. Costales, et al., "sendmail," O' Reilly & Associates, Inc., Sebastopol, CA, 1993.
K. S. Morris, "A Technical Overview of MIME," Web Developer's Journal Archives, Mar. 1995.
"comp.mail.mime FAQ (frequently asked questions list)," downloaded from the Internet at www.cis.ohio-state.edu/text/faq/usenet/mail/mime-faq/part1/faq.html, Jun. 11, 1997.
"Composing and Sending MIME Message," downloaded from the Internet at www.gieldasgarage.com/mh/cosemine.htm.
"Reading MIME Messages," downloaded from the Internet at www.gieldasgarage.com/mh/cosemime.htm.
"comp.mail.mime frequently asked questions list (FAQ) (1/3)," downloaded from the Internet at www.tu-chemnitz.de/-fri/mime/FAQ-1.htmk, Sep. 4, 1994.
M. Grand, "MIME Overview," downloaded from the Internet at www.mindspring.com/-mgrand/mime.html, revised Oct. 26, 1993.
D. W. Connolly, "A Formalism for Internet Information References," downloaded from the Internet at www.w3.org/People/Connolly/drafts/formalism.txt.
G. Vaudreuil, "The Multipart/Report Content Type for the Reporting of Mail System Administrative Messages," Network Working Group, Internet Draft, Sep. 1995.
G. Vaudreil, "Enhanced Mail System Status Codes," Network Working Group, Internet Draft, Jun. 1995.
K. Moore, et al., "An Extensible Message Format for Delivery Status Notifications," Network Working Group, Internet Draft, Sep. 1995.
"Information Technology—Text and office systems—Distributed-office-applications model—Part 1: General model," International Standard ISO / IEC 10031-1:7-73, 1991 (E).
"Information Technology—Text and Office Systems—Distributed Office Applications Model: Part 2; Distinguished-object-reference and Associated Procedures," International Standard ISO/IEC 10031-2:1-13, 1991.
D. H. Crocker, "Standard for the Format of ARPA Interent Text Message," RFC 822, 1982.
J. Klensin, "Simple Mail Transfer Protocol," Internet Draft, draft-ietf-drums-02.txt, May 21, 1996.
N. Borenstein et al., "MIME: Mechanisms for Specifying and Describing the Format of Internet Message Bodies," Network Working Group, RFC 1341, Jun. 1992.
N. Freed, et al., "Definition of the URL MIME External-Body Access-Type," Network Working Group, Internet Draft of RFC 2017 (Apr. 11, 1995) [see also N. Freed et al., "Definition of the URL MIME External-Body Access-Type," Network Working Group, RFC 2017, Oct. 1996.
C. Manros, "New Internet Mail Functionality for Delivery Status Notifications," Messaging Magazine, Jul./Aug. 1995.
K. Moore, "SMTP Service Extension for Delivery Status Notifications," Network Working Group, Internet-Draft of RFC 1891, Sep. 21, 1995.
Internet Engineering Task Force, R. Braden (ed.), "Requirements for Internet Hosts—Application and Support," Network Working Group, RFC 1123, Oct. 1989.
J. Meyers, et al., "Post Office Protocol—Version 3," Network Working Group, RFC 1725, Nov. 1994.
K. Sollins et al., "Functional Requirements for Uniform Resource Names," Network Working Group, RFC 1737 Dec. 1994.
T. Berners-Lee, "Universal Resource Identifier in WWW, A Unifying Syntax for the Expression and Address of Objects on the Network as used in the World-Wide Web," Network Working Group, RFC 1630, Jun. 1994.
T. Berners-Lee, et al., "Uniform Resource Locators (URL)," Network Working Group, RFC 1738, Dec. 1994.
T. Berners-Lee, et al., "Hypertext Markup Language—2.0," Network Working Group, RFC 1866, Nov. 1995.
S. Bradner, "The Internet Standards Process—Revision 3," Network Working Group, RFC 2026, 1996.
J. K. Reynolds, et al., "The DARPA Experimental Multimedia Mail System," Computer: 82-89, 1985.
S. Baker, "*Hypertext Browsing on the Internet*," *UNIX* Review: 21-27, 1994.
D.P. Dern, "Applying the Internet," BYTE Magazine, Feb. 1992.
K.M. Savetz, "Magazines Without Paper," BYTE Magazine, Sep. 1993.
S.J. Vaughan-Nichols, "The Web Means Business," BYTE Magazine, Nov. 1994.
A. Singleton, "The Virtual Storefront," BYTE Magazine, Jan. 1995.
J.R. Vacca, "Mosaic: Beyond Net Surfing," BYTE Magazine, Jan. 1995.
B. Smith, "Internet with Style," BYTE Magazine, Jan. 1995.
B. Smith, "Making the Internet Connection," BYTE Magazine, Jan. 1995.
B. Friesenhahn, "Build Your Own WWW Server," BYTE Magazine, Apr. 1995.
S.B. Jones, "Caught in the World Wide Web: MIT Moves Computer Documentation Online," Meet the Shadow Future: 187-189, 1994.
S. Baker; "Mosaic-Surfing at Home and Abroad," Meet the Shadow Future: 159-163, 1994.

R. J. Vetter et al., "Mosaic, HTML, and the World Wide Web," IEEE Computer, 27, 1994.
University of Cambridge Statistical Laboratory, "Using Mosaic for Xwindows," Internet Publication, Jul. 1994, downloaded from http://www.statslab.cam.ac.uk.
"New Features in Mosaic 2.0," Internet Publication, downloaded from http://www.issi.com, Dec. 1994.
"World Wide Web Frequently Asked Questions," from URL http://sunsite.unc.edu/boutell/faq/www_faq.html, Dec. 9, 1994.
MHonArc Home Page updated Nov. 17, 1994 and MHonArc software manual published by Earl Hood <ehood@convex.com> Convex Computer Corporation, Richardson Texas.
C. Liu, et al., "Managing Internet Information Services," World Wide Web, Gopher, FTP, and more : 357–359, Dec. 1994.
J. December, et al., "The World Wide Web; Everything You Need to Master the Web!": 180–189–part 1 and 277–280 (part II), 1994.
K. Reichard, "Leveraging E-Mail," PC Magazine: 241, 244 and 245, May 1995.
"Lan–Aces, Inc. Announces Expanded Capabilities to Office–Logic Clerk Application," PR Newswire, May–Jun. 1994.
"Working with AT&T Easylink, An Effective Communication Solution for Business," PC Today 62, May 1995.
J. Davis, et al., "Drop–in Publishing With the World Wide Web," Computer Networks and IDSN Systems, 28, pp. 247–255, 1995.
K. Goldberg, "Beyond the Web: Manipulating the Real World," Computer Networks and ISDN Systems, 28, pp. 209–219, 1995.
A. N. Boston, et al., "Interactive species distribution reporting, mapping, and modelling using the World Wide Web," Computer Networks and ISDN Systems, 28, pp. 231–238, 1995.
T. W. Yan, et al., "From user access patterns to dynamic hypertext linking," Computer Networks and ISDN Systems, 28, pp. 1007–1014, 1996.
H. Pusch, "Design and implementation of a global reference mechanism for data objects," Compueter Standards & Interfaces, 17, pp. 181–192, 1995.
B. Wiegel, "Secure External References in Multimedia Email Messages," 3rd ACM Conference on Computer and Communications Security, New Delhi, India, Mar. 14–16, 1996.
E. Levinson, "Exchanging SGML Documents Using Internet Mail and MIME," Computer Standards & Interfaces, 18, pp. 93–102, 1996.
E. Meyer, et al., "Borealis Image Server," Computer Networks and ISDN Systems, 28, pp. 1123–1137, 1996.
M. Rio, et al., "A framework for broadcasting and management of URIs," Computer Networks and ISDN Systems, 28, pp. 535–542, 1996.
Delrina Adevertisement, 1994.
Cope, "Working with . . . Fax Mailbox," *PC Today*, vol. 8, Issue 9, Sep. 1994.
Warren, "Voice/fax Combos," *Computer Telephony*, Sep./Oct. 1994, p. 88.
Swartz, Barry K. and Stephen B. Weinstein, Dual–Media Messaging Using Screen Telephones on the Telephone Network, IEEE International Conference on Communications '93, May 23–26, 1993, pp. 1183–1188, Technical Program, Conference Record, vol. 2/3.
Borenstein, Nathaniel S., "Internet Multimedia Mail with MIME: Emerging Standards for Interoperability," Upper Layer Protocols, Architectures and Applications, 1992, pp. 183–192, Elsevier Science Publishers B.V. (North–Holland).
Supplementary European Search Report in European Patent Application No. EP 96 91 3855, search results mailed Nov. 22, 2001.
·X·Critical Path Data Sheet–Critical Path Notification Server, 2 pages, Dec. 2002r.
·X·Critical Path Data Sheet—Critical Path Messaging Server, 2 pages, Dec. 2002r.
·X·Critical Path Data Sheet—Critical Path Internet File Server, 2 pages, Dec. 2002r.
·X·Critical Path Data Sheet—Critical Path Presentation Server, 2 pages, Dec. 2002r.
·X·Critical Path Data Sheet—Critical Path SMS Access Server, 2 pages, Dec. 2002r.
·X·Critical Path Data Sheet—Critical Path Calendar Server, 2 pages, Dec. 2002r.
·X·Critical Path Data Sheet—Critical Path Personal Address Book Server, 2 pages, Dec. 2002r.
·X·CP™ Meta–Directory Server, 4 pages, Jun. 2002r.
·X·Critical Path Meta–Directory Server, 1 page, May 8, 2003, http://www.cp.net/solutions/metaDirectoryServer.html.
·X·Tumbleweed Communications, 3 pages, May 8, 2003, http://www.tumbleweed.com/en/products/ime_overview.html.
·X·Tumbleweed Communications, 1 page, May 8, 2003, http://www.tumbleweed.com/en/products/ime_product_architecture.html.
·X·Tumbleweed Communications, 1 page, May 8, 2003, http://www.tumbleweed.com/en/products/ime_for_automated_deliveries.html.
·X·Tumbleweed Communications, 3 pages, May 8, 2003, http://www.tumbleweed.com/dy/print.
·X·Tumbleweed Communications, 1 page, May 8, 2003, http://www.tumbleweed.com/en/products/ime_portal_integration.html.
·X·Tumbleweed Communications, 1 page, May 8, 2003, http://www.tumbleweed.com/en/products/ime_message_tracking.html.
·X·Tumbleweed Communications, 2 pages, May 8, 2003, http://www.tumbleweed.com/dy/print/.

* cited by examiner

EX PARTE REEXAMINATION CERTIFICATE ISSUED UNDER 35 U.S.C. 307

THE PATENT IS HEREBY AMENDED AS INDICATED BELOW.

Matter enclosed in heavy brackets [ ] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in italics indicates additions made to the patent.

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1–35 are cancelled.

New claims 36–57 are added and determined to be patentable.

36. A system for receiving and storing a message signal directed to an intended recipient and for relaying the message signal to a computer, comprising:

a telephone interface for receiving an incoming call from a public switched telephone network, the incoming call including the message signal;

a central processor for receiving the message signal from the telephone interface and for storing the message signal in a storage medium;

a hyper-text transfer protocol deamon for receiving a request for the message signal from the computer and for forwarding the request to a network server, the request from the computer being formatted in a hyper-text transfer protocol; and

the network server, in response to receiving the request from the hyper-text transfer protocol deamon, forwarding at least a part of the message signal to the hyper-text transfer protocol deamon;

wherein the hyper-text transfer protocol deamon transmit at least part of the message signal to the computer;

wherein the message signal is addressed to the intended recipient and the computer is associated with the intended recipient;

wherein the hyper-text transfer protocol deamon further receives an access request from a hyper-text browser executing on the computer, via a packet switched data network, in accordance with the hyper-text transfer protocol;

wherein the access request contains an application layer address associated with the network server;

wherein the access request is indicative of a request by the intended recipient to gain access to a user-specific message storage area of the storage medium associated with the intended recipient;

wherein the message signal is stored in the user-specific message storage area;

wherein the computer is an end-user client computer;

wherein, in response to the access request, the network server transmits to the computer, via the hyper-text transfer protocol deamon and the packet switched data network, a user interface expressed as a sequence of markup language instructions; and

wherein the user interface provides one or more links to respective messages stored in the user-specific message storage area.

37. The system as set forth in claim 36, wherein:

in response to the markup language instructions, the hyper-text browser generates the user interface on a display associated with the computer;

the one or more links includes a particular link associated with the message signal; and

in response to the particular link being selected by the end user via the user interface, the request for the message signal is coupled, using the hypertext transfer protocol, via the packet switched data network, to the hyper-text transfer protocol deamon.

38. The system as set forth in claim 37, wherein the markup language instructions are described using a hyper-text markup language (HTML).

39. The system as set forth in claim 37, wherein the markup language instructions are described using a particular dialect of a standard generalized markup language.

40. The system as set forth in claim 37, wherein the access request comprises a password and the user interface is sent in response to the password being verified to match a stored password associated with the intended recipient.

41. The system as set forth in claim 37, wherein the user interface further provides an indication of the total number of messages stored in the user-specific message storage area.

42. The system as set forth in claim 37, wherein the user interface further provides an indication of the total number of new messages stored in the user-specific message storage area, and an indication of the total number of saved messages stored in the user-specific message storage area.

43. A method for receiving and storing a message signal directed to an intended recipient and for relaying the message signal to a computer, comprising the steps of:

receiving an incoming call from a public switched telephone network, the incoming call including the message signal;

storing the message signal in a storage medium;

receiving, at a hyper-text transfer protocol deamon, a request for the message signal from the computer and forwarding the request to a network server;

forwarding at least a part of the message signal from the network server to the hyper-text transfer protocol deamon; and

transmitting at least part of the message signal from the hyper-text transfer protocol deamon to the computer;

wherein the message signal is addressed to the intended recipient and the computer is associated with the intended recipient;

wherein the hyper-text transfer protocol deamon further receives an access request from a hyper-text browser executing on the computer, via a packet switched data network, in accordance with the hyper-text transfer protocol;

wherein the access request contains an application layer address associated with the network server;

wherein the access request is indicative of a request by the intended recipient to gain access to a user-specific message storage area of the storage medium associated with the intended recipient;

wherein the message signal is stored in the user-specific message storage area;

wherein the computer is an end-user client computer;

wherein, in response to the access request, the network server transmits to the computer, via the hyper-text

transfer protocol deamon and the packet switched data network, a user interface expressed as a sequence of markup language instructions; and

wherein the user interface provides one or more links to respective messages stored in the user-specific message storage area.

44. The method as set forth in claim 43, wherein:

in response to the markup language instructions, the hyper-text browser generates the user interface on a display associated with the computer;

the one or more links includes a particular link associated with the message signal; and

in response to the particular link being selected by the end user via the user interface, the request for the message signal is coupled, using the hypertext transfer protocol, via the packet switched data network, to the hyper-text transfer protocol deamon.

45. The method as set forth in claim 44, wherein the markup language instructions are described using a hyper-text markup language (HTML).

46. The method as set forth in claim 44, wherein the markup language instructions are described using a particular dialect of a standard generalized markup language.

47. The method as set forth in claim 44, wherein the access request comprises a password and the user interface is sent in response to the password being verified to match a stored password associated with the intended recipient.

48. The method as set forth in claim 44, wherein the user interface further provides an indication of the total number of messages stored in the user-specific message storage area.

49. The method as set forth in claim 44, wherein the user interface further provides an indication of the total number of new messages stored in the user-specific message storage area, and an indication of the total number of saved messages stored in the user-specific message storage area.

50. A system for receiving and storing a message signal directed to an intended recipient and for relaying the message signal to a computer, comprising:

a telephone interface for receiving an incoming call from a public switched telephone network, the incoming call including the message signal;

a central processor for receiving the message signal from the telephone interface and for storing the message signal in a storage medium;

a server-implemented function that generates one or more tagged markup language commands that define at least a portion of a mailbox user interface;

a hyper-text transfer protocol deamon for receiving a request for the message signal from the computer and for forwarding the request to a network server, the request from the computer being formatted in a hyper-text transfer protocol; and

the network server, in response to receiving the request from the hyper-text transfer protocol deamon, forwarding at least a part of the message signal to the hyper-text transfer protocol deamon;

wherein the hyper-text transfer protocol deamon transmits at least part of the message signal to the computer;

wherein the message signal is addressed to the intended recipient and the computer is associated with the intended recipient;

wherein the hyper-text transfer protocol deamon further receives an access request from a hyper-text browser executing on the computer, via a packet switched data network, in accordance with the hyper-text transfer protocol;

wherein the access request contains an application layer address associated with the network server;

wherein the access request is indicative of a request by the intended recipient to gain access to a user-specific message storage area of the storage medium associated with the intended recipient;

wherein the message signal is stored in the user-specific message storage area;

wherein the computer is an end-user client computer;

wherein at least one of the tagged markup language commands includes a reference to the message signal;

wherein the mailbox user interface is rendered in accordance with the tagged markup language commands and displayed on a display associated with the end-user client computer; and

wherein the mailbox user interface includes a listing of messages in the user-specific message storage area, to include the message signal.

51. The system as set forth in claim 50 wherein the tagged markup language commands conform with a hypertext markup language (HTML).

52. The system as set forth in claim 50 wherein the tagged markup language commands conform with a handheld device markup language (HTML).

53. The system as set forth in claim 50 wherein the tagged markup language commands conform with a dialect of an extensible markup language (XML).

54. The system as set forth in claim 50 further comprising:

a user option; and

the server-implemented function generating, in accordance with the user option, at least one of the one or more tagged markup language commands.

55. The system as set forth in claim 50 wherein the end-user client computer is configured to play back the least a part of the message signal forwarded thereto by the hyper-text transfer protocol deamon, and no part of the message signal is played back using a telephone.

56. The system as set forth in claim 50 wherein the one or more tagged markup language commands cause to be displayed to the user a total listing of all messages in the mailbox to include the message signal.

57. The system as set forth in claim 50 wherein one or more tagged markup language commands cause to be displayed to the user a total number of messages in the user's mailbox.

* * * * *

EXHIBIT E

US006597688B2

(12) **United States Patent**
Narasimhan et al.

(10) **Patent No.: US 6,597,688 B2**
(45) **Date of Patent: *Jul. 22, 2003**

(54) **SCALABLE ARCHITECTURE FOR TRANSMISSION OF MESSAGES OVER A NETWORK**

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(73) Assignee: **j2 Global Communications, Inc.**, Hollywood, CA (US)

(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/097,307**

(22) Filed: **Jun. 12, 1998**

(65) **Prior Publication Data**

US 2002/0181496 A1 Dec. 5, 2002

(51) **Int. Cl.**[7] **H04L 12/56**

(52) **U.S. Cl.** **370/353**; 370/465; 370/355; 370/356; 379/220.01

(58) **Field of Search** 370/237, 242, 370/252, 352, 353, 360, 389, 401, 465; 379/112, 114, 200, 220; 709/206, 228

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,941,170	A		7/1990	Herbst
5,193,110	A		3/1993	Jones et al.
5,339,156	A		8/1994	Ishii
5,406,557	A	*	4/1995	Baudoin 370/61
5,487,100	A		1/1996	Kane
5,604,788	A		2/1997	Tett
5,608,786	A		3/1997	Gordon
5,675,507	A		10/1997	Bobo, II
5,712,907	A		1/1998	Wegner et al.
5,740,231	A		4/1998	Cohn et al.
5,742,668	A		4/1998	Pepe et al.
5,742,905	A		4/1998	Pepe et al.
5,758,088	A		5/1998	Bezaire et al.
5,765,033	A		6/1998	Miloslavsky
5,812,786	A	*	9/1998	Seazholtz et al. 395/200.63
5,870,454	A		2/1999	Dahlen
5,999,594	A		12/1999	Mizoguchi et al.
5,999,965	A	*	12/1999	Kelly 709/202
6,025,931	A		2/2000	Bloomfield
6,073,165	A	*	6/2000	Narasimhan et al. 709/206
6,208,638	B1	*	3/2001	Rieley et al. 370/354
6,215,858	B1		4/2001	Bartholomew et al.
6,246,983	B1		6/2001	Zou et al.
6,259,533	B1		7/2001	Toyoda et al.
6,263,064	B1		7/2001	O'Neal et al.
6,330,079	B1		12/2001	Dugan et al.
6,339,591	B1		1/2002	Migimatsu
6,341,160	B2		1/2002	Tverskoy et al.
6,356,356	B1		3/2002	Miller, Jr. et al.

OTHER PUBLICATIONS

L. Orozco-Barbosa, D. Makrakis, C.H. Yang, and N.D. Georganas, Design and performance evaluation of intelligent multimedia services, Computer Communications 20 (1997) pp. 219-232.*

* cited by examiner

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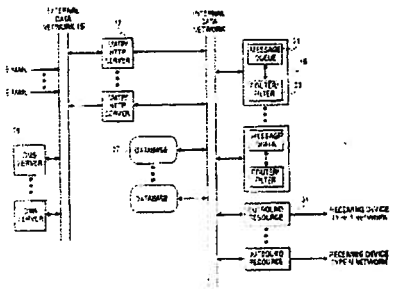
Assistant Examiner—Thai Hoang
(74) *Attorney, Agent, or Firm*—Blakely Sokoloff Taylor & Zafman

(57) **ABSTRACT**

A system for supporting a message delivery service, a method for supporting such a service and a machine accessible medium containing program data for implementing such a system. A number of processing servers are coupled to communicate with a number of outbound resources and a database server over an internal packet-switched data network. The database server contains account information on customers of the service. Request messages received from a customer over an external packet-switched data network are stored in a queue of a processing server. A router filter obtains a request message from the queue and validates a customer associated with the request message, after accessing the database server. A determination is made as to which of the multiple outbound resources to assign the request message. Each of these resources is capable of converting an input request message into a format capable of being received by a fax machine over a telephone network.

27 Claims, 8 Drawing Sheets



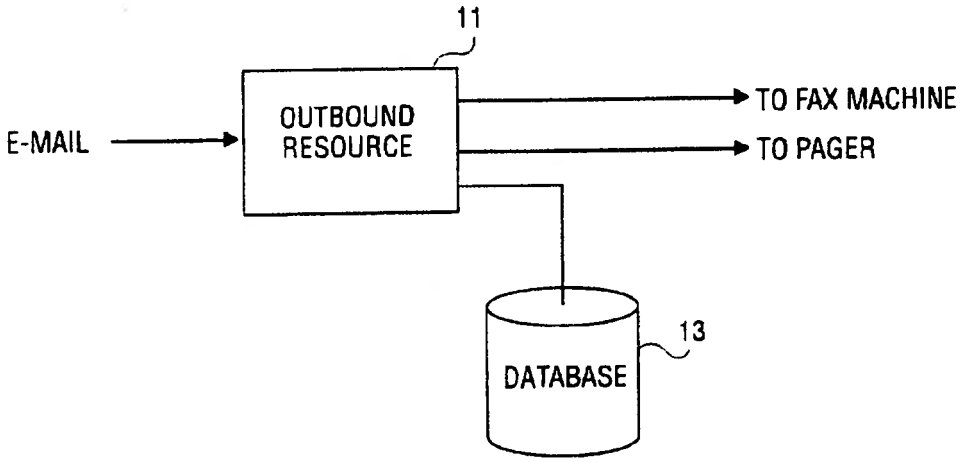


FIG. 1
(PRIOR ART)

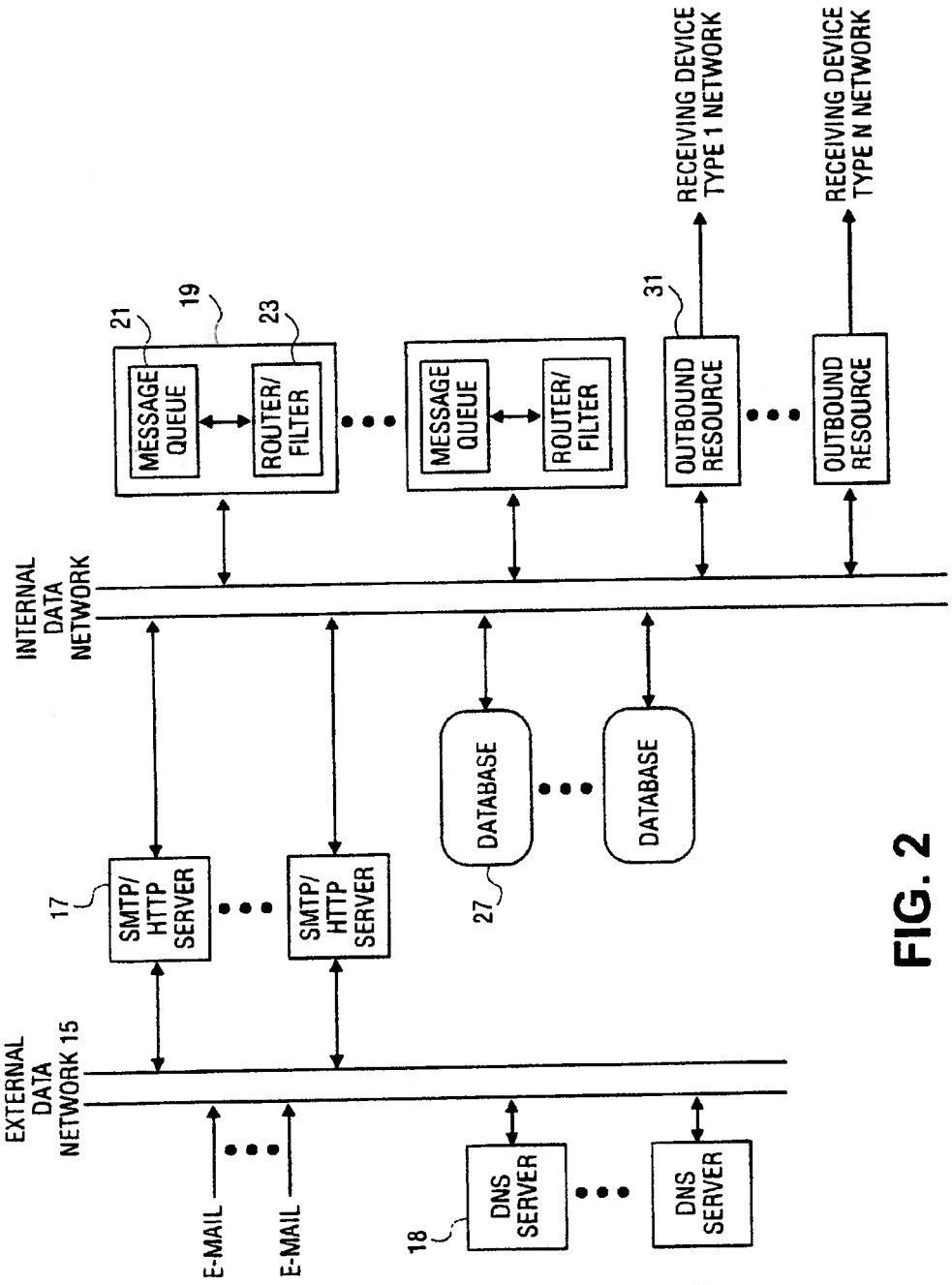

RECEIVING DEVICE TYPE 1 NETWORK
RECEIVING DEVICE TYPE N NETWORK
31
21
19
23
MESSAGE QUEUE
ROUTER/ FILTER
MESSAGE QUEUE
ROUTER/ FILTER
OUTBOUND RESOURCE
OUTBOUND RESOURCE
INTERNAL DATA NETWORK
DATABASE
DATABASE
27
17
SMTP/ HTTP SERVER
SMTP/ HTTP SERVER
EXTERNAL DATA NETWORK 15
E-MAIL
E-MAIL
18
DNS SERVER
DNS SERVER

FIG. 2

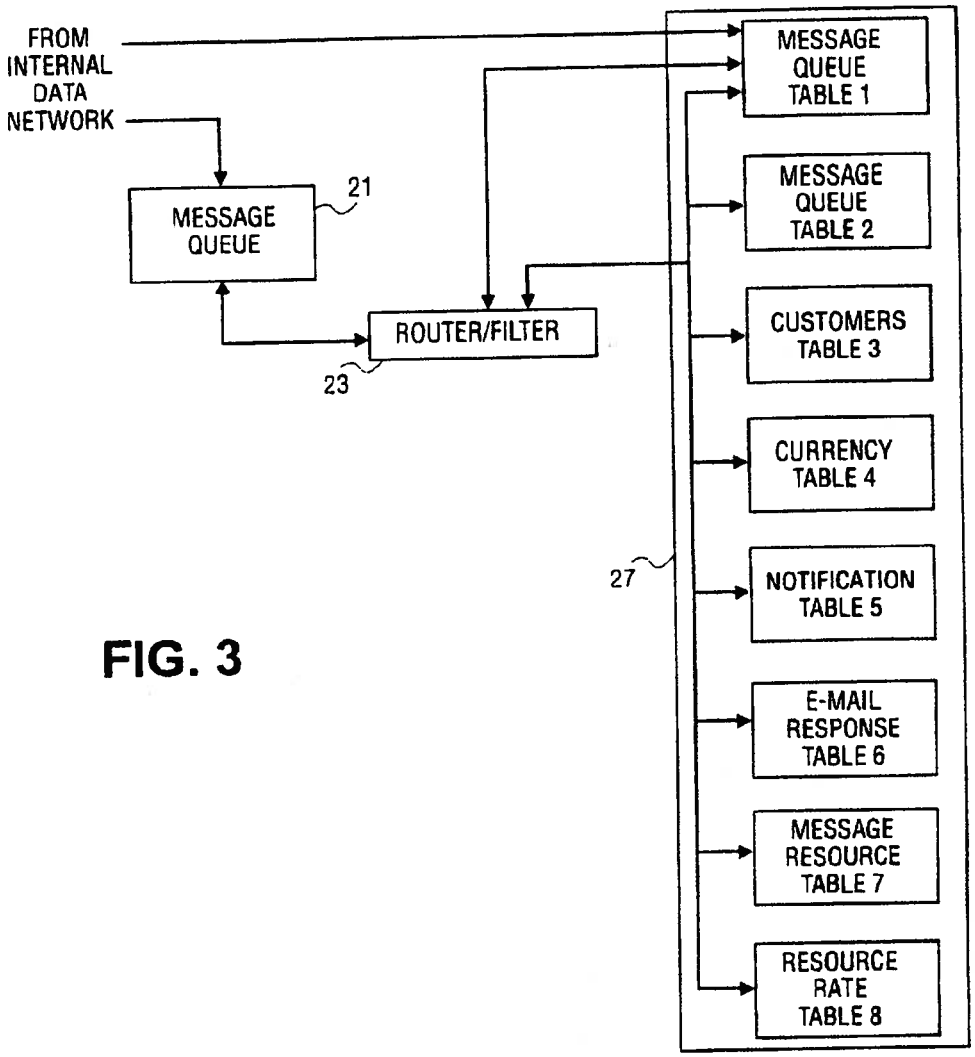

FROM INTERNAL DATA NETWORK
MESSAGE QUEUE
21
ROUTER/FILTER
23
27
MESSAGE QUEUE TABLE 1
MESSAGE QUEUE TABLE 2
CUSTOMERS TABLE 3
CURRENCY TABLE 4
NOTIFICATION TABLE 5
E-MAIL RESPONSE TABLE 6
MESSAGE RESOURCE TABLE 7
RESOURCE RATE TABLE 8

FIG. 3

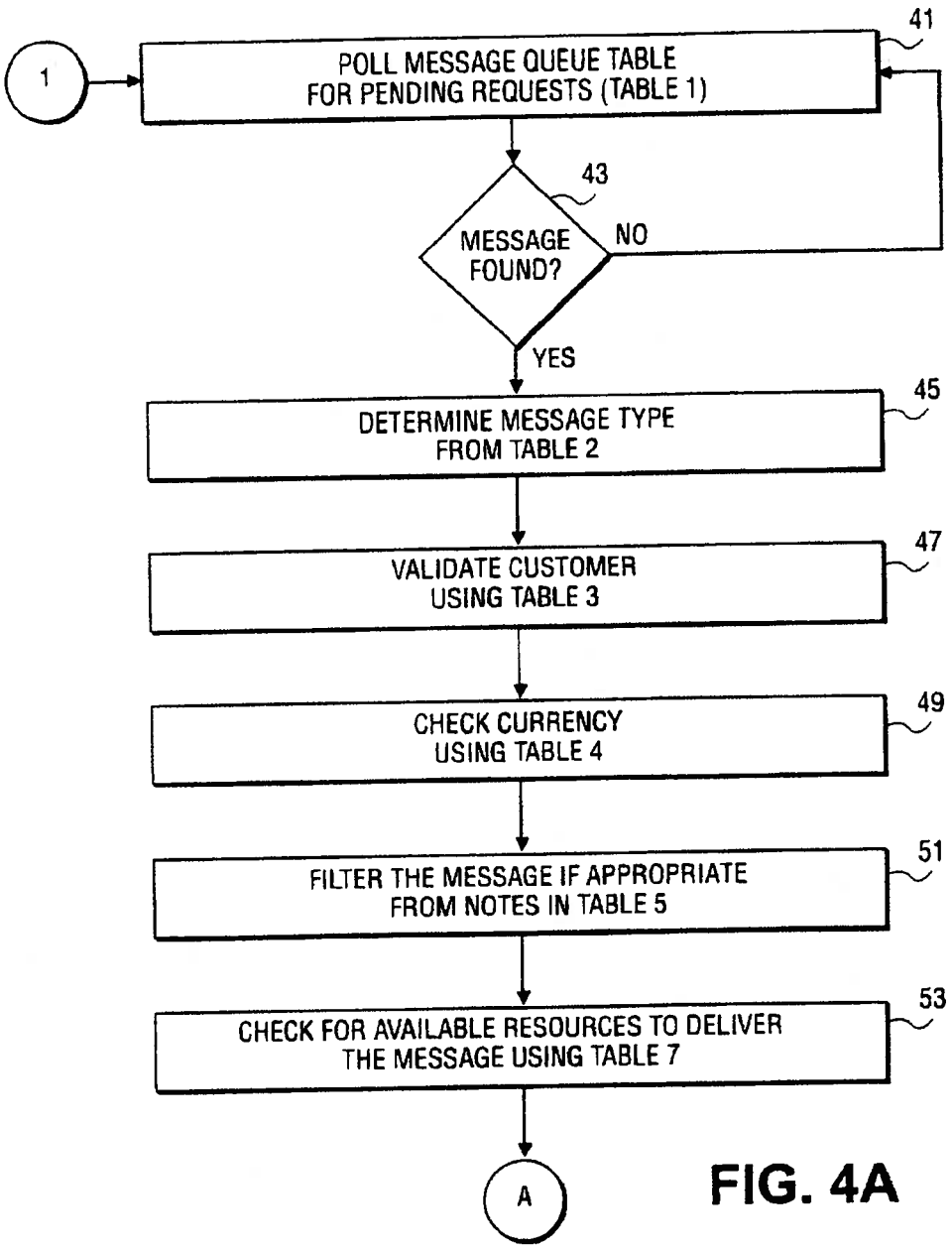

1
POLL MESSAGE QUEUE TABLE FOR PENDING REQUESTS (TABLE 1)
41
43
MESSAGE FOUND?
NO
YES
DETERMINE MESSAGE TYPE FROM TABLE 2
45
VALIDATE CUSTOMER USING TABLE 3
47
CHECK CURRENCY USING TABLE 4
49
FILTER THE MESSAGE IF APPROPRIATE FROM NOTES IN TABLE 5
51
CHECK FOR AVAILABLE RESOURCES TO DELIVER THE MESSAGE USING TABLE 7
53
A

FIG. 4A

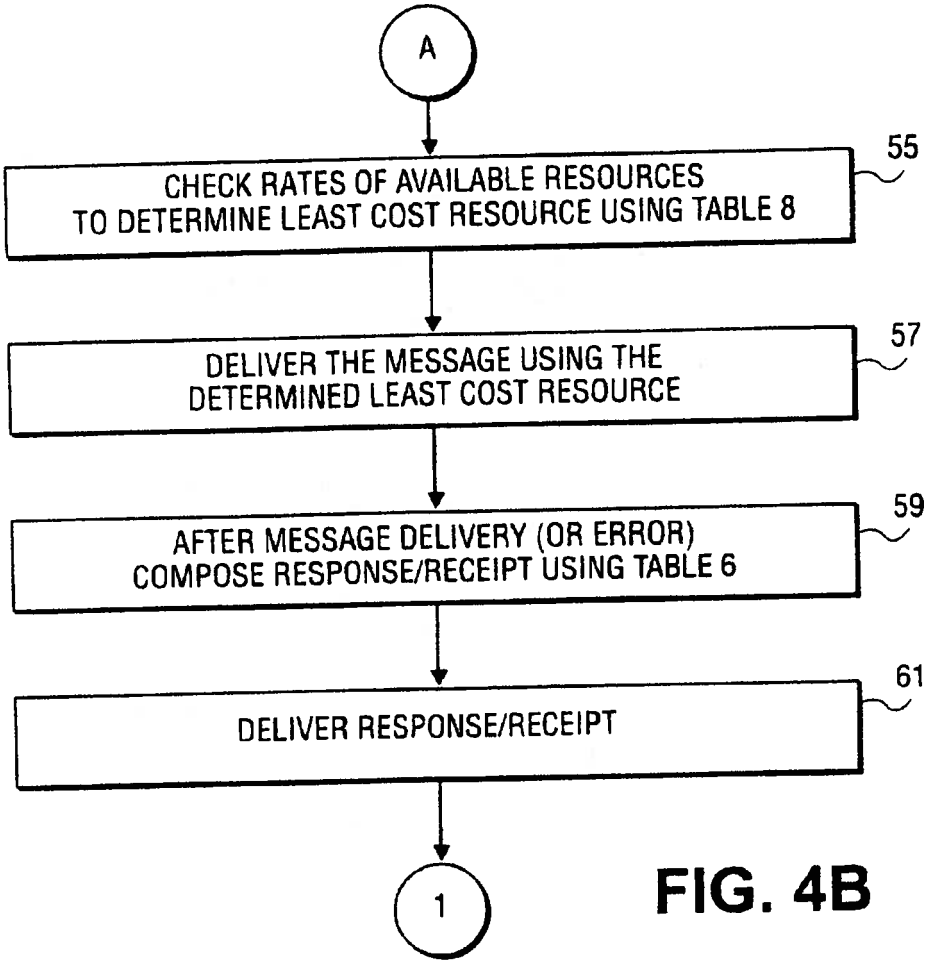

A
CHECK RATES OF AVAILABLE RESOURCES TO DETERMINE LEAST COST RESOURCE USING TABLE 8
55
DELIVER THE MESSAGE USING THE DETERMINED LEAST COST RESOURCE
57
AFTER MESSAGE DELIVERY (OR ERROR) COMPOSE RESPONSE/RECEIPT USING TABLE 6
59
DELIVER RESPONSE/RECEIPT
61
1

FIG. 4B

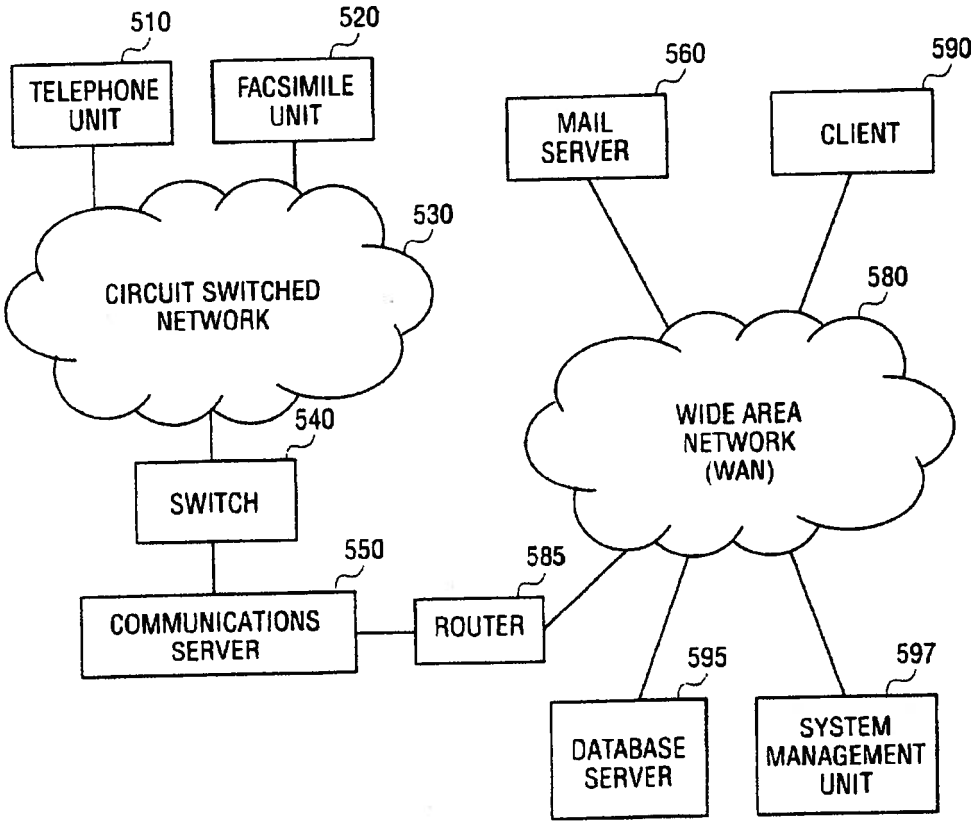

510
520
560
590
TELEPHONE UNIT
FACSIMILE UNIT
MAIL SERVER
CLIENT
530
580
CIRCUIT SWITCHED NETWORK
WIDE AREA NETWORK (WAN)
540
SWITCH
550
585
COMMUNICATIONS SERVER
ROUTER
595
597
DATABASE SERVER
SYSTEM MANAGEMENT UNIT

FIG. 5

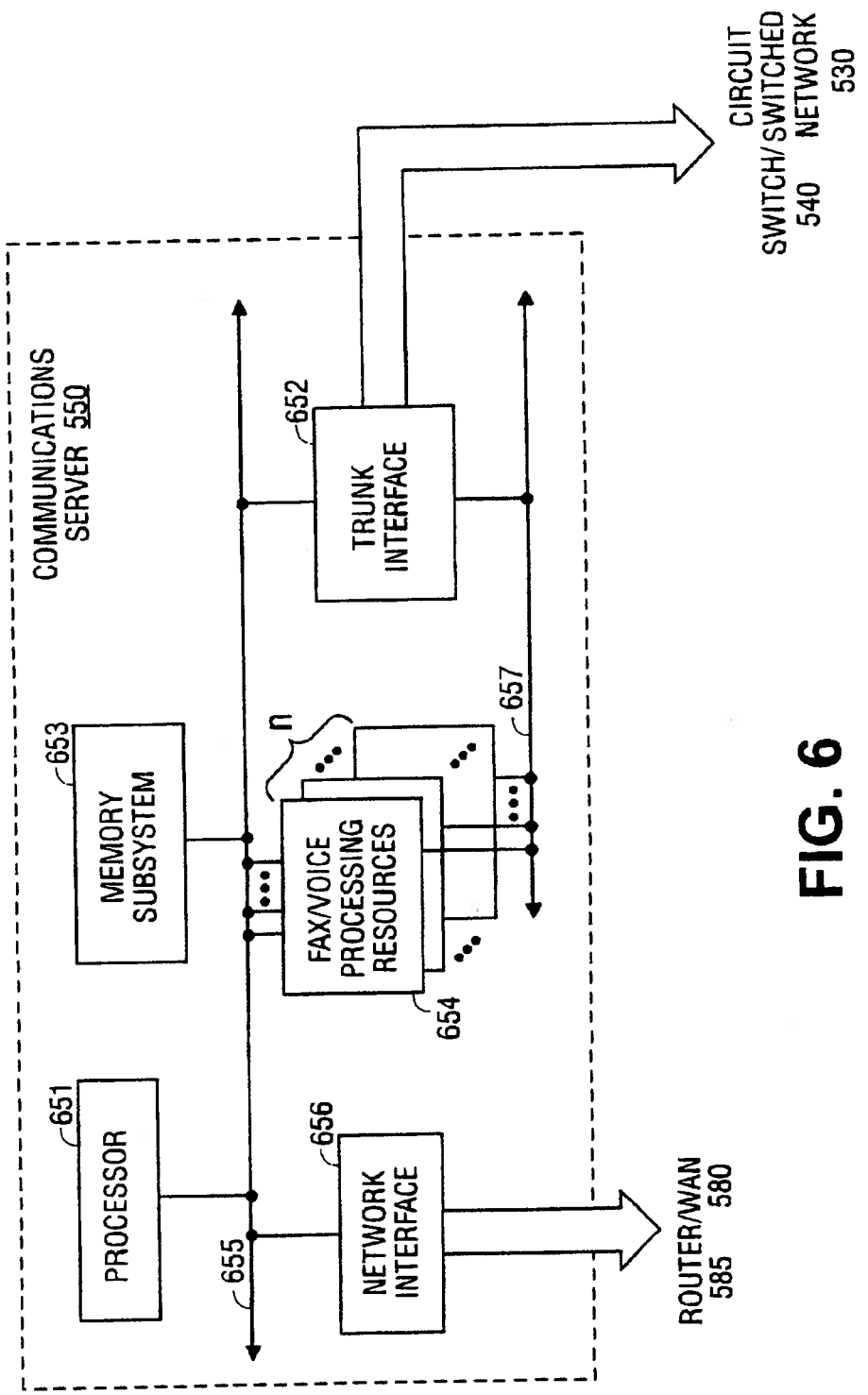

CIRCUIT SWITCH/SWITCHED NETWORK 530
540
COMMUNICATIONS SERVER 550
652
TRUNK INTERFACE
653
MEMORY SUBSYSTEM
n
657
FAX/VOICE PROCESSING RESOURCES
654
651
PROCESSOR
656
NETWORK INTERFACE
655
ROUTER/WAN 580
585

FIG. 6

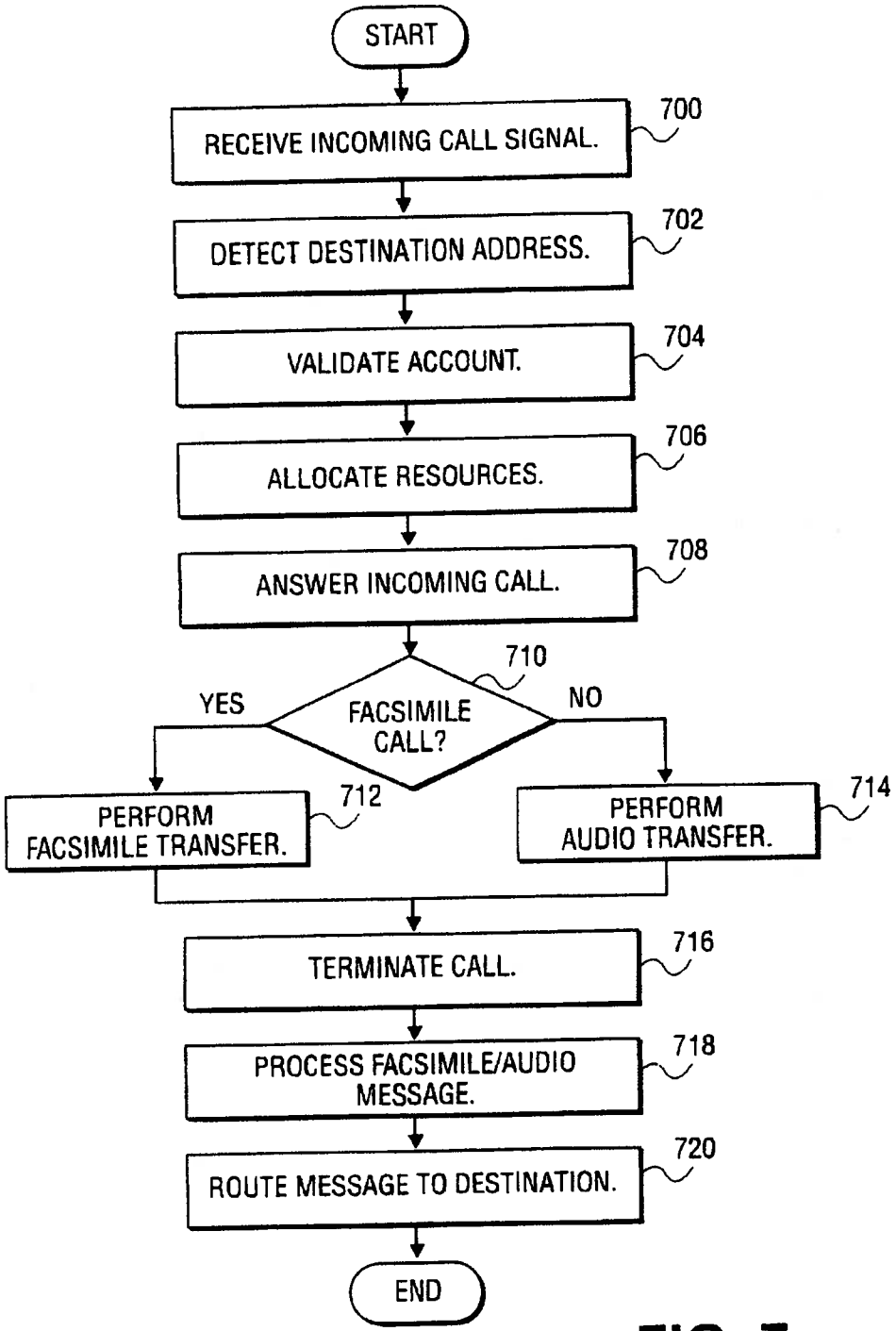

START
RECEIVE INCOMING CALL SIGNAL.
700
DETECT DESTINATION ADDRESS.
702
VALIDATE ACCOUNT.
704
ALLOCATE RESOURCES.
706
ANSWER INCOMING CALL.
708
FACSIMILE CALL?
710
YES
NO
PERFORM FACSIMILE TRANSFER.
712
PERFORM AUDIO TRANSFER.
714
TERMINATE CALL.
716
PROCESS FACSIMILE/AUDIO MESSAGE.
718
ROUTE MESSAGE TO DESTINATION.
720
END

FIG. 7

SCALABLE ARCHITECTURE FOR TRANSMISSION OF MESSAGES OVER A NETWORK

BACKGROUND OF THE INVENTION

The present invention relates to the field of message receipt/transmission and delivery using computer, phone, wireless and other communications networks. Specifically, the present invention relates to the transmission of e-mail messages which may be text only, text plus an audio file, text plus a video file, text plus a fax file or any combination thereof to a phone, pager or fax machine or other receiving device suitable for the message content, over appropriate communications networks using an architecture which enables easy expansion to handle additional message traffic as well as to connect to additional communications networks, including networks which do not presently exist which may become available in the future.

DESCRIPTION OF RELATED ART

Voice and data communications systems such as the public switched telephone network (PSTN) are currently used to transfer image and text data transmitted by facsimile ("fax") machines in addition to the normally carried voice traffic. These faxed images are usually transmitted through the PSTN and received for printout or storage of the image on a destination fax machine or computer for the use by the recipient.

In U.S. Pat. No. 6,208,638 entitled Method and Apparatus for Transmission and Retrieval of Facsimile and Audio Messages Over a Circuit or Packet Switched Network, it is disclosed that to provide for the receipt and transmission of audio and fax information by a first user over a circuit switched network such as the public switched telephone network (PSTN) to a second user over a packet switched network such as the Internet, a communications server is connected both to the circuit switched network and a packet switched network.

The communications server contains resources to receive and process incoming audio and facsimile calls from the circuit switched network into a format suitable for transmission over the packet switched network to the second user's address. In addition, a link is first determined between the second user's address on the circuit switched network and the second user's address on the packet switched network, and then an appropriate route to the second user's address on the packet network is determined. With the system being maintained in a distributed and redundant fashion, reliable receipt and transfer of all messages is ensured.

However, the architecture utilized as described in U.S. Pat. No. 6,208,638 is not easily scalable to handle increasingly higher levels of message traffic or to easily connect to networks in addition to the PSTN and the Internet. FIG. 1 shows the essence of the architecture of U.S. Pat. No. 6,208,638. An e-mail message is passed to an outbound resource 11 (communications server 550 in U.S. Pat. No. 6,208,638) which converts the e-mail message to a fax format or to audio for transmission to a fax machine or telephone connected to the PSTN. A database 13 stores customer information necessary for processing of messages

(an unnumbered part of communications server 150 in U.S. Pat. No. 6,208,638 which is also contained in database server 195 in U.S. Pat. No. 6,208,638). After processing of an e-mail message by outbound resource 11, a fax or voice mail message is sent over the PSTN or more generally, a generalized switched telephone network (GSTN) which includes cellular telephone networks as well as the PSTN. Optionally, a pager message may also be sent informing a user of the fax which has been sent or availability of a voice mail message as described in U.S. Pat. No. 6,073,165 entitled Processing and Forwarding Messages From a Computer Network to a Forwarding Service.

SUMMARY OF THE INVENTION

A system for supporting a message delivery service is described that has a highly scalable architecture. Multiple processing servers are each coupled to communicate with multiple outbound resources and with a database server over an internal packet-switched data network. The database server contains account information on customers of the service. Request messages received from a customer over an external packet-switched data network (such as the Internet) are stored in a queue. The queue is polled for pending requests and a request message is obtained therefrom. A customer associated with this obtained request message is validated after accessing the account information in the database server. An outbound resource is assigned to this request message, where each of these resources is capable of converting an input request message into a format capable of being received by a fax machine over a telephone network.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of a prior art architecture which performs the functions, but not the scalability of the architecture of the present invention.

FIG. 2 is a block diagram illustrating the architecture of the present invention.

FIG. 3 is a block diagram showing the data/control flow through message queue 21, router/filter 23 and database 27.

FIG. 4 (4a and 4b) is a flow diagram of the processing performed by router/filter 23.

FIG. 5 is a system diagram of a network containing a message server.

FIG. 6 is a block diagram illustrating the message server.

FIG. 7 is a flow diagram illustrating some operations.

DETAILED DESCRIPTION OF THE INVENTION

The present invention provides a method and apparatus for allowing the receipt and transmission of audio, video and fax information between a circuit switched network and a packet switched network. For purposes of explanation, specific embodiments are set forth to provide a thorough understanding of the present invention. However, it will be understood by one skilled in the art, that the invention may be practiced without these details. Further, although the present invention is described through the use of circuit switched and packet switched networks, most, if not all, aspects of the invention apply to all networks in general. Moreover, well-known elements, devices, process steps and

the like are not set forth in detail in order to avoid obscuring the present invention.

Referring now to FIG. **2**, e-mail messages for a customer are sent to/through an external data network **15** (e.g., the Internet) and routed to an appropriate SMTP/HTTP (or SHTTP) server **17** as determined by a domain name server (DNS) **18** according to well known techniques. The e-mail message may be a text message or it may include a file, the content of which may be audio, video or bitmapped (e.g., a fax) or other data. Again, the techniques for creating and sending e-mail messages with these characteristics are well known.

A processing server **19**, which includes a message queue **21** and a router/filter **23** first verifies that the message is from or is to a customer using information in database **27**. After successful verification, the message is broken into fragments (in the case of files with multiple attachments) and written to message queue **21**. Router/filter **23** obtains messages from the message queue and handles least call routing/billing/prioritization/filtering of messages. Filtering is primarily for notification messages for pager delivery. After billing verification and determination of a least cost route, the message is assigned to one or more outbound resources **31** for delivery to the intended recipient by a method or methods selected by the customer as previously recorded in database **27**.

In the case of faxes, the outbound resource is a server which dials the destination fax number and sends the fax.

In the case of voice messages, the outbound resource is a server which dials the destination telephone number and plays the voice message.

In the case of notification messages, the outbound resource is a server which dials out to the paging terminal or delivers the notification message through any appropriate paging gateway.

After the message (in whatever form) has been delivered, a receipt with details and an error log (if any) is sent back via a secure protocol to the message queue **21**.

The receipt/error log messages are then processed by the router/filter which interfaces with a billing system (not shown) for customer account update.

FIG. **3** is a block diagram showing the data/control flow through message queue **21**, router/filter **23** and database **27** using information contained in the following tables as explained with reference to FIGS. **4***a* and **4***b*.

TABLE 1

Message Queue Table	
MESSAGE_ID	This is a unique number assigned to each message that arrives in the system.
RESOURCE_ID	Unique number assigned to each Outbound Resource
RESOURCE_TYPE	Each Resource is identified by the type of messages it can deliver (e.g., FAX, VOICE, NOTIFY, etc.)
RESOURCE_ADDRESS	Location of the Resource (such as IP address)
MESSAGE_TO_EMAIL_ADDRESS	To: address of the message
MESSAGE_FROM_EMAIL_ADDRESS	From: address of the message
MESSAGE_LOCATION	Location of actual message on the Message Queue 21
MESSAGE_SIZE	Size of the message in bytes
MESSAGE_PRIORITY	Priority of the message (e.g., low, medium, high)
MESSAGE_CREATION_DATE	Timestamp identifying the date/time that the message was received by the system
MESSAGE_EXPIRY_DURATION	Amount of time after which the message becomes stale
MESSAGE_SCHEDULED_DATE	Scheduled delivery timestamp for the message
MESSAGE_STATUS	Current status of the message (Active, Pending, Sent, etc.)
MESSAGE_ESTIMATED_COST	Estimated cost for the delivery of the message
CUSTOMER_KEY	Unique number identifying the customer in the database
MESSAGE_PART_OF_BROADCAST	Flag identifying if the message is part of a larger broadcast list waiting to be delivered
BROADCAST_ID	Unique number identifying a broadcast list
COVERPAGE_ID	Unique number identifying a coverpage (if any) for a fax
MESSAGE_SUBJECT	Subject line of the message to be delivered
MESSAGE_DURATION	Duration of the message (delivery time of fax, or delivery time for a voice message, etc.)
MESSAGE_RATE	Rate for message delivery (dollars per second, etc.)
MESSAGE_SEND_DATE	Actual timestamp identifying when the message was delivered
MESSAGE_REMOTE_CSID	Identifier of the fax machine to which a FAX message was delivered
MESSAGE_TYPE	Type of message (e.g., FAX, VOICE, NOTIFICATION, etc.)
RESOURCE_COMMUNICATION_TYPE	Protocol used to communicate with the resource (HTTP, SHTTP, etc.)
MESSAGE_LANGUAGE_CODE	Language used for delivery of a receipt or response, based on settings in the customer table
MESSAGE_PAGES	Number of pages of a message (used primarily for a fax)

TABLE 2

File Type Table

FILETYPE_MESSAGE_TYPE	Identifier of a message type (FAX, VOICE, etc.)
FILETYPE_RESOURCE_TYPE	Identifier to determine a resource that can handle a particular file type
FILETYPE_EXTENSION	The filename extension that identifies a file type (e.g., WAV, TIF, JFX, AU, GSM, etc.)

TABLE 3

Customer Table

CUSTOMER_KEY	Unique number identifying a customer in the database
FIRSTNAME	First name of customer
LASTNAME	Last name of customer
COMPANY	Company name of customer
ADDRESSLINE1	Company address
ADDRESSLINE2	Company address
CITY	Company city
MAILREGION	Company state or equivalent
MAILCODE	Zipcode or equivalent
COUNTRY	Company country
WORKNUMBER	Customer work phone number
HOMENUMBER	Customer home phone number
EMAILADDRESS	Email address of customer
COLLECTIONMETHOD	Collection method such as Credit card, Debit, etc.
BILLTYPE	e.g., Customer, Demo, free, corporate, etc.

TABLE 3-continued

Customer Table

STATUS	Status of customer, Active, Inactive, etc.
LANGUAGECODE	Language of customer, English, German, etc.
CURRENCYCODE	Currency for billing the customer, U.S. Dollars, Pound Sterling, etc.

TABLE 4

Currency Table

FORMAT	Currency label
CURRENCY_SYMBOL	Symbol for currency

TABLE 5

Notification Table

CUSTOMERKEY	Unique number identifying a customer in the database
PAGERTYPECODE	Code to determine the kind of pager service
BBSNUMBER	Modem number for pager notification delivery, based on the pager type
PAGERNUMBER	Identifier number of the pager unit
PIN	PIN code for the pager unit
DISPLAYTYPE	Display type of the pager (numeric, alphanumeric, etc.)

TABLE 6

Response_email Table

RESPONSE_ID	Unique ID for a response/receipt message to be sent to a customer
RESPONSE_SUBJECT	Subject line of the response message
RESPONSE_FROM_EMAIL	From: line of the response message
RESPONSE_BODY	Actual text of the response message

TABLE 7

Resource Table

RESOURCE_ID	Unique identifier for the resource
RESOURCE_TYPE	Type of resource (FAX, VOICE, etc.)
RESOURCE_STATUS	Status of resource (Active, Inactive, etc.)
RESOURCE_QUEUE_STATUS	Status of the Queue, number of messages in queue
RESOURCE_TIME_ZONE	Time zone for the resource
RESOURCE_QUEUE_MAX	Maximum size of the resource queue
RESOURCE_ADDRESS	Address of the resource (IP address, etc.)
RESOURCE_NAME	Name of the resource
RESOURCE_EXPIRY_DURATION	Expiry duration for any message sent to the specified resource
RESOURCE_QUEUE_IN_STATUS	Number of messages waiting to be delivered by the resource
RESOURCE_COMMUNICATION_TYPE	Method used to communicate with resource (HTTP, SHTTP, etc.)

TABLE 8

Resource Rates Table

RESOURCE_ID	Unique identifier for the resource
RESOURCE_PREFIX	Any digits to be dialed before an actual number
RESOURCE_CITY_NAME	Name of destination city for the message to be delivered
RESOURCE_PROVIDER_RATE	Rate for a particular city (dollars per second, etc.)
RESOURCE_MAX_DIGITS	Max number of digits allowed to be dialed
RESOURCE_AREA_CODE	Area code for the particular city

FIGS. 4*a* and 4*b* are a flow diagram of the processing performed by router/filter **23** using Tables 1–8. When a message is received it is placed into message queue **21** which is simply a storage area, the specifics of which,

including the mechanism for placing the message into the queue are well known. Certain details concerning the message are also stored in a message queue table (Table 1). In step **41**, router/filter, which is a computer program running on processing server **19**, polls the message queue table for pending requests as determined by the existence of an active message in the message status field. If no message is found, after a system defined delay, the message queue table is again polled (step **43**). Once a message has been found in the table, processing continues with step **45** by determining the message type using the message_type field in Table 1 and the file type information in Table 2. The customer is then validated using information in Table 3 in step **47**. In step **49**, currency information for the customer is obtained from Table 4. The message is then filtered for possible pager notification using the information in Table 5 in step **51**. In step **53**, Table 7 is used to check for available resources to deliver the message. In step **55**, the rates of available resources are checked to determine the least cost resource using Table 8. Then in step **59**, the message is delivered using the determined least cost resource. After the message has been delivered, or after an error in the delivery has occurred, in step **59**, a response/receipt is composed using Table 6. In step **61**, the response or receipt is delivered to the sender. The system then begins the process over again at step **41**.

As noted above outbound resource **31** is equivalent to communications server **150** as described in U.S. Pat. No. 6,208,638. The modifications made to outbound resource to enable it to operate in a system having an architecture as described herein are as follows.

These changes will be described with reference to the message structure of received messages.

Message Structure

Each field has a value following an '=' sign and is terminated by a newline character. The exception to this is the "Message" field where a newline immediately follows the '=" sign and the actual message follows on the next line.

The fields of a message are as follows:

Password=
MessageID=
MessageStatus=
MessageSentTimeStamp=
MessageDuration=
MessageLength=
MessageRemoteCSID=
MessageSourceCSID=
MessageAttachStatus=
MessageDestination=
ResourceID=
ResourceStatus=
ResourceLastCommTimeStamp=
ResourceExpiryDuration=
ResourceQueueInStatus=
ResourceQueueOutStatus=
ResourceChannelMax=
ResourceChannelStatus=
MessageBoundary=
Message=

In the following explanation of the above fields, the text in brackets at the end indicates the entity providing the value for the field in the forward/reverse direction (i.e., from router/filter **23** (RF) to outbound resource **31** (RESOURCE), and from RESOURCE to RF, respectively). "NA" indicates that no value is applicable, and the text "NA" is used to populate the field. "Same" indicates that the same value is used in the reverse direction, i.e, the RESOURCE does not modify the value; it only echoes the value it receives in that field.

Password—There is a fixed password pair for each RESOURCE and RF combination. RESOURCE stores the RF password in a flat text password file in a directory (jfaxom), and RF stores the RESOURCE password in the database. (RF/RESOURCE).

MessageID—Unique ID, per message, generated by RESOURCE. (RESOURCE/Same).

MessageStatus—Code indicating current status of the message. See Status codes below. (RF/RESOURCE)

MessageSentTimeStamp—Time stamp indicating date/time the message was delivered to the final destination by RESOURCE. (NA/RESOURCE)

MessageDuration—Time (in seconds) to transmit message from RESOURCE. (NA/RESOURCE)

Messagelength—Number of pages transmitted by RESOURCE. (NA/RESOURCE)

MessageRemoteCSID—called subscriber identification (CSID) of fax machine to which message was transmitted. (NA/RESOURCE)

MessageSourceCSID—Source CSID. This may be customized per customer. (RF/Same)

MessageAttachStatus—Value of "A" indicates a message is attached for delivery. (RF/RESOURCE)

MessageDestination—Destination phone number. (RF/Same)

ResourceID—Unique ID, per resource, stored in the database. (RF/Same)

ResourceStatus—Code indicating the current status of the resource, i.e., whether it is active or not. RF uses this to determine whether further messages should be sent to RESOURCE for delivery. See Status codes below. (NA/RESOURCE)

ResourceLastCommTimeStamp—Date/time of last communication between RF and RESOURCE. (RF/RESOURCE)

ResourceExpiryDuration—Life of message (in minutes) on RESOURCE. If a message has not been delivered to the final destination by RESOURCE within this amount of time, the message is considered "expired" and is discarded.

ResourceQueueInStatus—Number of messages waiting to be processed in an Inbox directory on RESOURCE. (NA/RESOURCE)

ResourceQueueOutStatus—Number of messages waiting to be processed in an Outbox directory on RESOURCE. (NA/RESOURCE)

ResourceChannelMax—Number of channels available for use on RESOURCE. (NA/RESOURCE)

ResourceChannelStatus—Channel activity status, e.g., 0000000111000001, where 0's indicate an idle channel and 1's indicate a busy channel. (NA/RESOURCE)

MessageBoundary—Text for MIME boundary. (RF/NA)

Message—Actual MIME message sent by RF. If MessageAttachStatus=NA, no message follows this tag. All fields are NA if not used.

Date fields are expressed in MMDDYYhhmmss format.

Resource Status Codes are:

A—Active

I—Inactive

Message Status Codes are:

P—Pending

H—On Hold

D—Deferred

R—Ready for sending to RESOURCE

X—Exchanged, i.e., sent to RESOURCE but not acknowledged by it.

A—Sent to RESOURCE and acknowledged by it.

S—Sent (i.e., receipt for final delivery received from RESOURCE)

Normal sequence for Message delivery by RESOURCE is:

RF receives a request in its queue (message queue 21).

RF sends the message to RESOURCE.

RESOURCE gets message, authenticates password, and creates a new message in the Inbox directory.

RESOURCE acknowledges receipt of message.

RESOURCE processes the message in Inbox (MessageStatus=A, MessageAttachStatus=A).

RESOURCE moves message to a Process directory for further processing.

RESOURCE finishes processing message and delivers it to final destination.

RESOURCE removes the message from the Process directory.

RESOURCE creates a message in Outbox directory. (MessageStatus=S). If a "reply message" is to be delivered to the original sender, MessageAttachStatus=A, else MessageAttachStatus=NA. MessageID remains the same in either case.

RESOURCE delivers receipt (with "reply message," if applicable) to RF.

RF receives the message and puts it in the Queue for database processing.

Processing server **19** with the above described functionality may be implemented using readily available systems such as a Windows NT server or a UNIX server. Database **27** may be implemented as a database server using readily available systems such as a Windows NT server or a UNIX server running, for example a SQL database.

What follows is a detailed description of FIGS. **5–7** which set forth a method and apparatus for allowing the receipt and transmission of audio and fax information between a circuit switched network and a packet switched network, as described in U.S. Pat. No. 6,208,638. For purposes of explanation, specific embodiments are set forth to provide a thorough understanding of the present invention. However, it will be understood by one skilled in the art, from reading this disclosure, that the invention may be practiced without these details. Further, although the system is described through the use of circuit switched and packet switched networks, most, if not all, aspects apply to all networks in general.

FIG. **5** contains a block diagram illustrating an embodiment of a system containing a communications server **550** connected to a circuit switched network **530** and a wide area network (WAN) **580**. In an embodiment, the circuit switched network **530** is a circuit switched network such as the PSTN while WAN **580** is a packet switched network such as the Internet. It is to be noted that circuit switched network **530** can also be a network such as the generalized switched telephone network (GSTN), which encompasses PSTN networks, cellular telephone networks, and the other networks with which they are in communication.

Communications server **550** is connected to circuit switched network **530** via a switch **540** and to WAN **580** through the use of a router **585**. As described in further detail below, in an embodiment, switch **540** and router **585** are interfaced to communications server **550** using two separate hardware interfaces. In an alternate embodiment, switch **540** and router **585** can be interfaced to communications server **550** through the use of one hardware unit.

Connected to circuit switched network **530** is both a telephone unit **510** and a facsimile unit **520**. Telephone unit **510** is a standard telephone capable of converting audio signals into electrical signals suitable for transmission over circuit switched network **530**. Similarly, facsimile unit **520** is a standard facsimile machine capable of transmitting and receiving facsimile messages over circuit switched network **530**. Each of these devices can be connected to circuit switched network **530** using either wired or wireless technology.

Connected to WAN **580** is a database server **595**, a system management unit **597**, a mail server **560**, and a client **590**. Each of these systems communicate with each other and with communications server **550** via WAN **580** using such protocols such as simple network management protocol (SNMP) and hyper-text transport protocol (HTTP)—packetized using a protocol such as the transmission control protocol/internet protocol (TCP/IP).

In an embodiment, each one of database server **595**, system management unit **597**, mail server **560**, and client **590**, are stand-alone computers or workstations containing the hardware and software resources to enable operation. In alternate embodiments, the functions provided by each one of database server **595**, system management unit **597**, mail server **560**, and client **590**, are provided by any number of computer systems.

In an embodiment, mail server **560** is a server providing e-mail receipt and transmission using a protocol such as the simple mail transfer protocol (SMTP) and post office protocol (POP). Moreover, client **590** is configured to be able to communicate over WAN **580** using SMTP or POP in order to retrieve e-mail from mail server **560** or another suitably configured server.

System management unit **597** communicates with communications server **550** to monitor: (1) the processes on communications server **550**; (2) the status of the trunk line connected to communications server **550**; and (3) the connection between the various servers connected to WAN **580**. As described below, if any processes on communications server **550** or connection to the circuit switched network **530** is interrupted, system management unit **597** can allocate resources, or cause the re-routing of a call or message via one or more redundant resources or connections, ensuring that the call or message is routed to the final destination.

Communications server **550** contains user data needed to receive and route incoming messages received from circuit switched network **530**. The same information is also stored

on database server **595**. In an embodiment, communications server **550** stores an inbound address, a set of final destination addresses; and an account status for each user. The inbound address corresponds to the telephone number assigned to the user. As further discussed below, the inbound address is the number that a message sender dials on telephone unit **510** or facsimile unit **520** to leave a message for the user. The set of final destination address contain one or more e-mail addresses where the user account status information indicates whether the inbound address is either active and or inactive—i.e, whether the user is able to receive messages using the system.

Database server **595** stores a duplicate copy of the inbound address, the set of final destination addresses; and the account status for each user. Database server **595** also stores additional information for each user such as mailing address and billing information which are not used in the operation of the present invention but are note herein for completeness only. Thus, the information that is stored on communications server **550** is a subset of the information that is stored on database server **595**, and if communications server **550** were to become inoperable or otherwise unable to handle incoming messages, database server **595** can configure another communications server to accept those calls.

In an embodiment, system management unit **597** is responsible for monitoring the status of communications server **550** and re-assigning the users being handled by communications server **550** if communications server malfunctions or becomes overloaded with incoming calls. In the former case, system management unit **597** would re-assign all users being handled by communications server **550** to another communications server. In the latter case, system management unit **597** would only off-load the only those incoming calls for which communications server **550** does not have the available resources to process.

FIG. **6** is a block diagram of communications server **550** configured in accordance with an embodiment containing a processor **651** coupled to a memory subsystem **653** through the use of a system bus **655**. Also coupled to system bus **655** is a network interface **656**; a trunk interface **652**; and a set of fax/voice processing resources **654**. Set of fax/voice processing resources **654** and trunk interface **652** are also coupled to a bus **657**.

Bus **657** is a bus that supports time division multiplex access (TDMA) protocols to optimize the flow of real time traffic between set of fax/voice processing resources **654** and trunk interface **652**.

Memory subsystem **653** is used to store information and programs needed by communications server **550**. The functioning of memory subsystems in computer design are well known to those of ordinary skill in the art and thus will not be further discussed herein.

In an embodiment, trunk interface **652** is a trunk line interface, such as a T-1 or E-1 line, to switch **540** and can handle up to **24** channels of communications. Trunk line signaling is well known to those of ordinary skill in the art of telecommunication and thus will not be further discussed herein except as necessary for describing the invention.

Set of fax/voice processing resources **654** are made up of multiple fax/voice processing cards. Each of these processing cards contain processing units which are capable of receiving and transmitting facsimiles according to established protocols, and which are capable of digitizing voice or other audio data, also according to established protocols. In an embodiment, there are three fax/voice processing cards in set of fax/voice processing resources **654**, each fax/voice processing card containing eight processing units capable of handling a channel from trunk interface **652**. Thus, communications server **550** can communicate on twenty-four channels concurrently.

The storage of destination addresses on both circuit switched network **530** and WAN **580** is controlled by a database located either on communications server **550** or on database server **595**. Keeping this information separate from communications server **550** allows communications server **550** to be a resource that can be allocated on demand. Hence, a number of communications servers could be used, along with one or more database servers, to allow a fully redundant and scalable system. In addition, system management unit **597** monitors the status and connection of all the communication and database servers.

FIG. **7** is a flow diagram illustrating the operations of an embodiment of the present invention when a call originating from a source on the circuit switched network **530**. For example, either telephone unit **510** or facsimile unit **520** can initiate the call.

In block **700**, an incoming call signal is received by communications server **550** from switch **540**. The incoming call signal is initiated by telephone unit **510** or facsimile unit **520** over circuit switched network **530** and is routed to communications server **550** via switch **540**. Communications server **550** detects the incoming call signal using trunk interface **652**. Operation would continue with block **702**.

Continuing with block **702**, trunk line interface unit **652**, in addition to receiving signals to indicate that there is an incoming call from switch **540**, also receives signals indicating the circuit destination address of the incoming call. The destination address is captured by trunk interface **652** and is determined by trunk line signaling using mechanisms such as direct-inward-dial, or dual tone multifrequency (DTMF) tones.

Continuing with block **704**, to determine whether or not to process the incoming call, processor **651** searches the list of inbound addresses contained in memory subsystem **653** for the destination address. If processor **651** finds the destination address in the inbound address list, processor **651** will then look up the account status for the user who owns the inbound address to determine if the account of that user is a valid user account. In an alternate embodiment, the validation is performed through the use of a database maintained by a separate entity such as database server **595**. If the account is found to be inactive, communications server **651** will play a prepared message indicating that the number to which the incoming message was sent is an invalid account.

In block **706**, once the validity of the user account has been established, processor **651** will attempt to allocate one fax/voice processing resource from set of fax/voice processing resources **654** and also determine the availability of other resources required for the receipt and processing of the incoming call. These other resources include the processing

capacity of processor **651**, the storage capacity of memory subsystem **653**.

If it is determined that the appropriate resources are not available, then the call will be routed to a different communications server that is capable of allocating the necessary resources. The routing of calls is accomplished by trunk line signaling via switch **540** and is managed by system management unit **597**.

Also, it should be noted that the call will only come from switch **540** to communications server **550** if there are no problems with the line. Otherwise the call will get routed to a different communications server. In an embodiment, fault detection and correction happens in one of two ways. First, on the telephone network side, switch **540** can be set up to independently route a call to another line if it is determined that one of the lines is bad. Second, if communications server **550** detects that the trunk line coming into trunk interface **652** is down, communications server **550** will notify system management unit **597** to reallocate the users for whom communications server **550** is responsible onto another communications server. Thus, system management unit **597** will transfer the duplicate user information contained in database server **595** into a different communications server.

In block **708**, communications server **550** "answers" the incoming call by having trunk interface **652** go "off-hook" on the trunk line.

In block **710**, if the fax/voice processing resource of set of fax/voice processing resources **654** which is processing the call determines that the incoming call is a fax transmission, then operation will continue with block **712**. Otherwise, operation will continue with block **714**. For example, if the call is a fax, a fax protocol is initiated, and the fax is received by one of the fax/voice processing resources of set of fax/voice processing resources **654**. If the call is a voice call, the voice is recorded by one of the fax/voice processing resources of set of fax/voice processing resources **654**.

In block **712**, the fax/voice processing resource of set fax/voice processing resources **654** responsible for processing the incoming call will perform the fax transfer and store the incoming message as a temporary file in memory subsystem **653**. In an embodiment, the incoming fax is saved into a file which follows the group 3 facsimile file format. Operation will then continue with block **716**.

In block **714**, where it is determined that the incoming message is an audio message, the fax/voice processing resource of set of fax/voice processing resources **654** allocated to process the call will initiate an audio recording of the incoming voice message. In an embodiment, the audio message is digitized and stored in memory subsystem **653** as a temporary file in a pulse code modulated format. After the incoming call has been digitized and stored, operation will then continue with block **716**.

In block **716**, trunk interface **652** will terminate the call. Operation will then continue with block **718**.

In block **718**, the incoming message, which has been stored as a temporary file in memory subsystem **653**, is processed by processor **651**. In an embodiment, the temporary file is processed according to the type of the incoming call. If the incoming call was a fax transmission, then the temporary file, which has been stored as a group 3 facsimile file, will be converted into a file which follows the tagged image file format (TIFF), or a format that is suitable for transmission over WAN **580**. Optionally, the temporary fax file can also be compressed at this stage. If the incoming call was an audio message, then the temporary file would be compressed using a compression scheme such as the scheme defined in the global system for mobile-communications (GSM) standard. In alternate operations, compressing and other processing of the incoming message is performed as the same time the incoming message is being received and being placed in memory subsystem **653**.

In block **720**, communications server **550** uses the inbound address to determine the set of final destination addresses, which are destinations on WAN **580** (i.e., the packet switched network), to send the processed incoming message. Communications server **550** then sends an electronic mail (e-mail) with the processed incoming message as an attachment to all the destinations in the set of final destination addresses.

For example, the e-mail containing the attachment is transferred to, and stored in, a server such as mail server **560**. The e-mail is then retrieved by client **590** whenever the user wishes. In an alternate embodiment, client **590** can retrieve the e-mail directly from communications server **550**, without the storing operation of mail server **560**.

While the present invention has been particularly described with reference to the various figures, it should be understood that the figures are for illustration only and should not be taken as limiting the scope of the invention. Many changes and modifications may be made to the invention, by one having ordinary skill in the art, without departing from the spirit and scope of the invention.

What is claimed is:

1. A system for supporting a message delivery service, comprising:

a plurality of processing servers each being coupled to communicate with a plurality of first outbound resources and a database server, over an internal packet-switched data network, the database server containing account information on customers of the message delivery service, each processing server implements a router-filter and a message queue,

the message queue to store request messages that are received from a customer of the message delivery service over an external packet-switched data network,

the router-filter to obtain a request message from the queue while polling the queue for pending requests, validate a customer associated with said request message after accessing the account information in the database server, and determine to which of the plurality of first outbound resources to assign said request message,

each of the first resources being capable of converting an input request message into a format capable of being received by a fax machine over a telephone network.

2. The system of claim **1** wherein the internal data network is a private data network.

3. The system of claim **2** wherein the external data network is the Internet.

4. The system of claim **3** wherein the request messages are received from the customers via one of a mail transport protocol server and a hypertext transport protocol server on the Internet.

5. The system of claim 1 wherein the router-filter is to prioritize a plurality of request messages that have been obtained from the queue and that are assigned to an outbound resource.

6. The system of claim 1 wherein the router-filter is to determine which of the plurality of first outbound resources to assign said request message to, based on which resource offers the least cost of delivering said request message.

7. The system of claim 1 wherein the router-filter is to generate an error message that indicates an error in delivering said request message as reported by the outbound resource to which said request message was assigned.

8. The system of claim 1 further comprising:

a plurality of second outbound resources each being capable of converting an input request message into a format capable of being played back to a telephone over a telephone network, wherein the router-filter is to determine to which of the first and second resources said request message is to be assigned, based on a message type of said request matching a capability of one of a first resource and a second resource.

9. The system of claim 1 further comprising:

a plurality of second outbound resources each being capable of converting an input request message into a format capable of being transmitted to a paging terminal over one of (1) a telephone network and (2) a paging gateway over an external packet-switched network, wherein the route-filter is to determine to which of the first and second resources said request message is to be assigned, based on a message type of said request matching a capability of one of a first resource and second resource.

10. An article of manufacture for supporting a message delivery system, comprising:

a machine accessible medium containing data that, when accessed by a machine, cause a plurality of processing servers to communicate with a plurality of first outbound resources and a database server all as part of an internal packet-switched data network, each processing server implements a router-filter and a message queue, the message queue to store request messages that are received from a customer of the message delivery service over an external packet switched data network, the router-filter to obtain a request message from the queue, validate a customer associated with said request message after accessing account information in the database server, and determine which of the plurality of first outbound resources to assign said request message, each of the first resources being capable of converting an input request message into a format capable of being received by a fax machine over a telephone network.

11. The article of manufacture of claim 10 wherein the medium includes further data which, when executed by the machine, cause the internal network to perform as a private data network.

12. The article of manufacture of claim 10 wherein the medium includes further data which allow the request messages to be received from a customer over the Internet.

13. The article of manufacture of claim 12 wherein the medium includes further data which allow the request messages to be received from the customer via one of a mail transport protocol server and a hypertext transport protocol server on the Internet.

14. The article of manufacture of claim 10 wherein the medium includes further data which, when executed by the machine, cause the router-filter to prioritize a plurality of request messages that have been obtained from the queue and that are assigned to an outbound resource.

15. The article of manufacture of claim 10 wherein the medium includes further data which, when executed by the machine, cause the router-filter to determine which of the plurality of first outbound resources to assign said request message to, based on which resource offers the least cost of delivering said request message.

16. The article of manufacture of claim 10 wherein the medium includes further data which, when executed by the machine, cause the router-filter to generate an error message that indicates an error in delivering said request message as reported by the outbound resource to which said request message was assigned.

17. The article of manufacture of claim 10 wherein the medium includes further data which, when executed by the machine, cause one of the plurality of processing servers to be capable of (1) communicating with a plurality of second outbound resources each being capable of converting an input request message into a format capable of being played back to a telephone over the telephone network and (2) determining which of the first and second outbound resources to assign said request message based on a message type of said request message matching the capability of an outbound resource.

18. The article of manufacture of claim 10, wherein the medium includes further data which, when executed by the machine, cause one of the plurality of processing servers to be capable of (1) communicating with a plurality of second outbound resources each being capable of converting an input request message into a format capable of being transmitted to one of (1) a paging terminal over a telephone network and (2) a paging gateway over an external packet-switched network, and (2) determining which of the first and second outbound resources to assign said request message based on a message type of said request message matching the capability of an outbound resource.

19. A method for supporting a message delivery service, comprising:

communicating with a plurality of first outbound resources and a data base server over an internal packet-switched data network, each of the plurality of first outbound resources being capable of converting a request message into a format capable of being received by a fax machine over a telephone network, the database server containing account information on customers of the message delivery service;

obtaining a request message from a message queue, the queue storing a plurality of request messages that are received from customers of the message delivery service and that were sent from an external packet-switched data network;

validating a customer associated with said obtained request message after accessing the account information in the database server; and

determining to which of the plurality of first outbound resources said obtained request message should be assigned.

20. The method of claim 19 wherein the internal data network is a private data network.

21. The method of claim 19 wherein the external data network is the Internet.

22. The method of claim 21 wherein the request messages are received from the customers via one of a mail transport protocol server and a hypertext transport protocol server on the Internet.

23. The method of claim 19 further comprising:

prioritizing the delivery of a plurality of request messages that have been obtained from the queue and that are assigned to an outbound resource.

24. The method of claim 19 further comprising:

determining which of the plurality of first outbound resources to assign said obtained request message to, based on which resource offers the least cost of delivering said obtained request message.

25. The method of claim 19 further comprising:

generating an error message that indicates an error in delivering said obtained request message as reported by the outbound resource to which said obtained request message was assigned.

26. The method of claim 19 further comprising communicating with a plurality of second outbound resources each being capable of converting a request message into a format being capable of being played back to a telephone over a telephone network; and

determining to which of the plurality of first and second outbound resources said obtained message should be assigned, based on a message type of said request message matching a capability of an outbound resource.

27. The method of claim 19, further comprising:

communicating with a plurality of second outbound resources each being capable of converting an input request message into a format capable of being transmitted to one of (1) a paging terminal over a telephone network and (2) a paging gateway over an external packet-switched network; and

determining to which of the plurality of first and second outbound resources said obtained message should be assigned, based on a message type of said request message matching a capability of an outbound resource.

* * * * *

EXHIBIT F

US006597688C1

(12) EX PARTE REEXAMINATION CERTIFICATE (6151st)

United States Patent

Narasimhan et al.

(10) Number: US 6,597,688 C1

(45) Certificate Issued: Mar. 11, 2008

(54) **SCALABLE ARCHITECTURE FOR TRANSMISSION OF MESSAGES OVER A NETWORK**

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(58) **Field of Classification Search** ..... None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,941,170	A	7/1990	Herbst
5,113,496	A	5/1992	McCalley et al.
5,193,110	A	3/1993	Jones et al.
5,299,255	A	3/1994	Iwaki et al.
5,333,266	A	7/1994	Boaz et al.
5,339,156	A	8/1994	Ishii
5,406,557	A	4/1995	Baudoin
5,479,411	A	12/1995	Klein
5,487,100	A	1/1996	Kane
5,513,126	A	4/1996	Harkins
5,557,659	A	9/1996	Hyde-Thomson
5,561,703	A	10/1996	Arledge et al.
5,568,536	A	10/1996	Tiller et al.
5,568,540	A	10/1996	Greco et al.
5,579,472	A	11/1996	Keyworth, II et al.

(Continued)

FOREIGN PATENT DOCUMENTS

EP	0554456	A1	8/1993
EP	0835021	A1	4/1998
JP	09-135266		5/1947
JP	04-256273		9/1992
JP	04-290033		10/1992

(Continued)

OTHER PUBLICATIONS

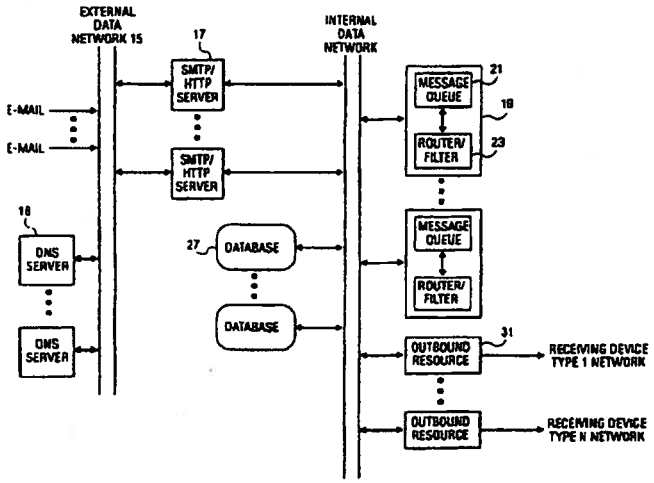
j2 Global Communications, Inc. v. *Venali, Inc.*, United States District Court Central District of California, Case No. CV04-01172 DDP (AJWx), litigation cover page.

(Continued)

Primary Examiner—Roland G. Foster

(57) **ABSTRACT**

A system for supporting a message delivery service, a method for supporting such a service and a machine accessible medium containing program data for implementing such a system. A number of processing servers are coupled to communicate with a number of outbound resources and a database server over an internal packet-switched data network. The database server contains account information on customers of the service. Request messages received from a customer over an external packet-switched data network are stored in a queue of a processing server. A router filter obtains a request message from the queue and validates a customer associated with the request message, after accessing the database server. A determination is made as to which of the multiple outbound resources to assign the request message. Each of these resources is capable of converting an input request message into a format capable of being received by a fax machine over a telephone network.



U.S. PATENT DOCUMENTS

5,604,788	A		2/1997	Tett
5,608,786	A		3/1997	Gordon
5,621,727	A		4/1997	Vaudreuil
5,630,060	A		5/1997	Tang et al.
5,633,916	A		5/1997	Goldhagen et al.
5,675,507	A		10/1997	Bobo, II
5,712,907	A		1/1998	Wegner et al.
5,717,742	A		2/1998	Hyde-Thomson
5,737,395	A		4/1998	Irribarren
5,740,231	A		4/1998	Cohn et al.
5,742,668	A		4/1998	Pepe et al.
5,742,905	A		4/1998	Pepe et al.
5,751,791	A		5/1998	Chen et al.
5,758,088	A		5/1998	Bezaire et al.
5,761,201	A		6/1998	Vaudreuil
5,761,396	A		6/1998	Austin et al.
5,765,033	A		6/1998	Miloslavsky
5,774,668	A		6/1998	Choquier et al.
5,781,614	A		7/1998	Brunson
5,870,454	A		2/1999	Dahlen
5,872,845	A		2/1999	Feder
5,933,412	A		8/1999	Choudhury et al.
5,933,490	A		8/1999	White et al.
5,937,161	A		8/1999	Mulligan et al.
5,940,476	A		8/1999	Morganstein et al.
5,987,508	A		11/1999	Agraharam et al.
5,991,292	A		11/1999	Focsaneanu et al.
5,999,525	A		12/1999	Krishnaswamy et al.
5,999,594	A		12/1999	Mizoguchi et al.
6,020,980	A		2/2000	Freeman
6,023,345	A		2/2000	Bloomfield
6,025,931	A		2/2000	Bloomfield
6,028,679	A		2/2000	Murphy
6,052,442	A		4/2000	Cooper et al.
6,064,723	A		5/2000	Cohn et al.
6,069,890	A		5/2000	White et al.
6,072,862	A		6/2000	Srinivasan
6,073,165	A	*	6/2000	Narasimhan et al. 709/206
6,084,892	A		7/2000	Benash et al.
6,084,952	A		7/2000	Beerman, Jr. et al.
6,185,603	B1		2/2001	Henderson et al.
6,208,638	B1	*	3/2001	Rieley et al. 370/354
6,212,550	B1		4/2001	Segur
6,215,550	B1		4/2001	Baer et al.
6,215,858	B1		4/2001	Bartholomew et al.
6,216,173	B1		4/2001	Jones et al.
6,233,318	B1		5/2001	Picard et al.
6,246,983	B1		6/2001	Zou et al.
6,259,533	B1		7/2001	Toyoda et al.
6,263,064	B1		7/2001	O'Neal et al.
6,285,777	B2		9/2001	Kanevsky et al.
6,301,245	B1		10/2001	Luzeski et al.
6,301,339	B1		10/2001	Staples et al.
6,304,636	B1		10/2001	Goldberg et al.
6,330,079	B1		12/2001	Dugan et al.
6,339,591	B1		1/2002	Migimatsu
6,341,160	B2		1/2002	Tverskoy et al.
6,350,066	B1		2/2002	Bobo, II
6,356,356	B1		3/2002	Miller, Jr. et al.
6,359,881	B1		3/2002	Gerszberg et al.
6,360,256	B1		3/2002	Lim
6,411,696	B1		6/2002	Iverson et al.
6,564,321	B2		5/2003	Bobo, II

FOREIGN PATENT DOCUMENTS

JP	04-291858		10/1992
JP	05-233488		9/1993
JP	05-235997		9/1993
JP	05-284326		10/1993
JP	05-316309		11/1993
JP	06-069956		3/1994
JP	06-217069		8/1994
JP	07-038689		2/1995
JP	07-212393		8/1995
JP	07-250094		9/1995
JP	08-009092		1/1996
JP	09-023273		1/1997
WO	WO 97/23082	A1	6/1997
WO	WO 98/017041	A2	4/1998
WO	WO 98/23058	A2	5/1998

OTHER PUBLICATIONS

Guo Zhen Sheng, et al., "Intranet-Based Mail Fax Gateway Technology", 1997 IEEE International Conference on Intelligent Processing Systems, Oct. 28-31, Beijing, China, 97TH8335 vol. 2 of 2, pp. 1607-1611.

L. Orozco-Barbosa, et al. "Design and Performance Evaluation of Intelligent Multimedia Services", Computer Communications 20 (1997) pp. 219-232.

Guide to Intelligent Least Cost Routing, Right Fax, Inc. (1997).

Guide to Internet Faxing, Right Fax, Inc. (1997).

Rightfax Ships Internet Connectivity Module for Lan Fax Software; Rightfax News Release; (Feb. 10, 1997).

Rightfax Poised for Internet Faxing; Rightfax News Release (May 27, 1997).

Mendel, Brett; Net Faxing Awaits Its Day; Lan Times, Dec. 9, 1996, v13 n27, p. 25(2).

Kinnucan, Paul; What's New in the Fax World; Systems Integration; Feb. 1990, v23 n2 p. 50(7).

Deixler, Lyle; Fax Forges Ahead; Teleconnect; Nov. 1996, v14 n11 p. 52(12).

Fax Solutions; Lan Times Sep. 23, 1996, v13 n21 p. 123(5).

Rightfax Introduces New Fax Server Designed for the Enterprise; Rightfax News Release (May 27, 1997).

* cited by examiner

EX PARTE REEXAMINATION CERTIFICATE ISSUED UNDER 35 U.S.C. 307

NO AMENDMENTS HAVE BEEN MADE TO THE PATENT

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1–27 is confirmed.

* * * * *

EXHIBIT G

US007020132B1

(12) **United States Patent**
Narasimhan et al.

(10) **Patent No.: US 7,020,132 B1**
(45) **Date of Patent: Mar. 28, 2006**

(54) **SCALABLE ARCHITECTURE FOR TRANSMISSION OF MESSAGES OVER A NETWORK**

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(73) Assignee: **j2 Global Communications, Inc.**, Hollywood, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/393,227**

(22) Filed: **Mar. 20, 2003**

Related U.S. Application Data

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(51) **Int. Cl.**
H04L 12/66 (2006.01)

(52) **U.S. Cl.** **370/355**; 370/357

(58) **Field of Classification Search** 370/237, 370/242. 252, 352–353, 360, 389, 401, 465; 379/112–114, 200, 220; 709/206, 228
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,941,170	A	7/1990	Herbst
5,115,326	A	5/1992	Burgess et al.
5,193,110	A	3/1993	Jones et al.
5,333,266	A	7/1994	Boaz et al.
5,339,156	A	8/1994	Ishii
5,406,557	A	4/1995	Baudoin
5,479,411	A	12/1995	Klein
5,487,100	A	1/1996	Kane
5,513,126	A	4/1996	Harkins et al.
5,561,703	A	10/1996	Arledge et al.
5,568,536	A	10/1996	Tiller et al.
5,568,540	A	10/1996	Greco et al.
5,579,472	A	11/1996	Keyworth, II et al.
5,604,788	A	2/1997	Tett
5,608,786	A	3/1997	Gordon
5,621,727	A	4/1997	Vaudreuil
5,675,507	A	10/1997	Bobo, II
5,712,907	A	1/1998	Wegner et al.
5,740,231	A	4/1998	Cohn et al.
5,742,668	A	4/1998	Pepe et al.
5,742,905	A	4/1998	Pepe et al.

(Continued)

FOREIGN PATENT DOCUMENTS

GB	2 024 561	A	1/1980

(Continued)

OTHER PUBLICATIONS

jFax Personal telecom™, http://www.jfax.net/, Dec. 4, 1994 4:57 p.m. (pp.1-2); and www.jfax.net/software.htm, Dec. 4, 1996 5:22 p.m. (pp.1-2).

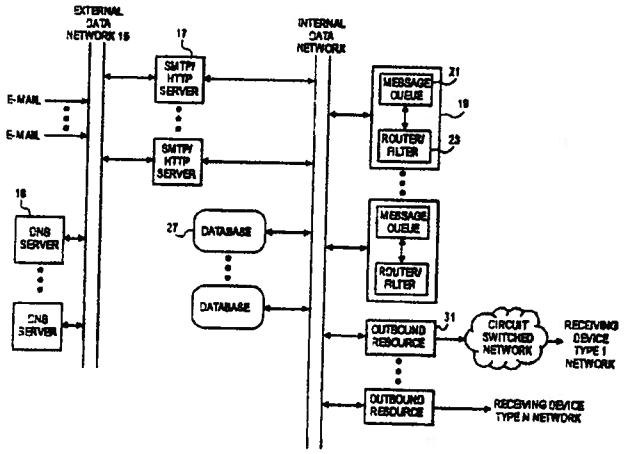
(Continued)

Primary Examiner—Chi Pham
Assistant Examiner—Thai Hoang
(74) *Attorney, Agent, or Firm*—Blakely, Sokoloff, Taylor & Zafman LLP

(57) **ABSTRACT**

A method and apparatus is disclosed for delivering messages that utilizes a message queue and a router/filter within a private data network. The private network is connected to an external data network such as the Internet, and has separate outbound resource servers to provide a high degree of scalability for handling a variety of message types.

20 Claims, 8 Drawing Sheets



U.S. PATENT DOCUMENTS

5,758,088	A		5/1998	Bezaire et al.
5,761,201	A		6/1998	Vaudreuil
5,761,396	A		6/1998	Austin et al.
5,765,033	A		6/1998	Miloslavsky
5,812,786	A		9/1998	Seazholtz et al.
5,870,454	A		2/1999	Dahlen
5,937,161	A		8/1999	Mulligan et al.
5,940,476	A		8/1999	Morganstein et al.
5,991,292	A	*	11/1999	Focsaneanu et al. 370/352
5,999,525	A		12/1999	Krishnaswamy et al.
5,999,594	A		12/1999	Mizoguchi et al.
5,999,965	A	*	12/1999	Kelly 709/202
6,020,980	A		2/2000	Freeman
6,025,931	A		2/2000	Bloomfield
6,073,165	A	*	6/2000	Narasimhan et al. 709/206
6,185,603	B1		2/2001	Henderson et al.
6,208,638	B1	*	3/2001	Rieley et al. 370/354
6,212,550	B1		4/2001	Segur
6,215,858	B1		4/2001	Bartholomew et al.
6,216,173	B1		4/2001	Jones et al.
6,246,983	B1		6/2001	Zou et al.
6,259,533	B1		7/2001	Toyoda et al.
6,263,064	B1		7/2001	O'Neal et al.
6,330,079	B1		12/2001	Dugan et al.
6,339,591	B1		1/2002	Migimatsu
6,341,160	B1		1/2002	Tverskoy et al.
6,350,066	B1		2/2002	Bobo, II
6,356,356	B1		3/2002	Miller, Jr. et al.
6,359,881	B1	*	3/2002	Gerszberg et al. 370/354
6,510,438	B1		1/2003	Hasegawa
6,564,321	B1		5/2003	Bobo, II
6,597,688	B1		7/2003	Narasimhan et al.

FOREIGN PATENT DOCUMENTS

GB	2 157 117 A	10/1985
JP	406164645	6/1994

OTHER PUBLICATIONS

Oracle & NT Software Library, Faxmail Networks for Windows v5.13 Fax over a network; Search results of online search, Dec. 5, 1996 12:03 p.m. (pp. 1-3).

Alta Vista Search, SHAREWARE.COM: Search results, Dec. 5, 1995 11:41 a.m. (pp. 1-2).

Yahoo™ Internet Life, vol. 3, No. 1, Jan. 1997 "Cooltools" (p. 73).

NetScan KOFAX, http://www.netscan.kofax.com/, Dec. 13, 1006 4:09 p.m. (pp. 103); http://www.netscan.kofax.com/brochure.html, Dec. 13, 1996 4:13 p.m. (pp. 1-4); and http://www.netscan.kofax.com/brochure2.html, Dec. 13, 1996 4:23 p.m. (pp. 1-3).

Electronics, Jan. 18 1979 (379-100), S9054 0063 (pp. 69-70).

"Unified Messaging Solutions On the Road", Mar. 7, 1995, Computer Telephony Expo, Dallas Texas.

j2 Global Communications, Inc. v. Venali, Inc. United States District Court Central District of California, Case No. CV04-01172 DDP (AjWx), Defendant Venali, Inc.'s Objections and Responses to Plaintiff j2 Global Communications, Inc.'s First Set of Interrogatories (Nos. 1-7) (19 pages).

"Guide to Intelligent Least Cost Routing", RightFAX, Inc. Tucson, Arizona, USA (1997) (pp. 1-17).

"Guide to Internet Faxing", RightFAX, Inc., Tucson, Arizona, USA (1997) (pp. 1-16).

"Rightfax Ships Internet Connectivity Module for Lan Fax Software", RightFAX News Research, RightFAX, Inc., Tucson, Arizona, USA, Feb. 10, 1997 (2 pages).

"RightFAX Poised for Internet Faxing", Right FAX News Release, RightFAX, Inc., Tucson, Arizona, USA, May 27, 1997 (2 pages).

"RightFAX Introduces New Fax Server Designed for the Enterprise", RightFAX News Research, RightFAX, Inc., Tucson, Arizona, USA, May 27, 1997 (3 pages).

Brett Mendel, "Net Faxing Awaits Its Day", LAN Times, Dec. 9, 1996, v13 n27 p. 25 (2 pages).

Paul Kinnucan, "What's New in the Fax World", Systems Integration, Feb. 1990, v23 n2 p. 50(7) (4 pages).

Lyle Deixler, "Fax Forges Ahead", Teleconnect, Nov. 1996, v14 n11 p. 52(12) (5 pages).

Fax Solutions, LAN Times, Sep. 23, 1996, v13 n21 p. 123(5) (10 pages).

Tomaru, "Electronic Mails Systems", 1983, Japan Annual Review in Electronics, Computers and Telecommunications, vol. 9, Telecomminication Technology, pp. 283-290.

* cited by examiner

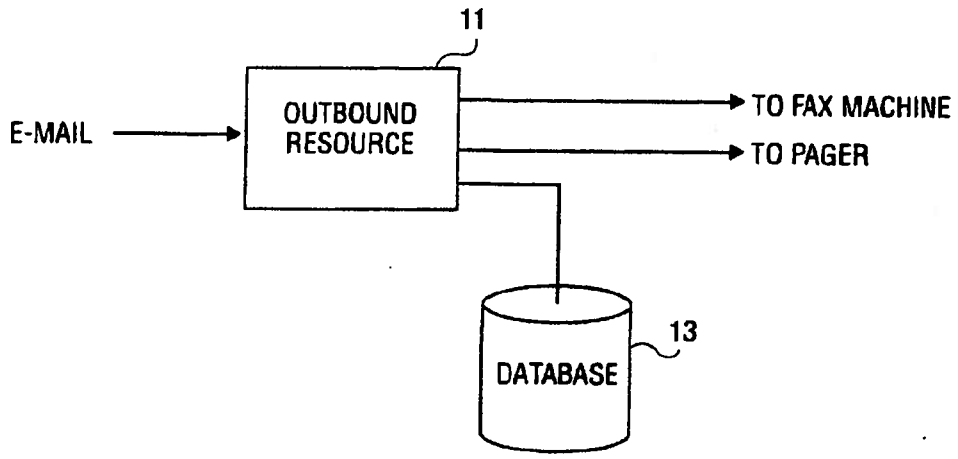


FIG. 1
(PRIOR ART)

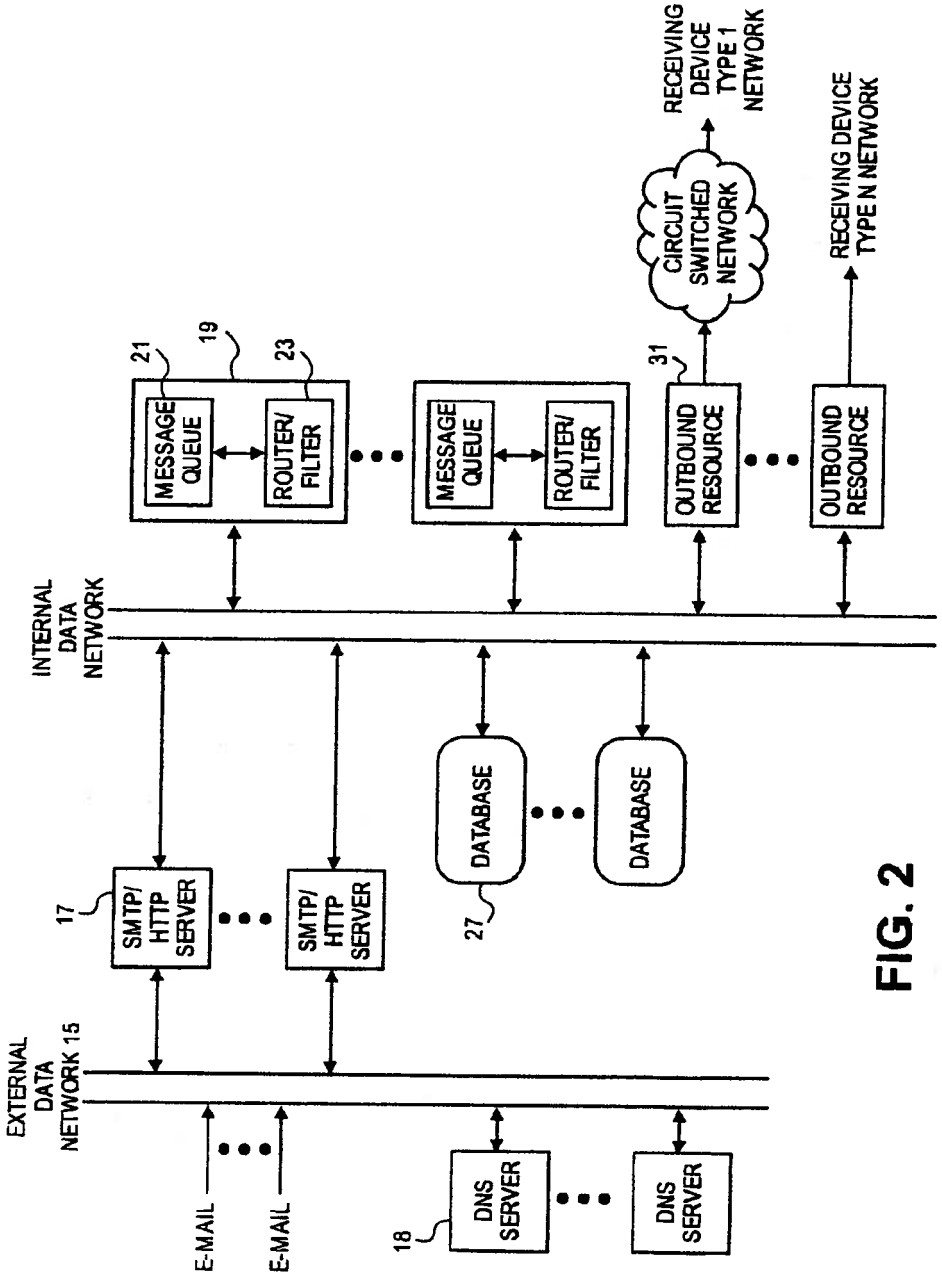

RECEIVING DEVICE TYPE 1 NETWORK
CIRCUIT SWITCHED NETWORK
RECEIVING DEVICE TYPE N NETWORK
21
19
23
31
MESSAGE QUEUE
ROUTER/ FILTER
MESSAGE QUEUE
ROUTER/ FILTER
OUTBOUND RESOURCE
OUTBOUND RESOURCE
INTERNAL DATA NETWORK
DATABASE
DATABASE
27
17
SMTP/ HTTP SERVER
SMTP/ HTTP SERVER
EXTERNAL DATA NETWORK 15
E-MAIL
E-MAIL
18
DNS SERVER
DNS SERVER

FIG. 2

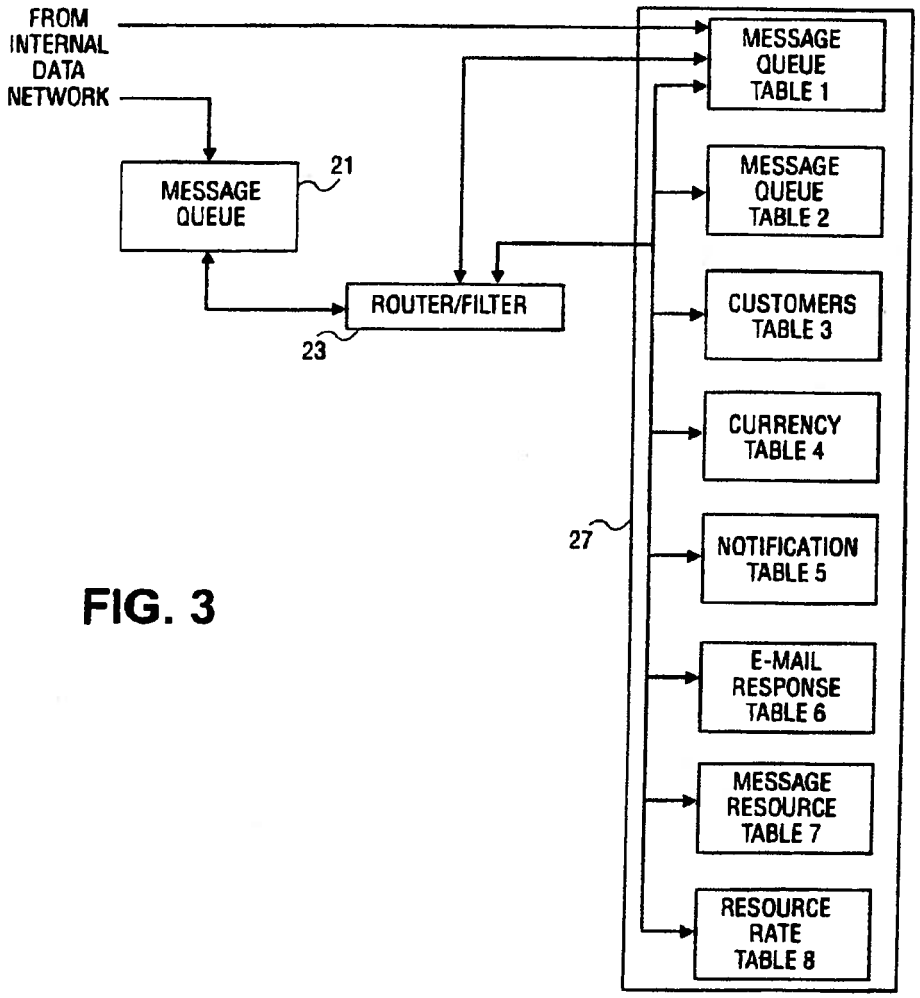

FROM INTERNAL DATA NETWORK
MESSAGE QUEUE
21
ROUTER/FILTER
23
27
MESSAGE QUEUE TABLE 1
MESSAGE QUEUE TABLE 2
CUSTOMERS TABLE 3
CURRENCY TABLE 4
NOTIFICATION TABLE 5
E-MAIL RESPONSE TABLE 6
MESSAGE RESOURCE TABLE 7
RESOURCE RATE TABLE 8

FIG. 3

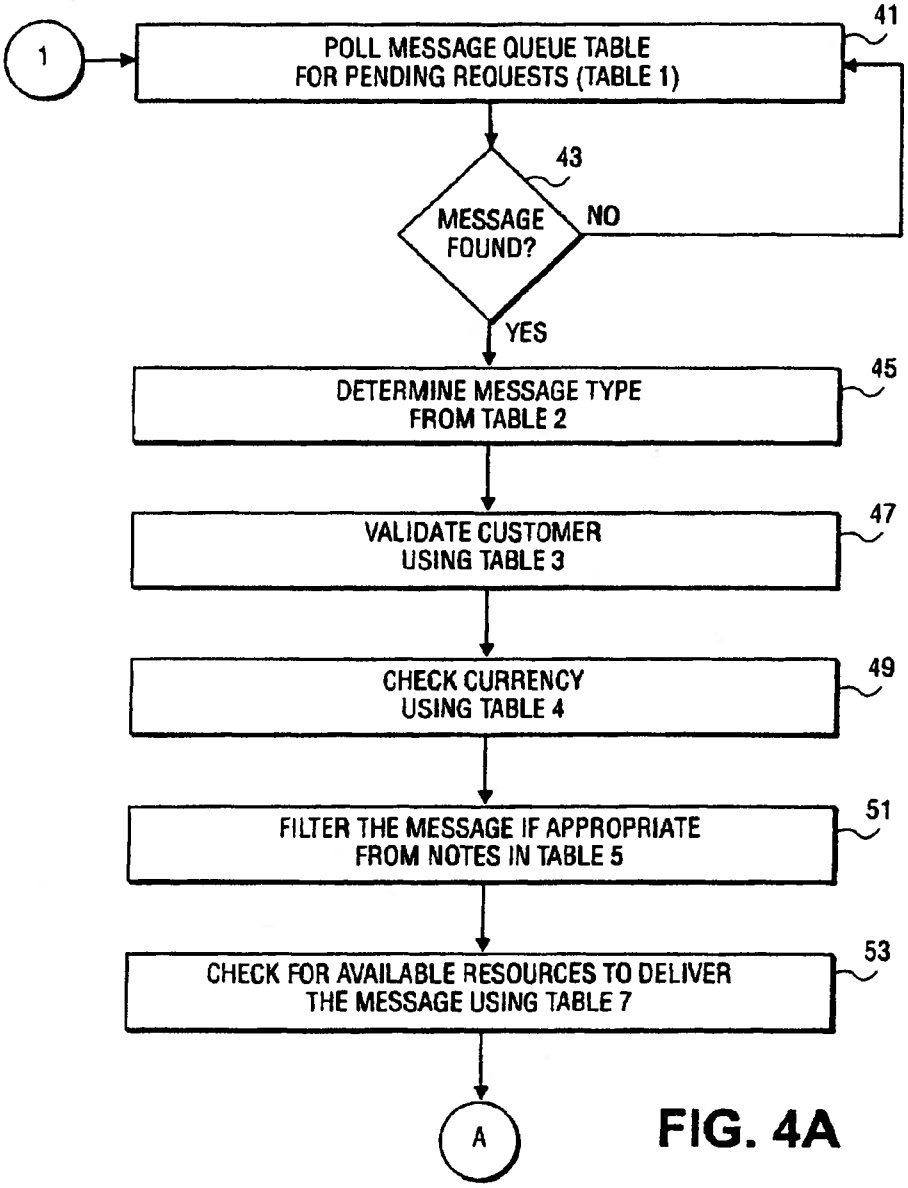

1
POLL MESSAGE QUEUE TABLE FOR PENDING REQUESTS (TABLE 1)
41
43
MESSAGE FOUND?
NO
YES
DETERMINE MESSAGE TYPE FROM TABLE 2
45
VALIDATE CUSTOMER USING TABLE 3
47
CHECK CURRENCY USING TABLE 4
49
FILTER THE MESSAGE IF APPROPRIATE FROM NOTES IN TABLE 5
51
CHECK FOR AVAILABLE RESOURCES TO DELIVER THE MESSAGE USING TABLE 7
53
A

FIG. 4A

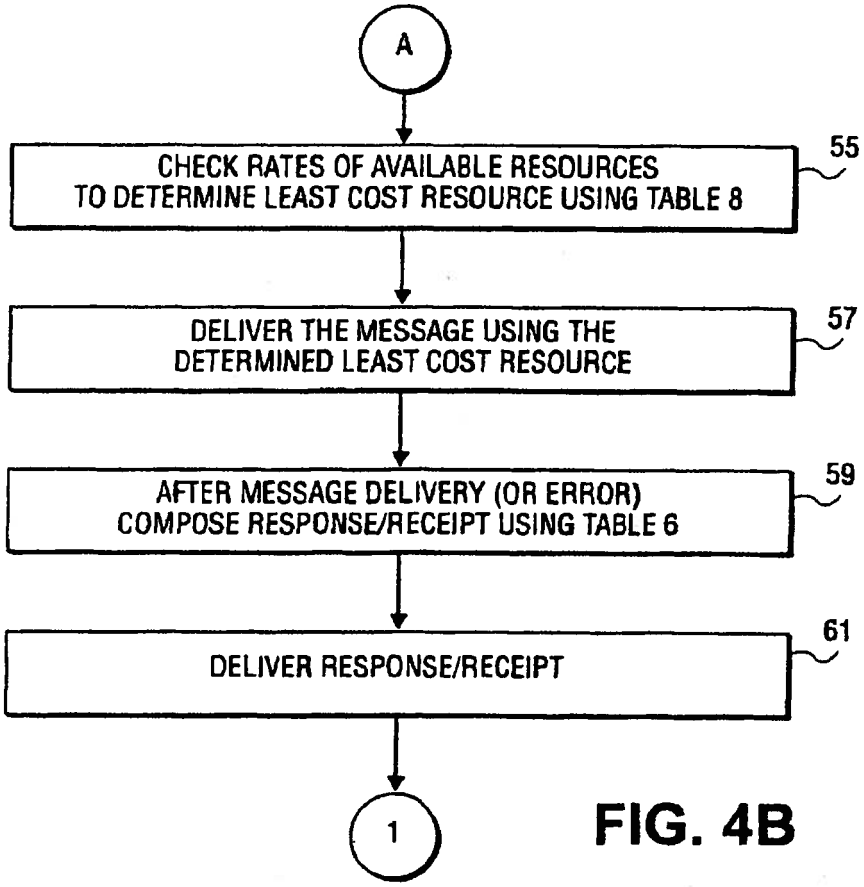

A
CHECK RATES OF AVAILABLE RESOURCES TO DETERMINE LEAST COST RESOURCE USING TABLE 8
55
DELIVER THE MESSAGE USING THE DETERMINED LEAST COST RESOURCE
57
AFTER MESSAGE DELIVERY (OR ERROR) COMPOSE RESPONSE/RECEIPT USING TABLE 6
59
DELIVER RESPONSE/RECEIPT
61
1

FIG. 4B

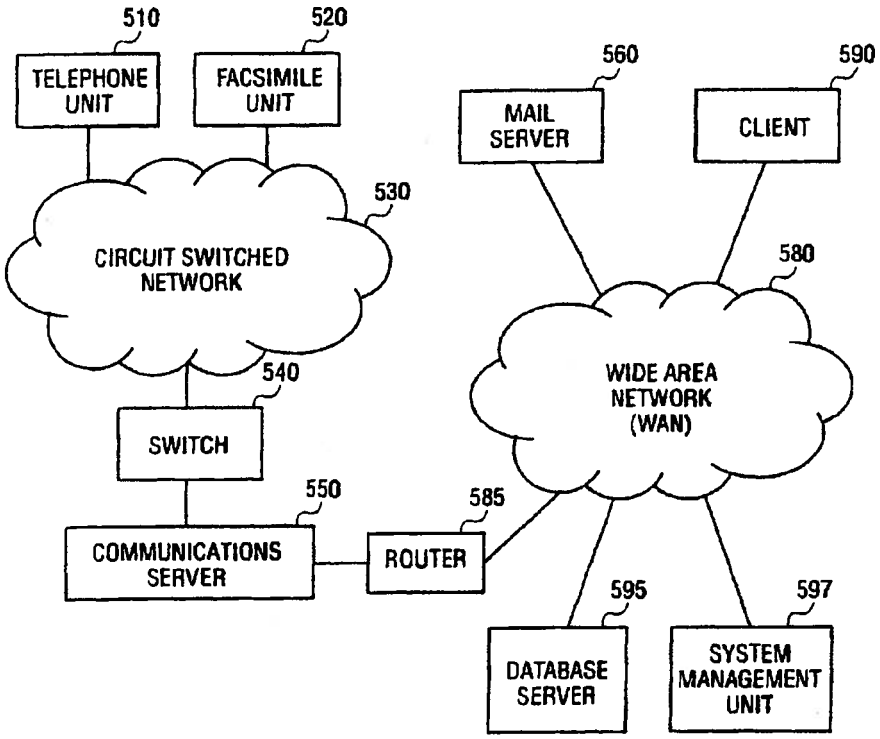

510
520
TELEPHONE UNIT
FACSIMILE UNIT
530
CIRCUIT SWITCHED NETWORK
540
SWITCH
550
COMMUNICATIONS SERVER
560
MAIL SERVER
590
CLIENT
580
WIDE AREA NETWORK (WAN)
585
ROUTER
595
DATABASE SERVER
597
SYSTEM MANAGEMENT UNIT

FIG. 5

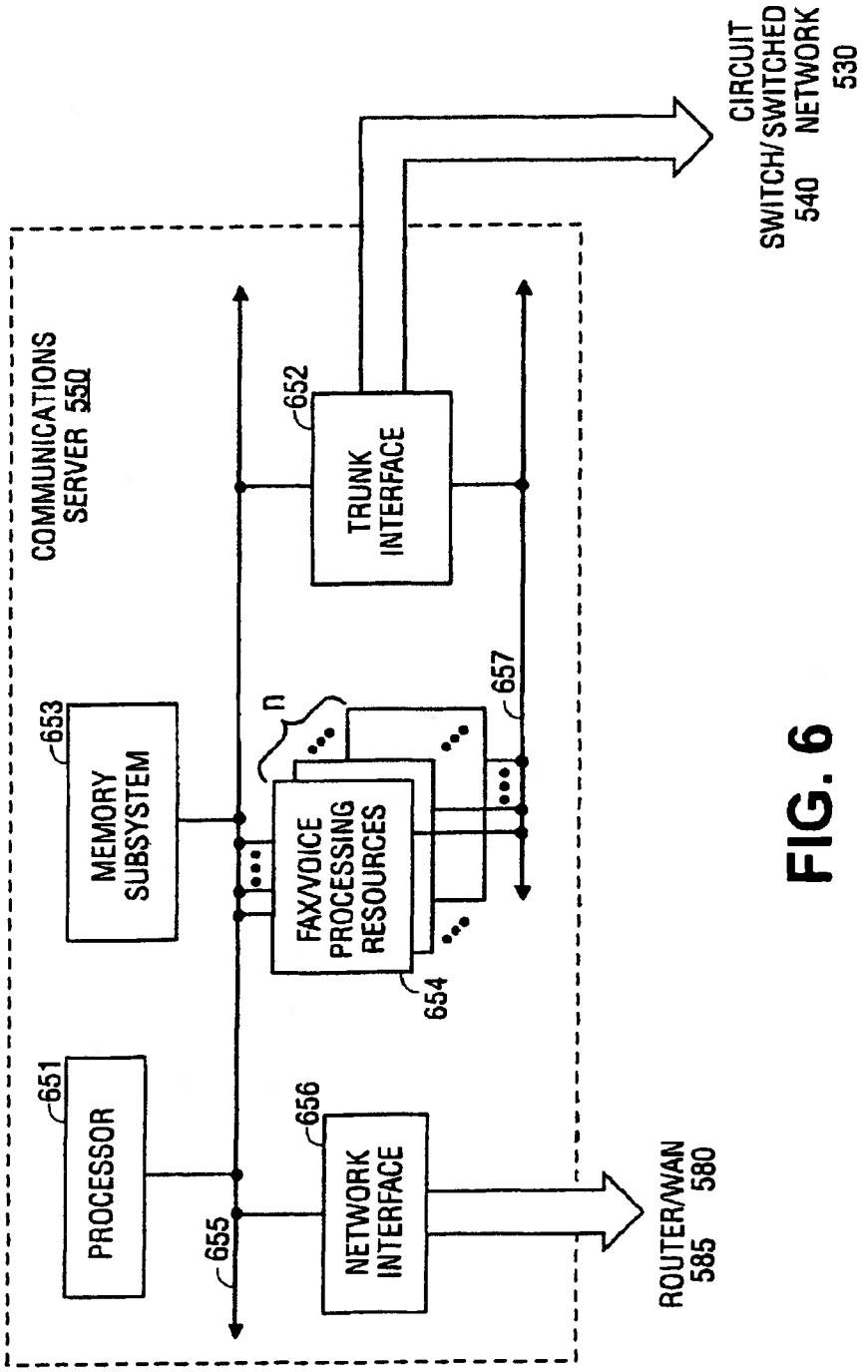

CIRCUIT SWITCH/SWITCHED NETWORK 530
540
COMMUNICATIONS SERVER 550
652
TRUNK INTERFACE
653
MEMORY SUBSYSTEM
n
657
FAX/VOICE PROCESSING RESOURCES
654
651
PROCESSOR
656
NETWORK INTERFACE
655
ROUTER/WAN 580
585

FIG. 6

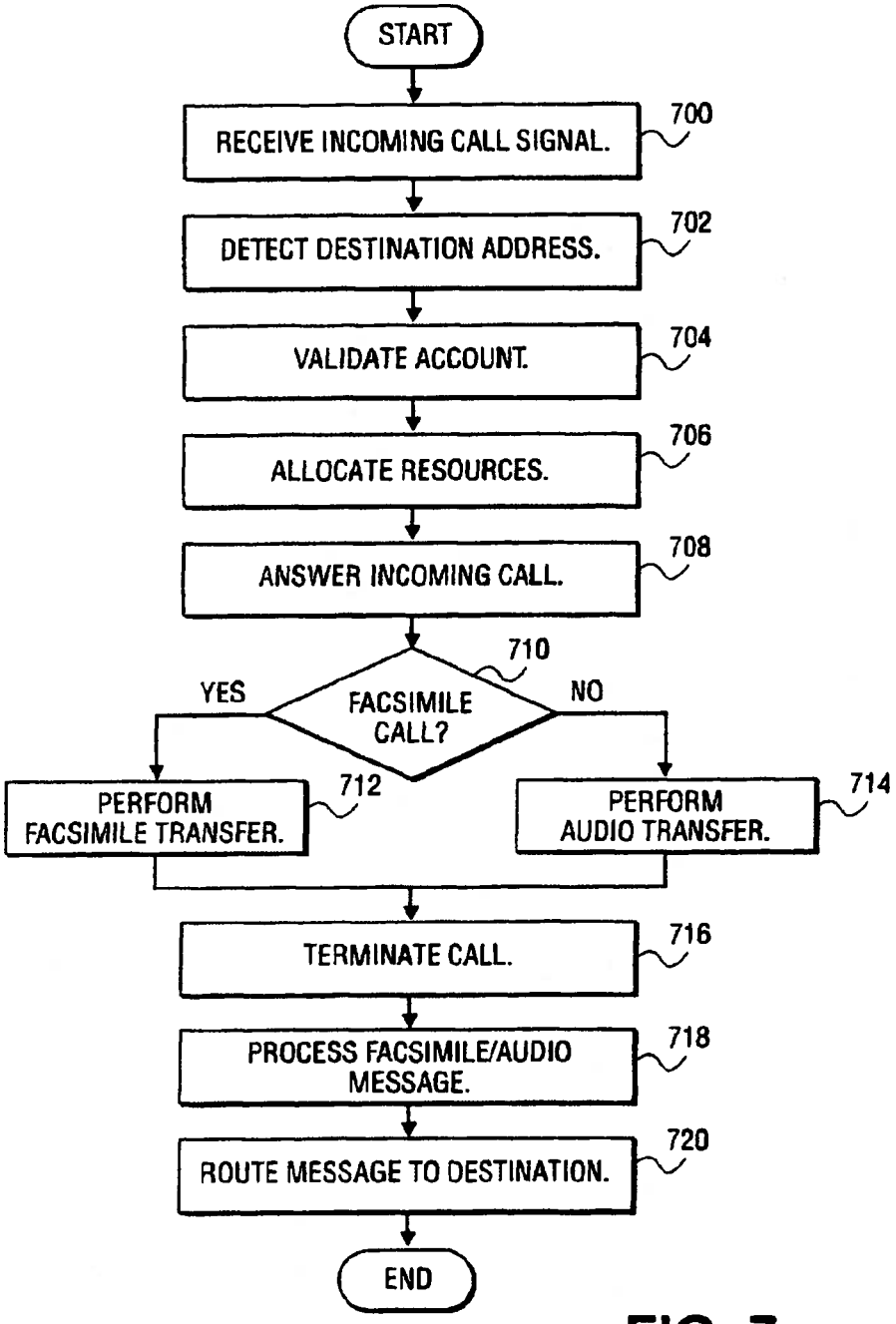

START
RECEIVE INCOMING CALL SIGNAL.
700
DETECT DESTINATION ADDRESS.
702
VALIDATE ACCOUNT.
704
ALLOCATE RESOURCES.
706
ANSWER INCOMING CALL.
708
710
FACSIMILE CALL?
YES
NO
PERFORM FACSIMILE TRANSFER.
712
PERFORM AUDIO TRANSFER.
714
TERMINATE CALL.
716
PROCESS FACSIMILE/AUDIO MESSAGE.
718
ROUTE MESSAGE TO DESTINATION.
720
END

FIG. 7

SCALABLE ARCHITECTURE FOR TRANSMISSION OF MESSAGES OVER A NETWORK

This is a continuation of Ser. No. 09/097,307, now U.S. Pat. No. 6,597,688 filed on Jun. 12, 1998.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to the field of message receipt/transmission and delivery using computer, phone, wireless and other communications networks. Specifically, the present invention relates to the transmission of e-mail messages which may be text only, text plus an audio file, text plus a video file, text plus a fax file or any combination thereof to a phone, pager or fax machine or other receiving device suitable for the message content, over appropriate communications networks using an architecture which enables easy expansion to handle additional message traffic as well as to connect to additional communications networks, including networks which do not presently exist which may become available in the future.

2. Description of Related Art

Voice and data communications systems such as the public switched telephone network (PSTN) are currently used to transfer image and text data transmitted by facsimile ("fax") machines in addition to the normally carried voice traffic. These faxed images are usually transmitted through the PSTN and received for printout or storage of the image on a destination fax machine or computer for the use by the recipient.

In U.S. Pat. No. 6,208,638 entitled Method and Apparatus for Transmission and Retrieval of Facsimile and Audio Messages Over a Circuit or Packet Switched Network, it is disclosed that to provide for the receipt and transmission of audio and fax information by a first user over a circuit switched network such as the public switched telephone network (PSTN) to a second user over a packet switched network such as the Internet, a communications server is connected both to the circuit switched network and a packet switched network.

The communications server contains resources to receive and process incoming audio and facsimile calls from the circuit switched network into a format suitable for transmission over the packet switched network to the second user's address. In addition, a link is first determined between the second user's address on the circuit switched network and the second user's address on the packet switched network, and then an appropriate route to the second user's address on the packet network is determined. With the system being maintained in a distributed and redundant fashion, reliable receipt and transfer of all messages is ensured. A copy of the specification and drawings of U.S. Pat. No. 6,208,638 is attached hereto.

However, the architecture utilized as described in U.S. Pat. No. 6,208,638 is not easily scalable to handle increasingly higher levels of message traffic or to easily connect to networks in addition to the PSTN and the Internet. FIG. **1** shows the essence of the architecture of U.S. Pat. No. 6,208,638. An e-mail message is passed to an outbound resource **11** (communications server **550** in U.S. Pat. No. 6,208,638) which converts the e-mail message to a fax format or to audio for transmission to a fax machine or telephone connected to the PSTN. A database **13** stores customer information necessary for processing of messages (an unnumbered part of communications server **550** in U.S. Pat. No. 6,208,638 which is also contained in database server **595** in U.S. Pat. No. 6,208,638). After processing of an e-mail message by outbound resource **11**, a fax or voice mail message is sent over the PSTN or more generally, a generalized switched telephone network (GSTN) which includes cellular telephone networks as well as the PSTN. Optionally, a pager message may also be sent informing a user of the fax which has been sent or availability of a voice mail message as described in U.S. Pat. No. 6,073,165 entitled Processing and Forwarding Messages From a Computer Network to a Forwarding Service.

SUMMARY OF THE INVENTION

A method and apparatus is disclosed for delivering messages that utilizes a message queue and a router/filter within a private data network. The private network is connected to an external data network such as the Internet, and has separate outbound resource servers to provide a high degree of scalability for handling a variety of message types.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram of a prior art architecture which performs the functions, but not the scalability of the architecture of the present invention.

FIG. **2** is a block diagram illustrating the architecture of the present invention.

FIG. **3** is a block diagram showing the data/control flow through message queue **21**, router/filter **23** and database **27**.

FIG. **4** (*4a* and *4b*) is a flow diagram of the processing performed by router/filter **23**.

FIG. **5** is a system diagram of a network containing a message server.

FIG. **6** is a block diagram illustrating the message server.

FIG. **7** is a flow diagram illustrating some operations.

DETAILED DESCRIPTION OF THE INVENTION

The present invention provides a method and apparatus for allowing the receipt and transmission of audio, video and fax information between a circuit switched network and a packet switched network. For purposes of explanation, specific embodiments are set forth to provide a thorough understanding of the present invention. However, it will be understood by one skilled in the art, that the invention may be practiced without these details. Further, although the present invention is described through the use of circuit switched and packet switched networks, most, if not all, aspects of the invention apply to all networks in general. Moreover, well-known elements, devices, process steps and the like are not set forth in detail in order to avoid obscuring the present invention.

Referring now to FIG. **2**, e-mail messages for a customer are sent to/through an external data network **15** (e.g., the Internet) and routed to an appropriate SMTP/HTTP (or SHTTP) server **17** as determined by a domain name server (DNS) **18** according to well known techniques. The e-mail message may be a text message or it may include a file, the content of which may be audio, video or bitmapped (e.g., a fax) or other data. Again, the techniques for creating and sending e-mail messages with these characteristics are well known.

A processing server **19**, which includes a message queue **21** and a router/filter **23** first verifies that the message is from or is to a customer using information in database **27**. After

successful verification, the message is broken into fragments (in the case of files with multiple attachments) and written to message queue **21**. Router/filter **23** obtains messages from the message queue and handles least call routing/billing/prioritization/filtering of messages. Filtering is primarily for notification messages for pager delivery. After billing verification and determination of a least cost route, the message is assigned to one or more outbound resources **31** for delivery to the intended recipient by a method or methods selected by the customer as previously recorded in database **27**.

In the case of faxes, the outbound resource is a server which dials the destination fax number and sends the fax.

In the case of voice messages, the outbound resource is a server which dials the destination telephone number and plays the voice message.

In the case of notification messages, the outbound resource is a server which dials out to the paging terminal or delivers the notification message through any appropriate paging gateway.

After the message (in whatever form) has been delivered, a receipt with details and an error log (if any) is sent back via a secure protocol to the message queue **21**.

The receipt/error log messages are then processed by the router/filter which interfaces with a billing system (not shown) for customer account update.

FIG. **3** is a block diagram showing the data/control flow through message queue **21**, router/filter **23** and database **27** using information contained in the following tables as explained with reference to FIGS. **4***a* and **4***b*.

TABLE 1

Message Queue Table	
MESSAGE_ID	This is a unique number assigned to each message that arrives in the system.
RESOURCE_ID	Unique number assigned to each Outbound Resource
RESOURCE_TYPE	Each Resource is identified by the type of messages it can deliver (e.g., FAX, VOICE, NOTIFY, etc.)
RESOURCE_ADDRESS	Location of the Resource (such as IP address)
MESSAGE_TO_EMAIL_ADDRESS	To: address of the message
MESSAGE_FROM_EMAIL_ADDRESS	From: address of the message
MESSAGE_LOCATION	Location of actual message on the Message Queue 21
MESSAGE_SIZE	Size of the message in bytes
MESSAGE_PRIORITY	Priority of the message (e.g., low, medium, high)
MESSAGE_CREATION_DATE	Timestamp identifying the date/time that the message was received by the system
MESSAGE_EXPIRY_DURATION	Amount of time after which the message becomes stale
MESSAGE_SCHEDULED_DATE	Scheduled delivery time-stamp for the message
MESSAGE_STATUS	Current status of the message (Active, Pending, Sent, etc.)
MESSAGE_ESTIMATED_COST	Estimated cost for the delivery of the message
CUSTOMER_KEY	Unique number identifying the customer in the database
MESSAGE_PART_OF_BROADCAST	Flag identifying if the message is part of a larger broadcast list waiting to be delivered

TABLE 1-continued

Message Queue Table	
BROADCAST_ID	Unique number identifying a broadcast list
COVERPAGE_ID	Unique number identifying a coverpage (if any) for a fax
MESSAGE_SUBJECT	Subject line of the message to be delivered
MESSAGE_DURATION	Duration of the message (delivery time of fax, or delivery time for a voice message, etc.)
MESSAGE_RATE	Rate for message delivery (dollars per second, etc.)
MESSAGE_SEND_DATE	Actual timestamp identifying when the message was delivered
MESSAGE_REMOTE_CSID	Identifier of the fax machine to which a FAX message was delivered
MESSAGE_TYPE	Type of message (e.g., FAX, VOICE, NOTIFICATION, etc.)
RESOURCE_COMMUNICATION_TYPE	Protocol used to communicate with the resource (HTTP, SHTTP, etc.)
MESSAGE_LANGUAGE_CODE	Language used for delivery of a receipt or response, based on settings in the customer table
MESSAGE_PAGES	Number of pages of a message (used primarily for a fax)

TABLE 2

File Type Table	
FILETYPE_MESSAGE_TYPE	Identifier of a message type (FAX, VOICE, etc.)
FILETYPE_RESOURCE_TYPE	Identifier to determine a resource that can handle a particular file type
FILETYPE_EXTENSION	The filename extension that identifies a file type (e.g., WAV, TIF, JFX, AU, GSM, etc.)

TABLE 3

Customer Table	
CUSTOMER_KEY	Unique number identifying a customer in the database
FIRSTNAME	First name of customer
LASTNAME	Last name of customer
COMPANY	Company name of customer
ADDRESSLINE1	Company address
ADDRESSLINE2	Company address
CITY	Company city
MAILREGION	Company state or equivalent
MAILCODE	Zipcode or equivalent
COUNTRY	Company country
WORKNUMBER	Customer work phone number
HOMENUMBER	Customer home phone number
EMAILADDRESS	Email address of customer
COLLECTIONMETHOD	Collection method such as Credit card, Debit, etc.
BILLTYPE	e.g., Customer, Demo, free, corporate, etc.
STATUS	Status of customer, Active, Inactive, etc.
LANGUAGECODE	Language of customer, English, German, etc.
CURRENCYCODE	Currency for billing the customer, US Dollars, Pound Sterling, etc.

TABLE 4

Currency Table	
FORMAT	Currency label
CURRENCY_SYMBOL	Symbol for currency

TABLE 5

Notification Table	
CUSTOMERKEY	Unique number identifying a customer in the database
PAGERTYPECODE	Code to determine the kind of pager service
BBSNUMBER	Modem number for pager notification delivery, based on the pager type
PAGERNUMBER	Identifier number of the pager unit
PIN	PIN code for the pager unit
DISPLAYTYPE	Display type of the pager (numeric, alphanumeric, etc.)

TABLE 6

Response_email Table	
RESPONSE_ID	Unique ID for a response/receipt message to be sent to a customer
REPONSE_SUBJECT	Subject line of the response message
RESPONSE_FROM_EMAIL	From: line of the response message
RESPONSE_BODY	Actual text of the response message

TABLE 7

Resource Table	
RESOURCE_ID	Unique identifier for the resource
RESOURCE_TYPE	Type of resource (FAX, VOICE, etc.)
RESOURCE_STATUS	Status of resource (Active, Inactive, etc.).
RESOURCE_QUEUE_STATUS	Status of the Queue, number of messages in queue
RESOURCE_TIME_ZONE	Time zone for the resource
RESOURCE_QUEUE_MAX	Maximum size of the resource queue
RESOURCE_ADDRESS	Address of the resource (IP address, etc.)
RESOURCE_NAME	Name of the resource
RESOURCE_EXPIRY_DURATION	Expiry duration for any message sent to the specified resource
RESOURCE_QUEUE_IN_STATUS	Number of messages waiting to be delivered by the resource
RESOURCE_COMMUNICATION_TYPE	Method used to communicate with resource (HTTP, SHTTP, etc.)

TABLE 8

Resource Rates Table	
RESOURCE_ID	Unique identifier for the resource
RESOURCE_PREFIX	Any digits to be dialed before an actual number
RESOURCE_CITY_NAME	Name of destination city for the message to be delivered
RESOURCE_PROVIDER_RATE	Rate for a particular city (dollars per second, etc.)
RESOURCE_MAX_DIGITS	Max number of digits allowed to be dialed
RESOURCE_AREA_CODE	Area code for the particular city

FIGS. **4***a* and **4***b* are a flow diagram of the processing performed by router/filter **23** using Tables 1-8. When a message is received it is placed into message queue **21** which is simply a storage area, the specifics of which, including the mechanism for placing the message into the queue are well known. Certain details concerning the message are also stored in a message queue table (Table 1). In step **41**, router/filter, which is a computer program running on processing server **19**, polls the message queue table for pending requests as determined by the existence of an active message in the message status field. If no message is found, after a system defined delay, the message queue table is again polled (step **43**). Once a message has been found in the table, processing continues with step **45** by determining the message type using the message_type field in Table 1 and the file type information in Table 2. The customer is then validated using information in Table 3 in step **47**. In step **49**, currency information for the customer is obtained from Table 4. The message is then filtered for possible pager notification using the information in Table 5 in step **51**. In step **53**, Table 7 is used to check for available resources to deliver the message. In step **55**, the rates of available resources are checked to determine the least cost resource using Table 8. Then in step **59**, the message is delivered using the determined least cost resource. After the message has been delivered, or after an error in the delivery has occurred, in step **59**, a response/receipt is composed using Table 6. In step **61**, the response or receipt is delivered to the sender. The system then begins the process over again at step **41**.

As noted above outbound resource **31** is equivalent to communications server **550** as described in U.S. Pat. No. 6,208,638. The modifications made to outbound resource to enable it to operate in a system having an architecture as described herein are as follows.

These changes will be described with reference to the message structure of received messages.

Message Structure

Each field has a value following an '=' sign and is terminated by a newline character. The exception to this is the "Message" field where a newline immediately follows the "=" sign and the actual message follows on the next line.

The fields of a message are as follows:

Password=
MessageID=
MessageStatus=
MessageSentTimeStamp=
Message Duration=
MessageLength=
Message RemoteCSID=
MessageSourceCSID=
MessageAttachStatus=
MessageDestination=
ResourceID=
ResourceStatus=
ResourceLastCommTimeStamp=
ResourceExpiryDuration=
ResourceQueueInStatus=
ResourceQueueOutStatus=
ResourceChannelMax=
ResourceChannelStatus=
MessageBoundary=
Message=

In the following explanation of the above fields, the text in brackets at the end indicates the entity providing the value for the field in the forward/reverse direction (i.e., from

router/filter 23 (RF) to outbound resource 31 (RESOURCE), and from RESOURCE to RF, respectively). "NA" indicates that no value is applicable, and the text "NA" is used to populate the field. "Same" indicates that the same value is used in the reverse direction, i.e, the RESOURCE does not modify the value; it only echoes the value it receives in that field.

Password—There is a fixed password pair for each RESOURCE and RF combination. RESOURCE stores the RF password in a flat text password file in a directory (jfaxom), and RF stores the RESOURCE password in the database. (RF/RESOURCE).

MessageID—Unique ID, per message, generated by RESOURCE. (RESOURCE/Same).

MessageStatus—Code indicating current status of the message. See Status codes below. (RF/RESOURCE)

MessageSentTimeStamp—Time stamp indicating date/time the message was delivered to the final destination by RESOURCE. (NA/RESOURCE)

MessageDuration—Time (in seconds) to transmit message from RESOURCE. (NA/RESOURCE)

Messagelength—Number of pages transmitted by RESOURCE. (NA/RESOURCE)

MessageRemoteCSID—called subscriber identification (CSID) of fax machine to which message was transmitted. (NA/RESOURCE)

MessageSourceCSID—Source CSID. This may be customized per customer. (RF/Same)

MessageAttachStatus—Value of "A" indicates a message is attached for delivery. (RF/RESOURCE)

MessageDestination—Destination phone number. (RF/Same)

ResourceID—Unique ID, per resource, stored in the database. (RF/Same)

ResourceStatus—Code indicating the current status of the resource, i.e., whether it is active or not. RF uses this to determine whether further messages should be sent to RESOURCE for delivery. See Status codes below. (NA/RESOURCE)

ResourceLastCommTimeStamp—Date/time of last communication between RF and RESOURCE. (RF/RESOURCE)

ResourceExpiryDuration—Life of message (in minutes) on RESOURCE. If a message has not been delivered to the final destination by RESOURCE within this amount of time, the message is considered "expired" and is discarded.

ResourceQueueInStatus—Number of messages waiting to be processed in an Inbox directory on RESOURCE. (NA/RESOURCE)

ResourceQueueOutStatus—Number of messages waiting to be processed in an Outbox directory on RESOURCE. (NA/RESOURCE)

ResourceChannelMax—Number of channels available for use on RESOURCE. (NA/RESOURCE)

ResourceChannelStatus—Channel activity status. e.g., 00000001110000l, where 0's indicate an idle channel and 1's indicate a busy channel. (NA/RESOURCE)

MessageBoundary—Text for MIME boundary. (RF/NA)

Message—Actual MIME message sent by RF. If MessageAttachStatus=NA, no message follows this tag. All fields are NA if not used.

Date fields are expressed in MMDDYYhhmmss format.

Resource Status Codes are:

A—Active

I—Inactive

Message Status Codes are:

P—Pending

H—On Hold

D—Deferred

R—Ready for sending to RESOURCE

X—Exchanged, i.e., sent to RESOURCE but not acknowledged by it.

A—Sent to RESOURCE and acknowledged by it.

S—Sent (i.e., receipt for final delivery received from RESOURCE)

Normal sequence for Message delivery by RESOURCE is:

RF receives a request in its queue (message queue 21).

RF sends the message to RESOURCE.

RESOURCE gets message, authenticates password, and creates a new message in the Inbox directory.

RESOURCE acknowledges receipt of message.

RESOURCE processes the message in Inbox (MessageStatus=A, MessageAttachStatus=A).

RESOURCE moves message to a Process directory for further processing.

RESOURCE finishes processing message and delivers it to final destination.

RESOURCE removes the message from the Process directory.

RESOURCE creates a message in Outbox directory. (MessageStatus=S). If a "reply message" is to be delivered to the original sender, MessageAttachStatus=A, else MessageAttachStatus=NA. MessageID remains the same in either case.

RESOURCE delivers receipt (with "reply message," if applicable) to RF.

RF receives the message and puts it in the Queue for database processing.

Processing server 19 with the above described functionality may be implemented using readily available systems such as a Windows NT server or a UNIX server. Database 27 may be implemented as a database server using readily available systems such as a Windows NT server or a UNIX server running, for example a SQL database.

What follows is a detailed description of FIGS. 5–7 which set forth a method and apparatus for allowing the receipt and transmission of audio and fax information between a circuit switched network and a packet switched network, as described in U.S. Pat. No. 6,208,638. For purposes of explanation, specific embodiments are set forth to provide a thorough understanding of the present invention. However, it will be understood by one skilled in the art, from reading this disclosure, that the invention may be practiced without these details. Further, although the system is described through the use of circuit switched and packet switched networks, most, if not all, aspects apply to all networks in general.

FIG. 5 contains a block diagram illustrating an embodiment of a system containing a communications server 550 connected to a circuit switched network 530 and a wide area network (WAN) 580. In an embodiment, the circuit switched network 530 is a circuit switched network such as the PSTN while WAN 580 is a packet switched network such as the Internet. It is to be noted that circuit switched network 530 can also be a network such as the generalized switched telephone network (GSTN), which encompasses PSTN networks, cellular telephone networks, and the other networks with which they are in communication.

Communications server 550 is connected to circuit switched network 530 via a switch 540 and to WAN 580 through the use of a router 585. As described in further detail

below, in an embodiment, switch **540** and router **585** are interfaced to communications server **550** using two separate hardware interfaces. In an alternate embodiment, switch **540** and router **585** can be interfaced to communications server **550** through the use of one hardware unit.

Connected to circuit switched network **530** is both a telephone unit **510** and a facsimile unit **520**. Telephone unit **510** is a standard telephone capable of converting audio signals into electrical signals suitable for transmission over circuit switched network **530**. Similarly, facsimile unit **520** is a standard facsimile machine capable of transmitting and receiving facsimile messages over circuit switched network **530**. Each of these devices can be connected to circuit switched network **530** using either wired or wireless technology.

Connected to WAN **580** is a database server **595**, a system management unit **597**, a mail server **560**, and a client **590**. Each of these systems communicate with each other and with communications server **550** via WAN **580** using such protocols such as simple network management protocol (SNMP) and hyper-text transport protocol (HTTP)—packetized using a protocol such as the transmission control protocol/internet protocol (TCP/IP).

In an embodiment, each one of database server **595**, system management unit **597**, mail server **560**, and client **590**, are stand-alone computers or workstations containing the hardware and software resources to enable operation. In alternate embodiments, the functions provided by each one of database server **595**, system management unit **597**, mail server **560**, and client **590**, are provided by any number of computer systems.

In an embodiment, mail server **560** is a server providing e-mail receipt and transmission using a protocol such as the simple mail transfer protocol (SMTP) and post office protocol (POP). Moreover, client **590** is configured to be able to communicate over WAN **580** using SMTP or POP in order to retrieve e-mail from mail server **560** or another suitably configured server.

System management unit **597** communicates with communications server **550** to monitor: (1) the processes on communications server **550**; (2) the status of the trunk line connected to communications server **550**; and (3) the connection between the various servers connected to WAN **580**. As described below, if any processes on communications server **550** or connection to the circuit switched network **530** is interrupted, system management unit **597** can allocate resources, or cause the re-routing of a call or message via one or more redundant resources or connections, ensuring that the call or message is routed to the final destination.

Communications server **550** contains user data needed to receive and route incoming messages received from circuit switched network **530**. The same information is also stored on database server **595**. In an embodiment, communications server **550** stores an inbound address, a set of final destination addresses; and an account status for each user. The inbound address corresponds to the telephone number assigned to the user. As further discussed below, the inbound address is the number that a message sender dials on telephone unit **510** or facsimile unit **520** to leave a message for the user. The set of final destination address contain one or more e-mail addresses where the user account status information indicates whether the inbound address is either active and or inactive—i.e, whether the user is able to receive messages using the system.

Database server **595** stores a duplicate copy of the inbound address, the set of final destination addresses; and the account status for each user. Database server **595** also stores additional information for each user such as mailing address and billing information which are not used in the operation of the present invention but are note herein for completeness only. Thus, the information that is stored on communications server **550** is a subset of the information that is stored on database server **595**, and if communications server **550** were to become inoperable or otherwise unable to handle incoming messages, database server **595** can configure another communications server to accept those calls.

In an embodiment, system management unit **597** is responsible for monitoring the status of communications server **550** and re-assigning the users being handled by communications server **550** if communications server malfunctions or becomes overloaded with incoming calls. In the former case, system management unit **597** would re-assign all users being handled by communications server **550** to another communications server. In the latter case, system management unit **597** would only off-load the only those incoming calls for which communications server **550** does not have the available resources to process.

FIG. **6** is a block diagram of communications server **550** configured in accordance with an embodiment containing a processor **651** coupled to a memory subsystem **653** through the use of a system bus **655**. Also coupled to system bus **655** is a network interface **656**; a trunk interface **652**; and a set of fax/voice processing resources **654**. Set of fax/voice processing resources **654** and trunk interface **652** are also coupled to a bus **657**.

Bus **657** is a bus that supports time division multiplex access (TDMA) protocols to optimize the flow of real time traffic between set of fax/voice processing resources **654** and trunk interface **652**.

Memory subsystem **653** is used to store information and programs needed by communications server **550**. The functioning of memory subsystems in computer design are well known to those of ordinary skill in the art and thus will not be further discussed herein.

In an embodiment, trunk interface **652** is a trunk line interface, such as a T-1 or E-1 line, to switch **540** and can handle up to 24 channels of communications. Trunk line signaling is well known to those of ordinary skill in the art of telecommunication and thus will not be further discussed herein except as necessary for describing the invention.

Set of fax/voice processing resources **654** are made up of multiple fax/voice processing cards. Each of these processing cards contain processing units which are capable of receiving and transmitting facsimiles according to established protocols, and which are capable of digitizing voice or other audio data, also according to established protocols. In an embodiment, there are three fax/voice processing cards in set of fax/voice processing resources **654**, each fax/voice processing card containing eight processing units capable of handling a channel from trunk interface **652**. Thus, communications server **550** can communicate on twenty-four channels concurrently.

The storage of destination addresses on both circuit switched network **530** and WAN **580** is controlled by a database located either on communications server **550** or on database server **595**. Keeping this information separate from communications server **550** allows communications server **550** to be a resource that can be allocated on demand. Hence, a number of communications servers could be used, along with one or more database servers, to allow a fully redundant and scalable system. In addition, system management unit **597** monitors the status and connection of all the communication and database servers.

FIG. 7 is a flow diagram illustrating the operations of an embodiment of the present invention when a call originating from a source on the circuit switched network **530**. For example, either telephone unit **510** or facsimile unit **520** can initiate the call.

In block **700**, an incoming call signal is received by communications server **550** from switch **540**. The incoming call signal is initiated by telephone unit **510** or facsimile unit **520** over circuit switched network **530** and is routed to communications server **550** via switch **540**. Communications server **550** detects the incoming call signal using trunk interface **652**. Operation would continue with block **702**.

Continuing with block **702**, trunk line interface unit **652**, in addition to receiving signals to indicate that there is an incoming call from switch **540**, also receives signals indicating the circuit destination address of the incoming call. The destination address is captured by trunk interface **652** and is determined by trunk line signaling using mechanisms such as direct-inward-dial, or dual tone multifrequency (DTMF) tones.

Continuing with block **704**, to determine whether or not to process the incoming call, processor **651** searches the list of inbound addresses contained in memory subsystem **653** for the destination address. If processor **651** finds the destination address in the inbound address list, processor **651** will then look up the account status for the user who owns the inbound address to determine if the account of that user is a valid user account. In an alternate embodiment, the validation is performed through the use of a database maintained by a separate entity such as database server **595**. If the account is found to be inactive, communications server **651** will play a prepared message indicating that the number to which the incoming message was sent is an invalid account.

In block **706**, once the validity of the user account has been established, processor **651** will attempt to allocate one fax/voice processing resource from set of fax/voice processing resources **654** and also determine the availability of other resources required for the receipt and processing of the incoming call. These other resources include the processing capacity of processor **651**, the storage capacity of memory subsystem **653**.

If it is determined that the appropriate resources are not available, then the call will be routed to a different communications server that is capable of allocating the necessary resources. The routing of calls is accomplished by trunk line signaling via switch **540** and is managed by system management unit **597**.

Also, it should be noted that the call will only come from switch **540** to communications server **550** if there are no problems with the line. Otherwise the call will get routed to a different communications server. In an embodiment, fault detection and correction happens in one of two ways. First, on the telephone network side, switch **540** can be set up to independently route a call to another line if it is determined that one of the lines is bad. Second, if communications server **550** detects that the trunk line coming into trunk interface **652** is down, communications server **550** will notify system management unit **597** to reallocate the users for whom communications server **550** is responsible onto another communications server. Thus, system management unit **597** will transfer the duplicate user information contained in database server **595** into a different communications server.

In block **708**, communications server **550** "answers" the incoming call by having trunk interface **652** go "off-hook" on the trunk line.

In block **710**, if the fax/voice processing resource of set of fax/voice processing resources **654** which is processing the call determines that the incoming call is a fax transmission, then operation will continue with block **712**. Otherwise, operation will continue with block **714**. For example, if the call is a fax, a fax protocol is initiated, and the fax is received by one of the fax/voice processing resources of set of fax/voice processing resources **654**. If the call is a voice call, the voice is recorded by one of the fax/voice processing resources of set of fax/voice processing resources **654**.

In block **712**, the fax/voice processing resource of set fax/voice processing resources **654** responsible for processing the incoming call will perform the fax transfer and store the incoming message as a temporary file in memory subsystem **653**. In an embodiment, the incoming fax is saved into a file which follows the group 3 facsimile file format. Operation will then continue with block **716**.

In block **714**, where it is determined that the incoming message is an audio message, the fax/voice processing resource of set of fax/voice processing resources **654** allocated to process the call will initiate an audio recording of the incoming voice message. In an embodiment, the audio message is digitized and stored in memory subsystem **653** as a temporary file in a pulse code modulated format. After the incoming call has been digitized and stored, operation will then continue with block **716**.

In block **716**, trunk interface **652** will terminate the call. Operation will then continue with block **718**.

In block **718**, the incoming message, which has been stored as a temporary file in memory subsystem **653**, is processed by processor **651**. In an embodiment, the temporary file is processed according to the type of the incoming call. If the incoming call was a fax transmission, then the temporary file, which has been stored as a group 3 facsimile file, will be converted into a file which follows the tagged image file format (TIFF), or a format that is suitable for transmission over WAN **580**. Optionally, the temporary fax file can also be compressed at this stage. If the incoming call was an audio message, then the temporary file would be compressed using a compression scheme such as the scheme defined in the global system for mobile-communications (GSM) standard. In alternate operations, compressing and other processing of the incoming message is performed as the same time the incoming message is being received and being placed in memory subsystem **653**.

In block **720**, communications server **550** uses the inbound address to determine the set of final destination addresses, which are destinations on WAN **580** (i.e., the packet switched network), to send the processed incoming message. Communications server **550** then sends an electronic mail (e-mail) with the processed incoming message as an attachment to all the destinations in the set of final destination addresses.

For example, the e-mail containing the attachment is transferred to, and stored in, a server such as mail server **560**, The e-mail is then retrieved by client **590** whenever the user wishes. In an alternate embodiment, client **590** can retrieve the e-mail directly from communications server **550**, without the storing operation of mail server **560**.

While the present invention has been particularly described with reference to the various figures, it should be understood that the figures are for illustration only and should not be taken as limiting the scope of the invention. Many changes and modifications may be made to the invention, by one having ordinary skill in the art, without departing from the spirit and scope of the invention.

What is claimed is:

1. A system for supporting a message delivery service, comprising:

a server coupled to communicate with a plurality of first outbound resources and a database server, over an internal packet-switched data network, the database server containing account information on customers of the message delivery service, the server implements a router-filter and a message queue,

the message queue to store a request message received from a customer of the message delivery service over an external packet-switched data network,

the router-filter to obtain a request message from the queue, validate said request message by accessing the account information in the database server, and determine to which of the plurality of first outbound resources to assign said request message,

each of the first resources being capable of converting an input request message into a format capable of being received by a fax machine over a circuit switched network.

2. The system of claim 1 wherein the internal data network is a private data network.

3. The system of claim 2 wherein the external data network is the Internet.

4. The system of claim 3 wherein the request message is received from the customer via one of a mail transport protocol server and a hypertext transport protocol server on the Internet.

5. The system of claim 1 wherein the router-filter is to prioritize a plurality of request messages that have been obtained from the queue and that are assigned to an outbound resource.

6. The system of claim 1 wherein the router-filter is to determine which of the plurality of first outbound resources to assign said request message to, based on which resource offers the least cost of delivering said request message.

7. The system of claim 1 wherein the router-filter is to generate an error message that indicates an error in delivering said request message as reported by the outbound resource to which said request message was assigned.

8. The system of claim 1 further comprising:

a plurality of second outbound resources each being capable of converting an input request message into a format capable of being played back to a telephone over a circuit switched network, wherein the router-filter is to determine to which of the first and second resources said request message is to be assigned, based on a message type of said request matching a capability of one of a first resource and a second resource.

9. The system of claim 1 further comprising:

a plurality of second outbound resources each being capable of converting an input request message into a format capable of being transmitted to a paging terminal over one of (1) a circuit switched network and (2) a paging gateway over an external packet-switched network, wherein the route-filter is to determine to which of the first and second resources said request message is to be assigned, based on a message type of said request matching a capability of one of a first resource and second resource.

10. The system of claim 1 wherein a location of each outbound resource is given by an Internet Protocol address.

11. The system of claim 1 wherein the message is received from the customer via one of a mail transport protocol server and a hypertext transport protocol server on the Internet.

12. The system of claim 1 wherein a protocol used by the router-filter to communicate with the plurality of outbound resources is one of HTTP and SHTTP.

13. The system of claim 1 wherein the router-filter is to send a MIME message.

14. An article of manufacture for supporting a message delivery system, comprising:

a machine accessible medium containing data that, when accessed by a machine, cause a server to communicate with an outbound resource and a database all as part of an internal packet-switched data network, the server to store a request message received from a customer of the message delivery service over an external packet switched data network, verify that the request message is from the customer using information in the database, and assign said request message to the resource which converts data associated with said request message into a format capable of being received by a fax machine over a circuit switched network.

15. The article of manufacture of claim 14 wherein the medium includes further data which allows the request message to be received from a customer over the Internet.

16. The article of manufacture of claim 14 wherein the medium includes further data which, when executed by the machine, cause the server to determine which of a plurality of first outbound resources to assign said request message to, based on which resource offers the least cost of delivering said request message.

17. A method comprising:

receiving an email message from an external packet data network;

performing a database lookup in an internal packet data network to correlate the email message with a user account;

verifying within the internal network the email message is associated with a valid user account;

performing within the internal network one of a least cost routing calculation, a billing calculation, a prioritization calculation, and a message filtering operation;

converting within the internal network the email message into a fax format for transmission to a machine; and

transmitting the converted email message into a public switched telephone network to a destination telephone number.

18. A method comprising:

receiving an email message from the Internet;

performing within an internal packet data network a database lookup to correlate the email message with a user account;

determining within the internal packet data network if the email message passes a filter screening criterion;

converting the email message into a fax format for transmission to a fax machine; and

transmitting the converted email message into a public switched telephone network to a destination telephone number.

19. A method comprising:

receiving an email message from the Internet;

performing a database lookup within an internal packet data network to correlate the email message with a user account;

queuing the email message within the internal packet data network;

reading the queued message based on a prioritized ordering rule within the internal packet data network;

converting the read message into a fax format for transmission; and

transmitting the converted message into a public switched telephone network to a destination telephone number associated with the user account.

20. A method comprising:

receiving in an internal packet data network an email message from the Internet;

correlating the email message with a user account in the internal packet data network;

queuing email the message in the internal packet data network;

performing a routing operation to determine a destination to forward the email message;

converting the routed message into a fax format; and

transmitting the converted message into a public switched telephone network to a destination telephone number associated with the user account and determined in said routing.

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