(51) International Patent Classification 6 : G08B 5/22, G06F 17/60, 17/30, 17/00	A1	(11) International Publication Number: WO 98/35326
		(43) International Publication Date: 13 August 1998 (13.08.98)

(54) Title: SYSTEM FOR ROUTING ELECTRONIC MAILS

(57) Abstract

A system for routing electronic mails to one of a plurality of support persons (122, 124) in a processing center (100) is disclosed. Each person has a skill set that is suitable for responding to a certain type of e–mails. The system comprises an e–mail server (102) for receiving the e–mail from a sender, an information extractor (204) for extracting relevant information from the e–mail, and a router (116) for routing the e–mail. The system contains a database (114) for storing information related to all persons who can answer e–mails. The system also contains a server (112) for storing the history of all activities in the system. The router (116) can make routing decisions and perform load–balancing and alert functions based on the information stored in the database (114) and the server (130).

SYSTEM FOR ROUTING ELECTRONIC MAILS

Field of the Invention

5

The present invention relates to electronic mails, and more particularly to a system for routing electronic mails to the best qualified person who can answer the mail.

10 ## Background of the Invention

Electronic mail (e-mail) has recently become one of the most commonly used communication tool in business. As more and more homes are connected to the Internet, it could become an important

15 communication tool for homes also.

In the simplest case, electronic mail is the delivery of text-based messages from a sending computer to one or more recipient computers. The sending and recipient computers are connected to a data network. Typically, the message is temporarily stored in a server of the data

20 network. The recipient computers (users) can retrieve the stored messages at their convenience.

Many users find that sending e-mails is more convenient than sending letters. The user can type a few lines on a computer, enter a simple e-mail address, press a button, and the message is sent. There is

25 no need to print out the message, put it in an envelope, write a long address, and deliver the letter to a mail-box. This is especially important when the user is traveling because he/she may not have access to printers, envelopes, stamps, and mail-boxes. Because of the convenience, people tend to write a lot of e-mails, which promote

30 communication. The increased communication improves efficiency,

which tends to have a positive effect on profitability of a company.

Although many companies recognize the benefits of e-mails, some of them have installed e- mail systems only recently. This is because e-mail systems in the past were proprietary systems. Messages

5   can only be delivered in such systems if the senders and recipients use the same proprietary system. The proprietary nature of these e-mail systems means that each system can only be accessed by persons associated with the same organization (such as a company or an on-line service provider). It is very difficult to send messages to an intended

10   recipient outside of the system. Thus, a message can only reach a relatively small number of computers (i.e., users). Unless the company has many employees, the costs of setting up an e-mail system may be much higher than the anticipated benefits.

More recently, many companies and homes have been connected

15   to the Internet, which is a world-wide open data network connecting tens of millions of computers. One of the reasons for the Internet's popularity is that the cost of accessing the Internet is very low. Another reason is that the Internet offers many resources in addition to e-mails. Each user of the Internet is assigned an e-mail address that is

20   recognizable around the world. A computer connected to the Internet can send e-mails to any one of these email addresses. As a result, it is possible to communicate electronically with many people at any time.

As a result of the popularity and convenience of e-mails, many companies allow their customers to send comments and request

25   information and services using e-mails. Typically, these companies set up one or more specific e-mail addresses for these purposes. These mails are typically answered on a first come first serve basis.

It has been found that many of these mails are lost or unanswered. There are many reasons for this problem. One reason is that the person

30   who is supposed to process an e-mail may not be familiar with the

- 3 -

subject matter of the e-mail. Thus, this e-mail is left unanswered. One

solution is for the person to forward the e-mail to another person who

may be more familiar with the subject matter. This increases data traffic

and work-load for everyone. Further, there is no guarantee that the

5   intended recipient is available to reply to the e-mail. Consequently,

there is a need to have a more efficient system to handle this problem.

Summary of the Invention

10

The present invention involves a system for routing an e-mail to

one of a plurality of support persons in a processing center. Each

support person has a skill set that is suitable for responding to a certain

type of e-mails. Thus, it is more efficient to route the e-mail to an

15   available person who is best qualified to answer the mail. The system

comprises an e-mail server for receiving the e-mail from a sender, an

information extractor for extracting relevant information from the e-

mail, and a router for routing the e-mail. In one embodiment of the

invention, the system contains a database for storing information related

20   to all persons who can answer e-mails. The system also comprises a

statistic server (also called stat-server) for storing the history of all

activities in the system. The router can make routing decisions based on

the information stored in the database and the stat-server.

These and other features of the present invention are disclosed in

25   the following description of the invention together with the

accompanying drawings.

30

- 4 -

Brief Description of the Drawings

Fig. 1 is a block diagram showing an e-mail processing center of the present invention.

5   Fig. 2 is a block diagram of an e-mail to CTI server adapter used in the e-mail processing center of the present invention.

Fig. 3 is a flow chart showing operation of the server adapter used in the e-mail processing center of Fig. 1.

10

Detailed Description of the Invention

The present invention comprises a novel routing system for electronic mails and related methods. The following description is

15   presented to enable any person skilled in the art to make and use the invention. Description of specific applications is provided only as examples. Various modifications to the preferred embodiments will be readily apparent to those skilled in the art, and the general principles defined herein may be applied to other embodiments and applications

20   without departing from the spirit and scope of the invention. Thus, the present invention is not intended to be limited to the embodiments shown, but is to be accorded the widest scope consistent with the principles and features disclosed herein.

Fig. 1 is a block diagram showing an e-mail processing center 100

25   of the present invention. Processing center 100 contains an e-mail server 102 which is connected to a data network 104. Data network 104 could be a local area network or a wide-area network (such as the Internet or an intranet). Other data processing devices, such as computers 106 and 108, are also connected to data network 104. All the data processing

30   devices can send e-mails to each other. As a result, some of the e-mails

are sent to e-mail server 102.

As an example, it is assumed that one of the addresses associated with e-mail server 102 is "support@abc-company.com". This is an address for customers of a company named "ABC" to send in questions

5   regarding products and services provided by the company. It is anticipated that the subject matter of the e-mails are diverse and the number of mails is large. For example, the e-mails may relate to all aspects of the products and services offered by ABC. Some of the e-mails may contain technical questions of a product. Other e-mails may

10   report a bug in software sold by ABC. A few e-mails may contain suggestions on improving the products and services. If support persons of ABC are assigned to answer some of the e-mails on a first come first served basis, it would be very difficult for them to do so because it is almost impossible for a single person to know everything about ABC.

15   One aspect of the present invention is a system for automatically routing the e-mails to the most qualified and available support persons. For example, a support person may be an expert in one product of ABC. All e-mails related to this product will be routed to this person automatically. Further, the system can distribute the load so that every

20   support person receives approximately the same number of emails. As a result, the problems of the prior art systems can be solved.

Note that the criteria for determining whether a support person is available is not limited to e-mail activities. This is because the same support person may provide telephone and facsimile support to customer

25   inquiries. Thus, the availability of a support person may involve a combination of activities involving telephone, facsimile, e-mail, data processing, etc.

Processing center 100 contains a server 112 that records all activity in the center. For example, it contains records of who are

30   present in the center at a particular time and are available for service, as

- 6 -

well as records of all e-mails that are pending and have been processed by center 100. Server 112 is called herein the "stat-server." It should be noted that many types of information can be recorded, and the choice of information is determined on a case-by-cased basis.

5   Processing center 100 also contains a database 114 that contains detailed information on each support person, products, and customers. Information of support persons includes their skill set (e.g., product expertise, written language ability) and prior relationship with customers. Information on customers (based on the incoming e-mail

10   address) includes the content of their previous e-mails, the products they bought, their physical addresses (obtained from product registration information), etc.

          Processing center 100 also contains a router 116. This router selects the most qualified and available support person to respond to a

15   particular e-mail based on one or more algorithms (or scripts). Various factors in a routing strategy will be described below.

          In one embodiment of the present invention, database 114, router 116 and stat-server 112 could be a database, router and stat-server commonly used in telephony call centers. The advantage of this

20   embodiment is that database, router and stat-server software for telephony applications are well developed and widely available. The use of existing software (or slightly modified versions) could speed up product development time. In telephony applications, a server is used to provide computer telephony integration (CTI) by controlling an

25   automatic call distributor (a telephony hardware device for controlling telephone communication between the public telephone networks and telephones inside a call center) and communicating with a database, router and stat-server. This server is called herein the CTI-server. One of the functions of the CTI server is allowing automatic call distributors

30   of different vendors to be used with the same database, router and stat-

server.

In this embodiment, a CTI-server 130 and an e-mail-to-CTI-
server adapter 110 is preferably included. As explained above, CTI-
server 130 provides a common interface for communicating with

5   database 114, router 116 and stat-server 112 via a digital communication
network 128. Because these software products are based on telephony
applications, some of the attributes used therein may not be exactly the
same as that used in e-mail applications. For example, the attribute of
"telephone number" in telephony applications is not used in e-mail

10   applications. Similarly, the e-mail attribute of "sender's e-mail address"
may not be recognizable in telephony applications. These two attributes
have similar characteristics, and can be used interchangeably provided
that they are formatted and used properly. One of the functions of
adapter 110 is to provide conversion between e-mail attributes and

15   telephony attributes.

Fig. 2 is a block diagram of e-mail-to-CTI-server adapter 110. It
includes an e-mail interface 202 for sending data to and receiving data
from e-mail server 102. Adapter 110 also includes an information
extractor 204 for extracting relevant information from e-mails. Extractor

20   204 contains a parser 206 for parsing the content of the e-mails obtained
from e-mail server 102. Extractor 204 also contains a storage device for
storing an algorithm 208 which directs parser 206 to extract appropriate
information from the content of the e-mails in accordance with
predetermined criteria. The extraction algorithm in extractor 204 is

25   changeable because the coding in algorithm 208 could be changed.
Examples of relevant information are:

(a) Addresses: Typically, an e-mail has a portion that contains the
addresses of the sender and recipient. Extractor 204 directs parser 206
to extract these e-mail addresses.

30   (b) Time Stamp: Some e-mail contains the date and time an e-mail is

sent. Extractor 204 could direct parser 206 to extract this information. This information may be more accurate than the time e-mail server 102 receives the e-mail because some e-mails may be delayed for more than a day due to network problems.

5   (c) Keyword: The Extractor may direct the parser to conduct a keyword search on the content of the e-mails. Examples of keywords are name of relevant products and services provided by the company, special words such as "bugs," "virus", "crash" (for software products), "overheat" and "electric shock" (for hardware products), and words of urgent nature

10   (such as "urgent", "ASAP", and "fast").

Adapter 110 contains a formatter 210 for formatting the relevant information into attributes that can be understood by CTI-server 130. As an example, the sender's e-mail address could be formatted as a caller's telephone number (which is a telephony attribute). The formatted

15   attribute is sent to a data communication interface 212 which communicates the attributes to CTI server 130 via communication network 128.

Adapter 110 also contains a deformatter 214 that accepts data and commands from CTI-server 130 and translate them to a form understood

20   by e-mail server102. As explained below, router 116 may send (via CTI-server 130) commands to e-mail server 102. Returning now to router 116, some examples of support person selection criteria are:

(a) the product expertise of the support person;

(b) language ability of the support person;

25   (c) activities the support person (e.g., how many e-malls have this person processed and how many are pending);

(d) work load of other support persons in the center (for load balance among various support persons);

(e) the language of the incoming e-mail;

30   (f) the subject matter of the incoming e-mail;

(g) information about the sender;

(h) overall activities of the center (e.g. whether the support persons need to process jobs other than e-mails); and

(i) the urgency of the matter.

5   Processing center 100 contains a number of computer terminals, such as computers 122 and 124, managed by support persons. When a support person starts 15 to work, he/she logs in so that stat-server 112 knows who is working in center 100 and how to reach the support person.

10   Router 116 obtains information to make selection decisions from stat-server 112 and database 114. Once a decision is made, router 116 sends a command to email server 102 to route the e-mail to the selected computer terminal. The support person responds to the e-mail and sends the reply to e-mail server 102, which delivers the reply to the sender via

15   data network 104.

A flow chart 150 showing the operation of e-mail processing center 100 is shown in Fig.3. In step 152, e-mail server 102 receives an e-mail. The e-mail is forwarded to e-mail-to-CTI-server adapter 110. In step 154, adapter 110 extracts e-mail attributes in accordance with pre-

20   configured rules (embodied in extraction algorithm 208). It also sends status information and formulates requests to CTI server 130 using appropriate extracted attributes. In step 156, CTI-server 130 forwards the request and status information to router 116 and stat-server 112. In step 158, router 116 retrieves information from stat-server 112 and

25   database 114 so as to make routing decision. In step 160, router 116 instructs e-mail server 102 to route the e-mail to the computer terminal used by a selected support person, such as computer 122. Because the instructions from router 116 may be coded in telephony-related commands, these instructions may need to pass through CTI-router 130,

30   deformatter 210 and e-mail interface 202. Upon receiving the e-mail,

the support person processes the e-mail using computer 122. If there is a need to send a reply, the support person writes the reply (step 162), and directs e-mail server 102 to deliver the reply to a recipient connected to data network 104 (step 164).

5   In addition to providing basic routing function, router 116 may also have a strategy to handle exception situations. For example, if an incoming mail is not answered by the selected support person within a predetermined time interval (e.g., three days), the mail is re-routed to another qualified and available support person. This strategy prevents

10   mails from being dropped. As another example, there may be times when the number of incoming mails exceeds the available resource to answer these mails (i.e., overflow). Router 116 could store these mails in a queue and direct e-mail server 102 to alert senders that it may take a little longer to receive a reply.

15   It should be noted that if router 116, stat-server 112 and database 114 are designed strictly for e-mail applications, there is no need to have CTI server 130, formatter 210 and deformatter 214. In this case, router 116, stat-server 112 and database 114 can communicate with e-mail server 102 and information extractor 204 directly.

20   The invention has been described with reference to a specific exemplary embodiment thereof. Various modification and changes may be made thereunto without departing from the broad spirit and scope of the invention. The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense; the invention is

25   limited only by the provided claims.

- 11 -

What is claimed is:

1.   A system for routing an electronic mail (e-mail) to one of a plurality
of support persons in a processing center, each of said support persons
5   having a specific skill set from a variety of possible skill sets, the system
comprising:

an e-mail server adapted to receive said e-mail from a sender;

an information extractor for extracting information from said e-
mail;

10   a router; and

a database accessible to the router and storing skill sets of said
support persons;

wherein said router selects said one of a plurality of support
persons by matching stored information about said specific skill sets
15   with portions of extracted information from said e-mail.

2. The system of claim 1 further comprising a statistics server (stat-
server) recording activities of said processing center, and wherein said
routing performed by said router further uses said recorded activity in
20   said stat-server.

3. The system of claim 2 wherein routing of e-mails to selected support
persons is load-balanced based on recorded activity stored in said stat-
server.

25

4. The system of claim 1 wherein an overload threshold is set for
number of e-mails to be routed, and senders of e-mails are notified of a
possible delay when the threshold is exceeded.

30   5. The system of claim 1 wherein said database further stores

information on senders of e-mails, and routing performed by said router further uses said stored information on senders of e-mails.

6. The system of claim 5 wherein said database stores information about prior relationships of support persons and e-mail senders, and said router uses said relationship information in routing decisions.

7. The system of claim 1 wherein a time limit for response to e-mails by said support persons is set, and wherein e-mails not answered within said time limit are rerouted to other support persons.

8. The system of claim 1 wherein said information extractor comprises plural and selectable extraction algorithms.

9. The system of claim 8 wherein one of the extraction algorithms includes a parser, and wherein said one of the extraction algorithms uses the parser to search for keywords in said e-mail.

10. A method for routing electronic mails (e-mails) in a processing center having a plurality of support persons, comprising steps of:

      (a) receiving e-mails at an e-mail server in the processing center;

      (b) extracting information from the e-mails;

      (c) matching extracted information with skill sets of support persons; and

      (d) selecting a specific support person to receive a specific e-mail based on results of the matching step (c).

11. A system for routing and re-routing an electronic mail (e-mail) to a selected one of support persons in a processing center, comprising:

an e-mail server adapted to receive said e-mail from a sender; and

a router adapted to select the one of said support persons to

receive said e-mail, said router imposing a predetermined time for

response to the e-mail by the selected support person;

5   wherein said router sends said e-mail to a selected support person,

and, in the event a response is not made in the predetermined time, sends

the same e-mail to a different one of the support persons.

12. The system of claim 11 further comprising a statistics server (stat-

10   server) recording activities of said processing center, and wherein said

routing performed by said router further uses said recorded activity in

said stat-server in selecting support persons to receive e-mails.

13. The system of claim 12 wherein routing of e-mails to selected

15   support persons is load-balanced based on recorded activity stored in

said stat-server.

14. The system of claim 11 wherein an overload threshold is set for

number of e-mails to be routed, and senders of e-mails are notified of a

20   possible delay when the threshold is exceeded.

15. The system of claim 11 further comprising a database adapted for

storing information on senders of e-mails, and routing performed by said

router further uses said stored information on senders of e-mails in

25   selecting support persons to receive said e-mails.

16. The system of claim 15 wherein said database stores information

about prior relationships of support persons and e-mail senders, and said

router uses said relationship information in routing decisions.

30

- 14 -

17. The system of claim 15 wherein the database stores data relating to skill sets of support persons, further comprising an extractor adapted to extract information from e-mails, and wherein support persons are selected to receive e-mails based on matches between said stored data
5   relating to skill sets of support persons and said information extracted from said e-mails.

18. The system of claim 17 wherein said information extractor comprises plural and selectable extraction algorithms.
10

19. The system of claim 18 wherein one of the extraction algorithms includes a parser, and wherein said one of the extraction algorithms uses the parser to search for keywords in said e-mail.

15   20. A method for routing electronic mails (e-mails) in a processing center having a plurality of support persons, comprising steps of:

        (a) receiving e-mails at an e-mail server in the processing center;

        (b) selecting specific support persons to receive said e-mails;

        (c) monitoring time for response to said e-mails by said selected
20   support persons against a preset time-for-response limit; and

        (d) sending an e-mail for which a response is not made in the
time-for-response limit to a different support person.

25   21. A system for routing electronic mails (e-mails) to individual ones of a plurality of support persons in a processing center, comprising:

        an e-mail server adapted to receive said e-mail from a sender;

        a router; and

        a database accessible to the router;

30   wherein said database stores statistical information about the

- 15 -

activities of the processing center, including numbers of e-mails routed to each support person in the processing center, and said router adjusts numbers of e-mails sent to said support persons according to a load-balancing algorithm.

5

22. The system of claim 21 wherein an overload threshold is set for number of e-mails to be routed, and senders of e-mails are notified of a possible delay when the threshold is exceeded.

10   23. The system of claim 21 further comprising a database storing data regarding skill sets of said support persons and a data extractor adapted to extract data from incoming e-mails, and the router is adapted to match skill-set data with extracted data and to use the results to select support persons to receive e-mails.

15

24. The system of claim 21 wherein said database stores information about e-mail senders and prior relationships of support persons and e-mail senders, and said router uses said relationship information in making routing decisions.

20

25. The system of claim 21 wherein a time limit for response to e-mails by said support persons is set, and wherein e-mails not answered within said time limit are rerouted to other support persons.

25   26. The system of claim 23 wherein said data extractor comprises plural and selectable extraction algorithms.

27. The system of claim 26 wherein one of the extraction algorithms includes a parser, and wherein said one of the extraction algorithms uses

30   the parser to search for keywords in said e-mail.

- 16 -

28. A method for routing electronic mails (e-mails) in a processing center having a plurality of support persons, comprising steps of:

    (a) receiving e-mails at an e-mail server in the processing center;

5   (b) selecting support persons to receive said e-mails;

    (c) storing statistical information regarding numbers of e-mails routed to each support person; and

    (d) using the statistical information in a balancing algorithm to adjust the number of e-mails sent to each support person.

10

29. A system for routing a electronic mails (e-mails) to support persons in a processing center, comprising:

    an e-mail server adapted to receive said e-mail from a sender; and

    a router adapted to select support persons to receive e-mails;

15   wherein the system notifies senders of a possible delay in processing e-mails if a preset load threshold is exceeded.

30. The system of claim 29 further comprising a statistics server (stat-server) recording activities of said processing center, and wherein said

20 router is adapted to use said recorded data in selecting support persons to receive e-mails.

31. The system of claim 30 wherein routing of e-mails to selected support persons is load-balanced based on recorded activity stored in

25 said stat-server.

32. The system of claim 29 further comprising a database wherein said database further stores information on senders of e-mails, and routing performed by said router further uses said stored information on senders

30 of e-mails in selecting support persons to receive e-mails.

33. The system of claim 32 wherein said database stores information about prior relationships of support persons and e-mail senders, and said router uses said relationship information in routing decisions.

5

34. The system of claim 29 wherein a time limit for response to e-mails by said support persons is set, and wherein e-mails not answered by support persons within said time limit are rerouted to other support persons.

10

35. The system of claim 32 further comprising a data extractor adapted to extract data from e-mails received and wherein said database stores data regarding skill sets of support persons, and wherein said router matches skill set data with extracted data in selecting support persons to

15   receive e-mails.

36. The system of claim 35 wherein said information extractor comprises plural and selectable extraction algorithms.

20   37. The system of claim 36 wherein one of the extraction algorithms includes a parser, and wherein said one of the extraction algorithms uses the parser to search for keywords in said e-mail.

38. A method for routing electronic mails (e-mails) in a processing

25   center having a plurality of support persons, comprising steps of:

    (a) receiving e-mails at an e-mail server in said processing center;

    (b) routing e-mails to selected ones of said support persons;

    (c) tracking numbers of e-mails received and routed; and

   (d) notifying senders of possible delays if preset load thresholds are
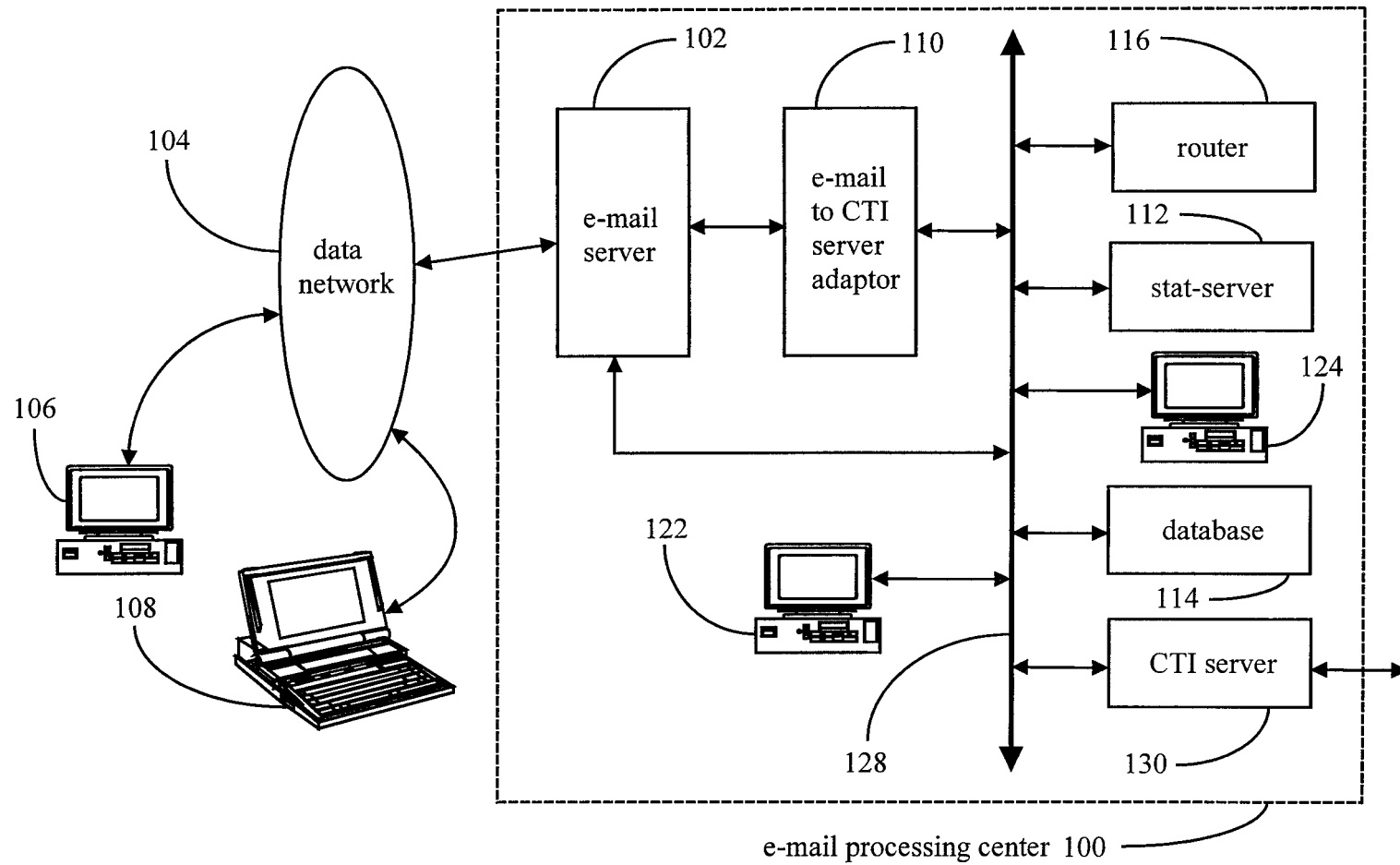
30   exceeded.

Fig. 1

Fig. 2

E-mail server receives an e-mail and fowards it it to the
e-mail-to-CTI-server-adaptor

152

The adaptor extracts e-mail attributes in accordance with pre-configured
rules and form requests to CTI-server with appropriate attributes

154

The CTI-server fowards the request and status information to a router
and a stat-server

156

The router retrieves information from the stat-server and a database,
and routes the e-mail based on skills and availability

158

The router directs the e-mail-server to rout the e-mail to a selected
support person

160

The selected support person writes a reply, if needed

162

The e-mail-server sends the reply to the originator of the e-mail

164

Fig. 3

INTERNATIONAL SEARCH REPORT

A.	CLASSIFICATION OF SUBJECT MATTER

IPC(6) :G08B 5/22; G06F 17/60, 17/30, 17/00
US CL :395/200.36, 200.37, 187.01, 200.68; 707/10, 104
According to International Patent Classification (IPC) or to both national classification and IPC

B.	FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 395/200.36, 200.37, 187.01, 200.68; 707/10, 104

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS, IEEE(proquest), MAYA, (search terms used: electronic mails or e-mails, data router, database, e-mail server, extractor, parser).

C.	DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,426,594 A (WRIGHT et al.) 20 June 1995, col. 2, lines 30-63.	1-38
Y	US 5,497,317 A (HAWKINS et al.) 05 March 1996, col. 2, lines 54-67; and col. 3, lines 1-49.	1-38
T,P	US 5,659,746 A (BANKERT et al.) 19 August 1997, col. 7, lines 14-67.	1-38
T,P	US 5,632,011 A (LANDFIELD et al.) 20 May 1997, col. 4, lines 1-50.	1-38

☐	Further documents are listed in the continuation of Box C.	☐	See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance		
"E"	earlier document published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed	"&"	document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
26 MARCH 1998	2 5 JUN 1998

Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized Officer ALYSSA H. BOWLER
Facsimile No. (703) 305-3230	Telephone No. (703) 305-9702

Form PCT/ISA/210 (second sheet)(July 1992)★