A system and method is disclosed for forwarding data via a communications hub (10) from one of a plurality of sources, such as personal computer (140), fax machine (100) or electronic pager (130), to one of a plurality of destinations, such as a telephone (110) or personal computer (140). Forwarding of data is carried out on the basis of one or more user defined rules stored in a memory (30) accessible by a hub data processor (20). The hub data processor (20) converts the format of the data from the data format of the source to a data format suitable for interpretation by the destination, in accordance with the defined rules. The system and method provide improved flexibility and allow a user to ensure that he may be contacted in a manner dependent upon, say, the time of day or present location.
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System and Method for Telecommunications Data Handling

Field of the Invention

The present invention relates to a system and method for the forwarding of telecommunications data.

Background of the Invention

The use of computer electronic mail, or e-mail, has increased rapidly over the past decade both for personal and business use. Although e-mail has been a common feature of larger computer systems for at least twenty years, it is the advent of mass public and business access to the Internet in the 1990's that has led to the widespread acceptance of e-mail as a means of business and personal communication outside of the scientific and technological research sectors.

As the use of e-mail has become widespread, the popularity of other telecommunications media has also increased. The use of fax machines for communicating documents, principally over existing telephone networks, is now common practise throughout the world, both for private and business users. Both electronic pagers which receive and display text messages forwarded from the sender using a cellular radio network, and cellular radio telephones, are in widespread use alongside the more traditional land-line telephone network.

A number of electronic message forwarding systems are currently available. In one such message forwarding system, each customer is provided with a telephone number to which fax transmissions may be sent. Fax
transmissions received via this telephone number are converted by the service provider to a computer file format which is then included as an attachment to an e-mail message forwarded to an e-mail account specified by the user.

In another known message forwarding system, each customer is provided with an e-mail account from which received e-mails are forwarded to the user’s electronic pager unit via an existing cellular pager network, to be displayed on the pager display.

The existing systems for message forwarding generally link a single first electronic data format, such as fax, to a single second electronic data format such as e-mail.

Such systems tend to be inflexible, requiring the use of predetermined hardware and/or software both by the user and by anyone wishing to communicate with that user.

Summary of the Invention

It is an object of the present invention to address these and other problems with the prior art.

According to the present invention, there is provided a system for forwarding data from one of a plurality of sources to one of a plurality of destinations according to user-defined rules, comprising: a hub data processor including an input arranged to receive an array of data in a source data format from a first of the plurality of sources, and a hub administrator, in communication with the said hub data processor, and
including memory means programmable by a user of the system, the memory means storing at least one user defined rule specifying a destination, selected from the said plurality of destinations, to which the said array of data is to be forwarded; the hub data processor further including a converter means, arranged to convert the said array of data in the said source data format into a destination data format different from the source data format and selected in dependence upon the said at least one user defined rule specifying the said destination to which the said array of data is to be forwarded, and an output arranged to transmit the said array of data in the said destination data format to the said specified destination; wherein the destination data format is capable of interpretation by a telecommunications device at the said destination specified by the said at least one user defined rule.

The system of the invention provides significantly increased flexibility relative to previous data forwarding systems. A user may program one or more rules which define the destination to which incoming messages are to be sent.

The system is not restricted to one particular format of source data or one particular format of destination data.

Preferably, the first converter means is further arranged to convert the said array of data in the said source data format into a standard data format, such as Simple Mail Transfer Protocol (SMTP), prior to conversion into the said destination data format, the said standard data format being intelligible by the said hub administrator.
In that case, the converter means may include a plurality of gateways each arranged to convert the said array of data in the said source format into the said standard data format. Additionally, each of the plurality of gateways may be further arranged to convert the said array of data in the standard data format into the array of data in the said destination data format.

Preferably, the hub data processor further comprises an SMTP mail box arranged to receive and store the said array of data in the said standard data format.

In a preferred embodiment, the system may further comprise a first telecommunications device at the said first of the plurality of sources, arranged to transmit the array of data in the said source data format to the input of the hub data processor, and a second telecommunications device different from the said first telecommunications device and located at the said specified destination, the second telecommunications device being arranged to receive the array of data in the said destination data format from the output of the hub data processor.

For example, the first telecommunications device may be a personal computer capable of connection to the Internet, a facsimile machine, an electronic pager, a mobile telephone or a land line telephone. The format of the array of data received from the source and transmitted to the destination are then chosen accordingly.

For example, if the source from which the array of data is received is a mobile telephone, then the array
of data received might be in the form of a modulated carrier signal. The array of data (i.e. the spoken words and so forth in this specific example) which are represented by the modulated carrier signal are converted by the hub data processor into a second, destination data format.

Again, as an example only, the destination may be a personal computer connected to the Internet. Then, the array of data is extracted from the modulated carrier signal, scanned to recover the spoken words, and the scanned words placed in a file format such as ASCII. The ASCII format file may be attached to an e-mail message which is forwarded to the personal computer at the destination via an Internet connection.

The user defined rule may specify the times during which the said array of data is to be transmitted to said first of the plurality of destinations. Alternatively, or in addition, the hub administrator may be arranged to scan the said array of data received by the input to the hub data processor to locate data strings therein, the at least one user defined rule further specifying that the said array of data is to be transmitted to the said destination specified by the said rule only when a user defined data string is located by the hub administrator when the received array of data is scanned. Thus, again by way of example only, the rules may be defined by a user such that a received array of data is forwarded to a facsimile machine at that user’s home between 5 p.m. on a Friday, and 9 a.m. on a Monday. Likewise, if the header to a received e-mail message contains the word "Urgent", the system may forward the received
e-mail as a voice-mail message to a pager or mobile telephone.

Preferably, the hub administrator is remotely accessible by a user of the system, whereby the said user may add a further user defined rule to the said programmable memory means from a location remote from the said hub administrator. Thus, if a user of the system is suddenly required to leave his office, for example, he may contact the hub administrator whilst out of the office and reset the rule so that an array of data subsequently received at the input to the hub data processor is forwarded to the user's mobile telephone for example, rather than his office facsimile machine.

The programmable memory means may be a database which interfaces with the said hub administrator under software control. For example, the database may be implemented in SQL™ or Microsoft® MS-Access which interfaces with the said hub administrator using Cold Fusion™ operating upon a Microsoft Windows NT™ server computer.

The invention also extends to a method of forwarding data from one of a plurality of sources to one of a plurality of destinations according to user defined rules, comprising the steps of: (a) receiving an array of data in a source data format, the said array of data being received from a first of the plurality of sources; (b) storing at least one user defined rule specifying a destination to which the said array of data is to be forwarded; (c) converting the received array of data in the source data format into a destination data format, different from the source
data format, and selected in dependence upon the said
at least one user defined rule specifying the said
destination to which the said array of data is to be
forwarded; and (d) transmitting the said array of data
in the said destination data format to the destination
specified by the at least one user defined rule.

Brief Description of the Drawings

Embodiments of the invention will now be described by
way of example only and with reference to the
drawings, in which

Figure 1 shows a schematic block diagram of a system
according to an embodiment of the present invention;
including a communications hub;

Figure 2 shows the communications hub of Figure 1 in
greater detail; and

Figures 3a, 3b and 3c show typical images from a
computer screen during programming of the
communications hub in the system of Figures 1 and 2.

Detailed Description of the Preferred Embodiment

A block diagram of a system according to an embodiment
of the present invention is shown in Figure 1.

The system comprises a communications hub 10 which
receives, processes and forwards electronic data in a
wide variety of formats. The hub 10 includes a hub
data processor 20 which is configured to receive
electronic data in the form of e-mail messages,
facsimile messages, voice mail messages and so forth.
The hub 10 also contains a hub administrator 30, linked to the hub data processor 20, which oversees the processing of the incoming electronic data in a manner to be described in detail in connection with Figure 2.

The hub data processor 20 and hub administrator 30 are connected to one another using a local area network 40 such as an Ethernet network. The communications hub 10 also comprises a plurality of communications sockets to allow input and output of electronic data to the hub 10 in various forms. A first socket includes a bridge 50 which is connected to the local area network 40 and allows connection of that local area network to the Internet 60.

A second communications socket includes a telephone connection 70, which may in turn be linked to a modem (not shown). This allows the hub data processor to receive and forward data in formats such as facsimile or voice mail. It also permits dial-up access by a personal computer using a variety of serial or other protocols, such as SLIP or PPP. As will be understood by the person skilled in the art, the hub 10 may include software drivers for driving the modem, for example.

In particular, and as shown in Figure 1, the telephone connection 70 allows access along a plurality of physically or logically separate lines 90 from the telephone network 80. The use of a plurality of telephone lines 90 allows multiple simultaneous access to and from a plurality of sources.

The telephone connection 70 may allow connection via
the public telephone network 80 to a facsimile machine 100, a conventional or cellular telephone 110, and a computer 140.

Likewise, the bridge 50 allows connections via the Internet 60 to a computer 140, or to an electronic pager 130 via a pager service provider 120. Remote e-mail addresses 15 may be accessed via the Internet 60 as well.

Electronic data in one of the above formats is sent to the communications hub 10 via the telephone connection 70 or the bridge 50. Here, it is processed by the hub data processor 20, as will be described in connection with Figure 2. It is then forwarded to one of a chosen plurality of destinations. A user is able to define, by programming the hub administrator 30, to which of the plurality of destinations the incoming data is to be forwarded.

For example, electronic data may be transmitted by a sender as an e-mail message from the computer 140 via the Internet 6 to the bridge 5 and then into the hub data processor 20. The hub administrator 30 may be programmed so that the hub data processor 20 sends the incoming data received from the sender to a facsimile machine 100 accessible by a recipient. Thus, the data in e-mail format is converted to data in facsimile format and then sent via the telephone connection 70 along the lines 90 to the facsimile machine 100.

Having described in general terms the system of Figure 1, the communications hub 10 will now be described in more detail with reference in particular to Figure 2. The block diagram of Figure 2 shows elements of the
hub data processor 20 and the hub administrator 30 of Figure 1.

The hub data processor 20 is preferably implemented in hardware such as a computer running a UNIX operating system such as Linux (TM). The hub administrator 30 may likewise be implemented in hardware such as a computer running the Microsoft (RTM) Windows NT (TM) operating system. Other operating systems and hardware may be employed.

The hub data processor 20 comprises a number of gateways 200-230, each of which may be implemented in software or in hardware. The hub data processor 20 also comprises an SMTP (Simple Mail Transport Protocol) mail server 240, typically implemented in software, with a number of associated user mailboxes 250. The SMTP mail server 240 is configured to receive and send e-mail messages over the Internet 60 as will be familiar to the person skilled in the art, to receive e-mail messages directed to the Internet address of the hub data processor 20 and to store these e-mail messages in user's mailboxes 250 according to the header fields of each e-mail message.

Each of the gateways 200-230 may typically comprise a Unix process if the hub data processor is running a Unix operating system, or an application program interface if the hub data processor is running a Microsoft (TM) operating system such as Windows NT (TM). The gateways typically comprise computer programs which convert electronic messages between an SMTP standard e-mail format and another electronic format such as facsimile or audio. Alternatively a gateway may arrange for an e-mail message to be
forwarded to another service provider, such as an electronic pager service provider, with appropriate headers and content.

The gateways may be obtained commercially and configured for operation within the system, or they may be designed and constructed particularly for the purposes of the present embodiment. Such gateways are generally known and will be readily implemented by those of ordinary skill. Accordingly, no further details will be given of this aspect of the system.

In the following, the gateways are described as being bi-directional. That is, the gateways are configured to receive data in a first format from a source and convert it to a format intelligible by the SMTP mailbox, and also to receive data from the SMTP mailbox and convert into that first format so that it may be understood by a destination. However, it will be understood that separate gateways for receiving data in a first format and separately transmitting data in a first format may be employed if desirable.

A message received in audio, facsimile or e-mail format by one of the gateways 200-230 is converted to e-mail format and passed to the SMTP mail server 240, to be stored in the mailbox 250 of the appropriate user. The appropriate user may be identified, for example, from the telephone number to which the message was sent, or from the header fields of a received e-mail.

Messages passed to the SMTP mail server 240 from the message forwarding process in the hub administrator 30 are passed to the appropriate gateway 200-230.
according to data held in the fields of the e-mail header. The gateway then transmits the message, for example as a facsimile, an e-mail or an audio message. An electronic pager service provider may be instructed by e-mail by the pager gateway 230. The SMTP mail server 240 therefore acts as a central hub for forwarding e-mail messages between the gateways 200-230, the user mailboxes 250 and the hub administrator 30.

The facsimile gateway 200 is configured to receive facsimile communications via the telephone connection 70, and convert them to an e-mail format in which an e-mail attachment contains the facsimile as a graphical data file. The intended recipient of the facsimile transmission may be identified from the telephone number to which the facsimile was sent, and the header fields of the e-mail message completed appropriately for the purposes of handling the e-mail message within the communications hub 10. Header fields of the e-mail message may contain other information such as the time of arrival of the facsimile, and information any further information that can be gleaned from the facsimile transmission itself such as the telephone number of the transmitting facsimile machine.

The e-mail message generated from the facsimile is forwarded to the SMTP mail server 240 which then stores it in the appropriate user mailbox 250.

The facsimile gateway 200 is also arranged to convert e-mail messages that are provided by the SMTP server 240 to facsimile format and to transmit them to a remote facsimile machine 100 over the telephone
network 80. The full text and attachments of an e-mail provided to the facsimile gateway 200 may be converted to facsimile format. The e-mail header may be included as text within the facsimile transmission, and the destination telephone number for the transmission of the facsimile may be obtained from a suitable field in the header of the e-mail, such as the destination field. The generated facsimile message is then forwarded via the telephone connection 70 to be sent over the telephone network 80 in the usual way.

Character recognition software may be provided to enable the facsimile gateway 200 to reduce the size of the e-mail that it generates from an incoming facsimile message by converting it to a conventional text e-mail message, without a graphical data file attached.

The voice mail gateway 210 typically comprises software running on the hub data processor 20, arranged to convert between audio messages and e-mail format, the audio messages being sent or received over the telephone network 80, for example to or from a conventional land line or cellular telephone 110. The voice mail gateway 210 is arranged to respond to an incoming telephone call by playing a recorded or synthesised message in the same manner as a conventional telephone answering machine or voice mail service, and recording the audio message provided by the caller.

An audio message received by the voice mail gateway 210 is converted to an e-mail message with an audio data file attachment. The telephone number to which the call was made may be used to identify the client
for whom the message was intended. This information is
used to generate the required header fields of the e-
mail message to ensure correct processing of the
message when it is passed to the SMTP mail server 240,
which stores the message in the mailbox 250 of the
correct user. The headers of the e-mail message may be
used to included any further information which may be
obtained such as the telephone number of the caller.

The voice mail gateway 210 may also be arranged to
receive e-mail messages from the SMTP mail server 240,
convert them to an audio format by means of a speech
synthesiser, and relay the message to an intended
recipient telephone 110 using the telephone network
70.

A POP (Point-of-Presence) e-mail server may be used to
provide a POP server gateway 220. E-mail messages may
be forwarded to this gateway by the SMTP server 240 to
be stored until a client connects to the POP server
gateway 22 either via the telephone connection 70 or
the bridge 50 to collect the messages. This gateway
may be used by a client whose remote computer 140 is
not permanently connected to the Internet 60, and
would therefore usually be configured to send and
collect e-mail messages using the POP protocol. The
POP mail server gateway 220 also enables the user to
send e-mail messages to the communications hub 10
using the POP protocol, for forwarding to other
internet e-mail addresses 150.

A pager gateway 230 is provided within the hub data
processor 20. The pager gateway is arranged to forward
an e-mail message passed to it by the SMTP mail server
240 to a remote pager service provider 120 for
transmission to the user's pager 130. The pager gateway 230 is arranged to ensure that the correct headers are provided in the e-mail to the pager service provider. The pager gateway may use the SMTP mail server 240 to forward the e-mail message to the pager service provider 120.

The SMTP mail server 240 also acts as a gateway in that it is arranged to receive e-mail addressed to a client and received via the Internet 60 and to process it by storing it in the appropriate client mail box. It may also forward e-mail to the client or elsewhere as directed by the message forwarding process of the hub administrator 20.

As previously mentioned, the system allows the exchange of data between a sender and a recipient to be controlled by a set of rules defined by a user and stored upon the hub administrator. Referring once more to Figure 2, the logical layout of the hub administrator 30 is shown.

The hub administrator comprises an HTML-based e-mail client 300, an HTML server 310, a message forwarding process 320, a rules database 330 and a database interface 340.

The HTML-based e-mail client 300 is accessible to users through the HTML server 310. A user with a remote computer 140 may connect to the HTML server 310 either through the bridge 50 or the telephone connection 70. The HTML server 310 provides access to HTML pages provided by the HTML-based e-mail client 300. These HTML pages are adapted to enable the user to read the e-mail contained in the SMTP mailbox 250,
either by the HTML-based e-mail server 300 reading the mailbox directly or by making the appropriate requests to the SMTP mail server 240.

5 The message forwarding process 320 may comprise a collection of PERL scripts or other suitable software elements which are executed from time to time, or which run continually. The message forwarding process 320 has access to the user mailboxes 250, and processes the contents of each mailbox at regular intervals according to each user’s set of message forwarding rules that are contained in the rules database 330.

10 The rules contained in the rules database 330 specify how e-mail messages arriving in the SMTP mail-account from the various gateways 200-230 are to be forwarded. Each rule provides criteria for selecting e-mail messages. The criteria may be defined by the presence of certain text strings in particular fields of the e-mail header or text body, by total message size, by the present time of day and date, by the communications means by which the message arrived and so on.

15 Associated with each rule are defined actions which are to be performed if an e-mail matches the rule’s criteria. The actions may include moving or copying an e-mail to another SMTP e-mail folder or to the user’s POP e-mail account. The actions may also include copying or moving the message via a speech synthesiser or facsimile message generator to a telephone number, copying or moving the message to a pager service provider for transmitting to the user’s electronic pager, or copying or moving the e-mail to another
Internet e-mail address.

If the e-mail message satisfies the rule criteria then the e-mail header is suitably adapted according to the associated action to indicate the destination address, format type and gateway before the e-mail is passed to the SMTP mail server 240.

The SMTP mail server 240 then passes the e-mail message to the appropriate gateway 200-230, to be delivered to the destination address in the required format type.

A rule may also specify whether an e-mail message is to be deleted from the user mailbox 250 on forwarding, or to be left in the mailbox. A single mail message may in general be forwarded to a number of different destinations in a number of different formats at a number of different times, if it satisfies the conditions of one or more rules at one or more times.

The message forwarding rules for a particular user that are held in the rules database 330 may be modified by the user. An HTML (Hypertext Markup Language) interface to the rules database 330 is provided using a database interface 340. This interface may be realised, for example, by using a software system such as Cold Fusion (RTM) that provides an interface between an HTML server and an ODBC (Open Database Connectivity) database driver. ODBC drivers are commercially available that provide a standard interface to one of a number of different databases such as Microsoft Access (RTM) or Microsoft SQL Server (RTM). Cold Fusion allows access to a database using requests written in SQL (Structured
Query Language) and embedded within extensions to HTML.

Cold Fusion may be installed to operate either through an API (applications program interface) written for a particular HTML server, or as calls to a Cold Fusion executable or script by using the CGI (Common gateway Interface) HTML server scripting standard. In either case, the HTML programmer constructing an HTML interface to the rules database 230 has access to a number of extensions to HTML that are provided by Cold Fusion and enable HTML pages to be written that provide a convenient interface between the client and the rules database.

Typically, data receipt and forwarding may be offered as a service by a service provider who owns and maintains the hub communicator 10. A user registering with the service provider is provided with access to the hub. Typically, a new user will be provided with an SMTP e-mail account and a POP e-mail account, and will be able to connect to the hub using a remote HTML browser.

For example, the user may access their SMTP mailbox by connecting to the hub over the Internet or via a telephone connection, using an HTML browser such as Netscape Navigator or Microsoft Explorer. The hub provides access to the user’s SMTP e-mail account using an HTML-based e-mail client so that e-mail can be read, written, sent and otherwise conveniently processed.

A user may also be provided with one or more telephone numbers to which telephone voice mail or facsimile
messages may be sent. Any message reaching the hub and addressed to the user is converted by the gateways in the hub to an e-mail message which is stored in the user's SMTP mailbox. The user for whom the message is intended may be identified either by means of the e-mail address or the telephone number to which the messages was sent.

Moreover, the user registered with the service provider is provided with remote access to the database, and a set of rules stored therein may be added or edited by the user. It will be understood that the database stores rules in a personal "folder" for an individual user, those rules being applied to that user's SMTP mail box only.

The procedure for defining and editing the database rules will now be described in more detail, referring to Figures 3a, 3b and 3c.

To access the database and define or edit rules, the user first connects to the hub 10 either by "logging in" via the Internet 60 or by effecting a dial-up connection via a computer modem communicating with the telephone connection 70. The user indicates his e-mail address and password to gain access to his personal SMTP mail box. At this point, a screen is displayed to the user which contains a list of messages which have been received at the hub 10 and have not been deleted. For example, if no rules have been defined, then any message arriving at the hub 10 will simply remain in the user's mail box until deleted either by the user or by the system administrator if they have remained in the mail box for more than a predetermined amount of time. A
typical screen as displayed to the user is shown in Figure 3a.

The screen displayed to the user when he logs on and shown in Figure 3a has a hyperlink to a second page of text which is shown in Figure 3b. A series of boxes are provided which allow various criteria to be selected for handling the incoming messages.

The first box 400 in Figure 3b allows all messages addressed to the particular user to be forwarded or copied. This is particularly advantageous when the user is one of a plurality of users who each have addresses that are sub-domains of a domain name. Such addresses may be inserted in the box 400 of Figure 3b thus defining that only incoming messages to that sub-domain name will be forwarded or copied.

The second box, 410, allows any mail copied to a particular user to be forwarded or copied again. Similarly, the third box 420 permits all messages arriving from a particular e-mail address, fax number and so forth to be forwarded or copied.

The fourth box 430 permits certain keywords to be defined in the subject header of an incoming e-mail and so forth. Thus, for example, any received message having a header including the word "urgent" may be forwarded or copied.

The fifth box 440 allows file sizes to be defined as a criterion for forwarding or copying, for example, it may be desirable that larger messages which are likely to include images, be sent to a user defined fax machine, as set out in connection with Figure 3c.
below.

A final criterion allows messages arriving between certain times of the day 450, 460 and between certain days 470-530, to be specified. For example, a business user may wish to have all incoming messages forwarded to his home facsimile machine between 5 p.m. on Friday and 9 a.m. on a Monday.

Having set up the criteria upon which incoming messages are to be forwarded or copied, the final destination may be specified. This is achieved in yet a further screen shown in Figure 3c.

A first box 540 of the screen of Figure 3c allows the user to define the destination a message is to be forwarded to. For an e-mail destination, an Internet Protocol address is inserted. If on the other hand, the message is to be forwarded as a facsimile, a drop-down box 550 allows the facsimile function to be selected. In that case, a facsimile telephone number is inserted into the box 540.

Likewise a second box 560 allows messages to be copied rather than simply forwarded to a chosen destination. Again, the destination may be an e-mail address, a facsimile number, a pager number and so forth.

Finally, text files which are received by the hub may be processed by setting up an automatic reply. That is, any sender of a text file received by the user's mail box may automatically receive a standard reply. The wording may be set by the user by completing a third box 570.
Once all the criteria have been set up, the user clicks on a button 580 which updates the database 330 so that any future messages received at the hub 10 will be processed accordingly.

5

The present invention thus provides significantly improved flexibility with regard to the transmission of data between a source and a destination. In particular, there are no geographical limitations to the system, either in terms of remote access to the database for updating the rules, or to the sources and destinations of data received at the hub 10. Furthermore, whilst remote access to the database has been described with reference to a computer connection, it will be understood that voice controlled or touch-tone telephone controlled updating of the rules may equally be effected. This may be advantageous where a user has no access to a computer. All incoming messages received at the hub 10 may be forwarded to a telephone anywhere in the world, by setting up rules via a telephone as well.

Finally, it is to be understood that, whilst data in facsimile, pager, e-mail, land line and mobile telephone formats have been described, any further data formats may be readily accommodated. The system, merely requires an additional gateway to be installed along with a further option in the software which allows rule creation and editing.
CLAIMS:

1. A system for forwarding data from one of a plurality of sources to one of a plurality of destinations according to user-defined rules, comprising:
   a hub data processor including an input arranged to receive an array of data in a source data format from a first of the plurality of sources, and a hub administrator, in communication with the said hub data processor, and including memory means programmable by a user of the system, the memory means storing at least one user defined rule specifying a destination, selected from the said plurality of destinations, to which the said array of data is to be forwarded;
   the hub data processor further including a converter means, arranged to convert the said array of data in the said source data format into a destination data format different from the source data format and selected in dependence upon the said at least one user defined rule specifying the said destination to which the said array of data is to be forwarded, and an output arranged to transmit the said array of data in the said destination data format to the said specified destination;
   wherein the destination data format is capable of interpretation by a telecommunications device at the said destination specified by the said at least one user defined rule.

2. The system of claim 1, in which the first converter means is further arranged to convert the said array of data in the said source data format into a standard data format prior to conversion into the
said destination data format, the said standard data format being intelligible by the said hub administrator.

3. The system of claim 1, further comprising a first telecommunications device at the said first of the plurality of sources, arranged to transmit the array of data in the said source data format to the input of the hub data processor, and a second telecommunications device different from the said first telecommunications device and located at the said specified destination, the second telecommunications device being arranged to receive the array of data in the said destination data format from the output of the hub data processor.

4. The system of claim 1, in which the at least one user defined rule further specifies the times during which the said array of data is to be transmitted to said first of the plurality of destinations.

5. The system of claim 2, in which the hub administrator is arranged to scan the said array of data in the said standard format to locate data strings therein, the at least one user defined rule further specifying that the said array of data is to be transmitted to the said destination specified by the said rule only when a user defined data string is located by the hub administrator when the received array of data is scanned.

6. The system of claim 1, in which the said source data format is selected from the group consisting of e-mail format, facsimile format, pager
format and voice format.

7. The system of claim 1, in which the said destination data format is selected from the group, consisting of e-mail format, facsimile format, pager format, and voice format.

8. The system of claim 2, in which the said standard data format is Standard Mail Transfer Protocol (SMTP).

9. The system of claim 3, in which the first telecommunications device is selected from the group consisting of a personal computer capable of connection to the Internet, a facsimile machine, an electronic pager, a mobile telephone and a land line telephone.

10. The system of claim 3, in which the second telecommunications device is selected from the group consisting of a personal computer capable of connection to the Internet, a facsimile machine, an electronic pager, a mobile telephone and a land line telephone.

11. The system of claim 1, in which the hub administrator is remotely accessible by a user of the system, whereby the said user may add a further user defined rule to the said programmable memory means from a location remote from the said hub administrator.

12. The system of claim 1, in which the hub administrator is remotely accessible by a user of the system, whereby the said user may edit an existing of
the at least one user defined rules stored in the said
programmable memory means.

13. The system of claim 1, in which the said
programmable memory means is a database which
interfaces with the said hub administrator under
software control.

14. The system of claim 13, in which the
database is SQL™ which interfaces with the said hub
administrator using Cold Fusion™ operating upon a
Microsoft® Windows® NT server computer.

15. The system of claim 13, in which the
database is Microsoft® MS-Access which interfaces with
the said hub administrator using Cold Fusion™
operating upon a Microsoft® Windows® NT server
computer.

16. The system of claim 1, in which the hub data
processor further comprises an SMTP mail box arranged
to receive and store the said array of data in the
said standard data format.

17. The system of claim 2, in which the converter
means includes a plurality of gateways each arranged
to convert the said array of data in the said source
format into the said standard data format.

18. The system of claim 17, in which each of the
plurality of gateways is further arranged to convert
the said array of data in the standard data format
into the array of data in the said destination data
format.
19. A method of forwarding data from one of a plurality of sources to one of a plurality of destinations according to user defined rules, comprising the steps of:

(a) receiving an array of data in a source data format, the said array of data being received from a first of the plurality of sources;

(b) storing at least one user defined rule specifying a destination to which the said array of data is to be forwarded;

(c) converting the received array of data in the source data format into a destination data format, different from the source data format, and selected in dependence upon the said at least one user defined rule specifying the said destination to which the said array of data is to be forwarded; and

(d) transmitting the said array of data in the said destination data format to the destination specified by the at least one user defined rule.

20. The method of claim 17, further comprising, after the step (a) of receiving the array of data in the source data format, converting the array of data, in the source data format into a standard data format prior to converting the said array of data into the said destination data format.

21. A system substantially as herein described with reference to the accompanying Figures.

22. A method substantially as herein described with reference to the accompanying Figures.
FIG. 2.

200 FAX

210 VOICE

220 POP

230 PAGER

240 SMTP MAIL SERVER

250 USER MAIL BOX

50 HTML CLIENT

320 MESSAGE FORWARDING

330 RULES DATABASE

340 DATABASE INTERFACE

SUBSTITUTE SHEET (RULE 26)
**FIG. 3a.**

<table>
<thead>
<tr>
<th>Sender</th>
<th>Subject</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Jason Drummond”</td>
<td>test</td>
<td>Fri, 9 Oct 1998 18:12:22+0100</td>
</tr>
<tr>
<td>“Syed Nauman Hashmi”</td>
<td>test mail</td>
<td>Mon, 2 Nov 1998 18:31:39+0500</td>
</tr>
<tr>
<td>“Syed Nauman Hashmi”</td>
<td>sending to test</td>
<td>Tue, 3 Nov 1998 17:59:16+0500</td>
</tr>
<tr>
<td>“Syed Nauman Hashmi”</td>
<td>message 1</td>
<td>Tue, 3 Nov 1998 17:59:42+0500</td>
</tr>
<tr>
<td>Select all displayed messages.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Delete Selected Messages | Move To | Deleted
**FIG. 3b.**

To  
CC  
From  
Subject  
Larger Than  
Time between  
0 \(\text{KB}\) Hours 0 \(\text{Minutes}\) 0 \(\text{Hours}\) 0 \(\text{Minutes}\)  
\(\checkmark\) Mon \(\checkmark\) Tues \(\checkmark\) Wed \(\checkmark\) Thurs \(\checkmark\) Fri \(\checkmark\) Sat \(\checkmark\) Sun  
470 480 490 500 510 520 530

**FIG. 3c.**

Perform Action

Select Your Choice

Move To Folder  
Copy To Folder  
Move To
Copy To
Reply With (only text file)  
Delete from Server

Add Rule  Reset

Email  Fax  Pager
### INTERNATIONAL SEARCH REPORT

**A. CLASSIFICATION OF SUBJECT MATTER**

<table>
<thead>
<tr>
<th>IPC</th>
<th>Classification of Subject Matter</th>
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<td>IPC 7</td>
<td>H04M3/533, H04L12/58</td>
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According to International Patent Classification (IPC) or to both national classification and IPC.

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols):

| IPC 7  | H04M H04L                     |

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

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
<thead>
<tr>
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<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<td>X</td>
<td>WO 97 49251 A (COMUSERVE INC) 24 December 1997 (1997-12-24)</td>
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- abstract
- page 4, line 3 - line 23
- page 5, line 5 - page 6, line 3
- page 15, line 3 - line 12
- claims 1,4,5,11
- figures 1,3

-/-

**X** Further documents are listed in the continuation of box C.

**X** Patient family members are listed in annex.

**Special categories of cited documents:**

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed.

**T** later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

**X** document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

**Y** document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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**Date of the actual completion of the international search**

21 July 2000

**Date of mailing of the international search report**

08/08/2000

**Name and mailing address of the ISA**

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
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Fax: (+31-70) 340-2016

**Authorized officer**

Lai, C
# INTERNATIONAL SEARCH REPORT

## Documents Considered to be Relevant

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<td>BEISER K: &quot;Database-driven Web sites. Cold Fusion for Web publishing&quot; DATABASE, DEC. 1997, ONLINE INC, USA, vol. 20, no. 6, pages 48-50, 52, XP0000925183 ISSN: 0162-4105 page 49, left-hand column, line 9 - middle column, line 3</td>
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