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# United States Patent [19]

Shaffer et al.

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- [54] **METHOD AND SYSTEM FOR DETERMINING THE LOCATION FOR PERFORMING FILE-FORMAT CONVERSIONS OF ELECTRONICS MESSAGE ATTACHMENTS**
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- [73] Assignee: **Siemens Information and Communication Networks, Inc.**, Boca Raton, Fla.
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- [51] Int. Cl.<sup>7</sup> ..... **G06F 15/16; G06F 17/30**
- [52] U.S. Cl. .... **709/232; 709/246; 707/1; 707/10**
- [58] Field of Search ..... **709/232, 246; 707/1, 10**

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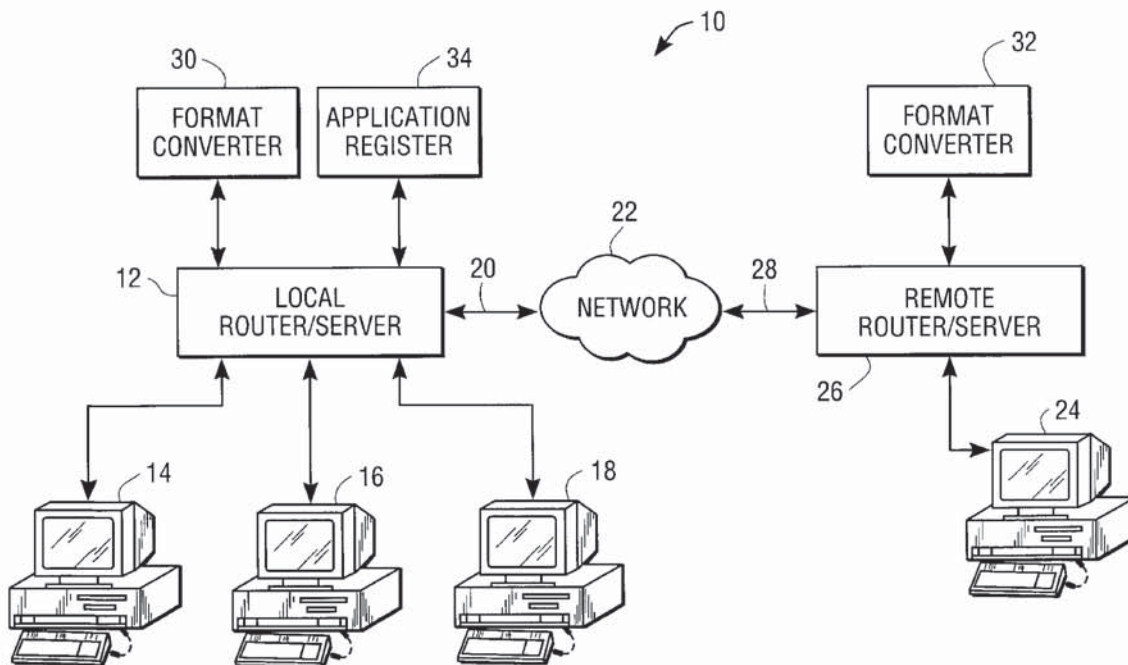
Primary Examiner—Krisna Lim

## [57] ABSTRACT

A method and system for exchanging electronic messages, such as email messages, include isolating personal computers and other client devices from the process of converting a message attachment from one file format to a second file format. File-format conversions are out-tasked to enhance file accessibility, free computer resources, and conserve a user's time. The access requirements of each attachment to electronic messages are compared to the capabilities of a target client device. If it is determined that a file-format conversion is required, the conversion operation is assigned to a server that supports the process of reformatting the attachments. In an email environment, the server is substantially equivalent to the conventional email server, but includes enhanced conversion capabilities. In one embodiment, the determination of whether an attachment is accessible without conversion occurs at the server level. In another embodiment, the determination is implemented at the client device level. Preferably, if a local email server is incapable of reformatting the attachment, a request is transmitted to a remote server to perform the conversion. Typically, the remote server is the email server that supports message exchanges for the person who originated the message.

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20 Claims, 3 Drawing Sheets



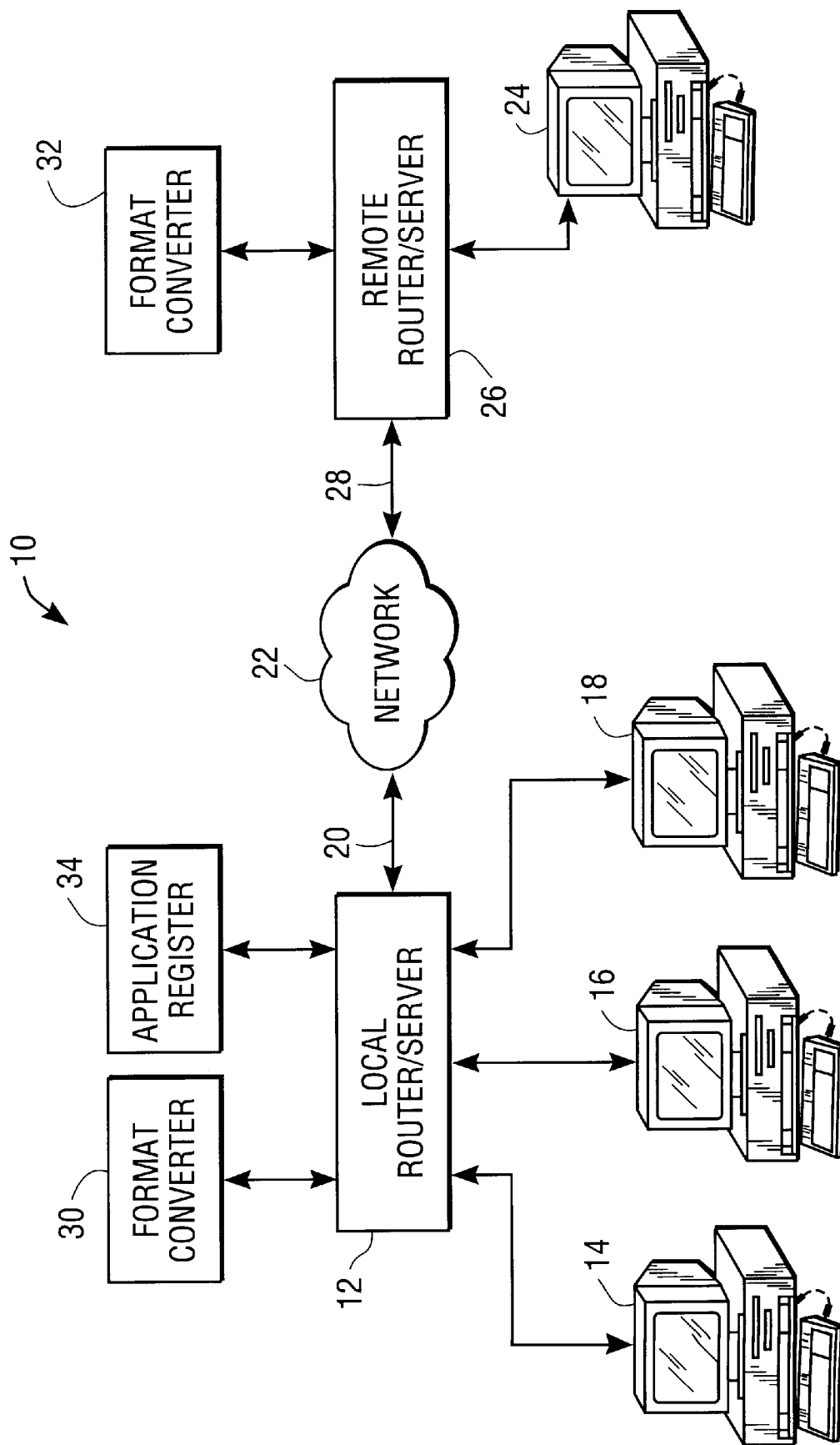


FIG. 1

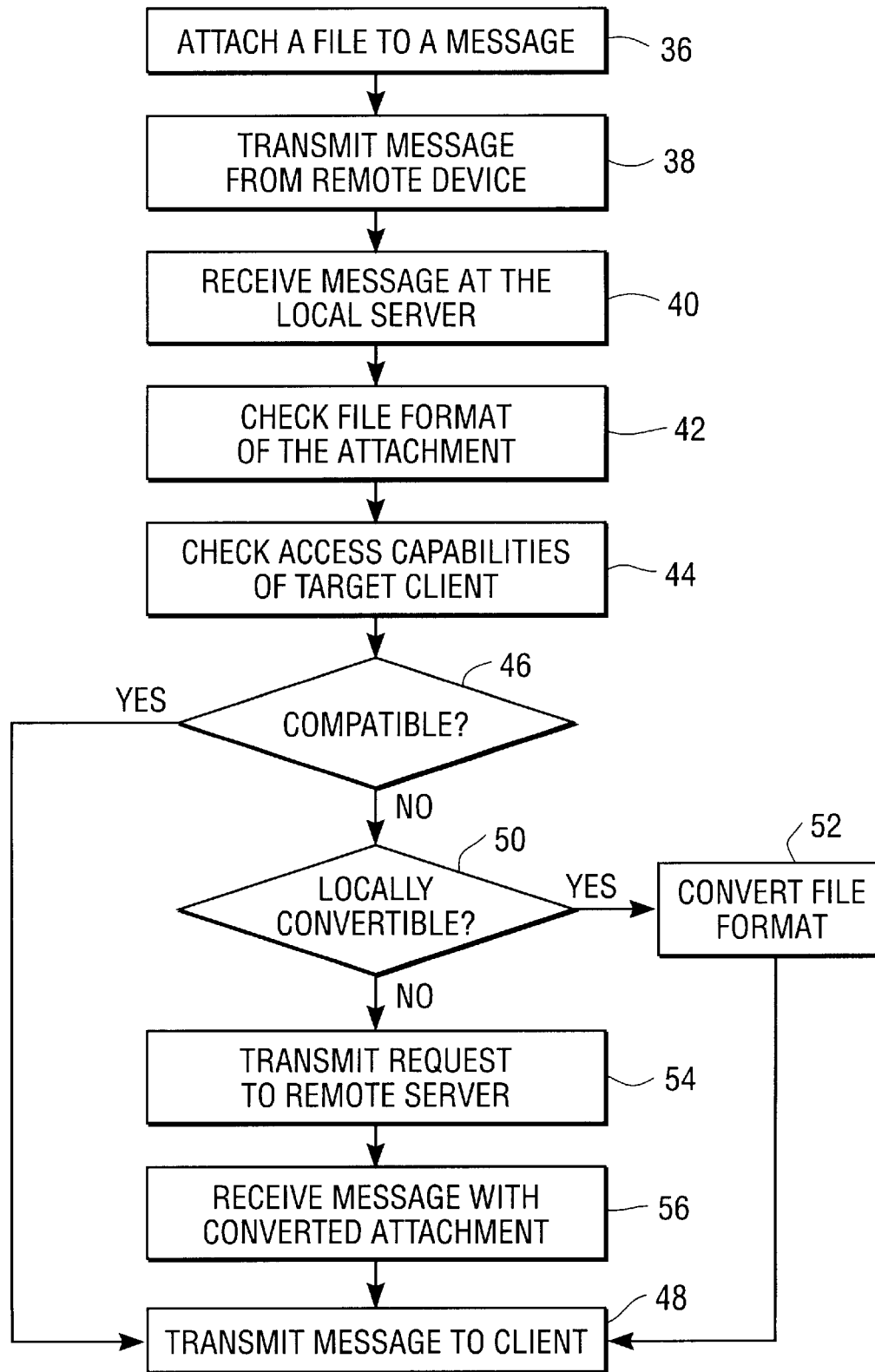


FIG. 2

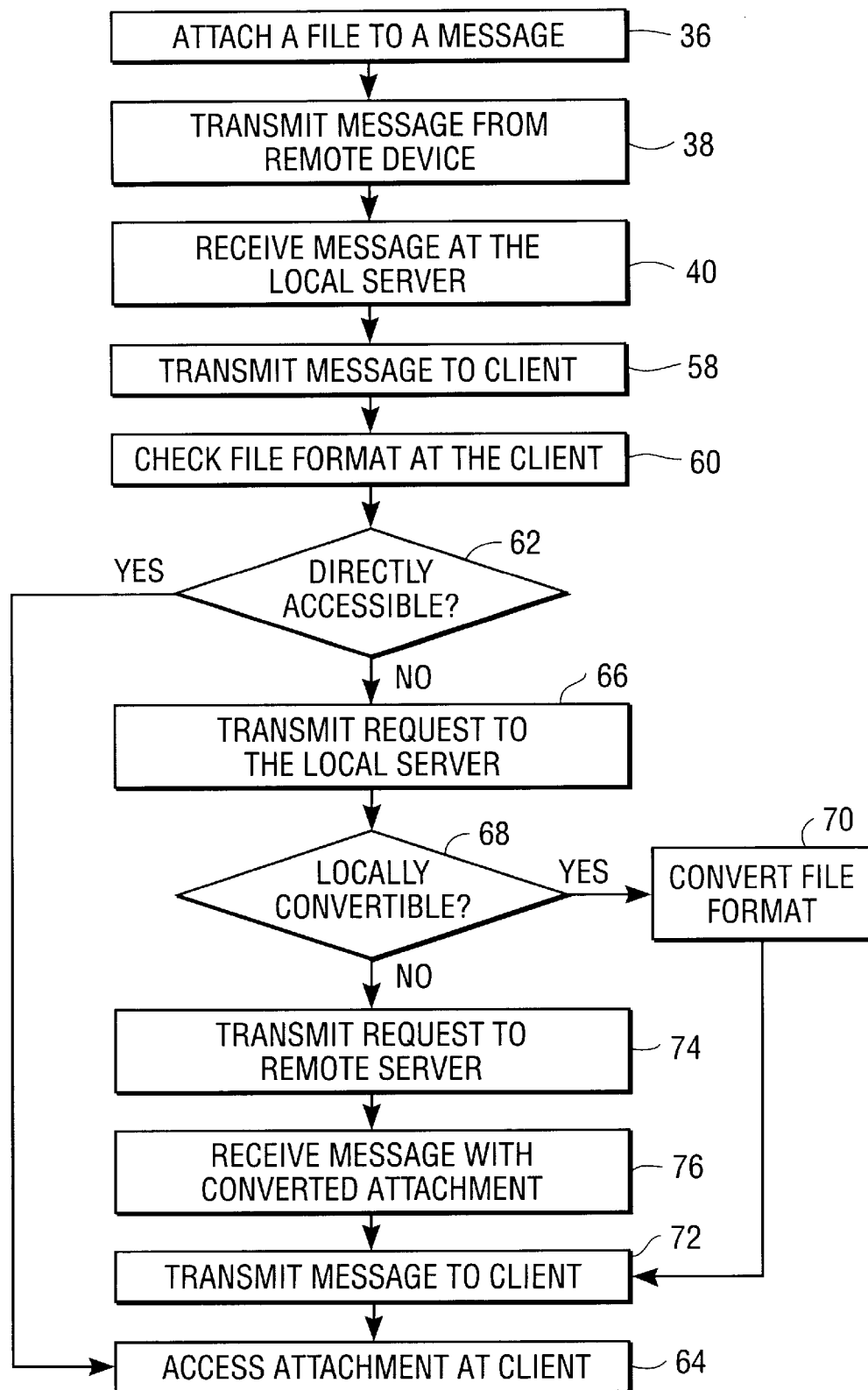


FIG. 3

**METHOD AND SYSTEM FOR  
DETERMINING THE LOCATION FOR  
PERFORMING FILE-FORMAT  
CONVERSIONS OF ELECTRONICS  
MESSAGE ATTACHMENTS**

**BACKGROUND OF THE INVENTION**

The invention relates generally to message delivery systems and more particularly to methods and systems for providing compatibility between file attachments of the messages and resource capabilities of devices to which the messages are directed.

**DESCRIPTION OF THE RELATED ART**

Systems that support the exchange of text messages among users often allow files to be attached to messages. As one example, electronic mail (i.e., email) may have an attachment that is a word processing document, or an audio, video or graphics file. As another example, a download of a message from a web site on the World Wide Web may include an attached text file in Hypertext Markup Language (HTML) or an attached audio, video or graphics file.

Messages may be transmitted from a sending client device (such as a computer) or from a remote server (such as a web server) to a message transport server that supports a computer or other client device at which the receiving party attempts to access the message. In an email environment, a sending party may generate an email message at a first computer that transmits the message to a first email server. If the first email server does not support message access for the party to whom the message is directed, the first email server forwards the message to a second email server that supports access by the receiving party. The message is stored at the second server for download by the receiving party.

Such message exchange systems operate seamlessly for messages that do not include file attachments, since the systems are designed for sending embedded text. Email is basically an ASCII text system. Difficulties arise when a message includes an attached file. Seamless access to the attached file may be inhibited by decoding-specific requirements or application-specific requirements upon the receiving client device. Regarding the decoding-specific requirements, attached files are typically encoded to accommodate transmission within a network, such as the Internet. There are different available protocols for accomplishing the encoding. One such protocol is Multimedia Internet Mail Extensions (MIME), which converts the attached files to text and sends the converted text within the message. The converted text is then reconverted to its original form at the receiving client device. Other well known standards include UUencode and BinHex. At the receiving client device, the same encoding standard must be used to decode the attached file, if the file is to be accessed.

Even if the attached file is properly decoded at the receiving client device, the file will not be accessible unless the client device has the required application program for opening the attached file. Typically, an attachment has a file format that is specific to an application. For example, an email attachment of a word processing text file may be specific to a particular word processing program. Access to the text is possible only if the receiving client device includes the program or has the capability of converting the decoded file to another file format that is accessible. Video, audio and graphics files typically have more exacting demands. For example, an AVI video formatted file is not converted to a MPEG video formatted file without signifi-

cantly more complexity than the process of converting from one application-specific word processing file format to a second application-specific word processing file format.

Many client devices have the capability of converting attachments from a limited number of inaccessible file formats to an acceptable me format. If the attachment is a relatively short word processing document, this capability is all that is required for efficient display of the document at the receiving client device. However, if the attached file is large, such as an intra-corporation multimedia presentation of a new product release, the required time to convert the attachment between file formats may lead to a significant inefficient use of the time of corporate personnel. Particularly in the conversion of multimedia file attachments, a complex algorithm must be utilized.

Thus, if a file attachment is received that requires an application that is "foreign" to the receiving computing device, the first issue is whether the computing device is capable of converting the attachment to an accessible file format. A second issue relates to the time requirements of the conversion process, if a conversion is executable. A third issue relates to the reliability of the conversion operation. Often, the conversion causes data loss.

What is needed is a messaging method and system that provide an efficient and reliable exchange of attached files in a multi-application environment.

**SUMMARY OF THE INVENTION**

A method and system for exchanging electronic messages, such as email messages, include out-tasking conversions of file formats when it is determined that a client device does not include the resources to directly access an attachment without conversion. The access requirements of each attachment to electronic messages are compared to the capabilities of the client device to which the attachment is to be transferred. If it is determined that a file-format conversion is required, the conversion operation is assigned to a server that supports the process of reformatting the attachment. In an email environment, the server may be substantially equivalent to the conventional email server, but includes enhanced conversion capabilities.

In one embodiment, the determination of whether an attachment is accessible without conversion by a target client device occurs at the server. One means of enabling the server to execute the determination is to maintain a universal register of applications at the server. The universal register may be a lookup table that identifies each application program stored at each client device supported by the server. The lookup table may also include data that matches each user (i.e., potential recipient) with a client device at which the user typically accesses messages (e.g., a target computer). When a message is received at the server, the file format of any attachment is identified. In its simplest form, this is accomplished by looking at the file extension (e.g., .BMP identifies a bitmap graphics format and .MPEG indicates a specific video format). Alternatively, the format indicator may be embedded by the sending party within the message that includes the attachment. As a third possibility, the server may access each attachment in order to identify its file format. If a file-format conversion is necessary, the conversion can be implemented at the server, thereby freeing resources and processing time at the target client device. In this embodiment, the conversion may be transparent to the receiving party.

In another embodiment, the determination of whether an attachment is accessible without conversion occurs at the

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