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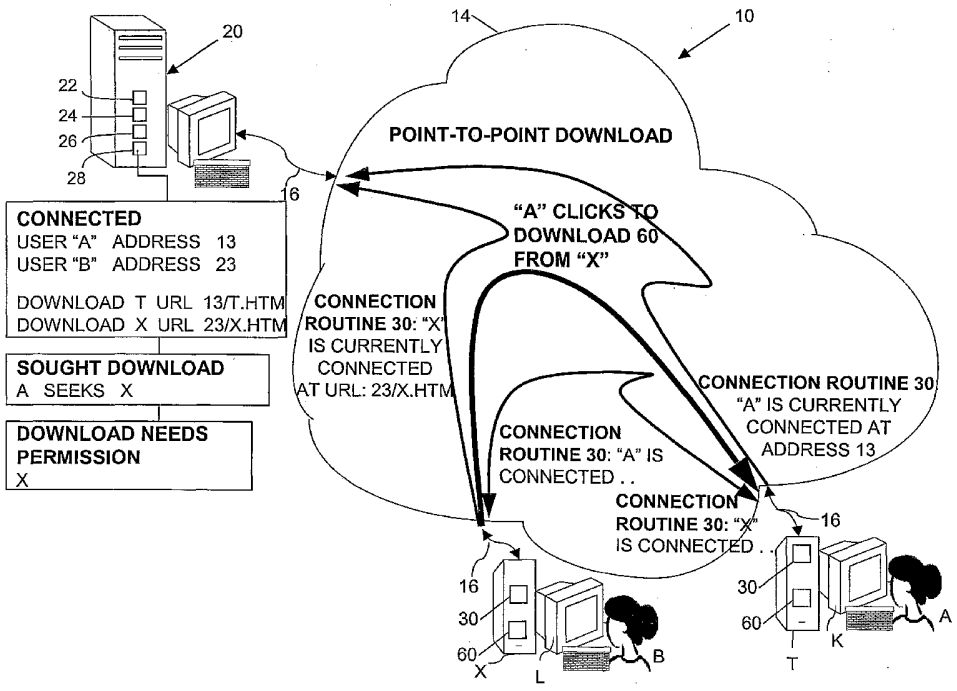
(54) Title: NETWORK DOWNLOAD SYSTEM



(57) Abstract: In one embodiment, the invention provides a method, comprising detecting a dynamically assigned network address associated with a server, copying a file to be published into a directory from which a server attempts to retrieve downloadable files for a network, and building a uniform resource locator (URL) for the file

WO 2004/100429 A2

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

NETWORK DOWNLOAD SYSTEM

[0001] This application claims priority to Provisional U.S. Patent Application No. 60/467,739, filed May 1, 2003, entitled "Network Download System," and to Provisional U.S. Patent Application No. 60/467,545, filed May 1, 2003, entitled "Network Meeting System," both of which are hereby incorporated by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to network communications systems generally and particularly network download systems.

BACKGROUND

[0003] Personal-servers are available on computers such as Windows PCs by installing server software, e.g. free Microsoft personal-server software such as pws10a.exe on Windows 95/98/Me, or Internet Information Server 3.0 or later on Windows 2000/NT/XP. When installed, a personal-server allows any user using a computer such as a Windows PC to have his/her own network server (e.g. web-site) when the computer is connected to an interconnected network (e.g. the Internet).

[0004] Establishing a point-to-point connection between users and a personal-server (to download contents, e.g. HTML or XML web-pages) connected to an interconnected network generally requires that a URL (universal resource locator) address of the personal-server be known to all users.

[0005] Today's Internet uses domain name and DNS (domain name server) lookups to allow Internet users to download content from web-sites or servers. A domain name is a name assigned to a fixed numeric IP Address, functioning as part of an URL (universal resource locator) address. For example, the domain name stanford.edu represents a fixed numeric IP address 171.64.14.203. Domain names are used in URLs to identify particular content such as web-pages. In the URL http://www.stanford.edu/index.html, the domain name is stanford.edu. The DNS (domain name server) system matches a domain name to the correct fixed numeric IP address so that Internet users can visit a web-site (e.g. www.stanford.edu) without knowing its numeric IP address. A web-site typically uses a default page index.html to form a

default URL, e.g. http://www.stanford.edu/index.html, to allow content download when Internet users visit the site.

[0006] Many network communications service providers, such as Internet Service Providers (ISP's), assign a connecting computer (and hence connecting personal-servers installed in the connecting computers) a different network address, such as an IP address, each time the connecting computer connects to the network, making foreknowledge of a particular personal-server's URL impossible (for other users to download personal-server contents). For computers and personal-servers having direct connections to the Internet through a company or organization, the IP addresses of the computers and personal-servers may be remapped, may change over time, or may be machine dependent. Furthermore, many companies and organizations have a computer network security barrier commonly referred to as a "firewall" to stop unauthorized intrusion into their computer networks, and the firewall may translate an IP address for a particular computer or personal-server such that the computer or personal-server is identified by a different IP address each time a connection the computer or personal server is made.

[0007] Some commercial and non-commercial services maintain network servers connected to a network. Users who connect to the network provide their current network address and other identifying information to these network servers. This information is made available to other users connected to the network for purposes such as establishing point-to-point communications. Such services include Internet Relay Chat (IRC), and Microsoft User Location Service (ULS).

[0008] These services require that users actively seek out other users, often from among several hundreds or thousands of users known to a server to be connected to a network at any given time. Such services also do not enable a user to limit who may access that user's identification information.

[0009] In recent years, popular instant messaging services from Microsoft, AOL, ICQ, Yahoo!, etc. provide an improved communications system for locating a user who is connected to an interconnected network, for the purposes of establishing point-to-point communications. However, a user's location on an interconnected network is still expressed in terms of the user's current network address.

[0010] Unfortunately, one problem of the above-mentioned services is that if the central server(s) (e.g. for instant messaging service) goes down, all connected users lose their service. In addition, a second problem associated with the above-mentioned services e is that they do not generally provide for the unique identification of URL of a user's personal-server content. Thus, quick and accurate location of specific personal-server content for purposes of downloading the content is difficult.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a simplified pictorial illustration of a network download system constructed and operative in accordance with one embodiment of the present invention, wherein a user "A" is connecting to an interconnected network 14 via a computer "K" and user information is provided to a database-server 20 connected to the interconnected network 14.

FIG. 2 is a simplified pictorial illustration of a network download system constructed and operative in accordance with one embodiment of the present invention, wherein a sought download "X" is connecting to the interconnected network 14 of **FIG. 1**, information identifying the sought download "X" is provided to the database-server 20 of **FIG. 1**, and wherein the database-server 20 of **FIG. 1** communicates information identifying the seeking user "A" to the sought download "X" of **FIG. 1** (which database-server 20 in turn reports information identifying the sought download "X" to the seeking user "A").

FIG. 3A is a simplified pictorial illustration of a network download system constructed and operative in accordance with one embodiment of the present invention, wherein the user "A" of **FIG. 1** downloads the sought download "X" of **FIG. 2**, having received the network URL address of the sought download "X".

FIG. 3B is a simplified pictorial illustration of a network download system constructed and operative in accordance with one embodiment of the present invention, is an extension of **FIG. 3A**, and shows the connection update 30 details when users "A", "B", and "C" clicks to download sought download "Z".

FIGS. 4-7 show user interface (e.g. web-page) layouts and hypertext selections in one embodiment of the present invention.

FIG. 8 shows the basic architecture for user interface (e.g. web-page) layouts.

FIG. 9 shows an overall design of the flow structure of the user interface (e.g. web-page).

FIG. 10A is a simplified pictorial illustration of a network download system constructed and operative accordance with one embodiment of the present invention, wherein the user "AA" downloads the sought download "X" of **FIG. 2**, by clicking instant message (which has hypertext-link to the URL address of the sought download "X") from "BB", and wherein both users "AA" and "BB" are connected and exchange messages using instant messaging software from Microsoft, AOL, ICQ, Yahoo!, etc.

FIG. 10B is a simplified pictorial illustration of a network download system constructed and operative in accordance with one embodiment of the present invention, is an extension of **FIG. 10A**, and shows users "AA", "BB", and "CC" clicks instant messages from "DD" to download sought download "Z".

FIG. 11 shows a flowchart of operations performed by a computer in accordance with one embodiment of the invention.

FIG. 12 shows a flowchart of operations performed by a server in accordance with one embodiment of the invention.

FIG. 13 shows a high-level block diagram of hardware that may be used to implement any of the servers and computers of the present invention.

DETAILED DESCRIPTION

[0011] In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the invention. It will be apparent, however, to one skilled in the art that the invention can be practiced without these specific details. In other instances, structures and devices are shown in block diagram form in order to avoid obscuring the invention.

[0012] Reference in this specification to "one embodiment" or "an embodiment" means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the invention. The appearances of the phrase "in one embodiment" in various places in the specification are not necessarily all referring to the same embodiment, nor are separate or alternative

embodiments mutually exclusive of other embodiments. Moreover, various features are described which may be exhibited by some embodiments and not by others. Similarly, various requirements are described which may be requirements for some embodiments but not other embodiments.

[0013] Reference is now made to FIG. 1, which is a simplified pictorial illustration of a network download system 10 constructed and operative in accordance with an embodiment of the present invention.

[0014] A network download system 10 includes various computers "T" and personal-servers "T" and "X" (which may be server software installed in the computers "T") connectable to an interconnected network 14 (e.g. LAN, WAN, Internet, etc.) via various connection means 16 (e.g. dial-up, leased line, wireless LAN, etc.), which may either be wired or wireless. Computer "K" and personal-servers "T" (and "X") can receive input from and display output to user "A", and to transmit and receive information via interconnected network 14 to and from at least one database-server 20 that is also connected to interconnected network 14 via connection means 16. Database-server 20 can also send and receive information via interconnected network 14.

[0015] User "A" starts network-browser/custom-software and connection routine 30 on computer "K" (and preferably personal-server "T"), which is connected to interconnected network 14. In one embodiment, address routine 26 resides in computer "K" (and personal-server "T"), where address routine 26 (e.g. custom C++ software using Microsoft Winsock API (applications interface) extracts the IP address of computer "K" (and personal-server "T") from the HOSTENT structure which is a data structure allocated by Windows Sockets and which is used by the C++ programming language Windows functions to store information about a given host, such as host name, IP address, and so forth.);determines the network address of computer "K" (and URL address of sought content download in personal-server "T" or "X") when a connection to interconnected network 14 is established, and provides the network address (and URL address) to network browser (or custom software) and connection routine 30.

[0016] Network browser/custom-software and connection routine 30 transmit a notification when first connected and then periodically (at intervals changeable, e.g. by database-server 20) via interconnected network 14 to server daemon 22 (e.g. HTTPD or

Hypertext Transfer Protocol daemon or program that waits in attendance for requests to come in from the rest of the Internet), which can receive input via interconnected network 14, and which is typically in database-server 20. User "A" enters user data (user name, password, etc.) on computer "K" (or personal-server "T"). Said user "A" data together with said network address (and URL address) information (from address routine 26) are sent from connection routine 30 and received by server daemon 22 and provided to server database 28 (e.g. Microsoft SQL database), where user information, network and URL address is maintained.

[0017] On data-base server 20, a different address routine 26 (e.g. a CGI program obtains a seeking user's (a "seeking user" is a user who is seeking to download content) IP address from the CGI environment variable REMOTE.sub.-- ADDR and stores it in server database) may alternatively or additionally determine the source network address (e.g. IP address) of the notification received by server daemon 22. Said different address routine 26 may alternatively or additionally provide the network (and URL) address to server database 28 (e.g. Microsoft SQL database), and may alternatively or additionally resident in database-server 20, where the network (and URL) address is maintained.

[0018] A reporting routine 24 (e.g. a CGI program) in database-server 20 retrieves information maintained by server database 28 and transmit this information to various computers "T" (and personal-servers "T" and "X").

[0019] A typical operation of network download system 10 is described in detail below with reference to FIGS. 1, 2, and 3.

[0020] Reference is now made to FIG. 1 which shows a user "A" establishing a connection to an interconnected network 14 (e.g. LAN, WAN, Internet, etc.) using a computer "K" (and preferably personal-server "T") via connection means 16. The connection to interconnected network 14 may be fixed line or wireless, and is typically via a leased line (e.g. DSL, ISDN, T1, wireless LAN) or dial-up line (e.g. POTS, GSM/CDMA/3G) to a network communications service provider, typically an Internet Service Provider (ISP) or telecom company.

[0021] At least one database-server 20 is typically continually connected to the interconnected network 14 via connection means 16. More than one database-server 20

may be provided wherein all database-servers are continually synchronized to have the same information.

[0022] Once user "A" is connected to interconnected network 14, user "A" uses network browser (or custom software) and connection routine 30 to notify (when first connected and then periodically at intervals changeable, e.g. by database-server) server daemon 22 that user "A" is connected to interconnected network 14. This notification may include a unique user name predefined for user "A" and may be maintained in a list of connected users by server database 28. The unique user name may be independent of the computer "K" used by user "A". The notification may also comprise a user password for authentication that the user "A" has authority to use the unique user name. This notification may also include other information such as the current network (and URL) address for computer "K" (and personal-server "T") used by user "A".

[0023] Address routine 26 (on computer "K") determines the current network address of user "A" when computer "K" is connected to interconnected network 14. Address routine 26 (on computer "K") may use the Microsoft Winsock API (Application Programmers Interface) to extract the network (and URL) address of computer "K" (and personal-server "T") from the HOSTENT structure which is a data structure allocated by Windows Sockets and which is used by C++ programming language Windows functions to store information about a given host, such as host name, network address, etc. Address routine 26 (on computer "K") then communicates the network (and URL) address to connection routine 30, which then communicates it to (database-) server daemon 22, when computer "K" is first connected and then periodically at intervals changeable, e.g. determined by the database-server. The current network (and shared-file/download URL) address for user "A" (i.e. computer "K" and personal-server "T") is then provided to (database-) server database 28 which maintains the network (and URL) address in a list of connected users (i.e. computers "T") and content downloads (in personal-servers "T" and "X") 60.

[0024] On database-server 20, a different address routine 26 (e.g. a CGI program obtains the seeking user's IP address from the CGI environment variable REMOTE.sub.-- ADDR and stores the IP address in server database 28) may alternatively or additionally determine the source network address (e.g. IP address) of the notification received by server daemon 22. Said different address routine 26 may

alternatively or additionally provide the network (and URL) address to server database 28 (e.g. Microsoft SQL database), and may alternatively or additionally be resident in database-server 20, where the network (and URL) address is maintained.

[0025] While said different address routine 26 communicates with database-server database 28 as mentioned above, said different address routine 26 (on database-server 20) may alternatively or additionally communicate with computer "K"(and personal-servers "T" and "X"), providing the computer "K" (and personal-servers "T" and "X") the current network (and URL) address to network browser (or custom software) and connection routine 30 on computer "K" (and personal-servers "T" and "X").

[0026] Computer "K" provides a set of sought (content) downloads predefined by user "A" to server database 28,which then maintains the set of sought downloads eg. in the form of a list. Server database 28, upon receipt of a set of sought (content) downloads from user "A" at computer "K", checks the list of connected (content) downloads for any sought (content) downloads that are currently connected to interconnected network 14, typically for display on the computer "K". If connected sought downloads are found, server database 28 causes reporting routine 24 (e.g. CGI program) to transmit a report to user "A" at computer "K" wherein the report typically includes the unique (content) download names and (preferably their hypertext links to) URL addresses for all sought (content) downloads currently available for download on interconnected network 14 and which is being sought by user "A" (i.e. computer "K").

[0027] Server daemon 22 receives connection updates from connection routine 30 of computer "K" (when first connected and then periodically at intervals changeable, e.g. set by the database-server) that computer "K" is currently connected or disconnected to interconnected network 14 in accordance with network communications protocols well known in the art, such as TCP/IP.

[0028] Reference is now made to FIG. 2 which shows download "X" (in personal-server "X" establishing a connection to interconnected network 14 in the same manner as described for user "A" (i.e. computer "K" or personal-server "T") in FIG. 1. Once download "X" (in personal-server "X") is connected, server database 28 checks the list of sought (content) downloads and the corresponding seeking users to determine if download "X" (in personal-server "X") is sought by user "A". If so, server database 28 then checks the list of connected users to determine if user "A" is currently connected.

If user "A" is still connected, server database 28 causes reporting routine 24 (e.g. CGI program) to transmit a report to user "A", wherein the report typically includes the unique (content) download name (e.g. download "X") for sought download "X", and the current network URL address (e.g. 222/D2.HTM, referring to FIG. 2) for sought (content) download "X".

[0029] According to another embodiment of the present invention server database 28 checks the list of (content) downloads who wish to be asked for permission to determine if download "X" wishes to explicitly permit requests from seeking users for information regarding (content) download "X". If explicit permission is required from download "X", reporting routine 24 (e.g. CGI program) transmits a request for permission to permission routine 36 (e.g. custom software checking seeking user name and/or password against a list of permitted users and password in personal-server "X"), typically resident in personal-server "X" (and "T"). Permission routine 36 (in personal-server "X") permits or declines the request from user "A" for URL address location or other information relating to (content) download "X". Permission routine 36 then provides the permission information to server database 28 which determines what reporting routine 24 (e.g. CGI program) will transmit (i.e. permission approved or denied) to user "A" (i.e. computer "K").

[0030] Server daemon 22 receives connection updates from connection routine 30 of personal-server "X" (and "T") when first connected and then periodically at intervals changeable (e.g. by database-server), that (content) download "X" (in personal-server "X") is currently connected or disconnected to interconnected network 14 in accordance with network communications protocols well known in the art, such as TCP/IP.

[0031] Reference is now made to FIG. 3A which shows user "A" (i.e. computer "K") making point-to-point connection to download sought (content) download "X" using the network URL address of sought (content) download "X" as provided by reporting routine 24 (e.g. CGI program) as described above with reference to FIGS. 1 and 2. FIG. 3B shows the connection update 30 details when users "A", "B", and "C" click to download sought download "Z". It will be appreciated that user "A", etc. may establish a point-to-point connection to download (content) download "X" once user

"A" possesses the network URL address of (content) download "X" independent of the present invention.

[0032] One method for constructing a network download system operative in accordance with an embodiment of the present invention is now described:

[0033] Construct an interconnected network 14 such as a LAN (local-area network) or a WAN (wide-are network) using a network protocol such as TCP/IP, or provide access to an interconnected network 14 such as the Internet.

[0034] Connect a computer "K", such as an Intel-based computer using the Microsoft Windows operating system, and a personal-server "X" (e.g. by installing Microsoft Personal Web Server (pws10a.exe) or Microsoft Internet Information Server (IIS 3.0 or later)) on the same or different computer, to the interconnected network 14.

[0035] Connect a database-server 20, such as an Intel-based computer operating the Windows 2000 advanced server operating system with database software (e.g. Microsoft SQL database) installed, to the interconnected network 14 at a designated network IP address, or at a designated site such as "http://www.databaseserver.com" if the interconnected network 14 is the Internet.

[0036] A user "A" using a web browser (or custom software) on computer "K" may go to the database-server 20 at the designated network address, or designated site "http://www.databaseserver.com" if the interconnected network 14 is the Internet. At this site, referring to FIG. 4, the user may enter his/her user name and password, and click My Shared File (31) selection (with My Shared File download preferably from personal-server "T" installed in user's computer "K") or click sought-download (33) selection.

[0037] Referring to FIG. 5, the My Shared File selection (31) provides the user "A" with a form asking for information pertinent to My Shared File (i.e. content download "T" by other users typically from its personal-server "T"), information such as My Shared File name (download "T" in FIG. 5), personal-server (network) IP address and My Shared File (in personal-server), and shared-file type. The user "A" may browse its personal-server "T" world wide web (WWW) root directory (or sub-directory) for its My Shared File (typically HTML or XML web-page that would be available for other users to download as content). The user "A" may enter a network IP address for his/her personal-server "T" if the user's computer "K" has a personal-server "T" address

routine 26 installed, address routine 26 extracts the network IP address from Windows HOSTENT as explained above, or alternatively database-server 20 (different) address routine 26 may use the CGI environment variable REMOTE.sub.—ADDR (using database-server CGI script 58, referring to FIG 8). Personal-server "T" network address (e.g. IP1.IP2.IP3.IP4) and My Shared File name (e.g. MySharedFileName.htm) is concatenated together to form the URL (universal resource locator) address of My Shared File (e.g. http://IP1.IP2.IP3.IP4/MySharedFileName.htm). With the said My Shared File (content) download "T" URL address, other users may download and display on their web browser the My Shared File, i.e. (content) download "T", of user "A" via the interconnected network 14, e.g. Internet. (The terminology for My Shared File (content download "T") then becomes other users' sought (content) download "T".)

[0038] If My Shared File type is private, the user "A" may enter a password (136 in FIG. 5) required for hi/her My Shared File (content) download "T", or select permitted users (35) selection to add, delete, review user names permitted (refer to FIG. 6) to download his/her My Shared File. Referring back to FIG. 5, the user "A" may then click to create or update (37) the My Shared File (content download "T") record (according to CGI script 58 in FIG. 8) for the server database 28 to store the latest information (My Shared File name, URL address, shared-file type, password, permitted users, and other pertinent information). When created, the said My Shared File information record is added into a My Shared File (content download, referring to FIG. 9) list containing the My Shared File (i.e. content download) information records of downloads in various personal-servers "T". This said My Shared File (content download) list is automatically updated (according to CGI script 58 in FIG. 8) to reflect current information (My Shared File name, URL address, shared-file type, password, permitted users, and other pertinent information) of My Shared File (content download) in various personal-servers "T", so that if a My Shared File (content download "T") of a personal-server "T" is online, users may seek to download it freely if it is a public My Shared File (content download), or may seek permission from the said My Shared File (content download "T") personal-server "T" and/or enter a password if it's a private My Shared File (content download "T"). (The terminology for My Shared File (content download "T") then becomes other users' sought content download "T".)

[0039] If interested to seek My Shared File (content download) from various personal-servers to download, referring back to FIG. 4, the user "A" may click the sought (content) downloads (33) selection to display a form (refer to FIG. 7) to review current sought (content) download status (online, offline, waiting permission, or permission denied), or to delete its sought (content) download entry, or to add sought (content) download (by entering sought download name and password if required by sought download).

[0040] The user "A" may:

a) click (44 in FIG. 7) online sought (content) download "X" (which has hypertext-link to the URL address of the sought download "X") to download and view the clicked online sought (content, typically a HTML or XML web-page) download "X" on web browser "T" (refer to FIG. 8).

b) click to create or update (40 in FIG. 7) its sought (content) download record (according to CGI script 58, referring to FIG. 8) to store the latest information (sought download name, password required, etc.) in server database 28.

[0041] When created (40 in FIG. 7), the said sought (content) download record of user "A" is inserted into a sought (content) download list containing the information records of sought (content) downloads of various users. When updating (40 in FIG. 7), the latest information (delete sought download, add sought download, password, and other pertinent information) updates the sought (content) download record of user "A" in the said sought (content) download list. If a sought (content) download has denied permission status, it is removed automatically (according to CGI script 58 in FIG. 8) during the update (after review by user "A").

[0042] FIG. 8 illustrates the basic architecture for the World-Wide Web interface for one embodiment. User "A" activates a web browser "T" (or custom software) on computer "K" (referring to FIG. 1), and connects to the interconnected network 14, e.g. Internet, via the web browser "T". By visiting a site such as database-server 20 in our example "http://www.databaseserver.com", a file in the hypertext mark-up language (HTML) format is sent to the user "A" and displayed by the web browser "T" on the user's computer "K" which preferably has a personal-server "T" installed. In certain cases, a form (for an example, refer to FIG. 4) requesting information from the user "A" is sent to the user "A" in HTML or XML format. If custom software "T" (e.g.

custom instant messaging software) is used, a custom (user interface) dialog-screen can be used (in lieu of HTML or XML form file) to request information from the user "A". By completing the form and sending it back to the database-server 20, a designated common gateway interface (CGI) script 58 (which typically is a series of commands in the PERL programming language) may be programmed to be executed by the database-server 20.

[0043] If user "A" clicks sought download selection (33 in example FIG. 4), the commands in the script file would request the database-server 20 to send a hypertext link for the URL address of the user's permitted online sought (content) download "X" to the user's web browser "T" (or custom software), which the user "A" may click (the hypertext link of the URL address for download "X") to download its sought (content) download "X" from another user's personal-server "X" (referring FIG. 3A and FIG. 8).

[0044] Similarly, other users may click their hypertext links for the URL address of My Shared File (download "T") of user "A" in the personal-server "T" to download the user's My Shared File (download "T"). (The terminology for My Shared File (content download "T") then becomes other user's sought download "T".)

[0045] FIG. 9 illustrates an overall user interface (e.g. web-page) flow structure (corresponding to FIGS. 4-7) of an implementation of the preferred embodiment of the present invention. The user interface (e.g. web-page) flow structure is briefly described and the major functions such as the create/update My Shared File function and the create/update sought download function are described in detail in the following sections. When visiting the database-server 20 on the Internet, the database-server 20 sends to the user "A" the Database-Server Log-in HTML or XML file 70 which provides user "A" log-in, and three hypertext selections (FIG. 4). By clicking on a selection, the log-in and corresponding CGI script files may be executed and the corresponding form HTML or XML file 31-34 is sent to user "A".

[0046] From the My Shared File (content download "T") HTML or XML web-page 31 (referring to FIG. 5), the user "A" may complete the My Shared File form, and select the create My Shared File selection 37 whereby the corresponding CGI script file 58 (FIG. 8) is executed, a new My Shared File record is created, and added to the My Shared File list (37 in FIG. 9). User "A" also may select permitted users (35 in FIG. 5) selection to permit other users to download its My Shared File (content download "T")

from the hi/her personal-server "T". The list of permitted users is displayed (FIG. 6, and 35 in FIG. 9) to user "A", and user "A" may add or delete other users, or change user permission. User "A" clicks selection 38 to create or update the permitted users information and the underlying permitted users CGI script is executed (38 in FIG. 9) to update the corresponding permitted users record and list in server database 28.

[0047] Under the sought (content) download page 33 (FIG. 7), the current sought (content) download status is retrieved (from server database 28, using corresponding CGI script 58 in FIG. 8) and displayed on the sought (content) download HTML or XML form (FIG. 7) which is displayed on web browser "T" for review by user "A". The user "A" may click online sought (content) download "X" (which has hypertext-link to the URL address of the sought download "X") to download and view the clicked online sought (content, typically a HTML or XML web-page) download "X" on a web browser "T". The user "A" may also complete the sought download form, and select the create/update sought download selection (40 in FIG. 7 and 9) whereby the corresponding CGI script file (58 in FIG. 8) is executed, the sought (content) download record is created/updated, and the sought (content) download list is updated.

[0048] From the public download page 34, (optionally) randomly selected online public (content) downloads are retrieved on the public (content) download form (accordingly to corresponding CGI script 58 in FIG. 8). The user "A" may also search for any public (content) download in the (content) download list (stored in server database 28) based on various criteria, e.g. download names which match a search string of characters, etc.

[0049] FIG. 10A illustrates one embodiment of the present invention, wherein:

a) both users "AA" and "BB" are connected and exchanges messages using instant messaging software from Microsoft, AOL, ICQ, Yahoo!, etc.

b) connection routine 30 (of personal-server "X") optionally creates text-message with hypertext-link to the URL address of the sought download "X" and saves said text-message in clip-board.

c) user "BB" sends the said clip-board text-message as instant message to user "AA" (by using Control_V, i.e. pressing the two keys "Control" and "V" simultaneously, to paste the said clip-board text-message onto its instant message dialog-box and then click "send" to send the instant message to "AA").

d) user "AA" receives said instant message from user "BB" and clicks said hypertext-link (to the URL address of the sought download "X") to download the sought download "X" of FIG. 2.

[0050] FIG. 10B is a simplified pictorial illustration of a network download system constructed and operative in accordance with an embodiment of the present invention, which is an extension of FIG. 10A, and shows users "AA", "BB", and "CC" receive instant messages from "DD" and click hypertext-links (to the URL address of the sought download "Z") to download sought download "Z".

[0051] Creating My Shared File (content download) in user's personal-server "T". Referring to FIG. 4, the My Shared File selection 31 provides the user "A" with the My Shared File form 31 (FIG. 5) sent by the database-server 20 to the user's web browser "T". The form provides blank spaces requesting My Shared File information from the user "A", information such as the My Shared File name (which by default is same as the user name), password (if needed for other users to download and view My Shared File (content download "T")), IP address (of the user's personal-server "T"), file name (of My Shared File (content download "T")), shared-file type, etc. The user "A" may browse its personal-server "T" WWW (world wide web) root directory (or sub-directory) for its My Shared File (content download "T") file. The user "A" may enter its personal-server's IP address, or preferably address routine 26 (on computer "K" or personal-server "T") uses Microsoft Winsock API (applications interface) to extract IP address from HOSTENT structure as described previously; alternatively or additionally, the IP address may also be obtained from the CGI environment variable REMOTE.sub—ADDR (using database-server 20 CGI script 58, referring to FIG 8). The user's personal-server IP address (e.g. IP1.IP2.IP3.IP4) and My Shared File name (e.g. MySharedFileName.htm) is concatenated together to form the URL address (e.g. http://IP1.IP2.IP3.IP4/MySharedFileName.htm) of My Shared File which allows download and display on web browser of the meeting participant's My Shared File (meeting content download "T") over the interconnected network 14, e.g. Internet.

[0052] If My Shared File type is private, the user "A" may enter password required for its My Shared File download, or select permitted users (35 in FIG. 5) selection to add, delete, review user names permitted (refer to FIG. 6) to download its My Shared File. The user "A" may then click to create or update (37 in FIG. 5) the My Shared File

record (according to CGI script 58 in FIG. 8) to store the latest information (My Shared File name, URL address, shared-file type, password, permitted users, and other pertinent information) in server database 28. When created, the said My Shared File record is added into the My Shared File (content download) list (in server database 28) containing the records for My Shared File (content download) in various personal-servers. This said My Shared File list is automatically updated (according to CGI script 58 in FIG. 8) to reflect current information (My Shared File name, URL address, shared-file type, password, permitted users, and other pertinent information) of My Shared File (content download) from various personal-servers, so that if a My Shared File (content download) of a personal-server is online, users may seek to download it freely if it is a public My Shared File (content download), or may seek permission from the said My Shared File (content download) personal-server and/or enter a password if it's a private My Shared File. (The terminology for My Shared File (content download) then becomes user's sought (content) download.)

[0053] Sought (content) downloads (over the Internet) from other user's personal-servers: If interested to seek (content) download from other personal-server "X" to download, referring back to FIG. 4, the user "A" may click the sought (content) download (33) selection to display a form (FIG. 7) to review current sought (content) download status (online, offline, waiting permission, or permission denied), or delete its sought download entry, or add sought download (by entering sought download name and password if required by sought download personal-server "X").

[0054] The meeting participant "A" may:

a) click (44 in FIG. 7) any online sought (content) download (which has hypertext-link to the URL address of the sought download) to download and view the clicked online sought (content, typically a HTML or XML web-page) download "X" on web browser "T" (refer to FIG. 8); or

b) click to create or update (40 in FIG. 7) its sought (content) download record (according to CGI script 58, referring to FIG. 8) to store the latest information (sought download names, passwords required, etc.) in server database 28.

[0055] When created (40 in FIG. 7), the said sought (content) download record of said user "A" is added into a sought (content) download list containing the information records of sought (content) downloads of various users. When updating (40 in FIG. 7),

the latest information (delete sought download, add sought download, password, and other pertinent information) updates the sought (content) download record of said user "A" in the said sought (content) download list in server database 28. If a sought (content) download has denied permission status, it'll be removed automatically (according to CGI script 58 in FIG. 8) during the update (after review by user "A").

[0056] Once the sought (meeting) download session is established, there is no traffic (data packets) going through the database-server 20. The users download and view the sought (content) download on a web browser (or custom software) directly from the sought (content) downloads' respective personal-servers over the interconnected network 14, e.g. Internet.

[0057] Removing the My Shared File (content download "T") from the user's personal-server "T". The user "A" may remove its My Shared File (content download "T") via blanking-out the My Shared File name (refer to FIG. 5) and un-authorizing (or deleting) all users from its My Shared File form (refer to FIG. 6). (The address routine 26 may also insert a random number or a string of random printable characters into the My Shared File name in the user's personal-server "T" wwwroot directory, so that each time a My Shared File is created/updated, it has a new My Shared File name and a new URL address to increase security, as described above.) The user's My Shared File (download) name will be deleted from the download list by a CGI script (58). This process can also be automated where the personal-server connection update routine 30 periodically notify the network database-server 20 to update/remove My Shared File (download) from the download list accordingly.

[0058] Note that in the case where a network has a firewall and there is a SOCKS proxy running between the browser "T" and the database-server 20, the CGI script gets the IP address of the SOCKS proxy rather than the IP address of the computer "K" that is running the browser "T". This problem is solved by providing a name registration daemon that registers each user's (i.e. computer "K") IP address and port number. When the computer "K" or personal-server "T" launches address routine 26 (and browser "T" or custom software), the said address routine 26 first makes a TCP/IP connection to the name registration daemon so that the daemon registers the IP address of computer "K" or personal-server "T".

[0059] It is appreciated that any of the software components of the present invention may, if desired, be implemented in ROM (read-only memory) form. The software components may, generally, be implemented in hardware, if desired, using conventional techniques.

[0060] In one embodiment of the invention described with reference to the flowchart of Figure 11, in process 1100, the computer K, detects a dynamically assigned address associated with a server i.e. the personal server T or a remote server (one that is not installed in the computer K), which address may be an IP address.

[0061] In process 1102, a file to be published is copied or put into a directory from which the personal server T attempts to retrieve downloadable files for a network (the Internet). The file to be published may represent any file including eg, streaming media files. The directory may be a well-known or default directory, for example, the wwwroot directory of an HTTP server.

[0062] In process 1104, a URL for the file is built. Process 1104 may be performed dynamically. Once process 1104 completes, process 1106 executes, wherein the URL is published. In one embodiment, publishing the URL may include sending an instant message containing the URL to another computer, eg. one that is seeking to download the file, as described above. In another embodiment, publishing the URL includes inserting an HTTP link to the URL in HTML for a web page.

[0063] In one embodiment of the invention described with reference to the flow chart of Figure 12, in process 1200, the database server 20 receives available-for-download information from at least one first computer eg, the computer K. The available-for-download information identifies content available for download from the first computer, for example, content such as the content identified by download X, above. In process 1202, the database server 20 stores the available-for-download information. In process 1204, the database server 20 receives sought download information from at least one second computer. Sought download information identifies content that is sought to be downloaded. In process 1206, the database 20 stores the sought download information. Thereafter in process 1208, the database server 20 selects a first computer to provide the content sought to be downloaded to the second computer. In process 1210, the database server 20 provides connection information to the second computer to enable the second computer to establish a

connection with the selected first computer in order to retrieve sought download from the selected first computer. In one embodiment, the connection information may comprise a URL for the sought download, as described above.

[0064] In one embodiment, the database server 20 may categorize the available-for-download information into one of a private download category, and a public download category. The stored available-for-download information in the public download category may be retrieved by the first and second computers for purposes of displaying the information to a user. In one embodiment, before providing the stored available-for-download information in the private download category to one of the first and second computers for displaying to a user, the database server 20 determines if the user has permission to access the information in the private download category.

[0065] Determining if the user has permission to access the information in the private download category may comprise, in one embodiment, verifying permission information provided by the user against permission information associated with the available-for-download information in the private download category. Before providing the connection information, the database server 20 may determine if an authentication challenge is required to be passed before the content sought to be downloaded can be downloaded. If an authentication challenge is required to be passed, the database server 20, may, in one embodiment, provide authentication information to the selected first computer, and thereafter only provide the connection information to the second computer if the authentication challenge is passed.

[0066] Referring to Figure 13 of the drawings, reference numeral 1300 generally indicates hardware that may be used to implement any of the servers and computers described above. The hardware 1300 typically includes at least one processor 1302 coupled to a memory 1304. The processor 1302 may represent one or more processors (e.g., microprocessors), and the memory 1304 may represent random access memory (RAM) devices comprising a main storage of the hardware 1300, as well as any supplemental levels of memory e.g., cache memories, non-volatile or back-up memories (e.g. programmable or flash memories), read-only memories, etc. In addition, the memory 1304 may be considered to include memory storage physically located elsewhere in the hardware 1300, e.g. any cache memory in the processor1302,

as well as any storage capacity used as a virtual memory, e.g., as stored on a mass storage device 1310.

[0067] The hardware 1300 also typically receives a number of inputs and outputs for communicating information externally. For interface with a user or operator, the hardware 1300 may include one or more user input devices 1306 (e.g., a keyboard, a mouse, etc.) and a display 1308 (e.g., a Cathode Ray Tube (CRT) monitor, a Liquid Crystal Display (LCD) panel).

[0068] For additional storage, the hardware 1300 may also include one or more mass storage devices 1310, e.g., a floppy or other removable disk drive, a hard disk drive, a Direct Access Storage Device (DASD), an optical drive (e.g. a Compact Disk (CD) drive, a Digital Versatile Disk (DVD) drive, etc.) and/or a tape drive, among others. Furthermore, the hardware 1300 may include an interface with one or more networks 1312 (e.g., a local area network (LAN), a wide area network (WAN), a wireless network, and/or the Internet among others) to permit the communication of information with other computers coupled to the networks. It should be appreciated that the hardware 1300 typically includes suitable analog and/or digital interfaces between the processor 1302 and each of the components 1304, 1306, 1308 and 1312 as is well known in the art.

[0069] The hardware 1300 operates under the control of an operating system 1314, and executes various computer software applications 1316, components, programs, objects, modules, etc. (e.g. a program or module which performs operations described above. Moreover, various applications, components, programs, objects, etc. may also execute on one or more processors in another computer coupled to the hardware 1300 via a network 1312, e.g. in a distributed computing environment, whereby the processing required to implement the functions of a computer program may be allocated to multiple computers over a network.

[0070] In general, the routines executed to implement the embodiments of the invention, may be implemented as part of an operating system or a specific application, component, program, object, module or sequence of instructions referred to as "computer programs." The computer programs typically comprise one or more instructions set at various times in various memory and storage devices in a computer, and that, when read and executed by one or more processors in a computer, cause the

computer to perform operations necessary to execute elements involving the various aspects of the invention. Moreover, while the invention has been described in the context of fully functioning computers and computer systems, those skilled in the art will appreciate that the various embodiments of the invention are capable of being distributed as a program product in a variety of forms, and that the invention applies equally regardless of the particular type of machine or computer-readable media used to actually effect the distribution. Examples of computer-readable media include but are not limited to recordable type media such as volatile and non-volatile memory devices, floppy and other removable disks, hard disk drives, optical disks (e.g., Compact Disk Read-Only Memory (CD ROMS), Digital Versatile Disks, (DVDs), etc.), among others, and transmission type media such as digital and analog communication links.

[0071] Although the present invention has been described with reference to specific exemplary embodiments, it will be evident that the various modification and changes can be made to these embodiments without departing from the broader spirit of the invention as set forth in the claims. Accordingly, the specification and drawings are to be regarded in an illustrative sense rather than in a restrictive sense.

[0072] It will be appreciated by persons skilled in the art that the present invention is not limited by what has been particularly shown and described hereinabove. Rather the scope of the present invention is defined only by the claims above.

CLAIMS

What is claimed is:

1. A method, comprising:

detecting a dynamically assigned network address associated with a server;

copying a file to be published into a directory from which a server attempts to retrieve downloadable files for a network; and

building a uniform resource locator (URL) for the file.

2. The method of claim 1, wherein the directory is a default directory.

3. The method of claim 1, wherein the directory is the www root directory of an HTTP server.

4. The method of claim 1, further comprising publishing the URL.

5. The method of claim 1, wherein the network address comprises an Internet Protocol (IP) address.

6. The method of claim 4, wherein publishing the URL comprises sending an instant message containing the URL to another computer.

7. The method of claim 4, wherein publishing the URL comprises inserting an HTTP link to the URL in HTML for a web page.

8. The method of claim 1, wherein building the URL is performed dynamically.

9. The method of claim 1, wherein the server comprises a remote server.

10. A method, comprising:

receiving available-for-download information from at least one first computer, the available-for-download information identifying content available for download from the first computer;

storing the available-for-download information;

receiving sought download information from at least one second computer, the sought download information identifying content sought to be downloaded;

storing the sought download information;

selecting a first computer to provide the content sought to be downloaded to the second computer; and

providing connection information to the second computer to enable the second computer to establish a connection with the selected first computer in order to retrieve the sought download from the selected first computer.

11. The method of claim 10, further comprising categorizing the available-for-download information into one of a private download category, and a public download category.

12. The method of claim 10, further comprising providing the stored available-for-download information in the public download category to one of the first and second computers for displaying to a user.

13. The method of claim 10, further comprising, before providing the stored available-for-download information in the private download category to one of the first and second computers for displaying to a user, determining if the user has permission to access the information in the private download category.

14. The method of claim 13, wherein determining if the user has permission to access the information in the private download category comprises verifying permission information provided by the user against permission information associated with the available-for-download information in the private download category.

15. The method of claim 10, further comprising, before providing the connection information, determining if an authentication challenge is required to be passed, before the content sought to be downloaded can be downloaded.

16. The method of claim 10, further comprising providing authentication information to the selected first computer; and providing the connection information to the second computer only if the authentication challenge is passed.

17. A computer-readable medium, comprising a sequence of instructions stored thereon, which when executed by a computer causes the computer to perform a method comprising:

detecting a dynamically assigned network address associated with a server;

copying a file to be published into a directory from which a server attempts to retrieve downloadable files for a network; and

building a uniform resource locator (URL) for the file.

18. A computer readable medium, having stored thereon a sequence of instructions which when executed by a computer causes the computer to perform a method, comprising:

receiving available-for-download information from at least one first computer, the available-for-download information identifying content available for download from the first computer;

storing the available-for-download information;

receiving sought download information from at least one second computer, the sought download information identifying content sought to be downloaded;

storing the sought download information;

selecting a first computer to provide the content sought to be downloaded to the second computer; and

providing connection information to the second computer to enable the second computer to establish a connection with the selected first computer in order to retrieve the sought download from the selected first computer.

19. A system, comprising:

a processor; and

a memory coupled to the processor, the memory storing instructions which when executed by the processor, cause the system to perform a method comprising:

detecting a dynamically assigned network address associated with a server;

copying a file to be published into a directory from which a server attempts to retrieve downloadable files for the network; and

building a uniform resource locator (URL) for the file.

20. A system, comprising:

a processor; and

a memory coupled to the processor, the memory storing instructions which when executed by the processor, cause the system to perform a method, comprising:

receiving available-for-download information from at least one first computer, the available-for-download information identifying content available for download from the first computer;

storing the available-for-download information;

receiving sought download information from at least one second computer, the sought download information identifying content sought to be downloaded;

storing the sought download information;

selecting a first computer to provide the content sought to be downloaded to the second computer; and

providing connection information to the second computer to enable the second computer to establish a connection with the selected first computer in order to retrieve the sought download from the selected first computer.

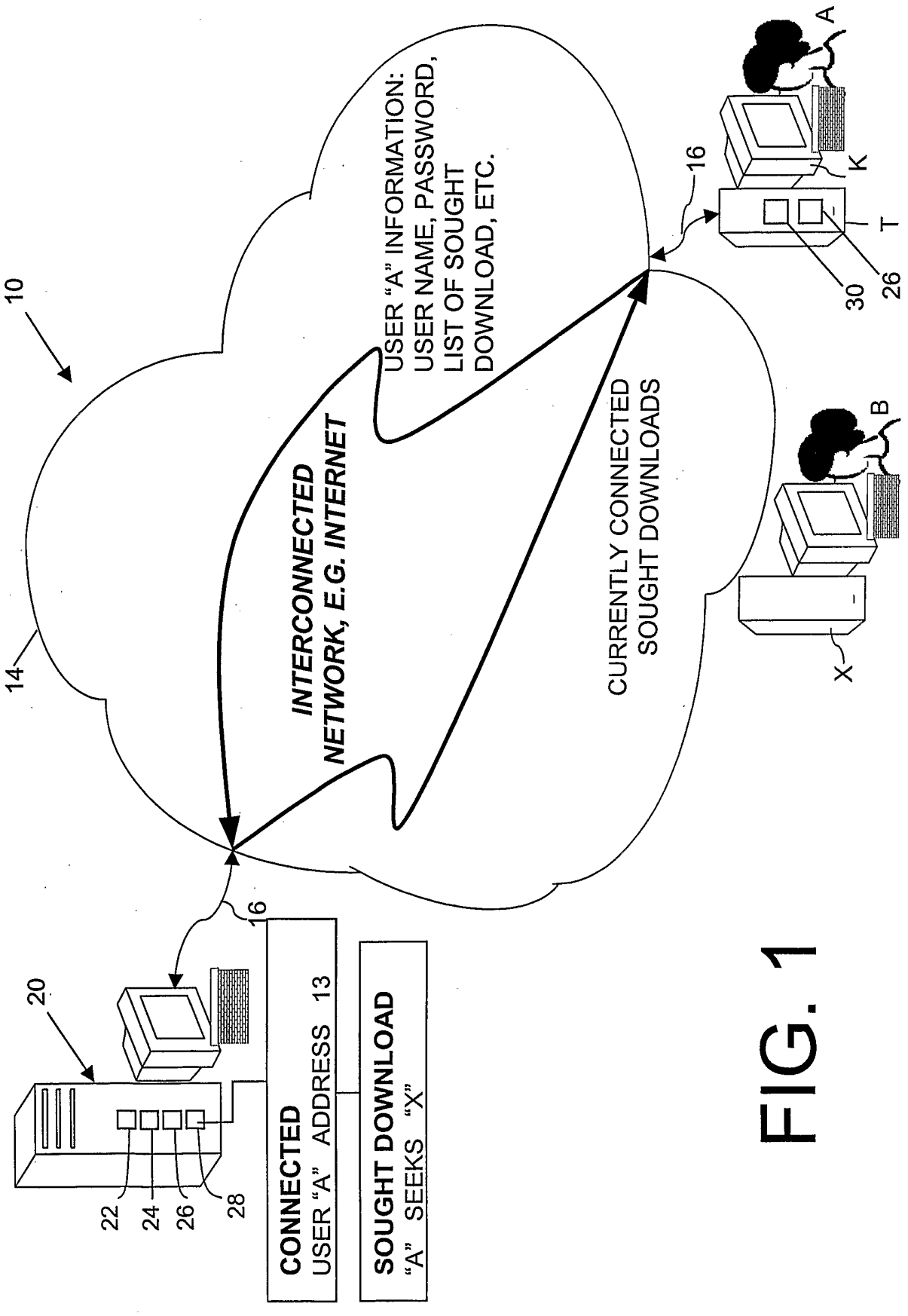

10
14
INTERCONNECTED
NETWORK, E.G. INTERNET
USER "A" INFORMATION:
USER NAME, PASSWORD,
LIST OF SOUGHT
DOWNLOAD, ETC.
CURRENTLY CONNECTED
SOUGHT DOWNLOADS
16
A
K
T
30
26
B
X
16
20
22
24
26
28
CONNECTED
USER "A" ADDRESS 13
SOUGHT DOWNLOAD
"A" SEEKS "X"

FIG. 1

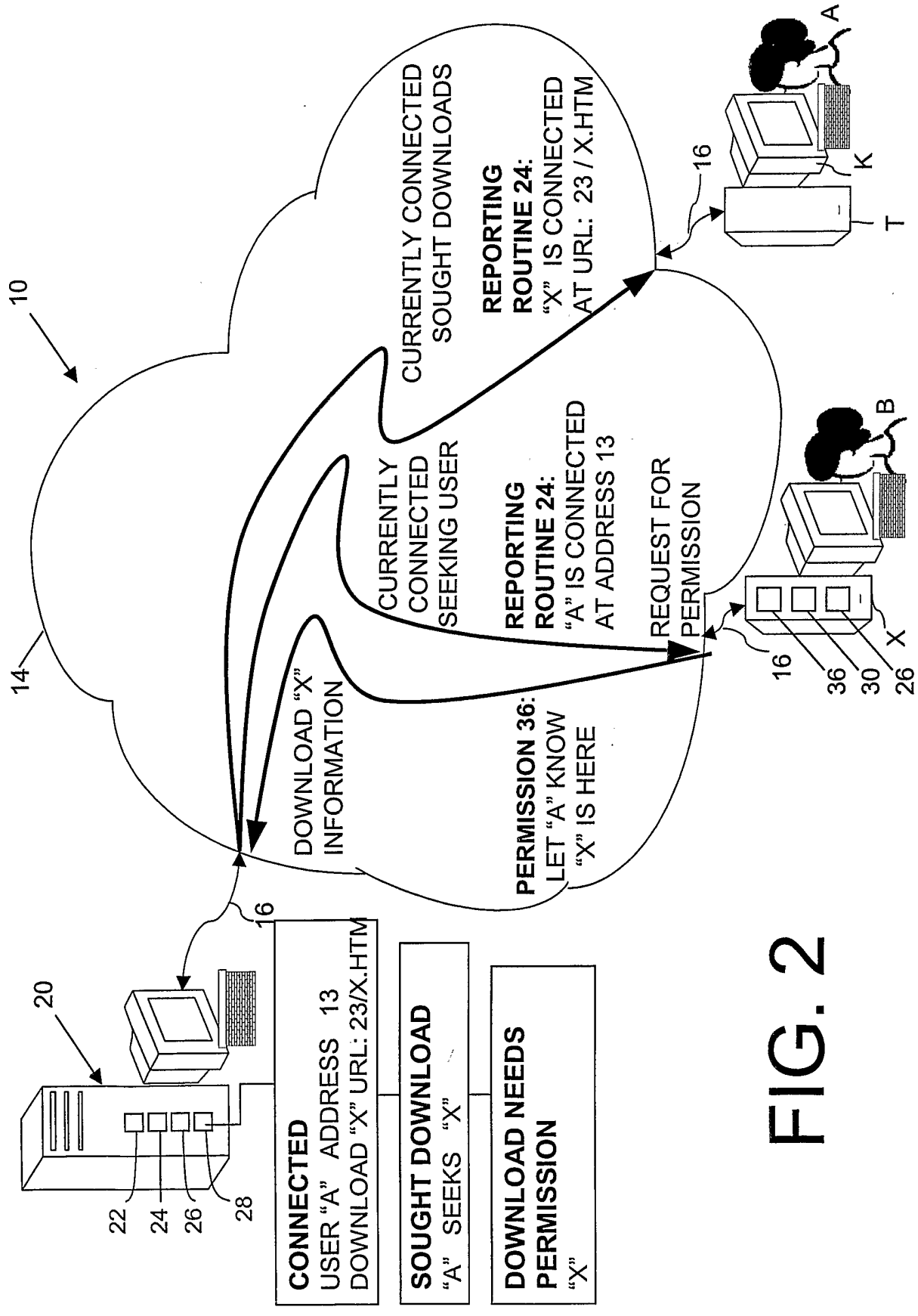

10
14
16
20
22
24
26
28
CONNECTED
USER "A" ADDRESS 13
DOWNLOAD "X" URL: 23/X.HTM
SOUGHT DOWNLOAD
"A" SEEKS "X"
DOWNLOAD NEEDS
PERMISSION
"X"
DOWNLOAD "X"
INFORMATION
CURRENTLY
CONNECTED
SEEKING USER
CURRENTLY CONNECTED
SOUGHT DOWNLOADS
REPORTING
ROUTINE 24:
"A" IS CONNECTED
AT ADDRESS 13
REPORTING
ROUTINE 24:
"X" IS CONNECTED
AT URL: 23 / X.HTM
REQUEST FOR
PERMISSION
PERMISSION 36:
LET "A" KNOW
"X" IS HERE
A
K
T
B
X
36
30

FIG. 2

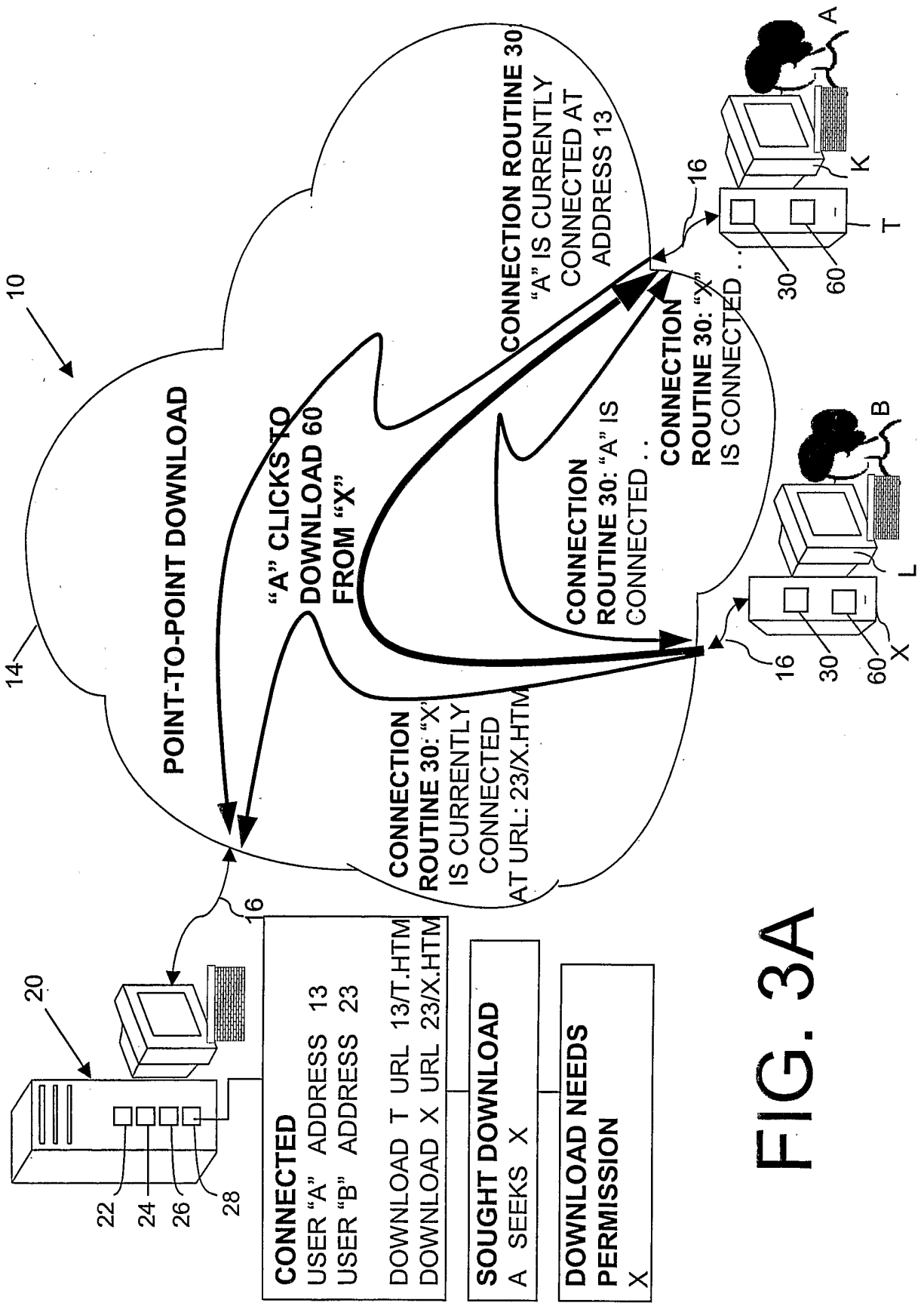
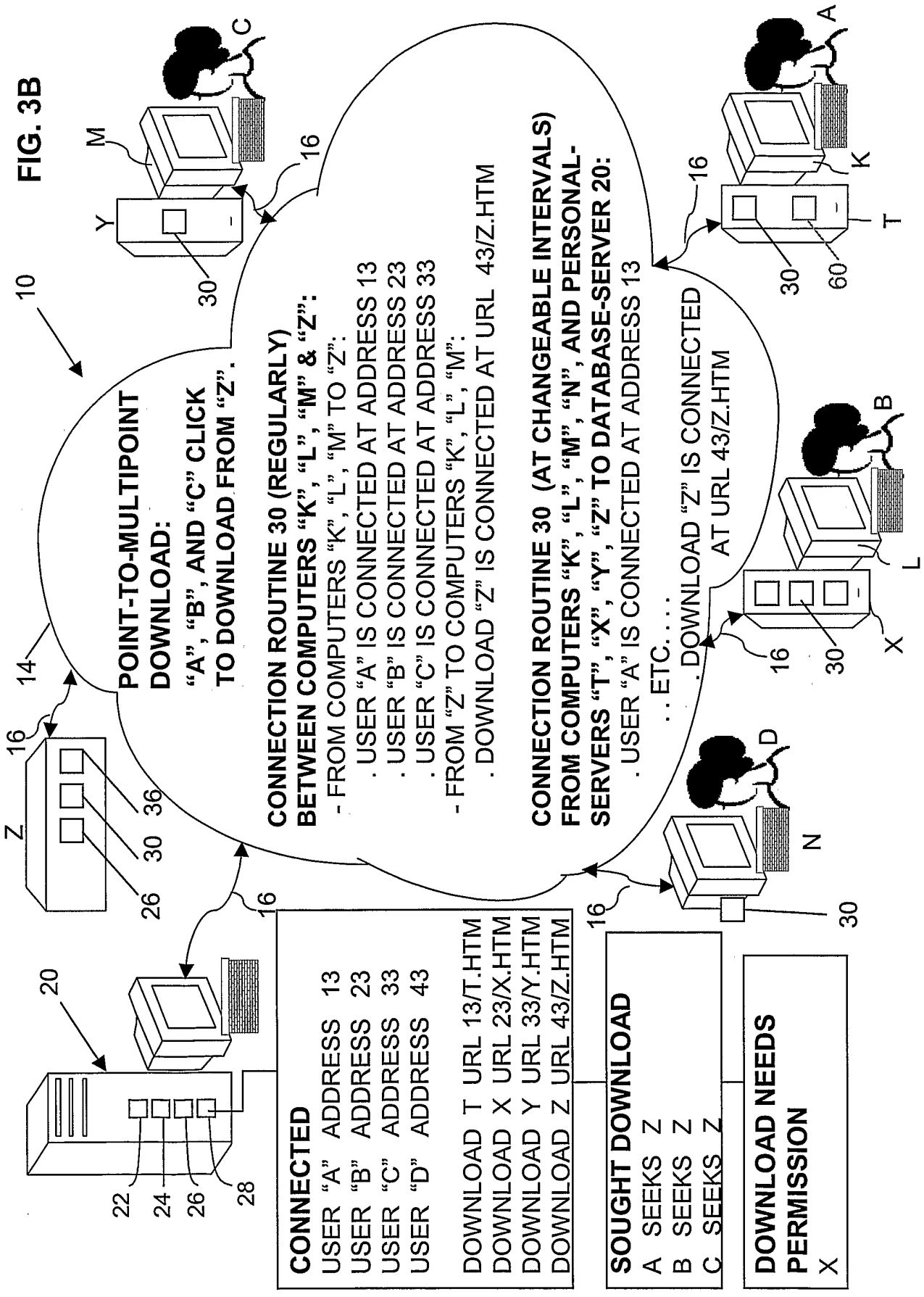

10
14
POINT-TO-POINT DOWNLOAD
"A" CLICKS TO DOWNLOAD 60 FROM "X"
CONNECTION ROUTINE 30 "A" IS CURRENTLY CONNECTED AT ADDRESS 13
CONNECTION ROUTINE 30: "A" IS CONNECTED . .
CONNECTION ROUTINE 30: "X" IS CONNECTED . .
CONNECTION ROUTINE 30: "X" IS CURRENTLY CONNECTED AT URL: 23/X.HTM
A
K
T
B
L
X
16
30
60
20
22
24
26
28
CONNECTED
USER "A" ADDRESS 13
USER "B" ADDRESS 23
DOWNLOAD T URL 13/T.HTM
DOWNLOAD X URL 23/X.HTM
SOUGHT DOWNLOAD
A SEEKS X
DOWNLOAD NEEDS PERMISSION
X

FIG. 3A

FIG. 3B


10
POINT-TO-MULTIPOINT DOWNLOAD:
"A", "B", AND "C" CLICK TO DOWNLOAD FROM "Z".
CONNECTION ROUTINE 30 (REGULARLY) BETWEEN COMPUTERS "K", "L", "M" & "Z":
- FROM COMPUTERS "K", "L", "M" TO "Z":
. USER "A" IS CONNECTED AT ADDRESS 13
. USER "B" IS CONNECTED AT ADDRESS 23
. USER "C" IS CONNECTED AT ADDRESS 33
- FROM "Z" TO COMPUTERS "K", "L", "M":
. DOWNLOAD "Z" IS CONNECTED AT URL 43/Z.HTM
CONNECTION ROUTINE 30 (AT CHANGEABLE INTERVALS) FROM COMPUTERS "K", "L", "M", "N", AND PERSONAL-SERVERS "T", "X", "Y", "Z" TO DATABASE-SERVER 20:
. USER "A" IS CONNECTED AT ADDRESS 13
. . ETC. . . .
. DOWNLOAD "Z" IS CONNECTED AT URL 43/Z.HTM
CONNECTED
USER "A" ADDRESS 13
USER "B" ADDRESS 23
USER "C" ADDRESS 33
USER "D" ADDRESS 43
DOWNLOAD T URL 13/T.HTM
DOWNLOAD X URL 23/X.HTM
DOWNLOAD Y URL 33/Y.HTM
DOWNLOAD Z URL 43/Z.HTM
SOUGHT DOWNLOAD
A SEEKS Z
B SEEKS Z
C SEEKS Z
DOWNLOAD NEEDS PERMISSION
X
14
16
20
22
24
26
28
30
36
60
A
B
C
D
K
L
M
N
T
X
Y
Z

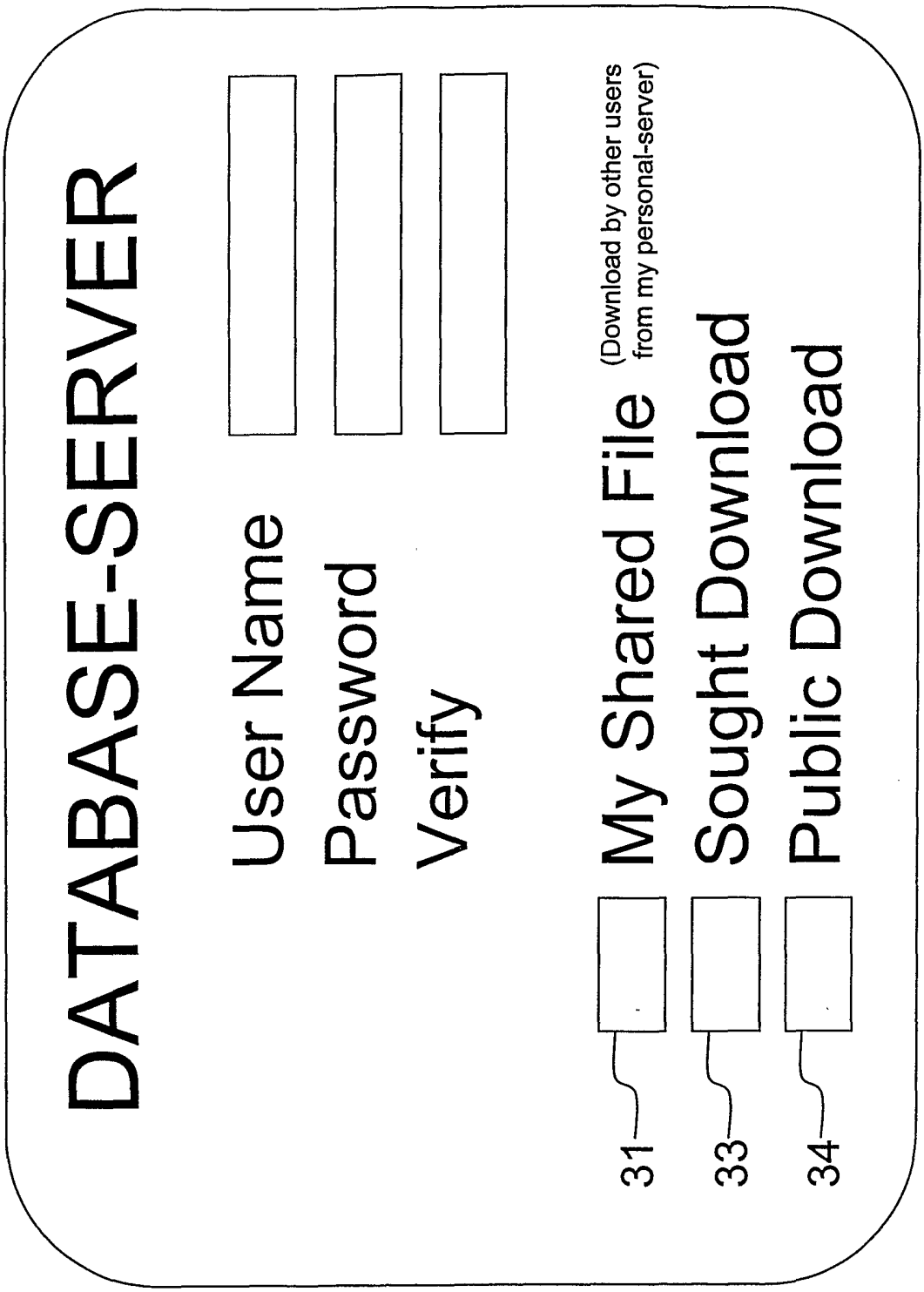

DATABASE-SERVER
User Name
Password
Verify
My Shared File (Download by other users from my personal-server)
Sought Download
Public Download
31
33
34

FIG. 4

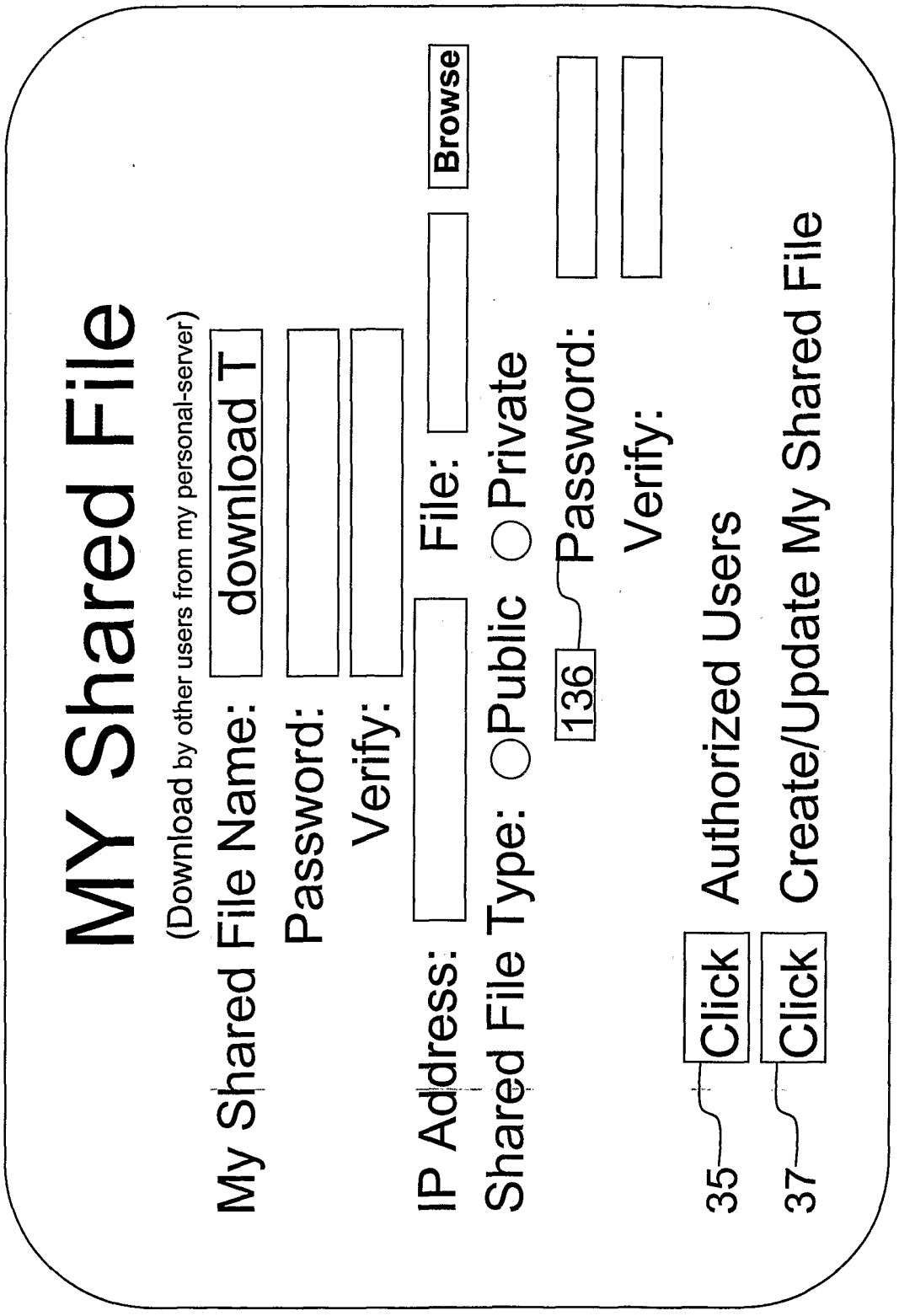

MY Shared File
(Download by other users from my personal-server)
My Shared File Name:
download T
Password:
Verify:
IP Address:
File:
Browse
Shared File Type: ○Public ○Private
136
Password:
Verify:
35
Click
Authorized Users
37
Click
Create/Update My Shared File

FIG. 5

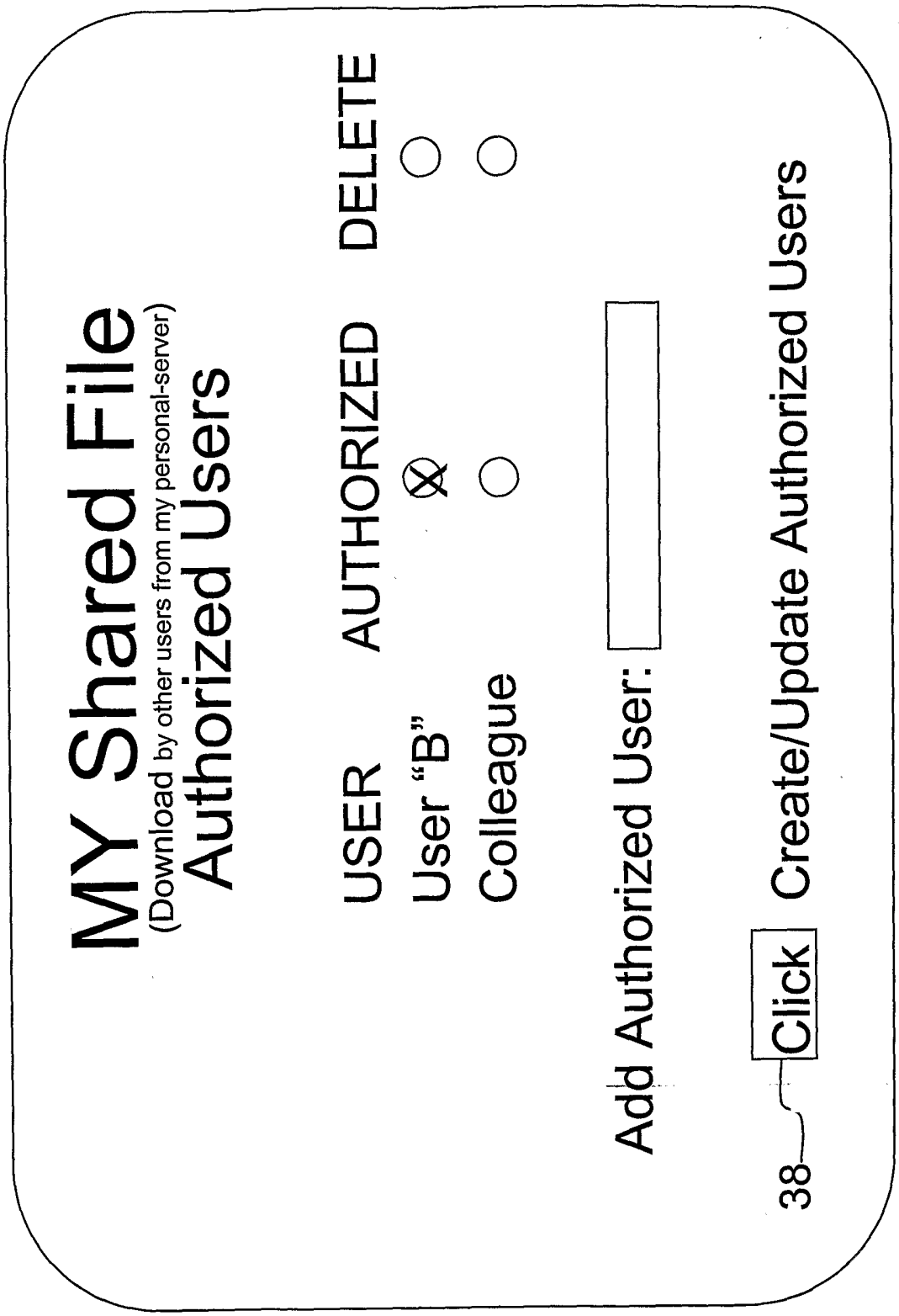

MY Shared File
(Download by other users from my personal-server)
Authorized Users
USER
AUTHORIZED
DELETE
User "B"
Colleague
Add Authorized User:
38
Click
Create/Update Authorized Users

FIG. 6

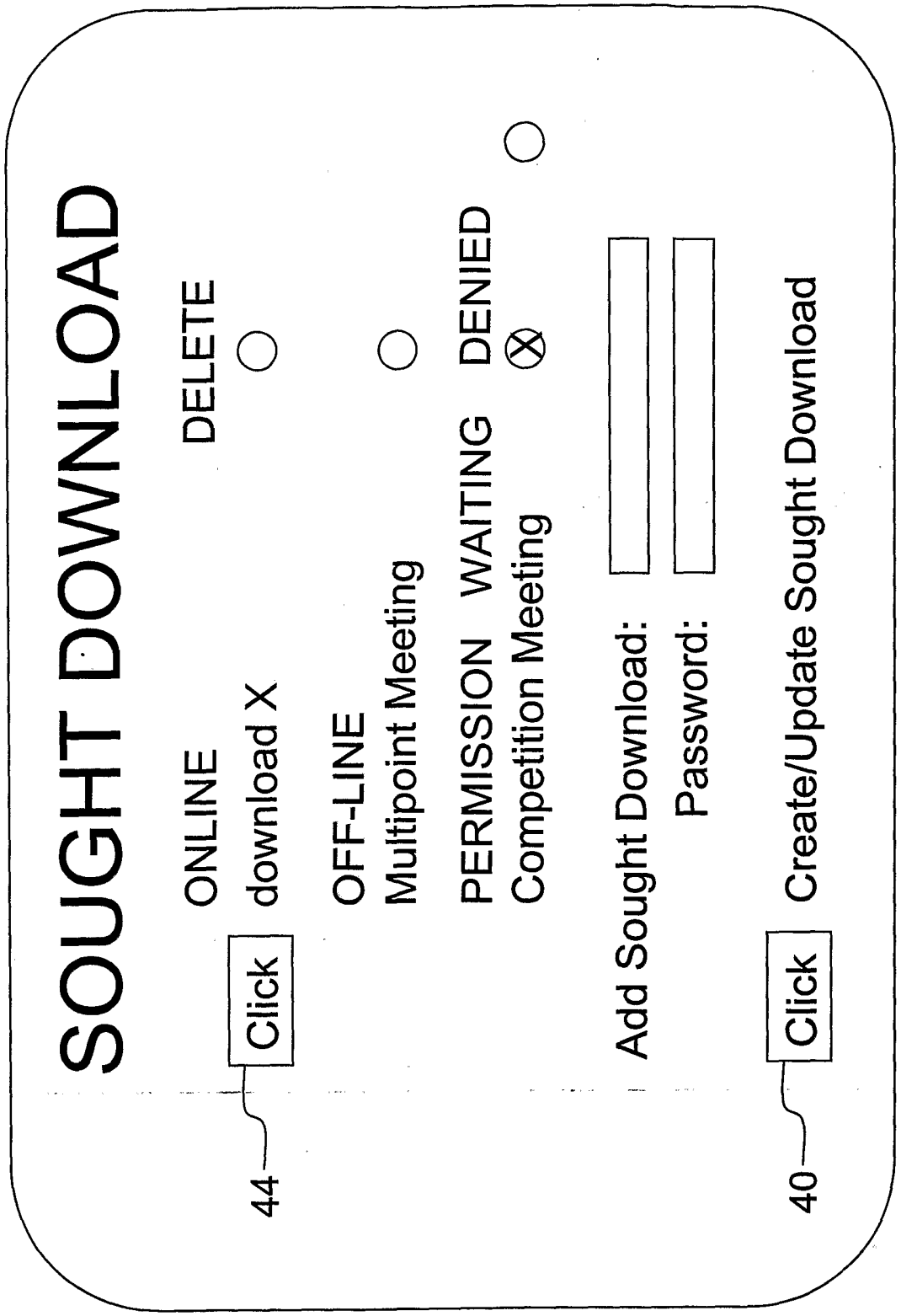

SOUGHT DOWNLOAD
ONLINE
DELETE
Click
download X
OFF-LINE
Multipoint Meeting
PERMISSION WAITING DENIED
Competition Meeting
Add Sought Download:
Password:
Click
Create/Update Sought Download
44
40

FIG. 7

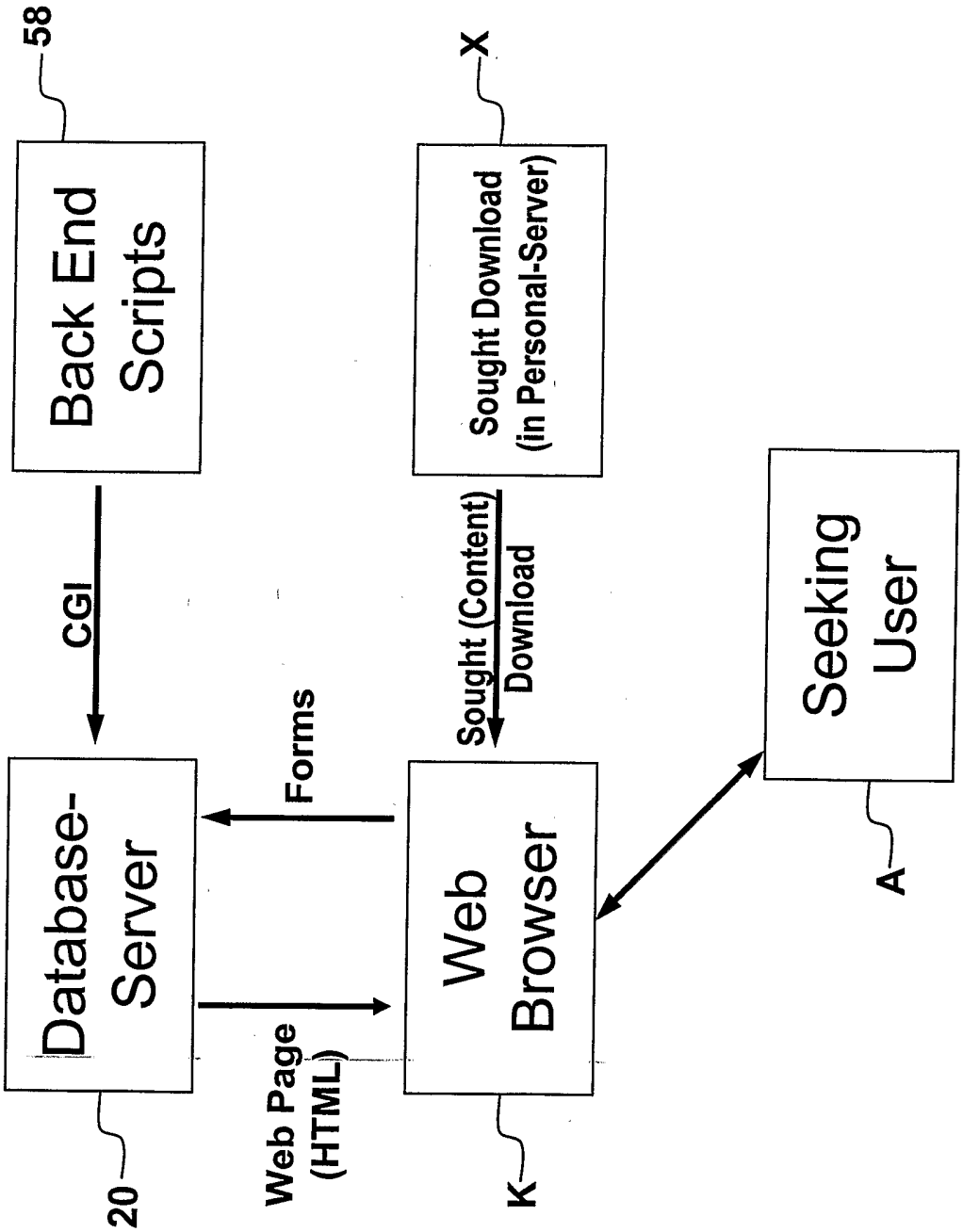

58
Back End Scripts
X
Sought Download (in Personal-Server)
CGI
Sought (Content) Download
Seeking User
Forms
Database-Server
Web Browser
Web Page (HTML)
20
K
A

FIG. 8

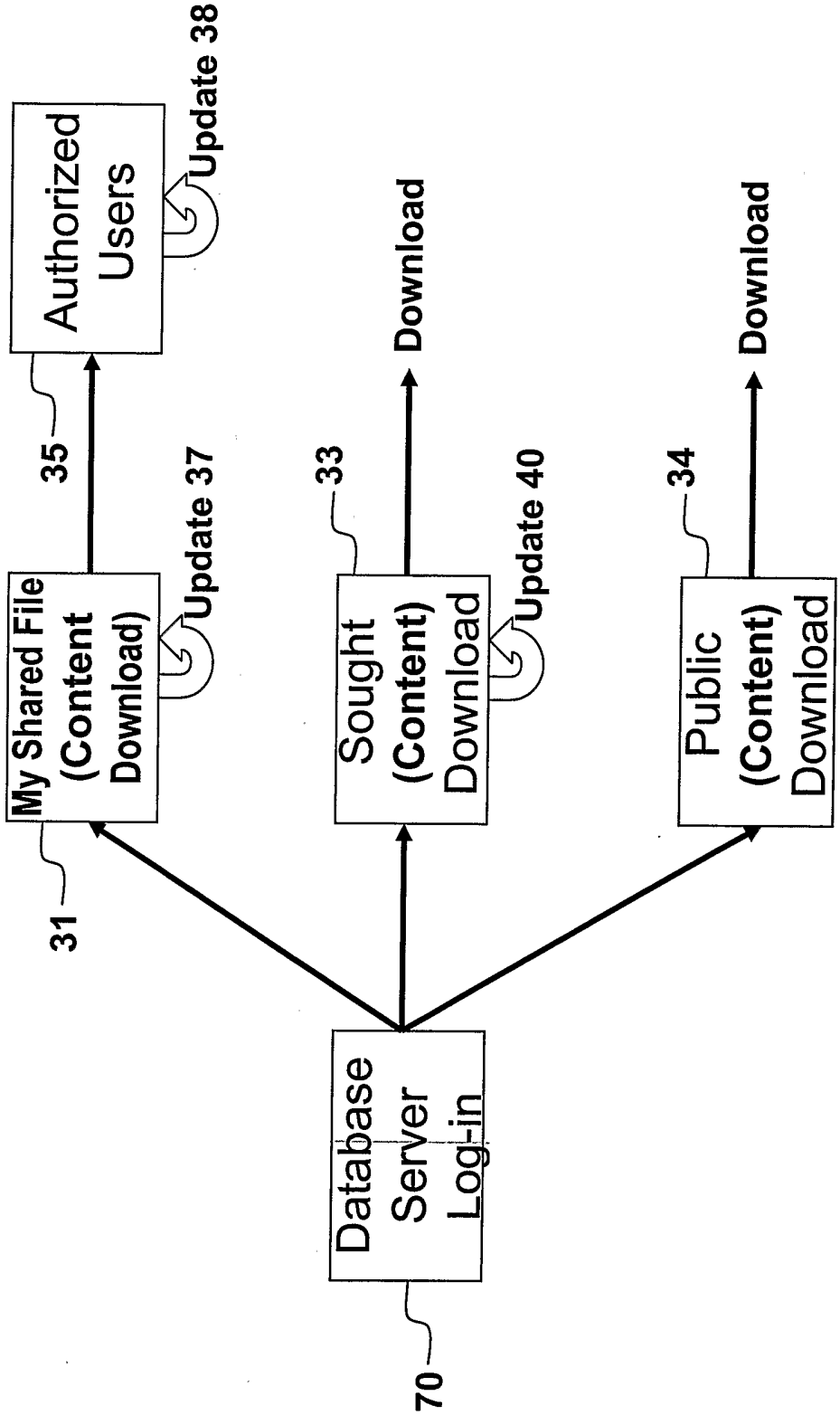

Authorized Users
Update 38
35
My Shared File (Content Download)
Update 37
31
Sought (Content) Download
Update 40
33
Download
Public (Content) Download
34
Download
Database Server Log-in
70

FIG. 9

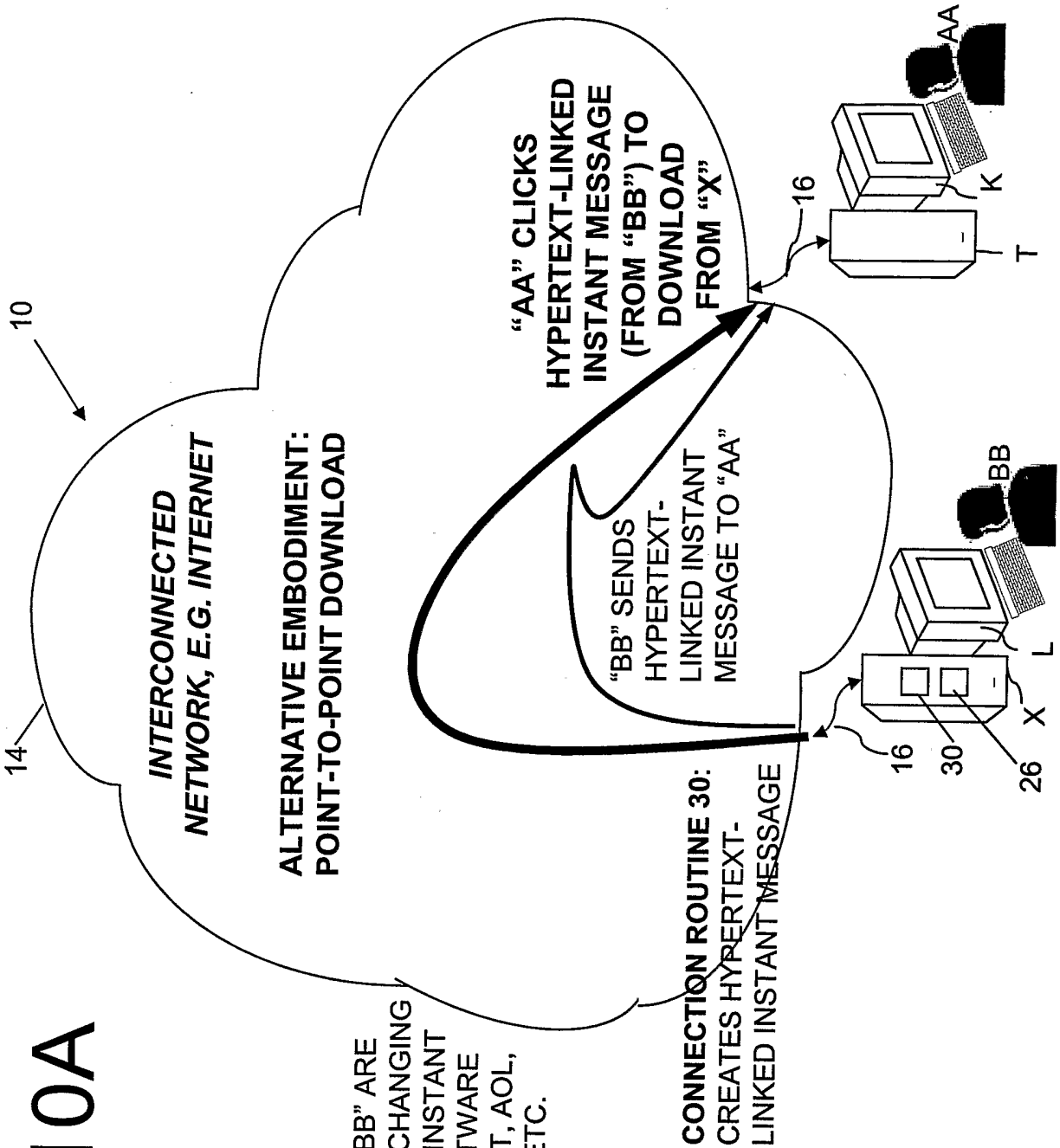

10
14
INTERCONNECTED NETWORK, E.G. INTERNET
ALTERNATIVE EMBODIMENT: POINT-TO-POINT DOWNLOAD
"AA" CLICKS HYPERTEXT-LINKED INSTANT MESSAGE (FROM "BB") TO DOWNLOAD FROM "X"
"BB" SENDS HYPERTEXT-LINKED INSTANT MESSAGE TO "AA"
AA
K
T
16
BB
L
X
16
30
26
CONNECTION ROUTINE 30: CREATES HYPERTEXT-LINKED INSTANT MESSAGE
USERS "AA" AND "BB" ARE CONNECTED AND EXCHANGING MESSAGES USING INSTANT MESSAGING SOFTWARE FROM MICROSOFT, AOL, ICQ, YAHOO!, ETC.

FIG. 10A

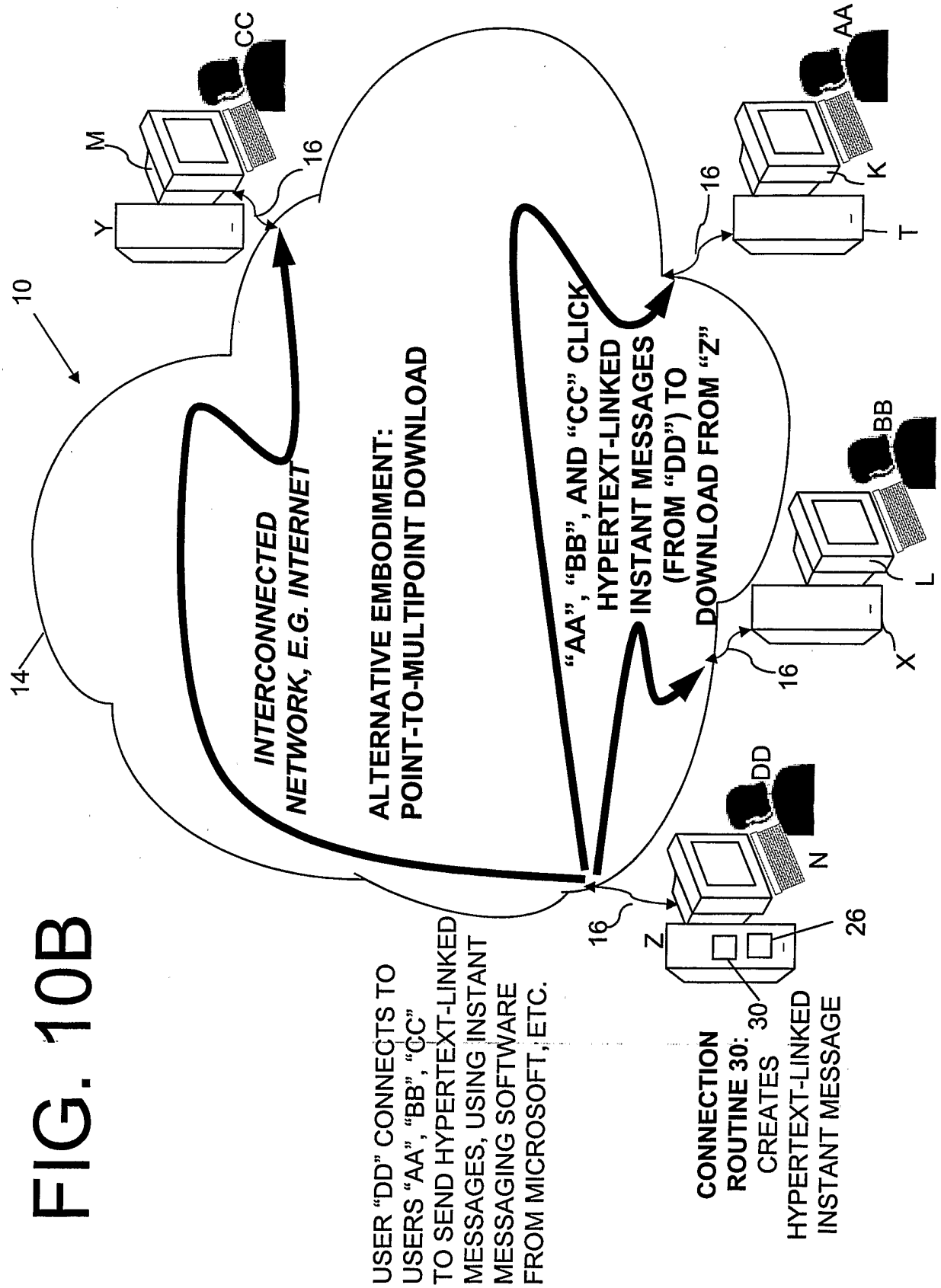

10
14
16
INTERCONNECTED NETWORK, E.G. INTERNET
ALTERNATIVE EMBODIMENT: POINT-TO-MULTIPOINT DOWNLOAD
"AA", "BB", AND "CC" CLICK HYPERTEXT-LINKED INSTANT MESSAGES (FROM "DD") TO DOWNLOAD FROM "Z"
USER "DD" CONNECTS TO USERS "AA", "BB", "CC" TO SEND HYPERTEXT-LINKED MESSAGES, USING INSTANT MESSAGING SOFTWARE FROM MICROSOFT, ETC.
CONNECTION ROUTINE 30: CREATES HYPERTEXT-LINKED INSTANT MESSAGE
26
30
AA
BB
CC
DD
K
L
M
N
T
X
Y
Z

FIG. 10B

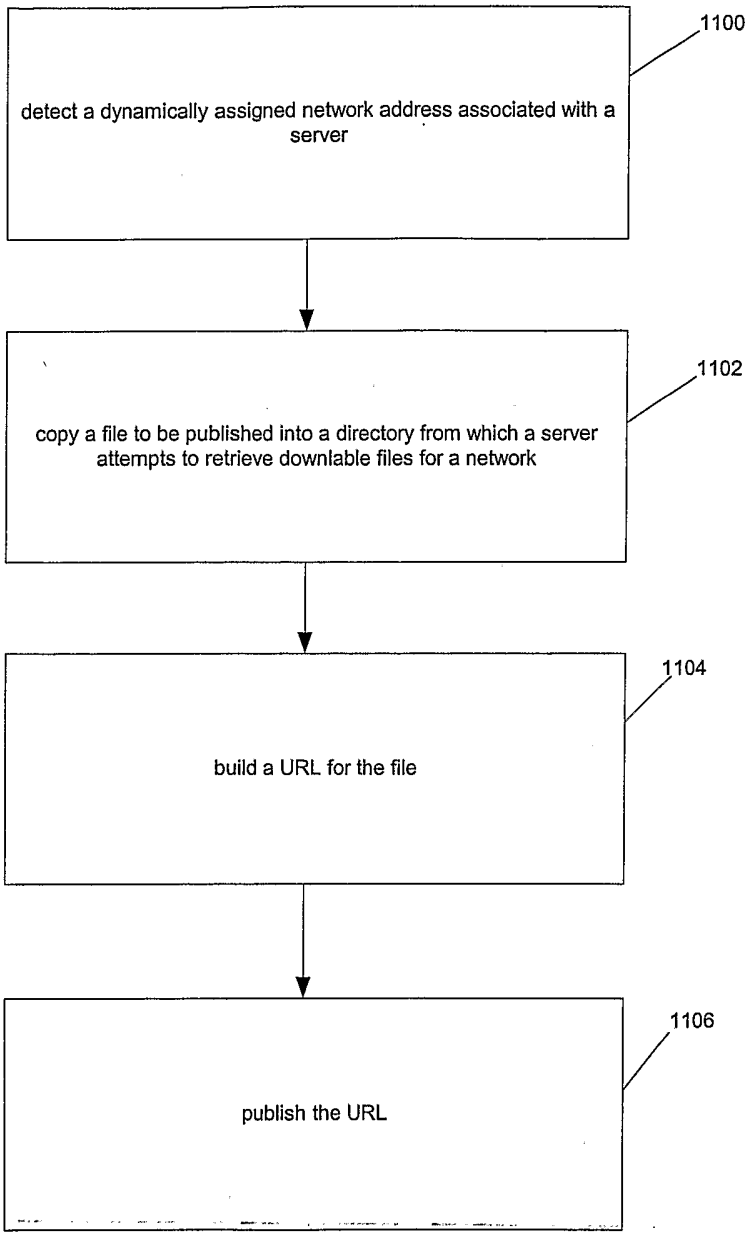

detect a dynamically assigned network address associated with a server
1100
copy a file to be published into a directory from which a server attempts to retrieve downlable files for a network
1102
build a URL for the file
1104
publish the URL
1106

FIGURE 11

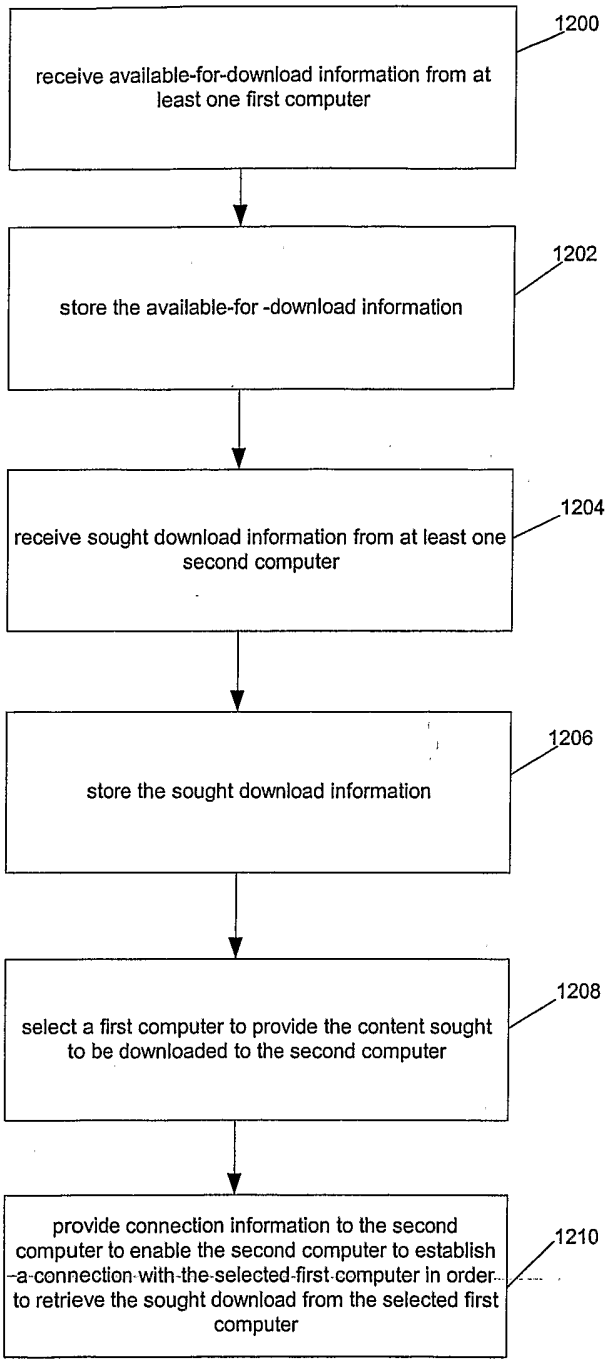

receive available-for-download information from at least one first computer
1200
store the available-for -download information
1202
receive sought download information from at least one second computer
1204
store the sought download information
1206
select a first computer to provide the content sought to be downloaded to the second computer
1208
provide connection information to the second computer to enable the second computer to establish a connection with the selected first computer in order to retrieve the sought download from the selected first computer
1210

FIGURE 12

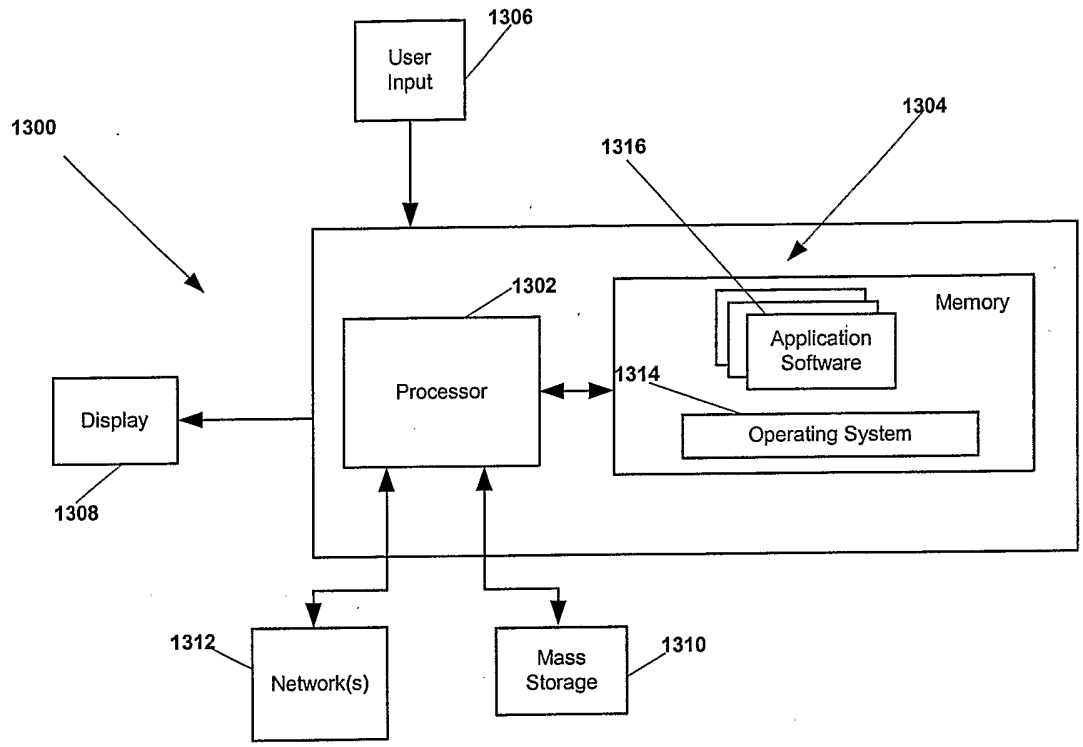

1306
User Input
1304
1300
1316
1302
Memory
Application Software
Processor
1314
Display
Operating System
1308
1312
Network(s)
Mass Storage
1310

FIGURE 13