

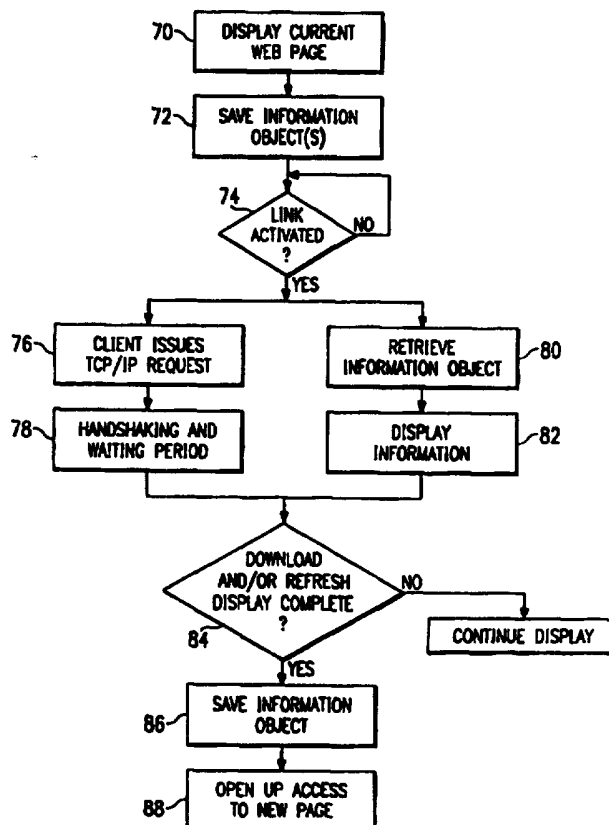


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<b>(21) International Application Number:</b> PCT/US96/16792 <b>(22) International Filing Date:</b> 18 October 1996 (18.10.96)  <b>(30) Priority Data:</b> 08/543,876      19 October 1995 (19.10.95)      US 08/708,795      6 September 1996 (06.09.96)      US  <b>(71)(72) Applicant and Inventor:</b> JUDSON, David, H. [US/US]; 6823 Northport Drive, Dallas, TX 75230 (US).		<b>(81) Designated States:</b> AU, CA, JP, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>

**(54) Title:** WEB BROWSER WITH DYNAMIC DISPLAY OF INFORMATION OBJECTS DURING LINKING**(57) Abstract**

A method of browsing the World Wide Web of the Internet using a client machine supporting a graphical user interface and an Internet browser. The method locally stores, retrieves and outputs information objects to reduce the waiting time normally associated with the download of hypertext documents having high resolution graphics. In one embodiment, the method begins as a web page is being displayed on the graphical user interface (70), the web page having a link to a hypertext document preferably located at a remote server. In response to the user clicking on the link, the link is activated by the browser (74) to request downloading the hypertext document from the remote server to the graphical user interface of the client (76). While the client waits for a reply and/or as the hypertext document is being downloaded, the browser displays a previously-cached information object (82).



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## WEB BROWSER WITH DYNAMIC DISPLAY OF INFORMATION OBJECTS DURING LINKING

### TECHNICAL FIELD

5           This invention relates generally to computer networks and more particularly to methods for enhancing the operation of a client browser operating in a multi-server computer environment.

### BACKGROUND OF THE INVENTION

10           The worldwide network of computers commonly known as the "Internet" has seen explosive growth in the last several years. Mainly, this growth has been fueled by the introduction and widespread use of so-called "web" browsers, which allow for simple graphical user interface (GUI)-based access to network servers, which support documents formatted as so-called "web pages". The  
15           "World Wide Web" (WWW) is that collection of servers of the Internet that utilize the Hypertext Transfer Protocol (HTTP). HTTP is a known application protocol that provides users access to files (which can be in different formats such as text, graphics, images, sound, video, etc.) using a standard page description language  
20           known as Hypertext Markup Language (HTML). HTML provides basic document formatting and allows the developer to specify "links" to other servers and files. Use of an HTML-compliant client browser involves specification of a link via a Uniform Resource Locator or "URL". Upon such specification, the client makes a tcp/ip request to  
25           the server identified in the link and receives a "web page" (namely, a document formatted according to HTML) in return.

          There is a finite time period between the time the user initiates the link and the return of the web page. Even when the web page is returned quickly, there is an additional time period during which  
30           formatting information must be processed for display on the display

interface. For example, most web browsers display in-line images (namely images next to text) using an X bit map (XBM) or .gif format. Each image takes time to process and slows down the initial display of the document. The user typically "sees" an essentially unrecognizable "image" on the display screen which only gradually comes into focus. It is only after the entire image is downloaded from the server and then processed by the browser that the user can fully access the web page itself. This "waiting" period is even longer when the client machine has a relatively slow modem, and often the user will have to wait many seconds before being able to see the in-line image and/or begin using the web page. This problem will be exacerbated when the next generation browser technology (such as Netscape Navigator 2.0) becomes more widely implemented because such browsers are being designed to handle much more complex download formats (for more interactive, dynamic displays).

#### BRIEF SUMMARY OF THE INVENTION

It is thus a primary object of the invention to enhance the operation of a web browser by causing the display of some useful information to the user during the period of user "downtime" that otherwise occurs between linking and downloading of a hypertext document identified by the link. Such information may include, without limitation, advertisements, messages, fill-in forms, notices from a service provider, notices from another Internet service (such as receipt of an e-mail message), or some third party notice.

It is another more particular object of the invention to use an Hypertext Markup Language comment (e.g., via an HTML comment tag) in a web page to store an information object related to a link and

then formatting and displaying such information when the link is activated.

It is still another object of the invention to embed an information object within an existing web page so that the object is masked until a link to another web page is activated. Upon  
5 activation, the object is displayed to the user effectively as a "mini" web page while the browser calls the link and awaits for a reply and download.

For example, in one particular embodiment, the information  
10 object includes copyright management information for a hypertext document associated with a link in a currently-displayed page. Such information may include the name or other identifying information of a copyright owner, terms and conditions for uses of the work within the hypertext document, and such other information as may be  
15 prescribed or desired. When the user "hits" the link in the current page, the copyright management information (which is already present in the browser) is displayed as the new document is being accessed and downloaded. The copyright management information, for example, may inform the user of the terms and conditions of how  
20 the copyrighted content being downloaded can then be reused. The "time" period normally associated with the download is thus productive for both the user (since he or she no longer has to sit and wait for the display) as well as to the content provider.

According to the preferred embodiment, there is described a  
25 method of browsing the World Wide Web of the Internet using an HTML-compliant client supporting a graphical user interface and a browser. The method begins as a web page is being displayed on the graphical user interface, the web page having at least one link to a hypertext document preferably located at a remote server. In

response to the user clicking on the link, the link is activated by the browser to thereby request downloading of the hypertext document from the remote server to the graphical user interface of the client. While the client waits for a reply and/or as the hypertext document is  
5 being downloaded, the browser displays one or more different types of informational messages to the user. Such messages include, without limitation, advertisements, notices, messages, fill-in forms, copyright information and the like. Preferably, the message information is in some way related to the hypertext document being  
10 accessed and downloaded, as in the case of copyright management information perhaps warning the user that the material being downloaded is subject to certain use restrictions of the copyright owner. Where the displayed information is related to the link, it is desirable that such information be embedded within the web page  
15 from which the link is launched. The information is preferably "hidden" within the web page using a hypertext markup comment tag.

The invention is preferably implemented in a computer having a processor, an operating system, a graphical user interface and a  
20 HTTP-compliant browser. In such case, the novel and advantageous features of the invention are achieved using a first means, responsive to activation of a link from a web page, for retrieving an information object masked within the web page, and a second means for displaying information from the information object on the graphical  
25 user interface as the browser establishes the link. Preferably, the information object is masked by an HTML comment tag, which may include other HTML tags nested therein to format the information in the object. This enables the support of complex "mini" web pages that are displayed and accessible to the viewer during otherwise non-

productive periods when the browser is busy processing links to other documents or web sites.

The foregoing has outlined some of the more pertinent objects of the present invention. These objects should be construed to be  
5 merely illustrative of some of the more prominent features and applications of the invention. Many other beneficial results can be attained by applying the disclosed invention in a different manner or modifying the invention as will be described. Accordingly, other objects and a fuller understanding of the invention may be had by  
10 referring to the following Detailed Description of the preferred embodiment.

#### BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention and the advantages thereof, reference should be made to the  
15 following Detailed Description taken in connection with the accompanying drawings in which:

FIGURE 1 illustrates a computer network in which the present invention is implemented;

FIGURE 2 illustrates a client computer supporting an HTML-  
20 compliant World Wide Web browser;

FIGURE 3 is a flowchart diagram of a preferred method of the present invention for dynamic display of an information object during linking;

FIGURE 4 is a representative graphical user interface  
25 illustrating browser navigation tools;

FIGURE 5 is a representative web page illustrating a hypertext link;

FIGURE 6 is a view of the HTML source code for the web page of FIGURE 5;

FIGURE 7 is an example of a modified version of the HTML source code for the web page illustrated in FIGURE 5, showing an information object embedded therein through a comment tag;

FIGURE 8 is a representative screen display illustrating how the information object appears as a "mini" web page upon activation of the hypertext link in the web page of FIGURE 5;

FIGURE 9 illustrates a computer program product comprising a substrate in which product data is encoded for carrying out various function of the invention when the product is used to control a processor;

FIGURE 10 illustrates a portion of the computer network in which this invention is implemented having a master server for use in distributing information objects to a plurality of servers that support hypertext documents; and

FIGURE 11 illustrates a preferred method of downloading an information object to a client computer to facilitate pre-caching of the object.

#### DETAILED DESCRIPTION

As represented in FIGURE 1, the Internet is a known computer network based on the client-server model. Conceptually, the Internet comprises a large network of "servers" 10 which are accessible by "clients" 12, typically users of personal computers, through some private Internet access provider 14 (such as Internet America) or an on-line service provider 16 (such as America On-Line, Prodigy, CompuServe, the Microsoft Network, and the like). Each of the clients may run a "browser," which is a known software tool used to access the servers via the access providers. A server 10 operates a so-called "web site" which supports files in the form of documents and pages. A network path to a server is identified by a so-called



Uniform Resource Locator or URL having a known syntax for defining a network connection.

The "World Wide Web" (WWW) is that collection of servers of the Internet that utilize the Hypertext Transfer Protocol (HTTP).

5 HTTP is a known application protocol that provides users access to files (which can be in different formats such as text, graphics, images, sound, video, etc.) using a standard page description language known as Hypertext Markup Language (HTML). HTML provides basic document formatting and allows the developer to  
10 specify "links" to other servers and files. Use of an HTML-compliant client browser involves specification of a link via the URL. Upon such specification, the client makes a tcp/ip request to the server identified in the link and receives a "web page" (namely, a document formatted according to HTML) in return.

15 FIGURE 2 shows a block diagram of a representative "client" computer in which the present invention is implemented. The system unit 21 includes a system bus or plurality of system buses 31 to which various components are coupled and by which communication between the various components is accomplished.  
20 The microprocessor 32 is connected to the system bus 31 and is supported by read only memory (ROM) 33 and random access memory (RAM) 34 also connected to system bus 31. The ROM 33 contains among other code the Basic Input-Output system (BIOS) which controls basic hardware operations such as the interaction and  
25 the disk drives and the keyboard. The RAM 34 is the main memory into which the operating system and application programs are loaded. The memory management chip 35 is connected to the system bus 31 and controls direct memory access operations including, passing data between the RAM 34 and hard disk drive 36 and floppy disk

drive 37. The CD ROM 42, also coupled to the system bus 131, is used to store a large amount of data, e.g., a multimedia program or large database.

Also connected to this system bus 31 are various I/O  
5 controllers: the keyboard controller 38, the mouse controller 39, the video controller 40, and the audio controller 41. The keyboard controller 38 provides the hardware interface for the keyboard 22, the controller 39 provides the hardware interface for the mouse (or other point and click device) 23, the video controller 40 is the  
10 hardware interface for the display 24, and the audio controller 41 is the hardware interface for the multimedia speakers 25a and 25b. A modem 50 enables communication over a network 56 to other computers over the computer network.

The operating system 60 of the computer may be DOS,  
15 WINDOWS 3.x, WINDOWS '95, OS/2, AIX, or any other known and available operating system, and each computer is sometimes referred to as a machine. RAM 34 also supports a number of Internet access tools including, for example, the HTTP-compliant web browser 62. Known browser software includes Netscape, Netscape Navigator  
20 2.0, Mosaic, and the like. The present invention is designed to operate within any of these known or developing web browsers, which are preferably modified as described herein to achieve the dynamic display of information objects during web site linking activities. RAM 34 may also support other Internet services  
25 including simple mail transfer protocol (SMTP) or e-mail, file transfer protocol (FTP), network news transfer protocol (NNTP) or "Usenet", and remote terminal access (Telnet).

HyperText Markup Language uses so-called "tags," denoted by the < > symbols, with the actual tag between the brackets. Most

tags have a beginning (<tag>) and an ending section, with the end shown by the slash symbol (</tag>). There are numerous link tags in HTML to enable the viewer of the document to jump to another place in the same document, to jump to the top of another document, to jump to a specific place in another document, or to create and jump to a remote link (via a new URL) to another server. Links are typically displayed on a web page in color or with an underscore. In response to the user pointing and clicking on the link, the link is said to be "activated" to begin the download of the linked document or text. For more details on HTML, the reader is directed to the HTML Reference Manual, published by Sandia National Laboratories, and available on the Internet at "http://www.sandia.gov/sci\_compute/html.ref.html" or the HTML Quick Reference, published by the University of Kansas, and available on the Internet at "http://kuhttp.cc.ukans.edu/lynx\_help/HTML\_quick.html". Each of these publications are incorporated herein by reference.

A known HTML tag is a "comment," which typically allows a web page developer to include text that is to be ignored by the browser. The syntax for a "comment" tag is denoted <!--text-->. HTML is an evolving language. Recent standards for new versions of this language propose to add SGML comment syntax to HTML elements. This proposal would begin a comment with a double dash encountered inside any HTML element (but no inside quotes), and treat every thing as comments (including any " ", " ", or quote character) until the next occurring double dash. Such syntax allows HTML elements within a comment.

According to the present invention, an information "object" is preferably placed within a comment tag of a web page and thus is

"ignored" by the browser in the formatting of the document then being displayed. This information object, however, is also saved to a separate file or cache within the client. A particular web page may have multiple information objects, with one or more objects associated with one or more links in the documents. Thus, for example, if the document has two links, one information object is associated with the first link and a second information object is associated with a second link, and so on. Or, multiple information objects may be associated with a single link. Or, the information object(s) may have no direct relation to the content of any link in the document. While in the preferred embodiment an HTML "comment" tag is used to mask the information object, those skilled in the art will recognize that other HTML commands and tags may be used for this purpose as well, including, for example, a tag dedicated to masking an information object within the currently-displayed page. For example, an information object may be hidden within a clickable image identified with an ismap tag. Also, an information object may be formatted as a "mini" web page by nesting HTML elements within a particular HTML comment tag.

As noted above, a web browser 62 running on the client uses a TCP/IP connection to pass a request to a web server running a HTTP "service" (under the WINDOWS operating system) or "daemon" (under the UNIX operating system). The HTTP service then responds to the request, typically by sending a "web page" formatted in the Hypertext Markup Language, or HTML, to the browser. The browser then displays the web page using local resources (e.g., fonts and colors).

A preferred operation of the inventive method is illustrated in the flowchart of FIGURE 3. The method begins at step 70 as a

current web page is being displayed on the graphical user interface of the computer. It is assumed that this web page has embedded therein one or more comment tags, each of which (or perhaps several of which in combination) define an information object. Generally, although not required, each information object will be provided for one or more links in the web page being displayed. However, because the information object is embedded within a comment tag, it is hidden or "masked" and thus is ignored by the display routines of the browser. In step 72, the method saves or stores the information object in memory or some dedicated portion of the RAM (e.g., a cache) so that it may be easily and quickly obtained. At step 74, a test is made to determine whether a link associated with the information object has been activated. If so, the method continues at step 76 and issues a tcp/ip request to the network (assuming the link was to a URL). Step 78 represents the handshaking period during which the client waits for the appropriate response from the server. During this period, the client retrieves the information object (at step 80) and outputs the information (in step 82) to the user on the display. Steps 80 and 82 are shown in parallel to the handshaking and wait step 78 to emphasize the inventive concept of displaying useful information to the viewer during the link process. At step 84, a test is then performed to determine whether the download and refresh of the display is complete. If so, the routine saves the information object at step 86 and opens up access to the hypertext document at step 88.

FIGURE 4 shows the browser navigation tool prior to download of the U.S. Patent and Trademark Office page (available at <http://www.uspto.gov>). FIGURE 5 shows the web page as it exists on the display. This web page has various links including "Welcome

to the United States Patent and Trademark Office." FIGURE 6 shows the HTML source code used to generate the web page of FIGURE 5, and FIGURE 7 shows this source code modified to include an information object 75 within a comment tag. This object displays  
5 the message "The PTO Welcomes You" when the "Welcome to the United States Patent and Trademark Office" link is activated. FIGURE 8 shows the effect of this information object when the routine of FIGURE 3 is carried out.

Although the invention has been described in terms of a  
10 preferred embodiment, those skilled in the art will recognize that various modifications of the invention can be practiced within the spirit and scope of the appended claims. Thus, for example, the information supplied to the user during the period between link activation and downloading of the hypertext document need not be  
15 merely a visual output. It is also envisioned that some or all parts of a particular message be conveyed to the user aurally (via a multimedia speaker set, for example) as well as on the display screen. The message itself may be retained on the screen as an in-line image or other text along with the downloaded hypertext  
20 document, and the browser includes appropriate means to queue the message to print and/or to save the message or allow the user to compose a response to the message. One such technique for responding to the message uses the HTML "fill-in" form tags. The browser may be suitably programmed to queue the mini web page for  
25 background printing whenever the link is activated.

Moreover, although in the preferred embodiment it is envisioned that the hypertext document (associated with the web page link) is located on a remote server, this is not a limitation of the invention. The display of informational messages may be effected

whenever a link is activated, regardless of the location of the target document. Also, while the preferred embodiment has been described in the context of an Internet browser, the techniques of the invention apply whether or not the user accesses the Worldwide Web via a  
5 direct Internet connection (namely using an Internet access provider) or indirectly through some on-line service provider (such as America On-Line, Prodigy, Compuserve, the Microsoft Network, or the like). Thus the "computer network" in which the invention is implemented should be broadly construed to include any client-server model from  
10 which a client can link to a "remote" document (even if that document is available on the same machine or system).

It should also be appreciated that while in the preferred embodiment the information object is formatted and displayed upon activation of a link in a web page being currently displayed, this is  
15 not a limitation of the invention either. The information object need not be embedded within an existing web page, but rather may be embedded within the home page of the browser or supported elsewhere within the client itself. Thus, the information object may be displayed whenever a call to a web page is made, such as when a  
20 search to a particular URL is initiated, or when a previously-stored URL is launched (e.g., from a "View Bookmark" pull-down menu). Moreover, the client may store random information objects in the form of information advertisements (which in turn may include .gif files to produce images) so that the browser may call any such  
25 information at random. The browser may even be programmed to select which of the plurality of information objects to display based on a comparison of the type of web pages accessed by the user. Thus, for example, if the user accesses web pages relating to a particular service, the browser may be programmed to identify this

access history and select predetermined information objects that will be of interest to the user (given that history).

The information objects may themselves be HTML "fill-in" forms that are retained on the display screen and may be filled in with information that the browser can then deliver back to some third party service provider. This enables the information objects to be used as mini survey forms for interactive, on-line surveys and the like, which would be especially advantageous for web site providers or other third parties. The information object may include its own embedded link so that the user can link to another URL directly from the object itself. Thus, for example, where the object is an advertisement, a user could read the ad and then hyperlink to the web page of the company that sponsors the ad.

As noted above, the information object may be automatically or selectively queued to the client printer upon display. This would enable the viewer to generate merchandise coupons and the like related to the web page being accessed. Thus the web site provider could offer the viewer some added incentive for accessing its web page by causing the printing of a redeemable coupon or other information token (e.g., a discount card, a receipt, etc.). All of these actions are initiated during the otherwise downtime between web page access and download, thereby significantly increasing the value of the on-line informational content provided to the user.

As used herein, the "information object" or "information" output to the viewer during the link process should be broadly construed to cover any and all forms of messages, notices, text, graphics, sound, video, tables, diagrams, applets and other content, and combinations of any of the above.



One of the preferred implementations of the "browser" of the invention is as a set of instructions in a code module resident in the random access memory of the user's personal computer. Until required by the computer, the set of instructions may be stored in  
5 another computer memory, for example, in a hard disk drive, or in a removable memory such as an optical disk (for eventual use in a CD ROM) or floppy disk (for eventual use in a floppy disk drive). As seen in FIGURE 9, for example, the invention may be implemented as a computer program product comprising a computer-readable storage  
10 medium 90 having a substrate 92, and program data 94 encoded on the substrate. The program data 94 implements various means for carrying out the above-described functions. The medium 90 may be a separate physical media such as a CD-ROM or floppy diskette, or it may comprise the client computer's hard drive, cache or other  
15 available memory, as would be the case if the program data or portions thereof are downloaded via the Internet.

In addition, although the various methods described are conveniently implemented in a general purpose computer selectively activated or reconfigured by software, one of ordinary skill in the art  
20 would also recognize that such methods may be carried out in hardware, in firmware, or in more specialized apparatus constructed to perform the required method steps.

The present invention is designed to be implemented with conventional HTML and enhancements thereto (including HTML 2.0,  
25 HTML 3.0, HTML with third party-supplied extensions such as NHTML, and the like), by an HTML-compliant browser, such as Netscape, Netscape Navigator 2.0, Mosaic, MSN, as such existing or developed programs are modified to include the functionality of the invention described above. The functionality may be built into the

browser or added as a plug-in. Netscape Navigator 2.0 has in-line support for platform-independent application objects (e.g., applets written in JavaScript, from Sun Microsystems). An applet resides on the server associated with a web page and is downloaded to the client browser after a link is established to the web page. The browser includes an engine for executing the downloaded applets. With this type of browser, the invention caches or otherwise stores a downloaded applet and later uses it, preferably when a new, related link is established. Thus, an "information object" according to the invention may include an applet which, for example, may generate an animated figure or icon, some aural output, a scrolling display, or a combination thereof. One of ordinary skill, however, will recognize that the inventive features of the invention, including the masking of "mini" hypertext documents within a web page and display of such documents upon link activation, may be applied to other Internet services as well as to HTTP compliant browsers. Thus, the invention would be useful to provide information to a user during an FTP access, an on-line chat, a posting to a bulletin board, or even during the sending and retrieval of e-mail. All such variations are considered within the scope of the invention.

FIGURE 10 illustrates how information objects (e.g., product/service advertisements) may be distributed to one or more servers in the computer network, and FIGURE 11 illustrates a preferred technique for downloading a hypertext document (with its associated information object) to the client machine. Turning initially to FIGURE 10, a server 100 provides various control functions and includes an associated information warehouse 102, which is preferably configured as a physically secure electronic repository for the storage of product/service descriptions and associated data.

Server 100 may be controlled by an entity that contracts with one or more product/service providers 104 who desire to advertise their products or services through the information objects. Entities 104 provide the advertisements, or descriptions and data used to create the advertisements, to the information warehouse preferably in an electronic manner. The information warehouse then electronically delivers the advertisements to one or more of the web servers 106 at which hypertext documents are supported. Advertisements can thus be "refreshed" or updated at any time or at regular intervals irrespective of whether the hypertext documents supported on web servers 106 change. Information objects may then be stored in the web server 106 in a dedicated area or directly embedded or associated with particular hypertext documents stored there.

An information object may include high bandwidth content including high resolution graphics, audio and video. In some instances then, the object may be relatively large in size such that "in-lining" the object as an embedded link (e.g., within an HTML comment tag) may not be the most efficient way of downloading. In such case, it will be desirable (although not required) to store the information object in the web server 106 separate from any particular hypertext document so that the object may be downloaded to the client machine (with a hypertext document) by being "appended" at the distal or "backend" of the hypertext document that may be used to bring the object down to the client machine. (Of course, as noted above, information objects may be stored at the client machine in other ways besides being brought down by hypertext documents). This technique is illustrated in FIGURE 11.

The method begins at step 110 by downloading a first (or "source") hypertext document (which then becomes the "current web

page" within the context of FIGURE 3). This document includes an associated information object, such as an advertising graphic that will be associated with some user-selectable display graphic (e.g., a link) in the first hypertext document. At step 112, the browser at the client machine displays at least a portion of the first hypertext document (e.g., introductory text) while the download of the document (and the information object) continues at step 114 as a background process. By "background process," it is meant that the process goes on without being directly or indirectly apparent to the user. This ensures that the user can begin browsing the first hypertext document irrespective of whether the download of the information object is complete. At step 116, the routine continues by storing the information object in a storage of the client machine (e.g., a dedicated cache) as the user browses the first hypertext document. This technique ensures that delivery of relatively large information objects does not otherwise slow down the browsing session. To complete the routine, the user activates the user-selectable clickable graphic at step 118 to link to a second (or "target") hypertext object. As discussed above, this retrieves the information object for display on the client interface as the new link is established. This is step 120.

Under some circumstances, it may be desirable to download the first hypertext document completely and then download the information object separately (e.g., after a time delay), again preferably as a background process. In this manner, the user would not be directly aware that the information object was downloaded as he or she would be browsing the first hypertext document in the foreground. As far as the user is concerned, the first hypertext document is wholly "present" in the client (and is displayed), even

though some of the information object is still being downloaded. Thus, as used herein, the concept of "appending" the information object to a hypertext document should be broadly construed to cover both the direct attachment of the object to the document (either  
5 directly or otherwise) as well as the serial transmission of the document and then the object (even if there is some finite time delay between such transmissions).

Delaying the download of the information object in this fashion can be advantageous, especially in the situation where the user  
10 receives the first hypertext document but then quickly decides to proceed to a URL that is not associated with a link in the document or to link to another URL (in the displayed document) that does not have an associated information object. In either case, the object would not be downloaded at all because the link with which it is  
15 associated would not be activated. Thus, it may be desirable to build in a fixed time delay between downloading of the first hypertext document and the information object(s) associated therewith so that if one or more predetermined events occur at the browser (with respect the document), no object download takes place.

20 Alternatively, information objects may be conveniently downloaded to the browser whenever there is "idle" time during the connection between the client and a server. Thus, an information object need not be appended to a hypertext document at all, but merely downloaded to the client during a period when the user is  
25 browsing the current page. Information objects downloaded in this manner are preferably stored in cache in a background process and may or may not be associated with a particular link in the current page. Upon link activation or some other event, however, an object is displayed to the user to provide seamless browsing.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is set forth in the following claims.

## IN THE CLAIMS

What is claimed is:

1. A method of browsing in a computer network having at least one client connectable to one or more servers, the client having  
5 an interface for displaying a first hypertext document with at least one link to a second hypertext document located at a server, comprising the steps of:

contacting the server in response to activation of the link to initiate downloading of the second hypertext document from the  
10 server to the client;

in response to activation of the link, retrieving an information object that has been stored in the client prior to the activation of the link; and

displaying the retrieved information object on the interface  
15 during at least a portion of a time period between the activation of the link and completion of the downloading of the second hypertext document from the server to the client to provide information to a user during a process of linking from the first hypertext document to the second hypertext document;

20 wherein the information object is stored within the first hypertext document and is not displayed on the interface until after activation of the link that initiates downloading of the second hypertext document from the server to the client.

25 2. A method of browsing in a computer network having at least one client connectable to one or more servers, the client having an interface for displaying a first hypertext document with at least one link to a second hypertext document located at a server, comprising the steps of:

contacting the server in response to activation of the link to initiate downloading of the second hypertext document from the server to the client;

5 in response to activation of the link, retrieving an information object that has been stored in the client prior to the activation of the link; and

displaying the retrieved information object on the interface during at least a portion of a time period between the activation of the link and completion of the downloading of the second hypertext  
10 document from the server to the client to provide information to a user during a process of linking from the first hypertext document to the second hypertext document;

wherein the information object includes copyright management information for the second hypertext document.

15

3. A method of browsing in a computer network having at least one client connectable to one or more servers, the client having an interface for displaying a first hypertext document with at least one link to a second hypertext document located at a server,  
20 comprising the steps of:

contacting the server in response to activation of the link to initiate downloading of the second hypertext document from the server to the client;

25 in response to activation of the link, retrieving an information object that has been stored in the client prior to the activation of the link; and

displaying the retrieved information object on the interface during at least a portion of a time period between the activation of the link and completion of the downloading of the second hypertext



document from the server to the client to provide information to a user during a process of linking from the first hypertext document to the second hypertext document;

wherein the information object includes an advertisement.

5

4. A method of browsing the World Wide Web of the Internet using a client machine supporting a browser, comprising the steps of:

storing an information object;

10 activating a link from a first hypertext document to initiate downloading of a second hypertext document;

retrieving the stored information object in response to activating the link; and

15 displaying the information object during at least a portion of a time period between activation of the link and completion of the downloading of the second hypertext document to provide information to a user of the client machine as the browser links from the first hypertext document to the second hypertext document;

20 wherein the information object is stored within the first hypertext document and is not displayed until after activating the link that initiates downloading of the second hypertext document.

5. In a computer having a processor, an operating system, a graphical user interface and a browser, the improvement  
25 comprising:

means, responsive to activation of a link from a web page that initiates downloading of a linked hypertext document, for retrieving information masked within the web page; and

means for outputting the information during at least a portion of a time period between activation of the link and completion of the downloading of the linked hypertext document to provide information to a user of the computer as the browser links from the web page to the linked hypertext document.

6. In a computer having a browser for retrieving hypertext objects from servers in a computer network, the browser including an engine for executing applets, the improvement comprising:

means, responsive to activation of a link from a hypertext object that initiates downloading of a linked hypertext object, for retrieving an applet downloaded to the computer prior to activation of the link; and

means for outputting the applet during at least a portion of a time period between activation of the link and completion of the downloading of the linked hypertext object to thereby provide information to a user of the computer as the browser links from the hypertext object to the linked hypertext object.

7. In a computer having a browser for retrieving hypertext objects from servers in a computer network, the improvement comprising:

means, responsive to activation of a link from a hypertext object that initiates downloading of a linked hypertext object, for retrieving an information object downloaded to the computer prior to activation of the link; and

means for outputting the information object during at least a portion of a time period between activation of the link and completion of the downloading of the linked hypertext object to

thereby provide information to a user of the computer as the browser links from the hypertext object to the linked hypertext object;  
wherein the information object is an advertisement.

5           8.     A method of browsing in a computer network having a plurality of servers that support hypertext objects, comprising the steps of:

              storing a plurality of information objects at a client machine having a browser, wherein the information objects are downloaded to  
10     the client machine from the computer network;

              in response to activation of a link that initiates downloading of a hypertext object, selectively displaying one of the stored information objects during at least a portion of a time period between activation of the link and completion of the downloading of the  
15     hypertext object to provide information to a user of the client machine during a process of linking to the hypertext object;

              wherein the information objects are advertisements for goods or services.

20           9.     A method of browsing in a computer network including a client machine having a browser and a plurality of servers that support hypertext documents, comprising the steps of:

              downloading a first hypertext document from one of the servers to the client machine and initiating the display of at least a  
25     portion of the first hypertext document on an interface of the client machine;

              as the portion of the first hypertext document is being displayed on the interface, downloading an information object to the client machine as a background process, wherein the information

object is associated with a clickable graphic in the first hypertext document;

storing the information object in the client machine as the user browses the first hypertext document; and

- 5 in response to selection of the clickable graphic, retrieving the information object from storage in the client machine and displaying the information object on the interface as a new link is established.

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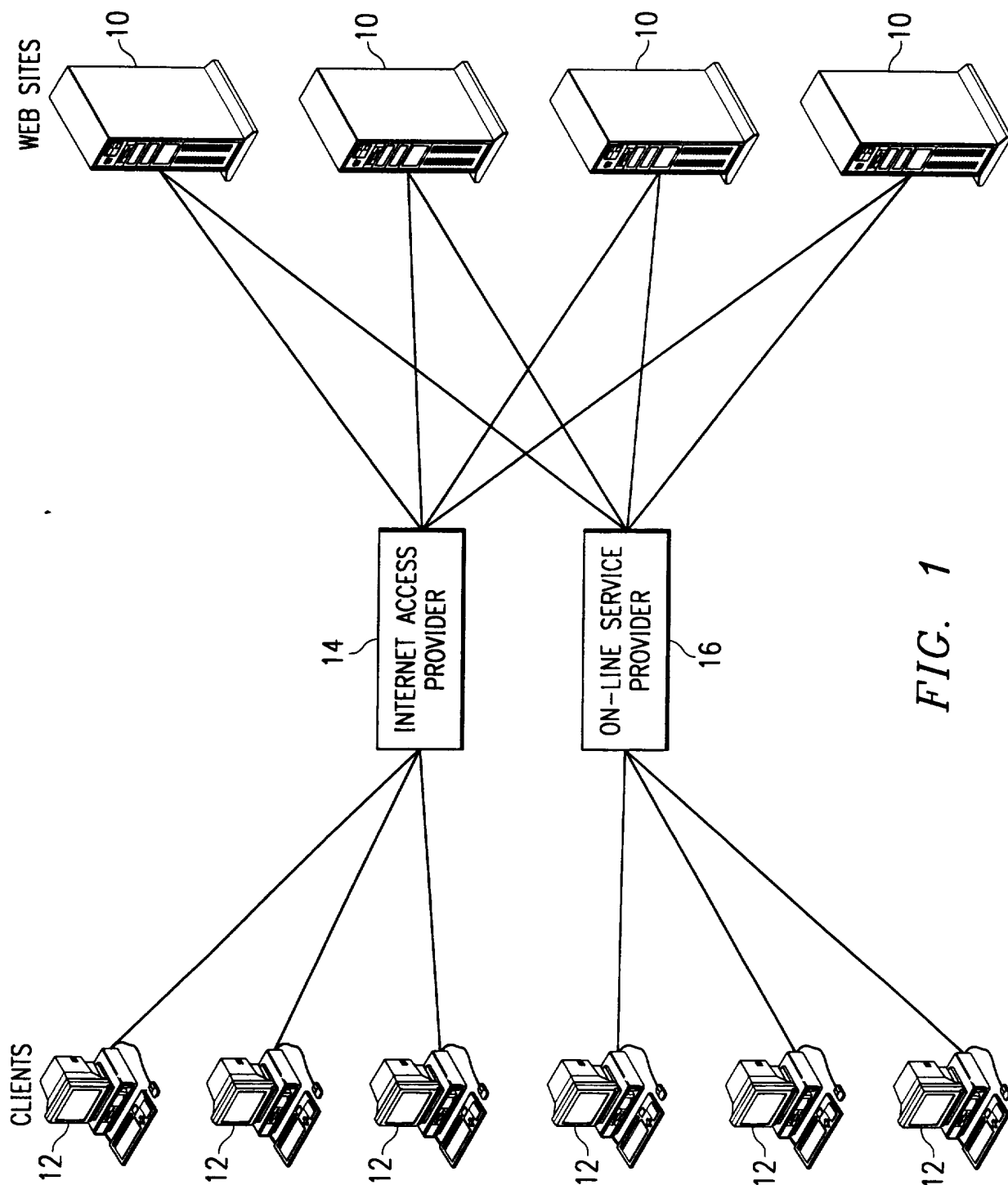
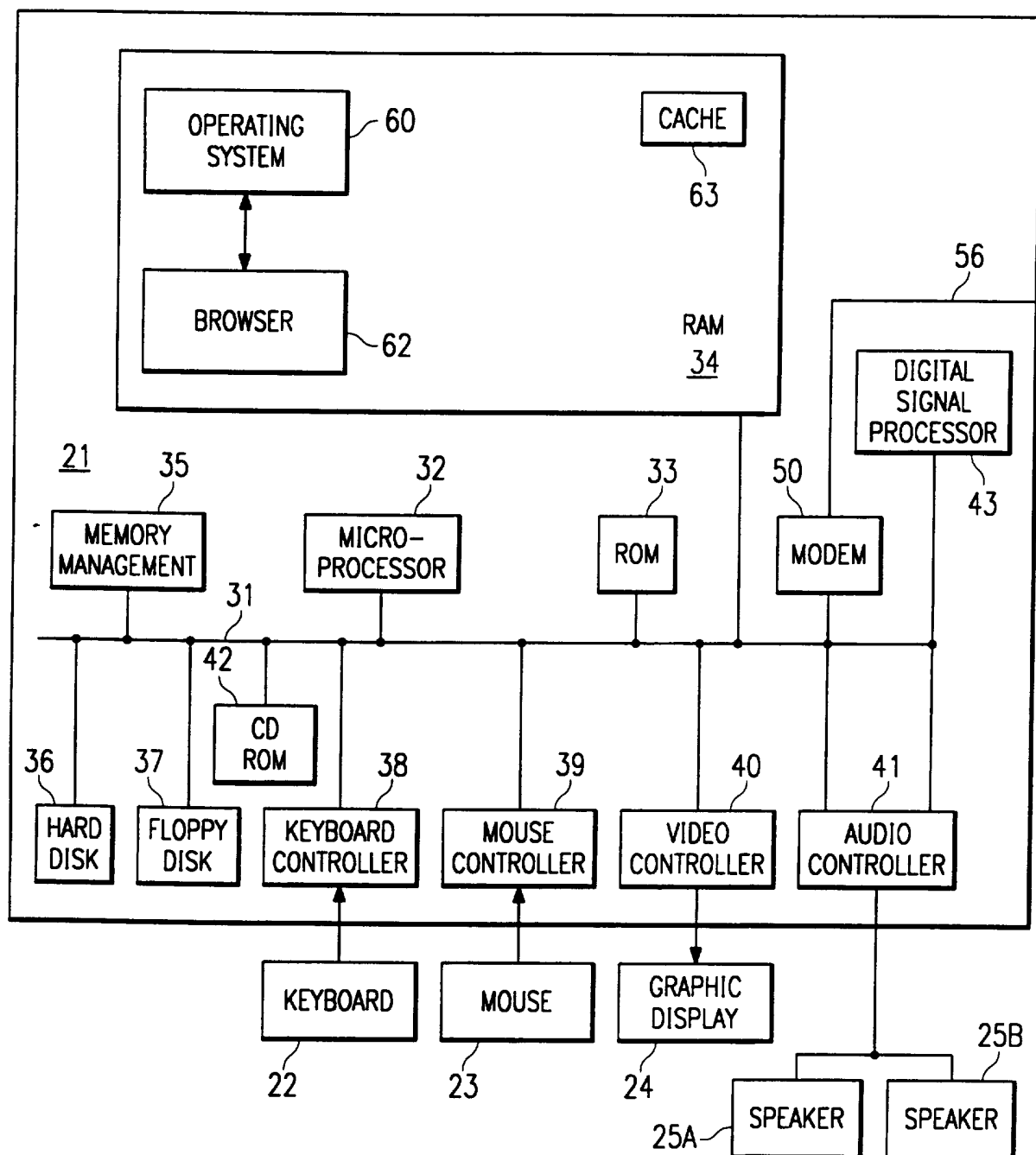


FIG. 1

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FIG. 2



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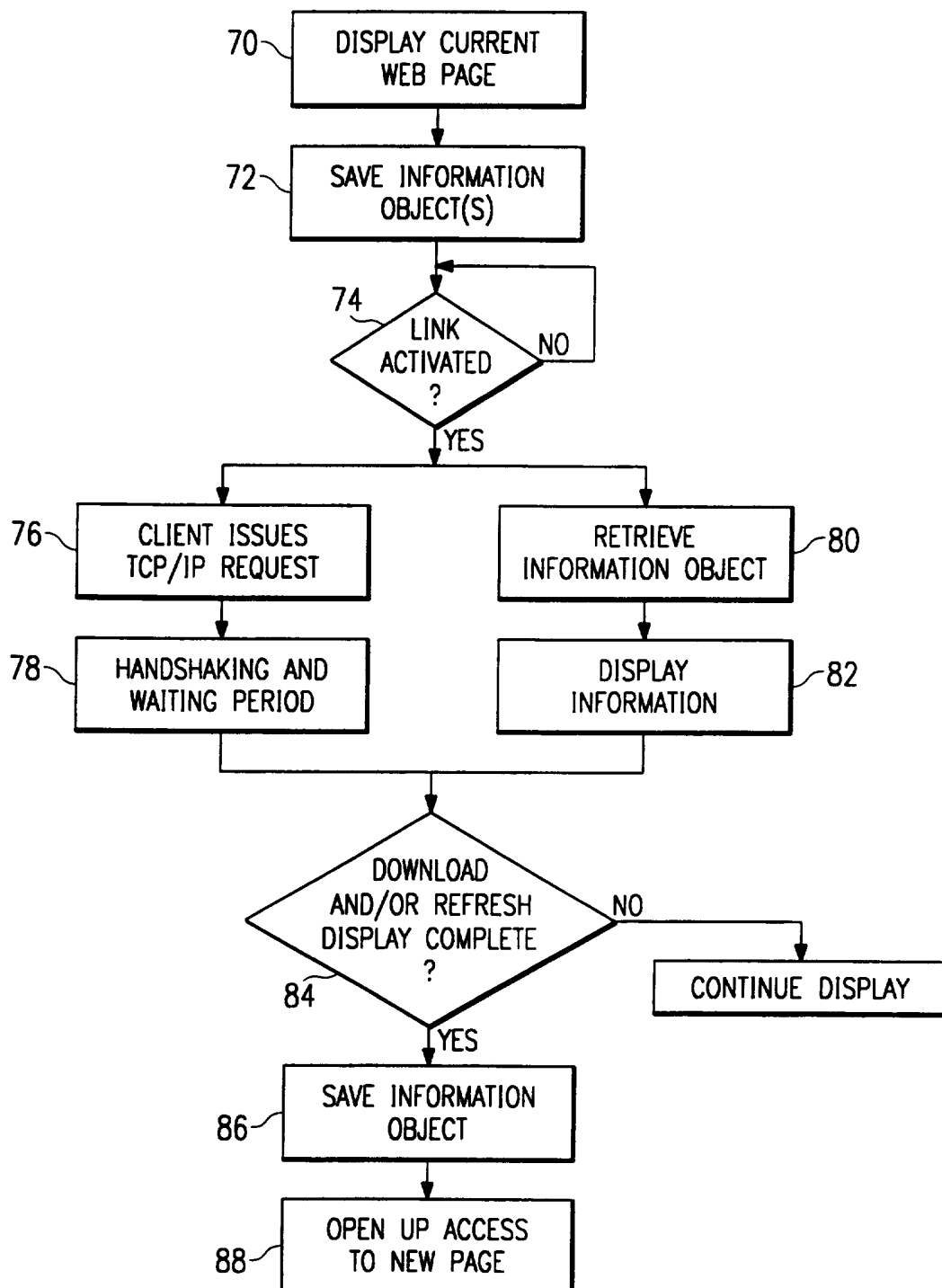
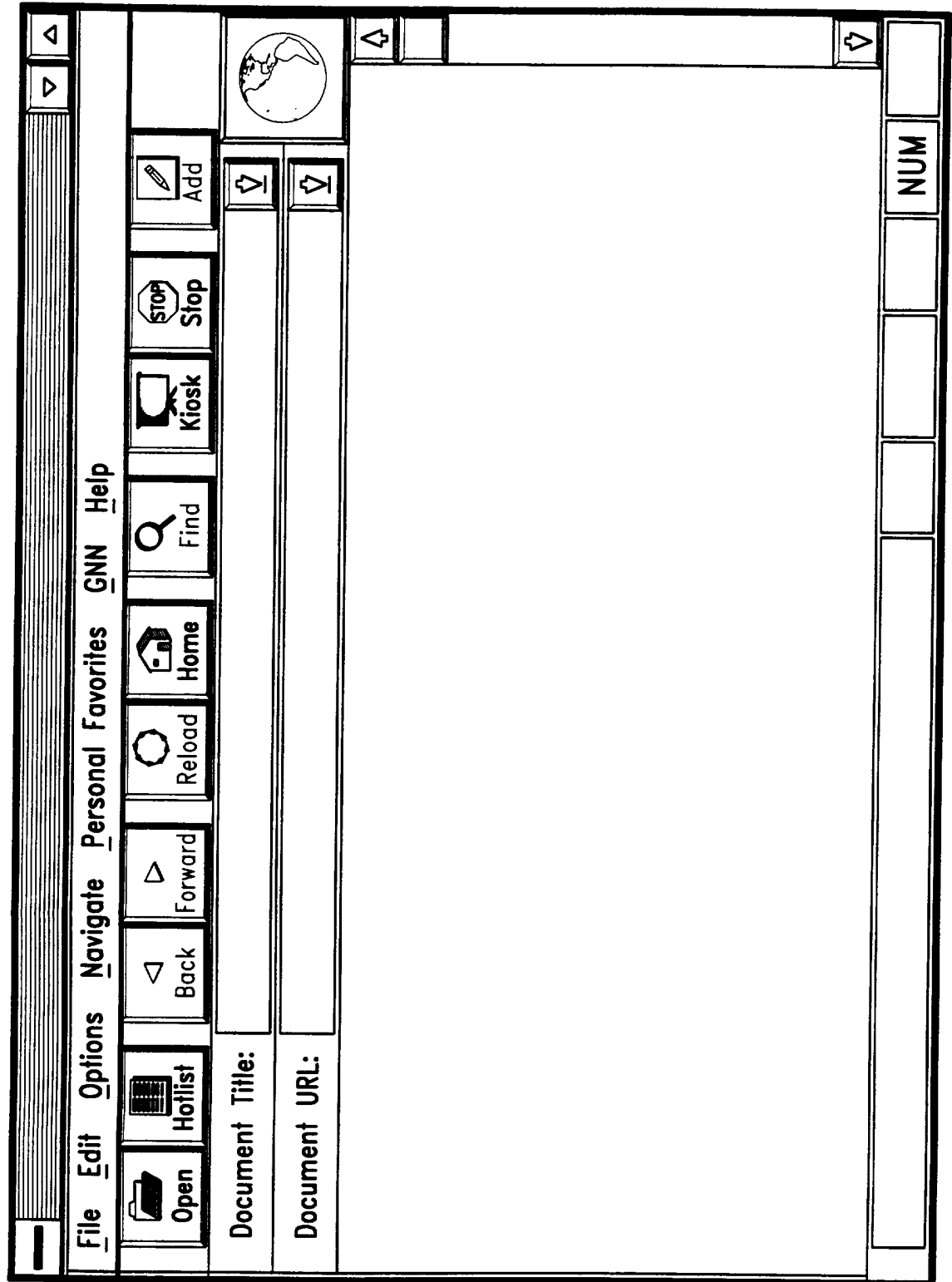


FIG. 3

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FIG. 4





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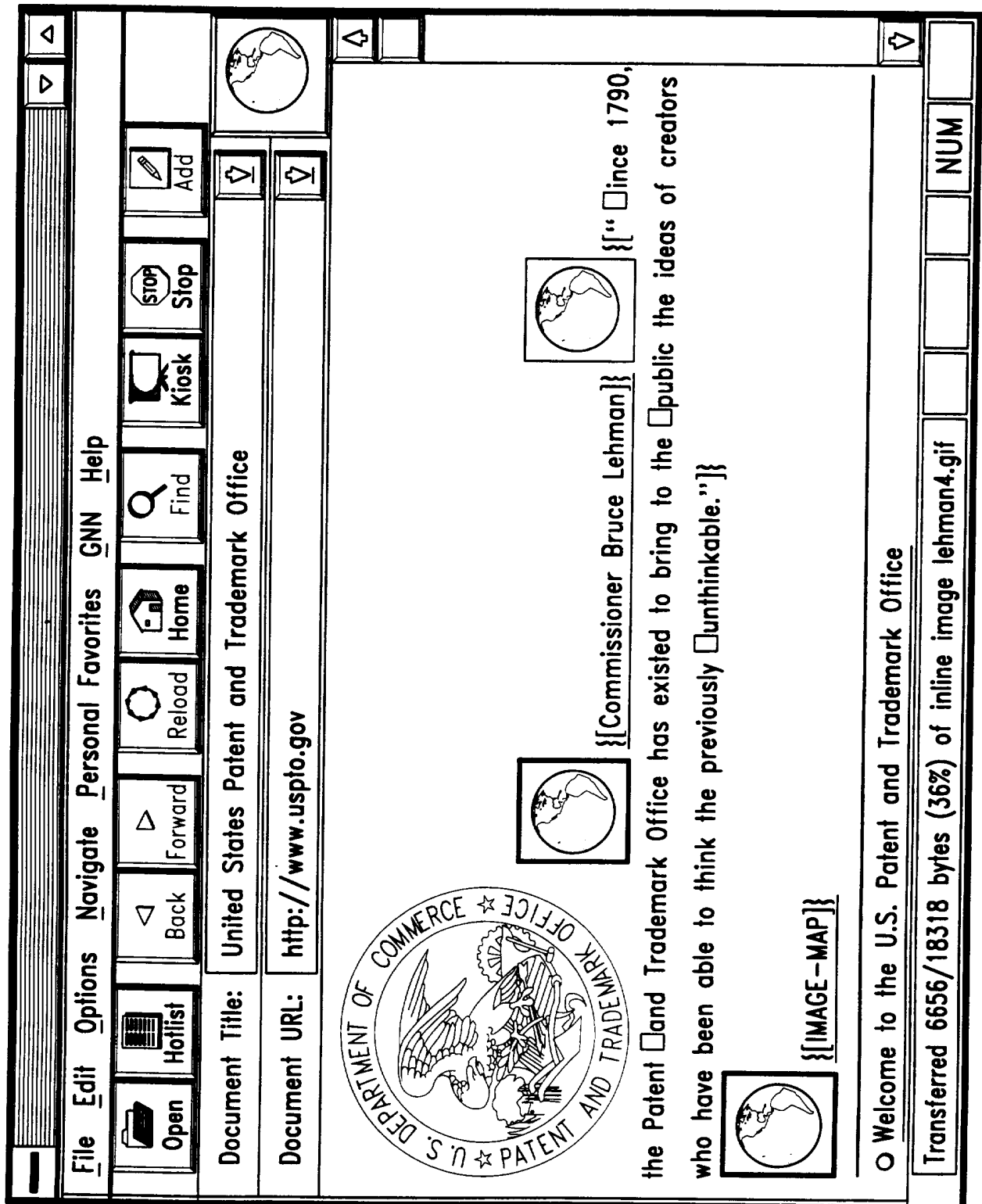


FIG. 5

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FIG. 6

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FIG. 7

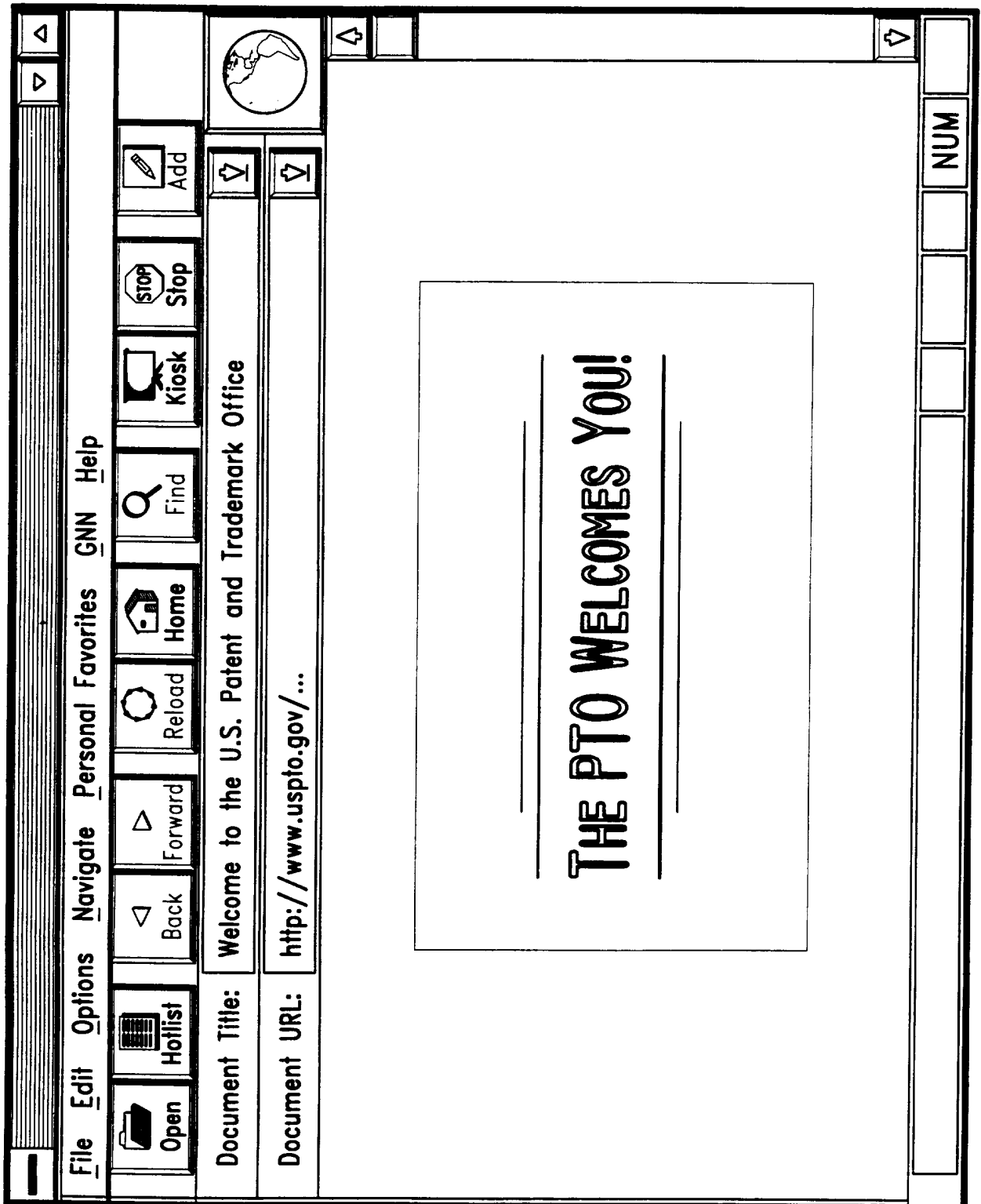


FIG. 8

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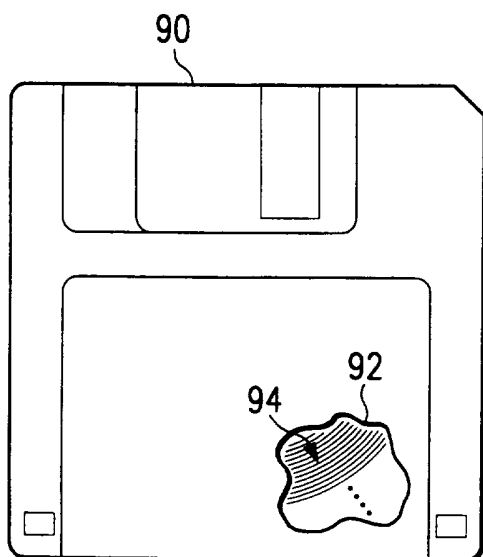


FIG. 9

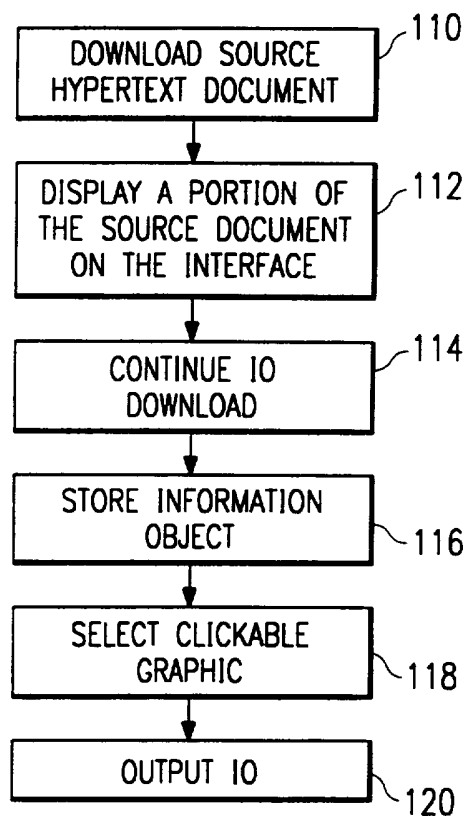


FIG. 11

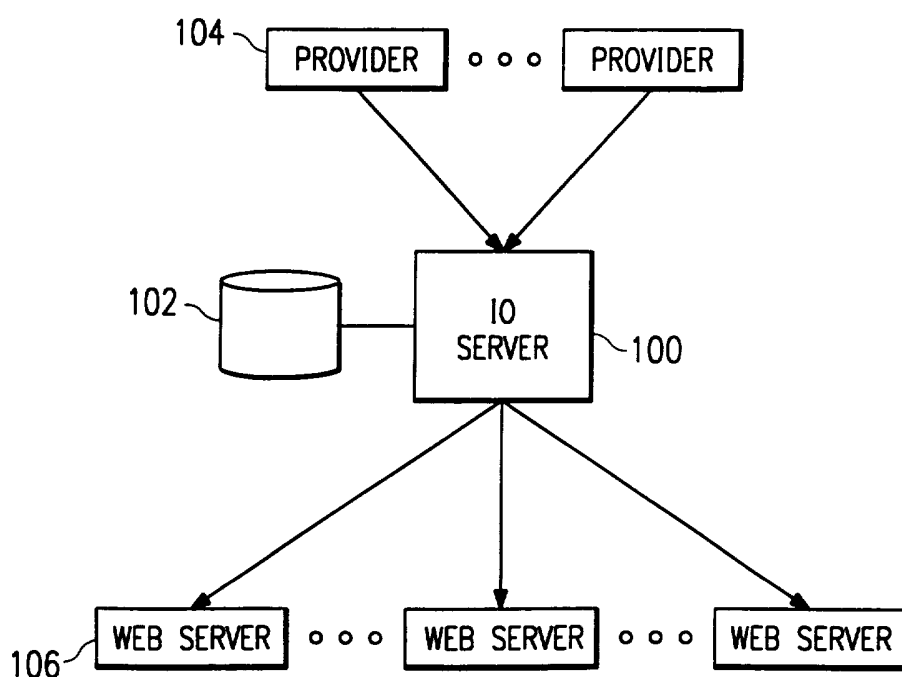


FIG. 10

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US96/16792

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(6) : G06F 19/00

US CL : 395/793

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 395/793, 395/155-161, 145-149, 791, 792, 326, 333-335; 380/4

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

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

APS, IEEE CD-ROM

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 5,355,472 A (LEWIS) 11 OCTOBER 1994 (11.10.94)	1-9
A	US 5,367,621 A (COHEN ET AL) 22 NOVEMBER 1994 (22.11.94)	1-9
A	US 5,367,623 A (IWAI ET AL) 22 NOVEMBER 1994 (22.11.94)	1-9
A	US 5,408,659 A (CAVENDISH ET AL) 18 APRIL 1995 (18.04.95)	1-9

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

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*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	

Date of the actual completion of the international search

15 JANUARY 1997

Date of mailing of the international search report

04 MAR 1997

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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US96/16792

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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