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Rosen et al.

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[54] **SERVER SYSTEM AND METHOD FOR MODIFYING A CURSOR IMAGE**

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[*] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

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[51] **Int. Cl.**[6] **G06F 3/14**

[52] **U.S. Cl.** **345/339**; 345/334; 345/145; 707/513

[58] **Field of Search** 345/302, 328, 345/329, 331, 348, 145, 339, 334, 335, 345; 395/200.33, 200.47, 200.48, 200.49

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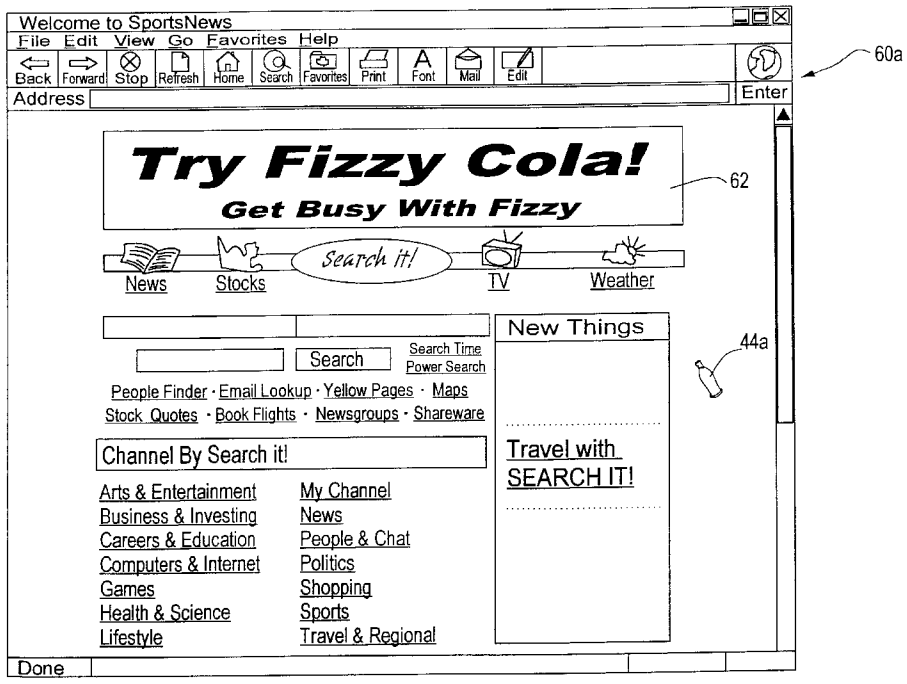
Assistant Examiner—Chadwick A. Jackson
Attorney, Agent, or Firm—Weingarten, Schurgin, Gagnebin & Hayes LLP

[57] **ABSTRACT**

A system for modifying a cursor image, as displayed on a video monitor of a remote terminal, to a specific image having a desired shape and appearance. The system stores cursor image data corresponding to the specific image, and a cursor display code. The cursor display code contains information in response to which the cursor image is modified to the specific image. A server computer transmits specified information to the remote terminal. The information includes at least one cursor display instruction. The cursor display instruction is operable to modify, in conjunction with the cursor information and the cursor image data, a cursor image displayed by a display of the remote terminal in the shape and appearance of the specific image.

75 Claims, 9 Drawing Sheets



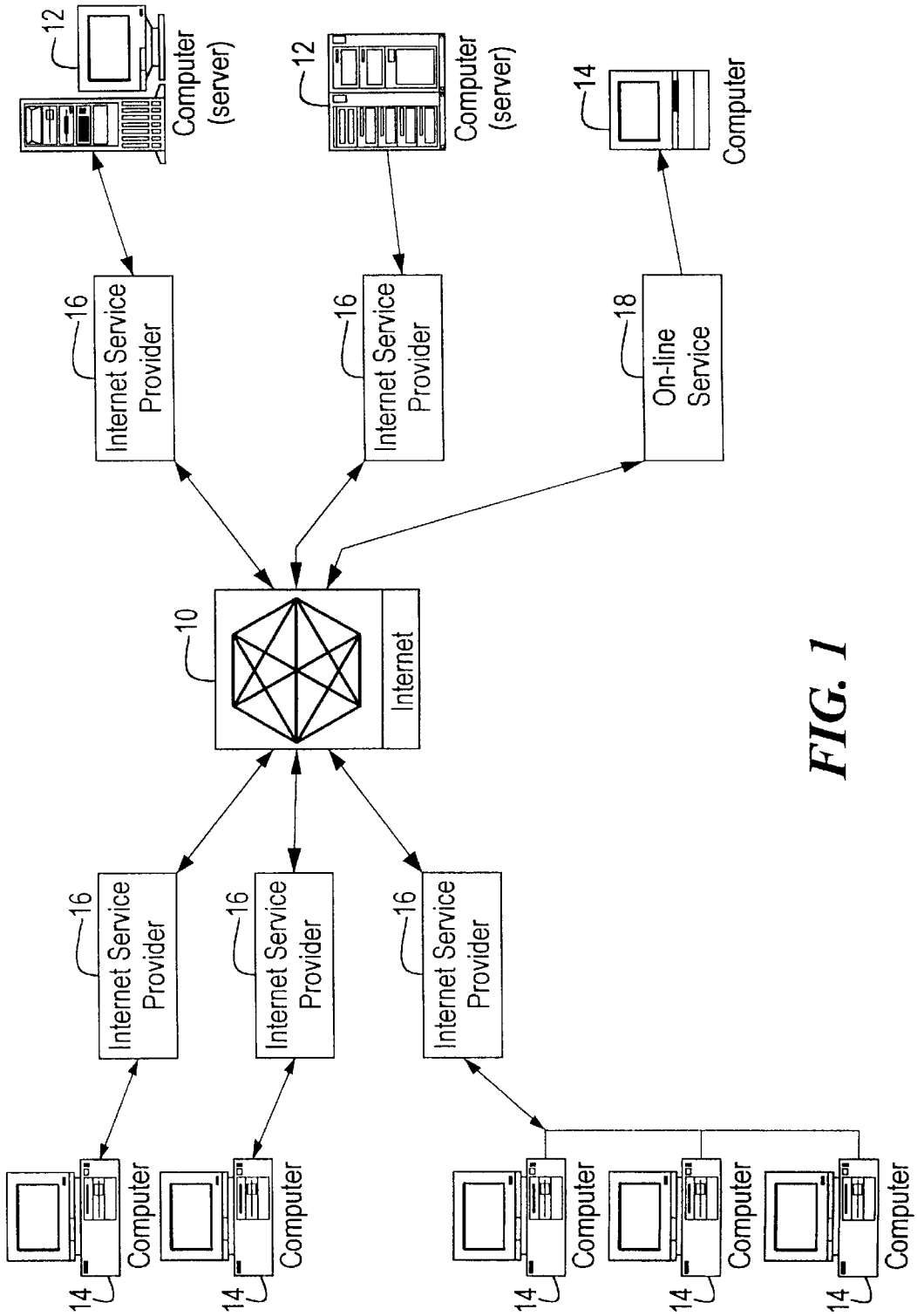

12
Computer (server)
12
Computer (server)
14
Computer
16
Internet Service Provider
16
Internet Service Provider
18
On-line Service
10
Internet
16
Internet Service Provider
16
Internet Service Provider
16
Internet Service Provider
14
Computer
14
Computer
14
Computer
14
Computer
14
Computer

FIG. 1

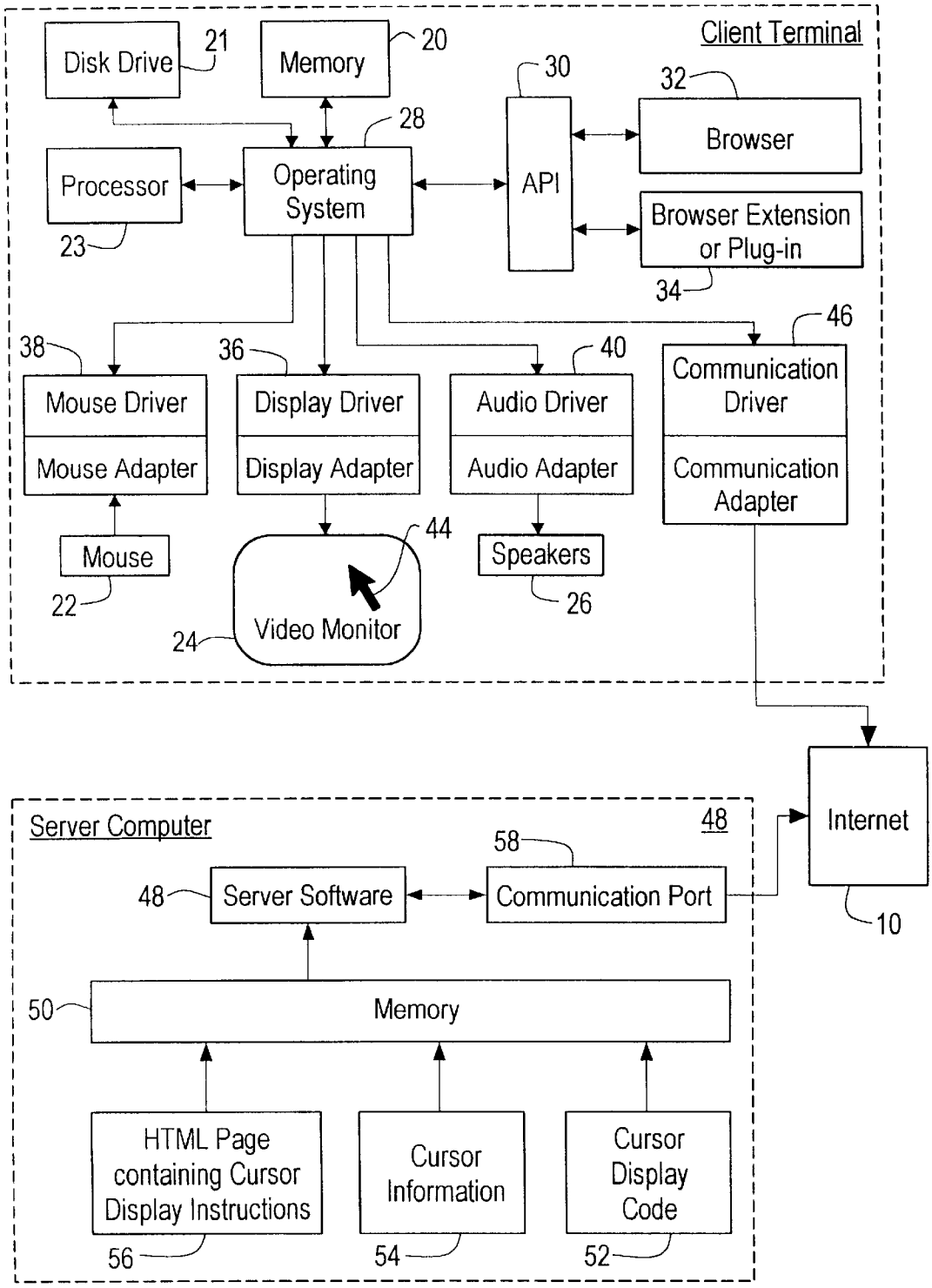

Client Terminal
Disk Drive
21
Memory
20
30
32
Browser
28
Processor
Operating System
API
Browser Extension or Plug-in
23
34
46
38
36
40
Mouse Driver
Mouse Adapter
Display Driver
Display Adapter
Audio Driver
Audio Adapter
Communication Driver
Communication Adapter
Mouse
22
44
Speakers
26
24
Video Monitor
Internet
10
Server Computer
48
58
48
Server Software
Communication Port
50
Memory
HTML Page containing Cursor Display Instructions
Cursor Information
Cursor Display Code
56
54
52

FIG. 2

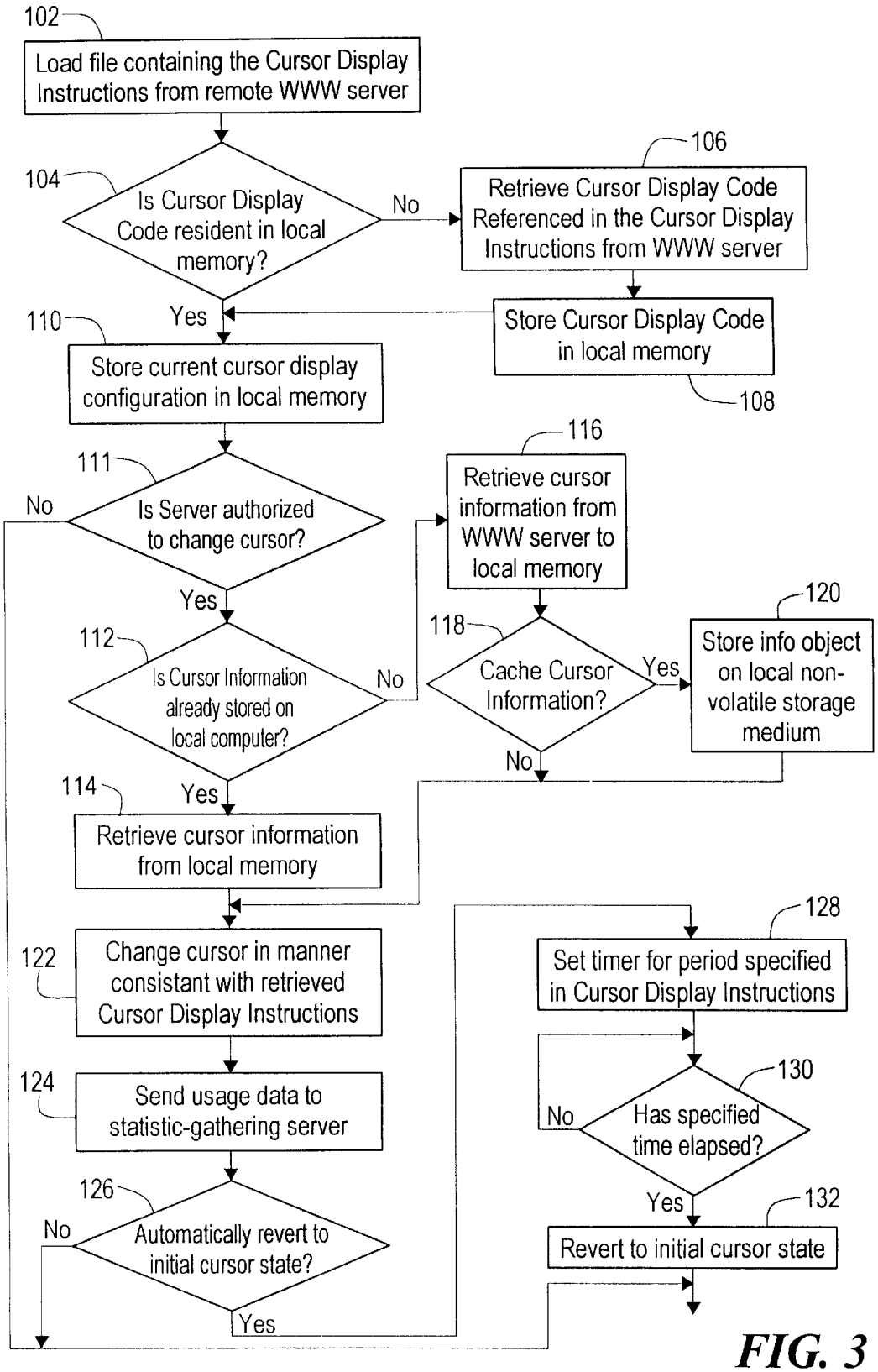

102
Load file containing the Cursor Display Instructions from remote WWW server
104
Is Cursor Display Code resident in local memory?
No
106
Retrieve Cursor Display Code Referenced in the Cursor Display Instructions from WWW server
Store Cursor Display Code in local memory
108
Yes
110
Store current cursor display configuration in local memory
111
Is Server authorized to change cursor?
No
Yes
112
Is Cursor Information already stored on local computer?
No
Yes
114
Retrieve cursor information from local memory
116
Retrieve cursor information from WWW server to local memory
118
Cache Cursor Information?
Yes
No
120
Store info object on local non-volatile storage medium
122
Change cursor in manner consistant with retrieved Cursor Display Instructions
124
Send usage data to statistic-gathering server
126
Automatically revert to initial cursor state?
No
Yes
128
Set timer for period specified in Cursor Display Instructions
130
Has specified time elapsed?
No
Yes
132
Revert to initial cursor state

FIG. 3

```
<OBJECT
        202.ID=cc1
        203.TYPE="application/x-oleobject"
        204.CLASSID="clsid:CB005660-D0C7-11cf-B7F6-00AA00A3F278"
        205.CODEBASE="http://cometsystems.com/controls/cc.cab#ver=4,70,
           0,1122"
        206.<PARAM NAME="CursorType" VALUE="1"
        207.<PARAM NAME="CursorImage"
           VALUE="http://cometsystems.com/library/images/acme.cur">
        208.<PARAM NAME="Counter" VALUE="http://
           cometsystems.com/accounting">
        209.<PARAM NAME="DisplayDuration" VALUE="5">
        210.<PARAM NAME="CacheCursor" VALUE="1">
        211.<PARAM NAME="ServerSignature" VALUE="54F5254A23BD988AB54">
        212.<PARAM NAME="DormantDelay" VALUE="600">
        213.<PARAM NAME="CursorTrajectoryMap" VALUE="http://
           cometsystems.com/maps/trajectory">
        214.<PARAM NAME="CursorPositionMap" VALUE="http://
           cometsystems.com/maps/position">
        215.<PARAM NAME="CursorVelocityMap"
           VALUE="http://cometsystems.com/maps/velocity">
        216.<PARAM NAME="CursorPositionMap" VALUE="http://
           cometsystems.com/maps/velocity">
        217.<PARAM NAME="CursorButtonMap" VALUE="http://
           cometsystems.com/maps/buttonstate">
        218.<PARAM NAME="ContentType" VALUE="5">
        219.<PARAM NAME="PriorityLevel" VALUE="1">
        220.<PARAM NAME="StreamBufferSize" VALUE="0">
        221.<PARAM NAME="SatelliteImage"
           VALUE="http://cometsystems.com/library/images/acmesat.bmp">
        222.<PARAM NAME="SatelliteXDisplacement" VALUE="-50">
        223.<PARAM NAME="SatelliteYDisplacement" VALUE="50">
        224.<PARAM NAME="ExtraDisplayParameters"
           VALUE="http://cometsystems.com/library/params/acme.prm">
</OBJECT>
```

FIG. 4

```
<script language="VBScript">
<!--\1`;
302.Sub window_onLoad()
303.   ccl.RememberCurrentCursor()
304.   ccl.SetNormalCursor("http://cometsystems.com/library/
          images/acme.cur")
305.end sub

306.Sub window_onUnload()
307.   ccl.Reset()
308.end sub
-->
</script>
```

FIG. 5

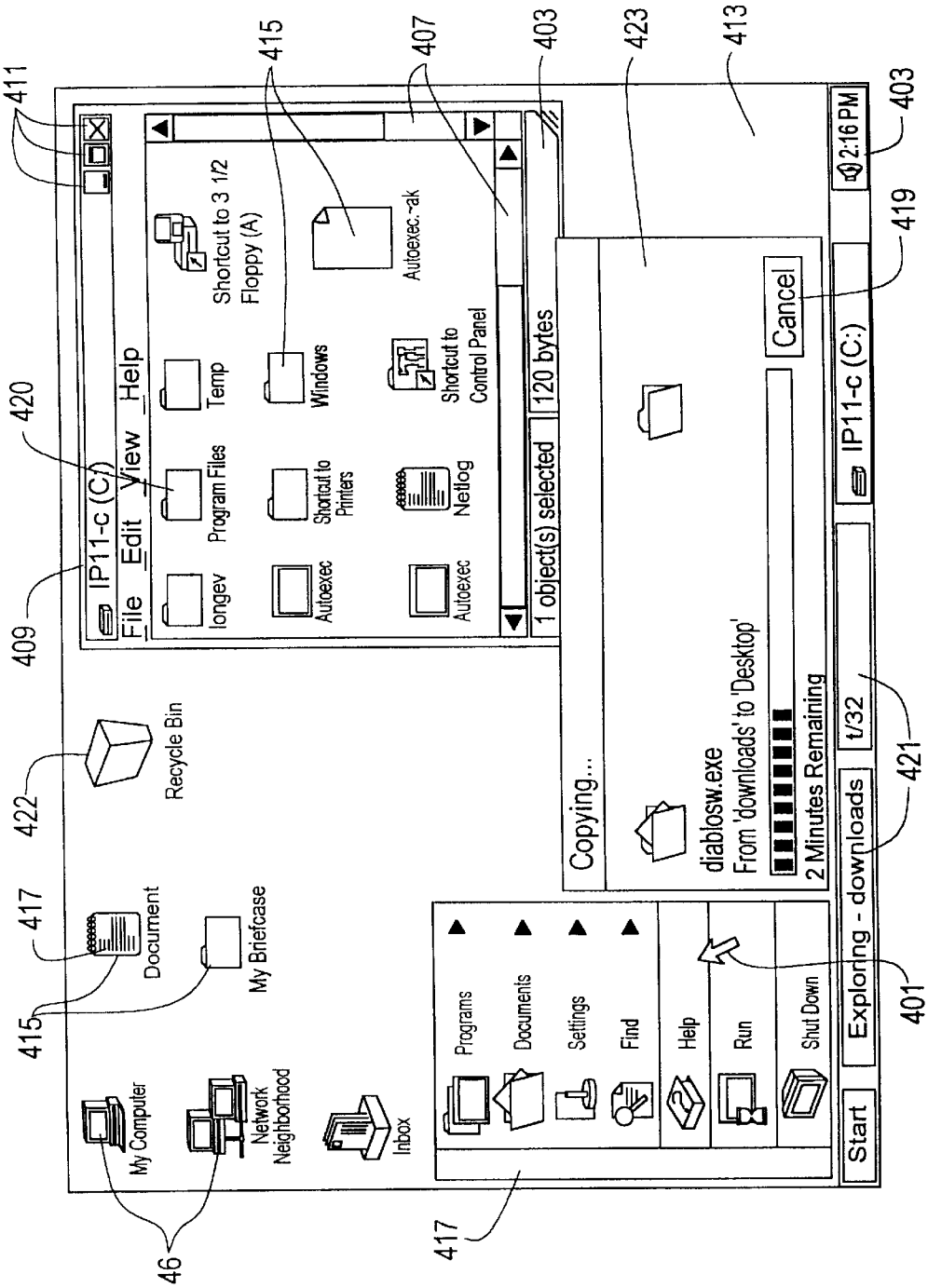

411
415
407
403
423
413
403
419
420
409
422
417
415
46
417
401
421
IP11-c (C:)
File Edit View Help
Shortcut to 3 1/2 Floppy (A)
Autoexec.~ak
Temp
Windows
Shortcut to Control Panel
Program Files
Shortcut to Printers
Netlog
longev
Autoexec
Autoexec
1 object(s) selected
120 bytes
Cancel
Copying...
diablosw.exe
From 'downloads' to 'Desktop'
2 Minutes Remaining
Recycle Bin
Document
My Briefcase
My Computer
Network Neighborhood
Inbox
Programs
Documents
Settings
Find
Help
Run
Shut Down
Start
Exploring - downloads
t/32
IP11-c (C:)
2:16 PM

FIG. 6

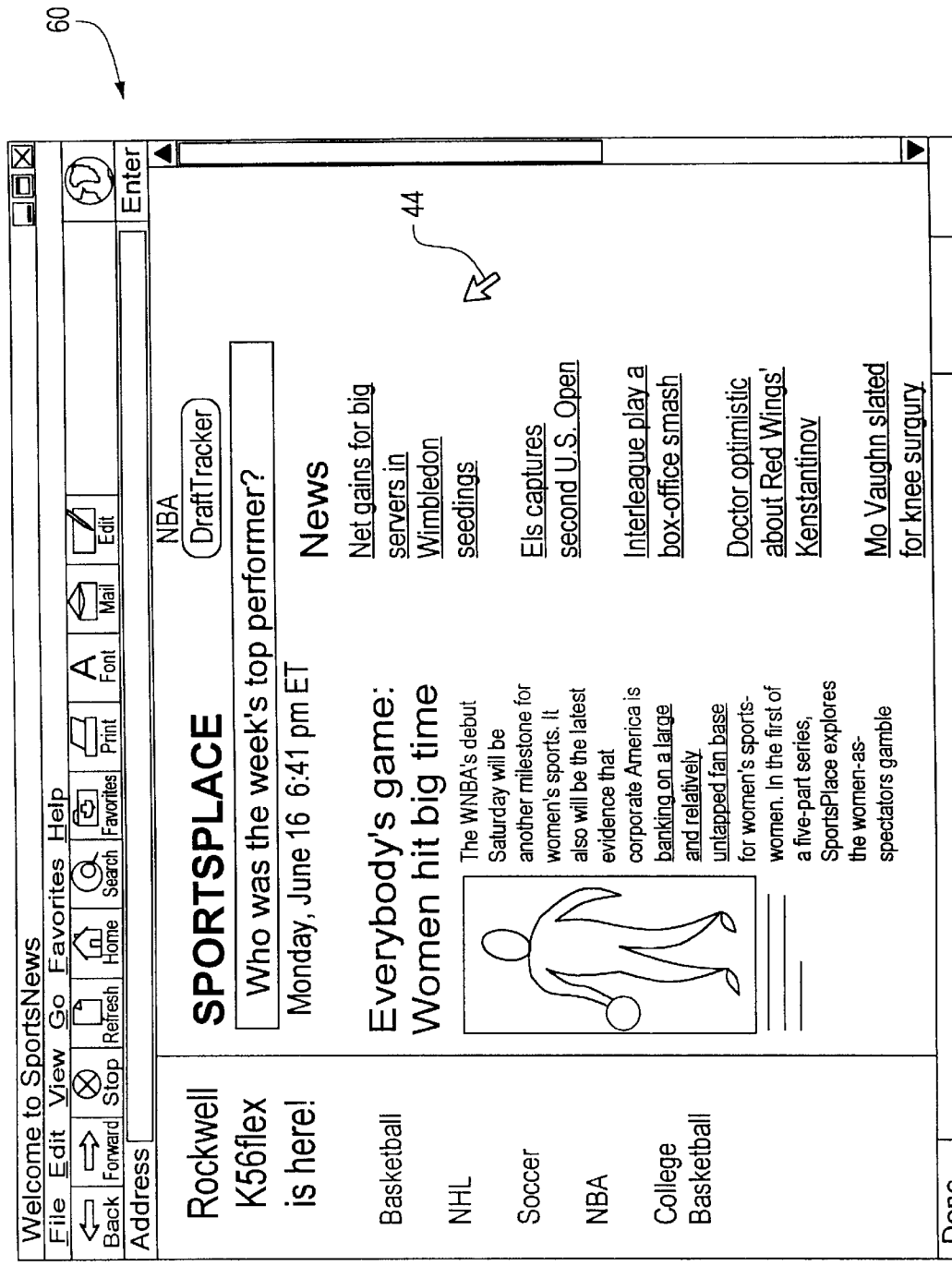

60
Welcome to SportsNews
File Edit View Go Favorites Help
Back Forward Stop Refresh Home Search Favorites Print Font Mail Edit
Address
Enter
Rockwell K56flex is here!
Basketball
NHL
Soccer
NBA
College Basketball
SPORTSPLACE
NBA
DraftTracker
Who was the week's top performer?
Monday, June 16 6:41 pm ET
Everybody's game: Women hit big time
The WNBA's debut Saturday will be another milestone for women's sports. It also will be the latest evidence that corporate America is banking on a large and relatively untapped fan base for women's sports-women. In the first of a five-part series, SportsPlace explores the women-as-spectators gamble
News
Net gains for big servers in Wimbledon seedings
Els captures second U.S. Open
Interleague play a box-office smash
Doctor optimistic about Red Wings' Kenstantinov
Mo Vaughn slated for knee surgury
44
Done

FIG. 7

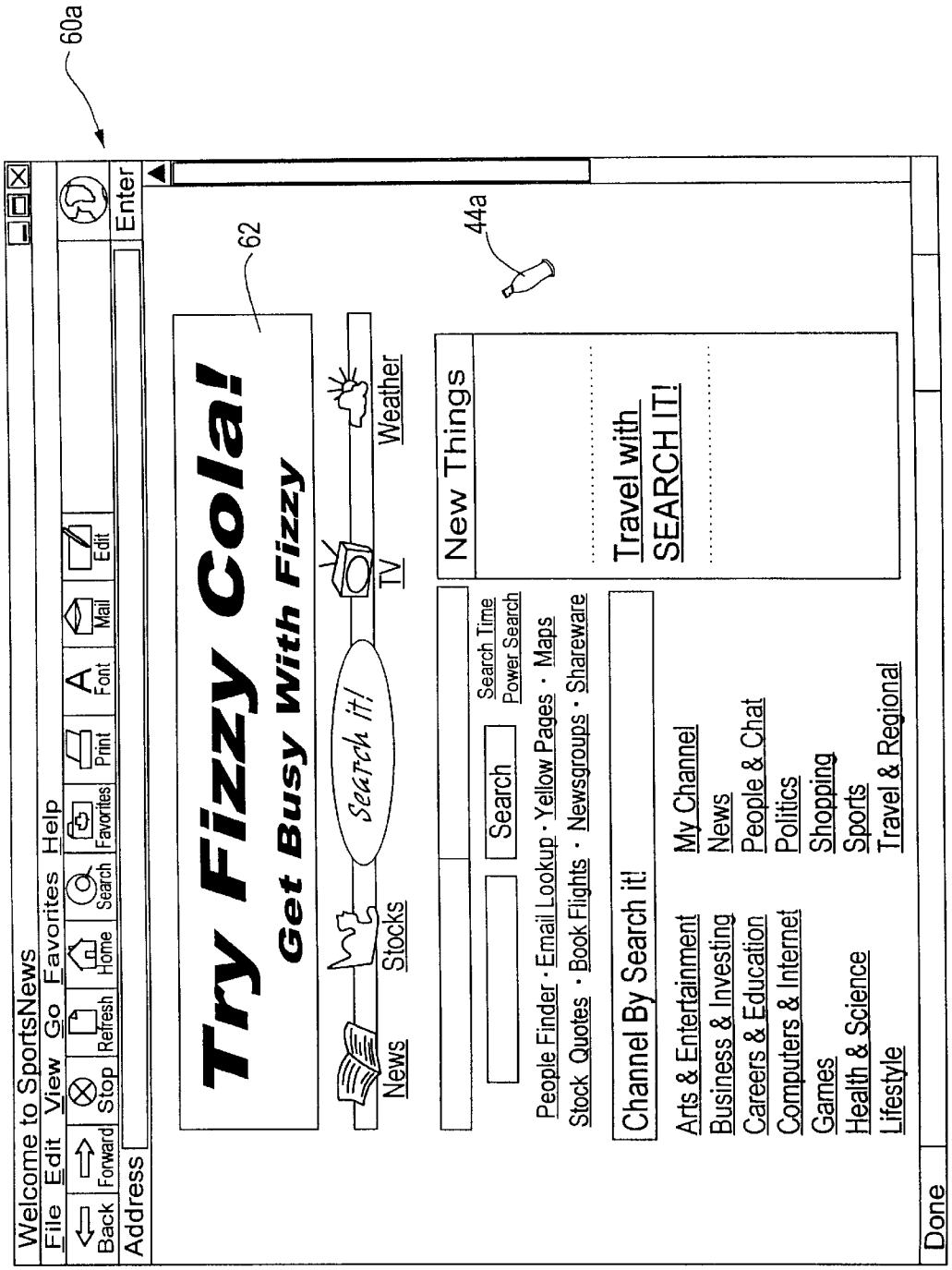

60a
Welcome to SportsNews
File Edit View Go Favorites Help
Back Forward Stop Refresh Home Search Favorites Print Font Mail Edit
Address
Enter
62
Try Fizzy Cola!
Get Busy With Fizzy
Search it!
News
Stocks
TV
Weather
44a
New Things
Travel with SEARCH IT!
Search
Search Time
Power Search
People Finder · Email Lookup · Yellow Pages · Maps
Stock Quotes · Book Flights · Newsgroups · Shareware
Channel By Search it!
Arts & Entertainment
Business & Investing
Careers & Education
Computers & Internet
Games
Health & Science
Lifestyle
My Channel
News
People & Chat
Politics
Shopping
Sports
Travel & Regional
Done

FIG. 8

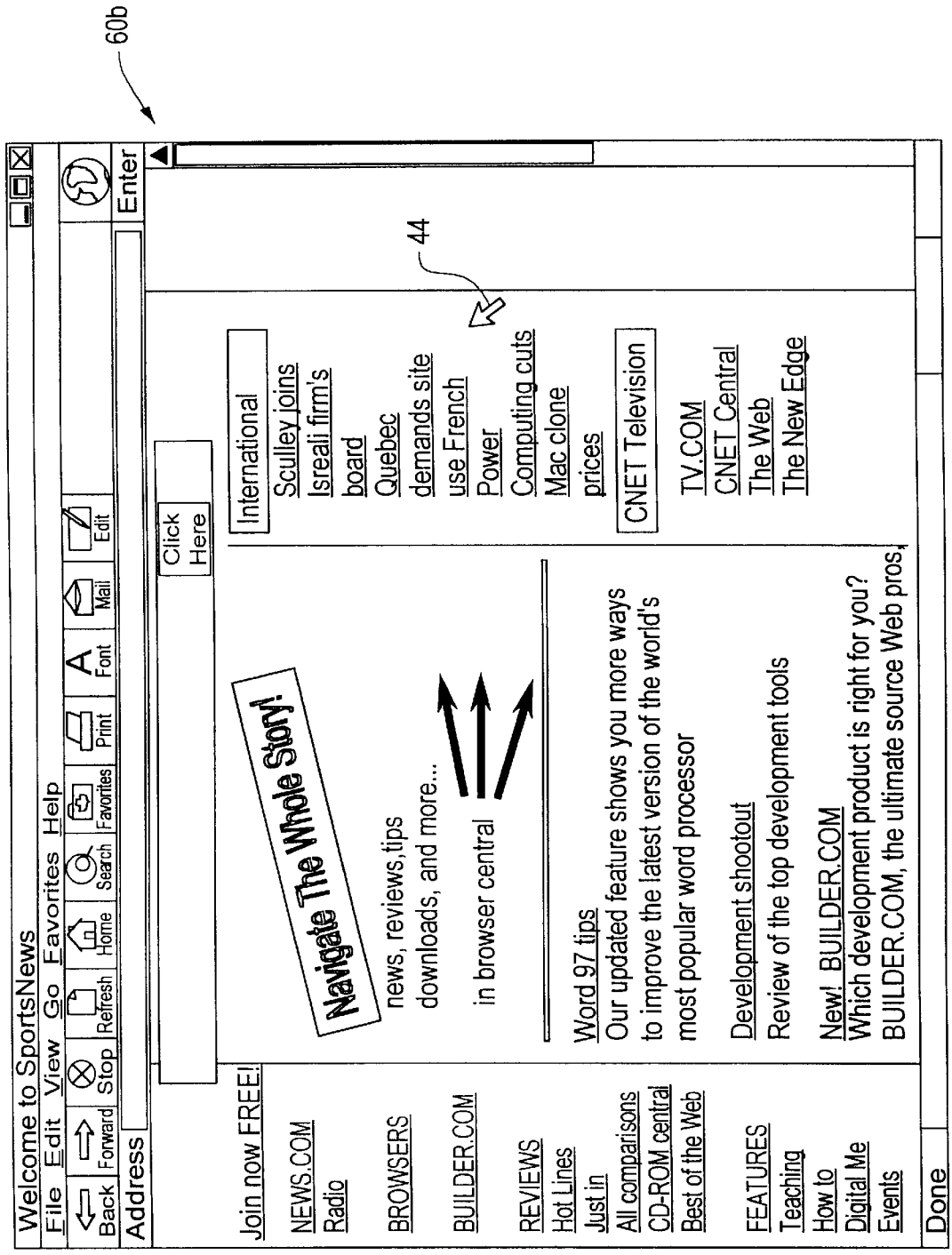

60b
Welcome to SportsNews
File Edit View Go Favorites Help
Back Forward Stop Refresh Home Search Favorites Print Font Mail Edit
Address
Enter
Click Here
44
Join now FREE!
NEWS.COM
Radio
BROWSERS
BUILDER.COM
REVIEWS
Hot Lines
Just in
All comparisons
CD-ROM central
Best of the Web
FEATURES
Teaching
How to
Digital Me
Events
Navigate The Whole Story!
news, reviews, tips
downloads, and more...
in browser central
Word 97 tips
Our updated feature shows you more ways to improve the latest version of the world's most popular word processor
Development shootout
Review of the top development tools
New! BUILDER.COM
Which development product is right for you?
BUILDER.COM, the ultimate source Web pros.
International
Sculley joins
Isreali firm's
board
Quebec
demands site
use French
Power
Computing cuts
Mac clone
prices
CNET Television
TV.COM
CNET Central
The Web
The New Edge
Done

FIG. 9

SERVER SYSTEM AND METHOD FOR MODIFYING A CURSOR IMAGE

FIELD OF THE INVENTION

This invention relates to computer networks and software, and more particularly, to a server system capable of modifying a cursor image displayed on a remote client computer.

BACKGROUND OF THE INVENTION

The World Wide Web ("WWW" or "web") and online services such as America Online, in conjunction with faster and more powerful personal computers, have rendered the Internet and other interactive online computer networks accessible to millions of people all over the world. Concomitant with the emergence of this new communication medium, digital content providers have proliferated, providing online news, entertainment, games and all sorts of other content. As with other mass mediums, such as television, radio, and print publications, the entities that create such content seek to offset their expenses by selling advertising. With reference to the WWW, online advertising has become a multimillion dollar business, to the amount of approximately $300 million dollars in 1996.

The most common type of online advertisement exists in the form of "banner advertisements". Users of online services routinely encounter banner ads on the top, sides, and/or bottom of their video monitor screens when viewing a web page. Banner ads are generally square or rectangular boxes provided with some combination of graphics, color and text directed to the product or service being advertised. As such, the intention of these banner advertisements is to create impressions among online users and to convey some advertising message and/or logo. Banner ads are usually provided on a web page in the form of a "hyperlink", in which users who yield to the advertisements solicitation to "Click Here" are transported to the web site of the manufacturer of the product or service being advertised, or to some other screen which provides additional information about the product or service.

Unfortunately, banner ads occupy only a small portion of a web page. As the user scrolls down a page the banner ad disappears. Although online advertisers and content publishers have attempted to optimize the visibility of banner advertisements by placing them on a popular web page where they will have a greater chance of being seen, Internet users, nevertheless, can easily ignore or find ways to remove and eliminate from their view the banner ads which exist on the web pages they are viewing. As such, the banner ads are rendered ineffective in their aim to provide information about a product or service. Additionally, money spent to advertise a product may be wasted if users are able to ignore or remove the advertisements from the web pages they are viewing.

Another method of online advertising involves the use of "frames" on a web page. Frames are a feature supported by the recent versions of leading web navigating programs known as browsers, such as Netscape Navigator® and Microsoft's Internet Explorer®. Frames generally divide up a user's screen so that the user can, for example, independently scroll down each of numerous frames which appear on the web page being viewed on the user's screen. Like banner advertisements, frames can be aesthetically unappealing as well as confusing to the user. Additionally, placement of advertising frames on a web page generally results in cramping or decreasing the size of the main content frame which oftentimes renders the content in the main frame difficult to read. As a result, users have developed ways to reduce the size or even eliminate frames from the web page being viewed.

Another type of online advertising involves the self-appearing window which generally appears on its own as a user is using the Internet or browsing on the WWW. Such advertisements are relatively easy for a user to avoid as a user may simply re-size the window to make it smaller, drag another window or object in front of it to obscure it from view, close the advertising window, or simply ignore it and continue with the task being undertaken online. Recently, online advertisers have begun using self-appearing screens which are delivered via dialog boxes which dominate the main part of the screen. Although these dialog boxes can be removed when the user clicks on the appropriate place(s) on the dialog box, the self-appearing dialog boxes have a much higher rate of being seen by users. This follows because the dialog boxes take control of the user's screen for a preset amount of time and/or until the user clicks on the appropriate place(s) to make the dialog box disappear. The recent prevalence in the use of self-appearing dialog box advertising has resulted in a more intrusive method of advertising which has resulted in resentment among users who are accustomed to more passive online advertising methods such as the frames and banner advertisements which are more easily avoided and/or ignored.

Accordingly, there is a need for a simple means to deliver advertising elements, i.e. logos, animations, sound, impressions, text, etc., without the annoyance of totally interrupting and intrusive content delivery, and without the passiveness of ordinary banner and frame advertisements which can be easily ignored.

OBJECTS AND SUMMARY OF THE INVENTION

It is thus a general object of the present invention to provide a means for delivering online advertisements which are unintrusive and which are not easily ignored by a user.

A more specific object of the present invention is to provide a server system for modifying a cursor image to a specific image displayed on a video monitor of a remote user's terminal.

It is another object of the present invention to provide a server system for modifying a cursor image to a specific image displayed on a video monitor of a remote user's terminal for the purposes of providing on-screen advertising.

It is a further object of the present invention to provide a means for providing on-screen advertising transmitted online which does not interrupt the delivery of content and which is aesthetically appealing and which affords the advertiser a great degree of unintrusive exposure.

It is still a further object of the present invention to provide a system and a method for causing a remote user terminal to display a cursor image as specified by a server terminal.

It is also an object of the present invention to provide a system and method for causing a remote user terminal to display a cursor image as specified by a server terminal, wherein the cursor image corresponds to the content retrieved by the user terminal.

It is a further object of the present invention to provide a system and method for causing a remote user terminal to display a cursor image such as a corporate name or logo, a brand logo, an advertising or marketing icon or slogan, an animated advertising image, and a related audio clip, that

relate to an advertisement, such as a banner advertisement, that is included in the information content being retrieved by the user terminal.

It is an additional object of the present invention to provide a means for changing a cursor's appearance by sending data and control signals from a remote computer so that the cursor or pointer's appearance is associated with a portion of, or the entire content being displayed on the user's screen.

It is still an additional object of the present invention to provide a means for changing the appearance of a computer's cursor or pointer by sending data and control signals from a remote computer so that the cursor or pointer's appearance is associated with advertising messages.

These and other objects of the invention are realized in various embodiments of the present invention by providing a system for delivering advertising elements online without the annoyance resulting from the interruption of content delivery and without the passiveness of ordinary banner and frame advertisements which can be too easily ignored or bypassed or removed. An exemplary embodiment of the present invention is directed to a system that provides online advertising content using the on-screen cursor which is generally controlled by an input of positioning device known as a "mouse" or "mouse pointer". Nearly all online computer interfaces utilize a wired or remote control positioning device such as a mouse or roller or track ball which controls the cursor's movement on the screen. It is the cursor controlled by the mouse or positioning device which a user uses to "navigate" or move the cursor over objects, buttons, menus, scroll bars, etc., which appear on-screen and then clicking or in some cases double-clicking in order to activate a screen or task, or to commence an application or some function.

As a result of the prevalence of the use of the mouse, by many millions of users of online systems, a great deal of time is spent focused on the icons which represent the cursor or pointer as it may appear in some cases. Presently, pointer icons change from application to application and can also change within an application depending upon where on the screen the pointer is located, what state the computer exists in at a given moment, and what tools are being used, among other factors. Generally, pointers change shape to reflect an internal state of the computer or the present function within an application. While it is not new for pointers and cursors to change shape, pointers are not presently used to convey advertising. In conventional systems, the appearance of the cursor or pointer does not change to correspond with on-line content being displayed on the screen.

The present invention provides a means for enabling cursors and pointers to change color, shape, appearance, make sounds, display animation, etc., when the user's terminal or computer, known as the "client" or "user" terminal, which has a network connection, receives certain instructions from a remote or "server" computer attached to the network. In an exemplary embodiment of the present invention, the generic cursor or pointer icons used in many networking applications, such as black arrows, hands with a pointing finger, spinning wheels, hourglasses, wristwatches, and others, will change appearance, and in some cases may incorporate sound or animation, in a way that is linked and related to the content, such as a web page, which is being transmitted to and displayed on the client computer. The cursor or pointer may appear as a corporate or a brand logo which relates to advertising content within the web page being transmitted and displayed. The cursor or pointer image may also appear in a specified shape or color that is intended to convey a message that relates to the advertising content within the web page being transmitted and displayed.

An exemplary embodiment of the present invention comprises a combination of hardware and enabling software residing on the transmitting (server) computer or network server and/or on the receiving (client or user) computer or terminal which brings about the stated effect of enabling a computer's cursor or pointer to change appearance and in certain cases provide sound and animation which is linked and related to the content being transmitted to and displayed on the client computer or terminal. The transmitting computer and receiving computer or terminal advantageously include a processor, an operating system (OS) loaded thereon, a video monitor used to display a graphical user interface (GUI) and a Hypertext Transfer Protocol (HTTP) compliant web browser capable of loading and displaying hypertext documents transmitted over the Internet, although the invention is not limited in scope in that respect. For example, the receiving terminal may be any device that is able to communicate with a remote server, such as a user computer terminal, a user dumb terminal, or a television based system, such as a Web TV® terminal and other devices.

Preferably, coded information for bringing about the change in appearance of the cursor are embedded within the web page being loaded and viewed. In one embodiment of the present invention, the web page is written in Hypertext Markup Language (HTML) which is one of the most common standard page description languages used to develop web pages. Typically a web browser retrieves a web page to be loaded on a user's terminal. The retrieved web page in accordance with one embodiment of the invention contains a set of predetermined instructions referred to herein as cursor display instructions. The browser or browser extension interprets the information contained in cursor display instructions and instructs the operating system of the user's terminal via an application programming interface (API) to check its memory to determine if the user terminal is capable of loading the coded image, animation, and/or soundbite. If the image, etc. has been previously cached in the client computer memory, the cursor display instructions instruct one or more of the many devices controlled by the operating system in the user's terminal, such as the video monitor and audio speakers to display the desired images, animation and play desired sounds. If the image, etc. has not been previously cached in the client computer's memory, the browser or browser extension retrieves the information corresponding to the desired image from a remote server.

The present invention may serve to enhance banner advertisements which appear on a web page so as to remind users which company is sponsoring the particular page being viewed and to draw the user's attention to the banner advertisement. The present invention can also serve as a stand-alone branding vehicle as part of a "ubiquity campaign" to generate massive impressions among an audience of online users or can be simply used to make web sites more entertaining by providing animated, colorful cursors which may incorporate sound and/or animation, and which are configured so as to connote a relationship with the topic or subject of the web site.

The foregoing sets forth certain objects, features and advantages provided by exemplary embodiments of the present invention. Other objects and features of the present invention will become apparent from the following detailed description considered in conjunction with the accompanying drawings. It is to be understood, however, that the

drawings are designed solely for the purposes of illustration and not as a definition of the limits of the invention, for which reference should be made to the appended claims.

DETAILED DESCRIPTION OF THE DRAWINGS

In the drawings in which like reference characters denote similar elements throughout the several views:

FIG. **1** illustrates a diagrammatic representation of a computer network illustrating the interconnection of a plurality of computers in which the present invention is implemented;

FIG. **2** illustrates a client-server computer network supporting the hardware and software of the present invention;

FIG. **3** illustrates a flowchart diagram of an exemplary method of the present invention for obtaining information from a remote site for modifying a cursor image and implementing such information at numerous user sites;

FIG. **4** illustrates a portion of the Cursor Display Instructions which is referenced as a resource within an HTML document according to one embodiment of the present invention;

FIG. **5** illustrates a set of exemplary codes that cause the user terminal's cursor to be modified, then revert to its original shape in accordance with one embodiment of the present invention;

FIG. **6** illustrates a plurality of user interface attributes that may be remotely modified in accordance with one embodiment of the present invention; and

FIGS. **7–9** illustrate the appearance of a cursor prior to, during and after linking to a web page that contains cursor display instructions.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** illustrates a computer network, such as Internet **10**, based on the client-server model. Internet **10** comprises a worldwide network of computers known as "servers" **12** which are accessible by "client computers" or "user terminals" **14**, which are typically used by individual users or comprise a collection of personal computers interconnected via a Local Area Network or LAN, which are capable of accessing the Internet via a private Internet service or access provider (ISP) **16**, such as the AT&T Worldnet Service® or the IBM Global Network®, or via an online service provider **18**, such as America Online®, Compuserve®, the Microsoft Network® or Prodigy® (to name the most popular online service providers). One of the most common applications of the Internet is to support the World Wide Web ("WWW" or "the web"), which is a collection of servers on the Internet that utilize the Hypertext Transfer Protocol (HTTP), a known application protocol that facilitates data exchange between client and server and provides users or clients **14** access to files which can include text, graphics, sound, video, etc., using a standard page description language referred to as Hypertext Markup Language (HTML).

Each client computer **14** as indicated in FIG. **1**, includes a "web browser" or browser loaded on the client computer's hard drive **21**. A browser is a common software tool which allows graphical user interface (GUI)-based access to Internet network servers **12** through Internet Service Providers, ISPs, **16** or online service providers **18**. A server **12** functions as a so-called "web site" which supports and maintains a plurality of files in the form of documents and pages. A Uniform Resource Locator or URL identifies a specific network path to a server **12** or some resource located on that server which has a known syntax for defining the network connection. The fundamental intrinsic capabilities of the browser are: (1) the ability to communicate with other computers using HTTP, and (2) the ability to process and present HTML documents to the user via a graphical user interface, GUI.

Recent versions of most browsers provide a plethora of other features beyond these two capabilities. For example, to increase its flexibility, the browser's intrinsic capabilities may be further extended through the use of software components, often called "controls" or "plug-ins". While the intrinsic capabilities of the browser are linked at compile-time ("statically"), the code which implements the capabilities of the control or plug-in component is linked with the browser's code at run-time ("dynamically"). By supporting these components through standard interface definitions, the browser's capabilities can be extended in ways never anticipated by its original manufacturer.

Another type of flexibility is offered when the browser implements some sort of command interpreter which is capable of interpreting and executing a code stream at run-time. In this case, the browser acts as a sort of "virtual machine" whose run-time behavior is completely governed by the code stream which it processes. The total scope of capabilities which can be realized with this approach is defined by the set of operations supported by the command interpreter.

Individually and collectively, these mechanisms provide a powerful and flexible platform which supports a wide range of Internet-based applications. Currently, some of the emerging standards govern the operation of these mechanisms, although the invention is not limited in scope in that respect. For example, Microsoft has created an interface definition for Windows "dynamic link libraries" and for ActiveX software components. Sun Microsystems has defined a software component model called JavaBeans. Sun has also created a virtual machine architecture and language called Java, which is supported via a variety of commercially available compilers. While a Java compiler translates source code into pseudo-code output called an "applet", which is in turn processed by the Java virtual machine, Microsoft, Sun, and others have also defined a set of HTML scripting languages whose source code is embedded directly in an HTML page. Microsoft's VBScript, JScript and Sun's JavaScript are examples of these embedded scripting languages.

The standard web page description language, HTML, provides basic document formatting and permits the web site developer to create and specify "links" or "hyperlinks" to other servers and files. Obtaining a web page or connecting to a web site requires the specification of a URL using an HTML-compliant client browser. After specifying the URL, client computer **14** initiates a request to server **12** identified in the link and connects to the web site and receives a web page. The request by client computer **14** to server **12** via the link is advantageously communicated via a TCP/IP (Transfer Control Protocol/Internet Protocol) communication, although the invention is not limited in this respect and other network connections or Internet protocols may be used.

Although an exemplary embodiment of the present invention is described based on the arrangement illustrated in FIG. **1**, it is noted that the invention is not limited in scope in that arrangement and other types of system connections may be employed. For example, a plurality of user terminals may be connected to an online provider via dedicated communica-

tion channels, such as telephone lines. In accordance with this embodiment, the server system provides certain information that causes the cursor image on the video monitor of the user terminal to display an image as specified by the server system. As a result, the server system remotely defines and manages the shape and appearance of the cursor image in accordance with a pre-specified condition. The shape and appearance of the cursor image may correspond to the actual content of the data being provided to the user. Furthermore, regardless of the actual content of the data being provided to the user, the shape and appearance of the cursor image may be specified by the server system such that a plurality of user terminals at a desired point in time receive appropriate instructions to display the specified cursor image.

FIG. **2** provides a block diagram of hardware and software which is representative of a client-server network system connected via the Internet according to one embodiment of the present invention. The user or client computer or user terminal **14** typically includes a number of hardware components and software subsystems which cooperate to deliver the wide range of capabilities demanded by a modern computer application or program. These include not only the basic computational processor **23** and memory **20**, but also a variety of input and output devices such as the keyboard (not shown), mouse **22**, video display monitor **24**, audio speakers **26**, non-volatile storage such as a hard drive **21** and network communications systems **46** such as a modem among other devices. User terminal **14** is controlled via an operating system ("OS") **28** which serves to organize all the disparate elements within the computer **14** and expose them in a consistent and organized way to a program which may need some or all of these capabilities. The interface between a program, which is generally loaded within the computer's memory **20**, and the systems under the control of the operating system **28** is commonly referred to as the Application Programming Interface ("API") **30**, which is essentially a library of functions which the program ("application") can invoke when it needs to interact with any of these hardware subsystems.

As illustrated, user terminal **14** contains a browser **32** loaded within the computer's memory **20**, and is adapted to communicate with a browser extension or browser plug-in **34**, both which are adapted to communicate with the operating system **28** via the application programming interface API **30**. As illustrated, operating system **28** is supplemented by a set of "drivers" which control and provide the operating system **28** with access to peripheral devices which are a part of user terminal **14**. The drivers include display driver **36** which controls and provides the operating system **28** with access to the cursor image or pointer **44** projected on video display monitor **24**, a mouse driver **38** which controls and provides the operating system **28** with access to mouse **22**, an audio driver **40** which controls and provides the operating system **28** with access to speakers **26**. Operating system **28** is configured to provide animated images to the video monitor. Furthermore, in accordance with another embodiment of the invention, the display driver may be configured to provide animated images to the video monitor. Operating system **28** also provides access to a communication port **46** such as a modem which serves as a communication interface to the Internet **10**.

With continued reference to FIG. **2**, user terminal **14** is connected to Internet **10** via a modem or some other communication interface such that information may be transmitted between user terminal **14** and Internet **10** via communication lines such as telephone cables or fiber optic networks, among other types of transmission systems. Internet **10** is also connected to numerous network servers, such as a simplified representation of a WWW server which is indicated as **48**. Server **48** is provided with memory **50** into which the contents of certain data files are loaded. Such data files, among others, include Cursor Display Code **52**, Cursor Information **54**, and an HTML page containing Cursor Display Instructions **56**, all of which are discussed in greater detail herein below. As illustrated in FIG. **2**, these data files **52**, **54**, **56** are shown residing on the same server computer. However, the interconnected nature of the WWW allows these data files **52**, **54**, **56** to exist anywhere on Internet **10**. For example, files **52** containing cursor display codes may be stored in various server systems, while files **54** containing cursor information may be stored in the same or other server systems, and files **56** containing HTML pages containing cursor display instructions may be stored in the same or yet other server systems.

In operation, WWW server **48** includes software which recognizes file requests received from WWW clients or users by communication port **58** and fulfills these requests by retrieving data stored in data files, i.e., Cursor Display Code **52**, Cursor Information **54**, and an HTML page containing Cursor Display Instructions **56**.

One of the characteristics of most recent software systems is the graphically oriented user interface (GUI) which is viewable on video monitor **24**. This graphical user interface helps to organize and filter the vast quantities of information which is accessible in a user terminal **14**. Fundamental to the graphical user interface is the pointing device, generally mouse **22** which allows the user to manipulate or input information into the user terminal **14**. Movement of mouse **22** is monitored by user terminal **14** which translates this movement into a corresponding movement of cursor **44** viewable on video monitor **24**. As such, operating system **28** may expose, as some subset of its API **30**, a set of functions which can be used to control aspects of the behavior and/or appearance of cursor **44**.

By combining the capabilities of browser extensions, such as indicated by **34** in FIG. **2**, with the capabilities to modify cursor **44**, it is possible for a WWW server, such as that indicated by **48** in FIG. **2**, to control the display characteristics of cursor **44** displayed on video monitor **24** of the user's computer **14**. By doing so, a cursor control arrangement is established which is capable of delivering information which supplements, enhances, or is completely independent of, other information transmitted from a server, such as indicated by **48**, through traditional means as via a communications port **58**. The basic conceptual components of such exemplary system for modifying cursor **44** comprises Cursor Display Code **52**, Cursor Information **54**, and Cursor Display Instructions **56**, discussed hereinabove with reference to FIG. **2**. Preferably, Cursor Display Code **52** comprises a set of instructions which are executed on the user terminal **14** and which interact directly with application programming interface **30** of the user terminal **14** and operating system **28** so as to accomplish the actual change of cursor **44**. Cursor Information **54** is, advantageously, a set of data which identifies the actual cursor image or images and corresponding audio content if desired. In one embodiment of the invention, Cursor Display Instruction **56** includes data that convey information that is used by Cursor Display Code **52** to control drivers, such as **36**, **40**, **46**, and to identify such things, which among others consist of: the physical location of Cursor Information **54**, the format of its representation, the intended manner and duration of its display, and information pertaining to how (and for how long) any cached Cursor Information **54** should be stored.

In general, the fundamental elements of the process of changing cursor **44** displayed on video monitor **24** of user terminal **14** are as follows: Cursor Display Instructions **56** are initially embedded inside an HTML document, e.g. a web page. When browser **32** of the user terminal **14** encounters Cursor Display Instructions **56**, Cursor Display Code **52** is retrieved then invoked. As part of the invocation, the browser passes to the Cursor Display Code coded information sufficient to specify the manner of the display. Cursor Display Code **52** then retrieves Cursor Information **54** either from within memory **20** of user terminal **14** or from storage at a remote site and then causes the Cursor Information to interact with the display system, such as display driver **36**, of user terminal **14** via the application programming interface **30** of operating system **28**. This interaction causes Cursor Information **54** to be accessed by the display driver **36** in order to accomplish the intended effect, e.g., the change or transformation of cursor **44** visible on video monitor **24**, and a corresponding sound information may be heard on speakers **26**.

FIG. **4** illustrates the Cursor Display Instruction as a resource within an HTML document which is retrieved from a remote server. The Cursor Display Instructions as shown in FIG. **4** are written for ActiveX® technology, although the invention is not limited in scope to that technology. Among the information included within this resource definition is an identifier of the Cursor Display Code (the ActiveX® control), and the ActiveX® control's physical location on the Internet. This information is listed in lines **202–205** which generally identifies the Cursor Display Code. Line **204** of the Cursor Display Instruction is an identifier which comprises a globally unique name, often called a "Class ID", and which allows a particular ActiveX® control to be distinguished from all other ActiveX® controls, such that the wrong ActiveX® control is prevented from being utilized or retrieved. The remainder of the Cursor Display Instruction listed in lines **206–224** include the ActiveX® parameters or argument list as discussed hereinafter with reference to FIG. **3**. The argument list includes parameters which provide information such as the type of cursor image (line **206**), where the image can be retrieved from if not already resident on the user computer (line **207**), where usage statistics are to be transmitted to (line **208**), how long a changed image should remain before reverting, if at all, to the initial image (line **209**), whether the cursor image is cached in the user terminal (line **210**), whether the transmitting server is authorized to send cursor display instructions (line **211**), the dormant delay duration (line **212**), the URL of a file which specifies cursor trajectory path (line **213**), the URL of a file which specifies how the cursor's shape should change based on its location on the screen (line **214**), the URL of a file which specifies how the cursor's shape should change based on its velocity (line **215**), the URL of a file which specifies how the cursor's shape should change based on modifications to the mouse button or keyboard state (line **217**), specification of the type of modification intended (line **218**), specification of the priority of intended modification (line **219**), specification that the modifications will occur as a result of the transfer of a series of data files (line **220**), the URL of a file which specifies the display of a satellite image that tracks the movement of the cursor image (line **221–223**), and location of additional display instructions (line **224**). It is noted that the invention is not limited in scope in this respect and other features may be included in the Cursor Display Instructions data.

One embodiment of this method in accordance with the present invention is set forth in greater detail in the flowchart illustrated in FIG. **3**. This embodiment is discussed with reference to the use of ActiveX® technology currently promoted by the Microsoft Corp. The ActiveX® technology provides a mechanism for defining the format of Cursor Display Instructions **56**, for defining, identifying, and in some instances dynamically retrieving Cursor Display Code **52**, and for implementing the interaction between Cursor Display Instructions **56** and the Cursor Display Code **52** as previously described. Although the flowchart in FIG. **3** is discussed with reference to ActiveX® technology, the invention is not limited in this respect, and other technologies for use with browser extensions or "plug-ins" may be utilized in accordance with various embodiments of the present invention as illustrated in FIG. **3**. Furthermore, additional embodiments in accordance with the principles of the present invention may be incorporated within other application software employed in the user terminal. For example, the operating system or the browser itself may be configured to incorporate the mechanism for receiving and recognizing the Cursor Display Instructions and in return provide additional instructions for changing the image or appearance of the cursor display.

With reference to FIG. **3**, in step **102**, browser **32** of user terminal **14** retrieves an HTML file containing Cursor Display Instructions **56**. The HTML file is retrieved when the user directs browser **32** to a remote WWW server site (such as, for example server **48** as indicated in FIG. **2**) by specifying the uniform resource locator, URL, of the site on the Internet where the HTML file is located. When the HTML file is retrieved, it is loaded from the remote WWW server site at which point browser **32** of user terminal **14** begins its routine parsing of the HTML document and eventually encounters a reference to an ActiveX® control or some other information coded in an appropriate programming language such as Sun Microsystem Inc.'s Java® or VBScript®, which is embedded in the Cursor Display Instructions **56** within the HTML document. The Cursor Display Code is capable of interacting with the application programming interface **30** of operating system **28** for the purpose of performing the change, transformation or "swap" of cursor **44** as it is presently displayed on video monitor **24**.

Upon encountering Cursor Display Instructions **56**, browser **32** recognizes Cursor Display Instructions **56** as a request to invoke the particular ActiveX® control with a particular argument list or set of parameters as illustrated in FIG. **4**. At step **104**, browser **32** examines Cursor Display Instructions **56** and uses a unique class identification within the Cursor Display Instructions **56** to determine whether Cursor Display Code **52** (ActiveX® control) is already resident within local memory **20** of user computer **14**.

If the Cursor Display Code **52** is not resident in local memory **14**, generally in the form of a browser extension or plug-in **34**, or if local memory contains an obsolete version of Cursor Display Code **52**, browser **32** attempts, at step **106**, to retrieve the ActiveX® control from a remote server on the Internet and store the Cursor Display Code in local memory **20** of user terminal **14** at step **108**. With reference to FIG. **4**, these steps correspond to lines **202–205**.

Cursor Display Code **52** retrieved in step **106** may be client-platform specific and may also be browser specific such that browser **32** may transmit specific details to the remote server so that the remote server can deliver the appropriate Cursor Display Code **52**.

In accordance with another embodiment of the invention, browser extension or plug-in **34** may be configured such that it can recognize Cursor Display Instructions based on any

one of the available technologies, such as Active X, JavaBeans, JavaScript or VBScript.

Furthermore, it is understood that data compression techniques may be used in order to reduce the amount of network traffic involved in the transmission of data over the Internet.

After Cursor Display Code **52** has been recognized by user terminal **14** as at step **104** or retrieved and loaded therein at steps **106** and **108**, operating system **28** is queried to determine the current cursor display configuration and this information is temporarily cached in local memory **20** of user terminal **14** at step **110** so that the cursor configuration may eventually be restored to its original state. Before any changes are made to cursor **44**, the system at step **111** determines whether server **48** is authorized to change cursor **44**. If authorization is not confirmed, no changes to cursor **44** transpire.

Step **112** is the first step which is executed from within the code of the ActiveX® control. At step **112**, the ActiveX® control determines whether the image specified (Cursor Information **54**) in the ActiveX® argument list which is to become the new cursor image exists in local memory **20** of user terminal **14**. If the specified image in the ActiveX® argument list exists in local memory **20**, it is retrieved therefrom at step **114**. An additional argument in the ActiveX® argument list (line **207**) identifies the location of this data on a remote server. If the specified image does not exist in local memory **20**, this data is utilized by the ActiveX® control to retrieve Cursor Information **54** at step **116** from the specified location.

At step **118**, an additional argument added within the ActiveX® control can be used to determine whether and for how long Cursor Information **54** should be cached in local memory **20**. At step **120** Cursor Information **54** is cached in local memory **20**. At step **122**, the cursor is caused to change in the manner consistent with the retrieved Cursor Display Instructions **56**. In an alternative embodiment, an additional step may be included which provides the user with the option of saving and storing the retrieved Cursor Information **54** in the computer's permanent memory on hard drive **21** even after the retrieved cursor is displayed. Storing the retrieved Cursor Information **54** in the computer's permanent memory saves time on the next occasion when the user loads a web page which requires the same cursor since the cursor is already stored within the computer's memory and need not be retrieved from a remote server.

Cursor Display Instructions **56** cause the invocation of an operating system function which causes the cursor to be displayed on video monitor **24**. More specifically, the ActiveX® control invokes the application programming interface **30** of operating system **28** which causes the cursor image displayed on video monitor **24** to change to the form intended as recited in the argument list. The changed cursor is not limited to image, and may also include animation as well as sound. It should also be appreciated that most computers utilize a multitude of cursor images depending upon the application and task which is being run on the computer. The invention is not limited to changing only a single cursor image and any and all cursor images controlled by the computer's display driver **36** may be caused to change.

At step **124** the ActiveX® control may send usage information to a particular remote server as coded in Cursor Display Instruction **56** or Cursor Display Code **52**. This information can be used to calculate the usage statistics of particular cursor images or cursor information and the context in which they are retrieved and viewed by users. In this particular embodiment, this information is conveyed as a data file transmitted to the remote server via HTTP. The invention is not, however, limited in the type of information and/or statistics which may be transmitted to the server, nor is the invention limited to being conveyed via HTTP as those skilled in the art will understand that such information may be conveyed via other transfer protocols. With reference to FIG. **4**, this step corresponds to line **208**. Additionally, the information may contain an identifying code for the server which issued the web page which contained the Cursor Display Instructions. This information could be used, for example, to verify that the issuing server has been granted the appropriate license to use the technology, by comparing a list of authorized servers or through digital signature validation.

In accordance with one embodiment of the present invention, the licensing arrangement is described in more detail, hereinafter. It is noted that licensing enforcement of the cursor display technology could be accomplished in several ways, and the invention is not limited in scope in that respect. As discussed previously, the server that transmits a web page may include the identity of the server in the form of a server ID within the Cursor Display Instructions. The user terminal then transmits the server ID to another server that among other things functions as a licensing body ("Licensing Body") so as to authenticate the server that transmits the web page as a valid licensee. Should this authentication fail, the execution of Cursor Display Instructions may not occur. In an alternative implementation, the execution of Cursor Display Instructions may be allowed to execute even if the issuer fails authentication. Such an infraction could be logged by the Licensing Body for use in enforcement through traditional channels. For performance reasons it may be desirable to collect the usage information for a plurality of Cursor Display Instructions as the user accesses multiple servers, and transmit the collection of information in batch form to the Licensing Body.

An alternative embodiment would involve the inclusion of an encrypted authentication code within the Cursor Display Instructions, as illustrated in line **211** of FIG. **4**, or via a separate exchange of data between the client and server. In order to ensure that this code could not be re-used by other, non-authorized sites, it could for example be derived from the server's IP address, the date and time at which it is generated, the argument list, or some other information that is accessible to the client. Another possibility would involve the transmission of a unique or pseudo-unique code, from the client to the server. Upon receipt of this authentication code, the client would perform a decryption and verify its authenticity. Under such circumstances, the server software could be augmented with an Authentication Code Module supplied by the Licensing Body which generates and encrypts this code. The mechanism by which this augmentation could occur is similar to that discussed previously in the context of extending the client browser. For example, the server software could be modified and statically linked to the Authentication Code. Alternatively, it could be dynamically linked at run-time. Another alternative would be to implement the Authentication Code as its own process on the server and facilitate an inter-process communication protocol such as the Common Gateway Interface ("CGI").

At step **126**, an ActiveX® control argument is used to determine whether the changed cursor should revert to its initial configuration. If it is intended to revert the changed cursor to its initial configuration, the reversion is paused at step **128** for a specified time period. After it is determined at step **130** that the specified time period has lapsed, the changed cursor reverts to its original configuration at step **132**.

Whether the cursor is caused to revert to its initial configuration is of concern to many users so as to ensure that the user's computer configuration is not permanently altered as a result of the process of changing the cursor. As such, additional alternative measures may be added into Cursor Display Instructions **54** such that the changed cursor could be restored to its original configuration when the ActiveX® control is loaded or unloaded, when the computer starts up, is rebooted or is shut down, when the browser is activated or shut down, when an animated cursor completes its animation sequence, when instructed by a remote server, or as a result of some user input such as setting an option in the browser or accessing another web page or site. An alternative to adding parameters to the Cursor Display Instructions would be to control the process of changing the cursor to its initial state by a control program downloaded by and executed on the client computer. An example written in VBScript and interacting with an ActiveX control is included in FIG. **5**.

Additionally, one of the significant attributes of this embodiment is the manner in which Cursor Display Code **52** is retrieved from a remote server if it is not located in the computer's local memory. Since Cursor Display Code **52** may be operating system or browser specific, it may be necessary that the server with which the user computer **14** is communicating be informed by user terminal **14** of the specific type of Cursor Display Code **52** which is desired. In another embodiment of the invention, browser extension or plug-in **34** may be configured such that it can recognize Cursor Display Instructions based on any available technology such as Active X and JavaScript.

The operation of steps **102–132** as set forth in FIG. **3**, may be illustrated pictorially in FIGS. **7–9**. FIG. **7** illustrates an example of a typical web page **60** as it would appear on a user's video monitor **24** having the standard arrow cursor **44**. In FIG. **8**, there is illustrated a different web page **60***a* having a banner advertisement **62** for Fizzy Cola which contains Cursor Display Instructions. When web page **60***a* loads, the Cursor Display Instructions cause arrow cursor **44** to change into a Fizzy cola bottle shaped cursor **44***a* in conjunction with the Fizzy Cola banner advertisement. As illustrated in FIG. **9**, if the user then loads a new web page **60***b* which is not provided with Cursor Display Instructions, the cola bottle shaped cursor of FIG. **8**, reverts to the standard arrow cursor **44**.

It is also understood that ActiveX® is but one of numerous technologies utilized over the Internet with which a user's computer may interact in bringing about the change or transformation of the cursor displayed on video monitor **24**. Other implementations may utilize different technologies such as Windows dynamic link libraries, VBScript and JScript from Microsoft, as well as Java, JavaScript and JavaBeans from Sun Microsystems Inc.. While these examples represent the dominant standards-based definitions, proprietary implementations could also be developed. Accordingly, while ActiveX® represents one embodiment of distributing and invoking Cursor Display Information **54** on a user's computer **14**, it is to be appreciated that there are a variety of alternative implementations, and this particular implementation should not be considered a limitation of the invention. For example, alternative versions of browser **32** may encapsulate the appropriate operating system application programming interface call within their own code modules such that a browser extension **34** is not required.

In yet another embodiment of the invention the tasks described in steps **102** through **132** may be employed cooperatively between browser and browser extension or plug-in **34**. Furthermore, browser **32** may employ a computational or processing engine such as an interpreter (as is the case with the Java® programming language, for example) which can extend the capabilities of browser **32** to a virtually unlimited degree.

It is also to be understood that in the course of carrying out the process of changing the cursor as discussed hereinabove, user terminal **14** may communicate with a multitude of remote servers as opposed to just a single server. For example, Cursor Display Codes may be retrieved from one remote server, Cursor Instructions may be retrieved from a second remote server, and the user terminal **14** may also be in communication with a third server to which it is transmitting the usage statistics.

Features identified in reference with FIG. **4** are described in more detail hereinafter. It is noted that in accordance with one embodiment of the invention, it may be desirable to modify the Cursor Display Code to improve its performance or enhance its capabilities. The server may transmit version information in the Cursor Display Instructions as illustrated in line **205** of FIG. **4**. The Cursor Display Code could compare this information with its own version information in order to determine whether it has been rendered obsolete by a more recent version. If so, the Cursor Display Code could retrieve the current version from a remote server and invoke execution on the new version.

In an alternative embodiment of the present invention the position, as well as the image, of the user terminal's cursor may be controlled by a remote server. This embodiment would be implemented within the Cursor Display Code **52** such that additional information could be passed to Cursor Display Code **52** via Cursor Display Instructions **56**. The additional information passed to Cursor Display Code **52** would contain code which indicates: (1) that the cursor position control is intended, (2) the conditions under which the cursor should be moved, and (3) the source of the data which specifies the particular movement that is intended. The latter could be stored in memory on a remote server and retrieved in a manner similar to retrieving Cursor Display Instructions **56** or the Cursor Display Code **52**. For example, if no user input is received for a specified interval, the cursor image could change and the position of the cursor could be set such that it follows a specified trajectory for several seconds, then reverts to its original state as illustrated by line **213** of FIG. **4**.

In accordance with another embodiment of the invention it is possible to vary the modification to the cursor as a function of cursor position. For example, the cursor pointer could be controlled such that it "points" to a specific location on the screen regardless of the cursor's location on the screen as illustrated in line **214** of FIG. **4**.

In accordance with another embodiment of the invention it is possible to vary the modification to the cursor as a function of cursor velocity. For example, the cursor image could change from a stationary bird to a bird with flapping wings only when the cursor is moved quickly across the screen as illustrated in line **215** of FIG. **4**. Furthermore, it is possible to vary the modification to the system-level user interface attributes as a function of mouse button state or keyboard state. For example, the image of a cube could be replaced with that of a jack-in-the-box when the mouse button is depressed.

In accordance with another embodiment of the invention, it is possible to modify other "system-level" attributes of the client computer's user interface, hereafter called "system-

level user interface attributes". These attributes, as illustrated in FIG. **6** are typically under the control of the operating system and, as such, they exist independently of the user "applications" (programs) and data which are stored on the computer and interact with that operating system. User applications interact with the operating system to deliver the computer's functionality to the user. Examples of user applications include word-processors, spreadsheets, web browsers, games, etc. The operating system may contribute certain user interface elements to the user interface of the applications running on it.

Because many of these attributes are inherited from the operating system by all applications running on that operating system, applications tend to exhibit a degree of commonality in their user interfaces. Examples of these attributes include: the shape and color of the cursor **401**, the shape and color of a status bar which displays current state information to the user **403**, the shape and color of the scroll bar which indicates the relative position and scope of the displayed sub-image to that of the underlying larger image to the user **407**, the shape and color of the title bar which displays current state information **409**, the shape and color of icons representing standard window operations such as close, minimize display size, restore display size, etc. **411**. Thus, these system level attributes may also be modified in response to Cursor Display Instructions data.

In addition, the operating system itself may have a user interface. Examples include: the images and sounds displayed when the computer starts or shuts down, the background image ("wallpaper") against which other graphical elements are displayed **413**, file catalogs and file selection mechanisms **415**, system icons **416**, file invocation mechanisms **417**, buttons **419**, process selection mechanisms **421**, etc. Further examples include the icons representing various system elements or information such as files **418**, groups of files **420**, files marked for deletion **422**, as well as standard, information bearing "dialog boxes", such as cancel, warning, illegal operation, stop, accept, continue, etc. **423**. The system may also support a set of audibly distinct waveforms which may be used to convey similar information to the user. These operating system user interfaces may also be modified in response to a Cursor Display Instruction data.

In yet another exemplary embodiment of the present invention a plurality of modifications to the system-level user interface attributes may occur simultaneously. For example, the cursor could animate while an audio waveform is playing, as the minimize display icon changes to a specific image.

A further feature of the invention is to accumulate information regarding the user's exposure time to various system-level user interface attribute modifications, and to vary the exposure to those modifications accordingly. For example, the client could transmit exposure data to the server and the server would select a version of the image based on that data. Furthermore, the exposure data could be transmitted as part of the usage statistics discussed previously.

Another feature of the invention is to monitor the load being placed on the client system by the user and schedule data exchange with the servers so that it occurs when it is least disruptive to the user's activities.

It is also possible to allow the user to control the level of interface modification he or she wishes to entertain. For example, the user could specify that only those modifications of specific types, as illustrated on line **218** of FIG. **4** or of specific priority should be delivered, or even that none be delivered, as illustrated at lines **218** and **219** of FIG. **4**. This specification could be implemented directly by the user on the client system, or could be implemented through communication with a remote server.

In accordance with another embodiment of the invention it is possible to transmit the image and/or audio data which specifies the modification as a series of data files which are delivered in a continuous stream to the client, as illustrated at line **220** of FIG. **4**. These files are exposed to the user before the complete set of data has been delivered, thereby providing the capability for the initiation of long animations or audio files before the entire quantity of data has been received by the client.

A further feature of the invention is to support the display of a "satellite" image which tracks the cursor's position on the screen. For example, the cursor image could be replaced with that of a mouse, and the image of a cat could be displayed near that mouse. When the cursor is moved, the satellite image moves accordingly at a specific offset, as illustrated at lines **221–223** of FIG. **4**.

A further feature of the invention is to provide a mechanism for the user to quickly establish a connection with a specific server based on the specific user interface attribute modification which is in effect when the mechanism is invoked. For example, the user could press a specific key sequence on the keyboard and immediately jump to the web site related to the cursor image which is currently displayed.

In accordance with another embodiment of the invention, it is possible to convey additional detailed Cursor Display Instructions as a separate file which is explicitly retrieved from a server by the Cursor Display Code, as illustrated at line **224** of FIG. **4**.

For each modification to the system-level user interface attributes, an appropriate set of display instructions must be transmitted to the client. These could take the form of additional parameters in the Cursor Display Instructions as discussed previously, or they could be represented within a code module which is received by and executed on the client. As discussed previously, Java, and its related technologies could be used for such a purpose, but use of these technologies should not considered a limitation of the invention.

It is noted that there are numerous ways in which a system-level user interface attribute modification is accomplished in accordance with the principles of the present invention. It is further noted that system level user interface attributes may be modified independently or in conjunction with cursor modification. Furthermore, the system-level user interface attribute modification may be related to specific information displayed on the rest of the user's screen (hereafter referred to as "specific information") in many different ways. Thus, the present invention is not limited in scope to how content providers may relate the system-level user interface attribute with the specific information. Rather, at least one of the goals of the present invention is to enable the content providers to modify the system-level user interface attribute whenever and wherever they see fit. For example, content providers may modify system-level user interface attributes at a remote user's terminal for advertising, entertainment, information delivery, celebrating an event, or other reasons, and therefore, the invention is not limited in scope in that respect. Furthermore, when a content provider elects to display a specified system-level user interface attribute in conjunction with and corresponding to specific information conveyed via the user's terminal, the cursor image and the background display data are deemed related.

Additional examples intended to illustrate some applications of the present invention are explained below, although the invention is not limited in scope to any one of these examples.

Thus, in accordance with one embodiment of the invention, a modified cursor might take the appearance of a "Fizzy Cola" bottle when a "Fizzy Cola" banner advertisement appears among the display data of a popular search engine's site. Similarly, the cursor can be modified for advertising purposes to represent Fizzy Cola's logo, its corporate mascot, images of its products or services, slogans, icons, brand images, advertising messages (the word "Thirsty?", for example), abstract suggestions (such as a straw or glass), etc.

Alternatively, Fizzy Cola, on its own site, or homepage, might have a picture of a bottle of Fizzy in the middle of the page (in the display data). A dynamic cursor image could then be used to show a person holding a straw in such a way that the straw always points from the user toward the top of the Fizzy bottle, no matter where the cursor moves on the screen. The straw, in this case, might be "attached" to the cursor image (part of the same image) or could be separate, "satellite" image, a "sprite," whose movement on the screen (in this case) is related to the movement of the cursor. Sprites, which can appear and disappear as desired, can enhance the invention by enabling the use of graphical elements which are associated with the cursor but which reside outside the limited cursor "space" (which in some systems may be, at maximum, 32 by 32 pixels). For the purposes of the invention, however, there should be no limitation to the size of the cursor.

Additional examples of modification to the cursor include rendering the cursor as a baseball bat (on a site with sports information), a pink but otherwise standard-shaped pointer (on a site about the Pink Panther), a witch-on-a-stick to celebrate Halloween, the Statue of Liberty to celebrate the Fourth of July, etc. All of the foregoing cursor images could be enhanced with related animations, such as the bat hitting the ball.

Similarly, the present invention can be used to replace not just the standard arrow but other standard cursors as well, such as the generic hand with pointing index finger (the icon commonly used in browsers to indicate that the pointer is positioned above a hot link). A site for children might, for example, replace this generic pointing-hand cursor with the pointing "paw" of a furry animal. A site dealing with horror movies might choose to replace this pointing hand with a bony skeleton-like hand.

Additional examples involve cursors with text or numbers. For example, the cursor might contain the text "Right-Click Now!" prompting users to click the right button of their mouse (where right-clicking on the mouse could, for example, trigger the delivery of a new page of display data). It may also be desirable in certain cases to put alphanumeric data in the cursor "space" to convey information to users, such as stock prices, baseball game scores, the temperature in Florida, etc. The data can be static, semi-static (i.e. updated periodically), or dynamic (updated frequently—possibly incorporating available streaming-data and data-compression technologies).

Use of associated sound, sprites, animations, and modified system display elements are provided as enhancements to the basic invention. For example, a Fizzy cola mascot could appear in the cursor space in conjunction with the speakers, attached to the user's machine, playing the sound of the mascot saying, "drink Fizzy!" Any time a content provider elects to incorporate said enhancements in conjunction with a new modified cursor image, the cursor image and said enhancements have been deemed related.

The present invention allows users to change cursor images; it also allows them to change them back. It may be desirable to revert the pointer to a previous or generic pointer image. Given the Fizzy Cola example above, if the page containing display data changes and there is no longer an advertisement for Fizzy, but rather an advertisement for its rival, Jazzy Cola, it may be desirable to ensure the removal of the Fizzy cursor image(s) and accompanying enhancements.

The foregoing examples are not intended to suggest limited uses for this invention; to the contrary, the examples are intended to illustrate the wide range of uses for this invention. The collective creativity of the online advertising, art, design, commerce, content publishing, and related industries will develop many novel and unforeseen ways to use the present invention. The versatility of the present invention should not be regarded as a limitation on its scope.

Thus, while there have been shown and described and pointed out fundamental novel features of the invention as applied to preferred embodiments thereof, it will be understood that various omissions and substitutions and changes in the form and details of the disclosed invention may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the claims appended hereto.

It is to be understood that the drawings are not necessarily drawn to scale, but that they are merely conceptual in nature.

We claim:

1. A server system for modifying a cursor image to a specific image having a desired shape and appearance displayed on a display of a remote user's terminal, said system comprising:

cursor image data corresponding to said specific image;

cursor display code, said cursor display code operable to modify said cursor image; and

a first server computer for transmitting specified content information to said remote user terminal, said specified content information including at least one cursor display instruction indicating a location of said cursor image data, said cursor display instruction and said cursor display code operable to cause said user terminal to display a modified cursor image on said user's display in the shape and appearance of said specific image, wherein said specified content information is transmitted to said remote user terminal by said first server computer responsive to a request from said user terminal for said specified content information, and wherein said specified content information further comprises information to be displayed on said display of said user's terminal, said specific image including content corresponding to at least a portion of said information to be displayed on said display of said user's terminal, and wherein said cursor display code is operable to process said cursor display instruction to modify said cursor image to said cursor image in the shape and appearance of said specific image responsive to displaying of said at least a portion of said information to be displayed on said display of said user's terminal.

2. The server system in accordance with claim **1**, wherein said specific image relates to at least a portion of said information to be displayed on said display of said user's terminal.

3. The server system in accordance with claim 2, wherein said specific image comprises advertising material related to at least a portion of said information to be displayed on said display of said user's terminal.

4. The server system in accordance with claim 3, wherein said advertising material further comprises a brand logo.

5. The server system in accordance with claim 3, wherein said advertising material further comprises a corporate mascot.

6. The server system in accordance with claim 3, wherein said advertising material further comprises images of a good or a service corresponding to said information to be displayed on said display of said user's terminal.

7. The server system in accordance with claim 3, wherein said advertising material further comprises messages relating to said information to be displayed on said display of said user's terminal.

8. The server system in accordance with claim 2, wherein said specific image has a shape and appearance corresponding to said information to be displayed on said display of said user's terminal.

9. The server system in accordance with claim 1, wherein at least a portion of said cursor image data and said cursor display code are disposed locally to said first server computer.

10. The server system in accordance with claim 1, wherein at least a portion of said cursor image data and said cursor display code are disposed within a second server computer located remotely to said first server computer.

11. The server system in accordance with claim 1, wherein at least a portion of said cursor image data and said cursor display code are disposed locally to said user's terminal.

12. The server system in accordance with claim 10 wherein said first server computer in response to a request from said user terminal transmits information stored in said second server computer to said user terminal.

13. The server system in accordance with claim 1, wherein said specified content information is transmitted in the form of HTML files that define a web page.

14. The server system in accordance with claim 13, wherein said cursor image data includes at least in part an advertisement for goods or services contained in said web page.

15. The server system in accordance with claim 1, wherein said user terminal includes a browser application responsive to said cursor display instruction, said browser application executing said cursor display code using parameters defined in said cursor display instruction.

16. The server system in accordance with claim 1, said cursor display instruction further comprising an image identifier indicating said cursor image data corresponding to said specific image.

17. The server system in accordance with claim 1 wherein said first server computer transmits said cursor image data in response to a request received from said remote user terminal indicating that a copy of said cursor image data is not stored in said remote user terminal.

18. The server system in accordance with claim 1 wherein said cursor display instruction further comprises an image identifier that corresponds to a graphic animation sequence.

19. The server system in accordance with claim 18, wherein said cursor display instruction further comprises instructions operable to modify said specific image to display said graphic animation sequence.

20. The server system in accordance with claim 1, wherein said cursor display instruction further comprises an audio identifier that corresponds to an audio information sequence.

21. The server system in accordance with claim 20, wherein said cursor display instruction further comprises instructions operable to play an audio clip corresponding to said audio information sequence.

22. The server system in accordance with claim 1, wherein said cursor display instruction further comprises information that controls a duration of time said specific image is displayed on said display of said remote user's terminal.

23. The server system in accordance with claim 1, wherein said specified content information is transmitted in the form of one or more hypertext objects.

24. The server system in accordance with claim 1, wherein said specified content information includes instructions executable by a virtual machine on said user terminal.

25. The server system in accordance with claim 1, wherein said specified content information includes HTML tags recognized by said cursor display code.

26. The server system in accordance with claim 1, wherein said cursor display code generates usage data for calculating usage statistics of said specific image.

27. The server system in accordance with claim 1, wherein said cursor display instruction transmitted to said remote user terminal initiates communication with a plurality of server systems for obtaining additional cursor image data.

28. A method for modifying an initial cursor image displayed on a display of a user terminal connected to at least one server, comprising:

receiving a request at said at least one server to provide specified content information to said user terminal;

providing said specified content information to said user terminal in response to said request, said specified content information including at least one cursor display instruction and at least one indication of cursor image data corresponding to a specific image; and

transforming said initial cursor image displayed on said display of said user terminal into the shape and appearance of said specific image in response to said cursor display instruction, wherein said specified content information includes information that is to be displayed on said display of said user's terminal, wherein said specific image includes content corresponding to at least a portion of said information to be displayed on said display of said user's terminal, and wherein said cursor display instruction indicates a cursor display code operable to process said cursor display instruction to modify said cursor image to said cursor image in the shape and appearance of said specific image responsive to displaying of said at least a portion of said information that is to be displayed on said display of said user's terminal.

29. The method in accordance with claim 28, wherein said transforming further comprises executing said cursor display code so as to display said specific cursor image while at least a portion of said information to be displayed is displayed on said display of said user's terminal.

30. The method in accordance with claim 28, wherein said displaying of said specific image further comprises displaying advertising material related to at least a portion of said information to be displayed.

31. The method in accordance with claim 30, wherein said advertising material further comprises a brand logo.

32. The method in accordance with claim 30, wherein said advertising material further comprises a corporate mascot.

33. The method in accordance with claim 30, wherein said advertising material further comprises images of a good or a service corresponding to said information to be displayed.

34. The method in accordance with claim 30, wherein said advertising material further comprises messages relating to said information to be displayed.

35. The method in accordance with claim 28, wherein said specific image has a shape and appearance relating to said information to be displayed.

36. The method in accordance with claim 28, wherein said specified content information further comprises HTML files that define a web page.

37. The method in accordance with claim 36, wherein said cursor image data corresponds to an advertisement for goods or services contained in said web page.

38. The method in accordance with claim 28, wherein said transforming further comprises:

employing a browser application including said cursor display code responsive to said cursor display instruction; and

executing said cursor display code by employing parameters defined in said cursor display instruction.

39. The method in accordance with claim 28 wherein said specified content information comprises an image identifier that corresponds to the location of data representing said specific image.

40. The method in accordance with claim 28, further comprising transmitting said cursor image data in response to a request received from said remote user terminal indicating that a copy of said cursor image data is not stored in said remote user terminal.

41. The method in accordance with claim 28, wherein said cursor display instructions further comprises an image identifier that corresponds to a graphic animation sequence.

42. The method in accordance with claim 41, further comprising modifying said remote user terminal's cursor to display said graphic animation sequence.

43. The server system in accordance with claim 28, wherein said cursor display instruction further comprises an audio identifier that corresponds to an audio information sequence.

44. The server system in accordance with claim 43, further comprising playing an audio clip corresponding to said audio information sequence responsive to displaying said specific image.

45. The method in accordance with claim 28 further comprising controlling a duration of time said specific image is displayed on said remote user's display.

46. The method in accordance with claim 28, further comprising providing usage data by said cursor display code for calculating usage statistics of said specific image, responsive to said cursor display instruction.

47. A computer storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform the method steps in claim 28.

48. An internet browser computer program stored on a computer readable medium, said internet browser configured to modify a cursor image to a specific image having a desired shape and appearance displayed on a display of a remote user's terminal, said internet browser comprising:

program code operable to receive specified content information from a remote server, said specified content information comprising information to be displayed on said remote user's terminal and at least one cursor display instruction, wherein said specific image includes content corresponding to at least a portion of said information to be displayed on said remote user's terminal, wherein said cursor display instruction indicates cursor image data corresponding to said specific image;

program code operable to recognize said cursor display instruction in connection with processing said information to be displayed on said display; and

program code operable to execute a cursor display code, responsive to said cursor display instruction and displaying of said at least a portion of said information to be displayed on said display, said cursor display code being operable to modify said cursor image to said specific image.

49. The internet browser in accordance with claim 48 further comprising program code operable to retrieve said cursor image data from a prespecified server, when said cursor image data is not stored in said user terminal.

50. The internet browser in accordance with claim 48 further comprising program code operable to retrieve said cursor display code from a prespecified server, when said cursor display code is not stored in said user terminal.

51. The internet browser in accordance with claim 48 further comprising program code operable to determine whether cursor display instructions received by said user terminal were transmitted by an authorized server.

52. The internet browser in accordance with claim 48 further comprising program code operable to transmit statistical information to a prespecified server so as to provide information relating to the usage of said specific image.

53. The internet browser in accordance with claim 48, wherein said specific image reverts back to its original shape and appearance after a prespecified duration.

54. The internet browser in accordance with claim 53 further comprising program code operable to store said cursor display code in a memory located locally to said user terminal.

55. The internet browser in accordance with claim 48 further comprising program code operable to provide audio clips corresponding to said display of said specific image.

56. The internet browser in accordance with claim 55 wherein information relating to said audio clips is contained within said cursor display instruction.

57. The internet browser in accordance with claim 48, further comprising program code operable to provide animated images corresponding to said specific image.

58. The internet browser in accordance with claim 57 wherein information relating to said animated images are contained within said cursor display instruction.

59. The internet browser in accordance with claim 48, wherein said specific image corresponds to at least a portion of said information to be displayed on said display of said user's terminal.

60. The internet browser in accordance with claim 48, wherein said specific image comprises advertising material related to at least a portion of said information to be displayed on said display of said user's terminal.

61. The internet browser in accordance with claim 60, wherein said advertising material further comprises a brand logo.

62. The internet browser in accordance with claim 60, wherein said advertising material further comprises a corporate mascot.

63. The internet browser in accordance with claim 60, wherein said advertising material further comprises images of a good or a service corresponding to said information to be displayed on said display of said user's terminal.

64. The internet browser in accordance with claim 60, wherein said advertising material further comprises messages relating to said information to be displayed on said display of said user's terminal.

65. The internet browser in accordance with claim 48, wherein said specific image has a shape and appearance

related to said information to be displayed on said display of said display of said user's terminal.

66. The internet browser in accordance with claim **48**, wherein said specified content information is transmitted in the form of at least one HTML file that defines a web page.

67. The internet browser in accordance with claim **48**, wherein said specified content information is transmitted in the form of one or more hypertext objects.

68. The internet browser in accordance with claim **48**, wherein said specified information content is executable at least in part by a virtual machine on said user terminal.

69. The internet browser in accordance with claim **48**, wherein said specified information content includes at least one instruction in an interpreted programming language.

70. A server system for modifying a cursor image to a specific image having a desired shape and appearance displayed on a display of a remote user's terminal, said system comprising:

cursor image data corresponding to said specific image;

cursor display code, said cursor display code operably to modify said cursor image; and

a first server computer for transmitting specified content information to said remote user terminal, said specified content information including at least one cursor display instruction indicating a location of said cursor image data, said cursor display instruction and said cursor display code operable to cause said user terminal to display a modified cursor image on said user's display in the shape and appearance of said specific image, wherein said specified content information is transmitted to said remote user terminal by said first server computer responsive to a request from said user terminal for said specified content information, and wherein said specified content information further comprises information to be displayed on said display of said user's terminal, said specific image including content corresponding to at least a portion of said information to be displayed on said display of said user's terminal, and wherein said cursor display code is operable to process said cursor display instruction to modify said cursor image to said cursor image in the shape and appearance of said specific image responsive to movement of said cursor image over a display of said at least a portion of said information to be displayed on said display of said user's terminal.

71. A server system for modifying a cursor image to a specific image having a desired shape and appearance displayed on a display of a remote user's terminal, said system comprising:

cursor image data corresponding to said specific image;

cursor display code, said cursor display code operable to modify said cursor image; and

a first server computer for transmitting specified content information to said remote user terminal, said specified content information including at least one cursor display instruction indicating a location of said cursor image data, said cursor display instruction and said cursor display code operable to cause said user terminal to display a modified cursor image on said user's display in the shape and appearance of said specific image, wherein said specified content information is transmitted to said remote user terminal by said first server computer responsive to a request from said user terminal for said specified content information, and wherein said specified content information further comprises information to be displayed on said display of said user's terminal, said specific image including content corresponding to at least a portion of said information to be displayed on said display of said user's terminal, and wherein said cursor display code is operable to process said cursor display instruction to modify said cursor image to said cursor image in the shape and appearance of said specific image responsive to movement of said cursor image over a specified location on said display of said user's terminal.

72. A method for modifying an initial cursor image displayed on a display of a user terminal connected to at least one server, comprising:

receiving a request at said at least one server to provide specified content information to said user terminal;

providing said specified content information to said user terminal in response to said request, said specified content information including at least one cursor display instruction and at least one indication of cursor image data corresponding to a specific image; and

transforming said initial cursor image displayed on said display of said user terminal into the shape and appearance of said specific image in response to said cursor display instruction, wherein said specified content information includes information that is to be displayed on said display of said user's terminal, wherein said specific image includes content corresponding to at least a portion of said information that is to be displayed on said display of said user's terminal, and wherein said cursor display instruction indicates a cursor display code operable to process said cursor display instruction to modify said cursor image to said cursor image in the shape and appearance of said specific image responsive to movement of said cursor image over a display of said at least a portion of said information to be displayed on said display of said user's terminal.

73. A method for modifying an initial cursor image displayed on a display of a user terminal connected to at least one server, comprising:

receiving a request at said at least one server to provide specified content information to said user terminal;

providing said specified content information to said user terminal in response to said request, said specified content information including at least one cursor display instruction and at least one indication of cursor image data corresponding to a specific image; and

transforming said initial cursor image displayed on said display of said user terminal into the shape and appearance of said specific image in response to said cursor display instruction, wherein said specified content information includes information that is to be displayed on said display of said user's terminal, wherein said specific image includes content corresponding to at least a portion of said information that is to be displayed on said display of said user's terminal, and wherein said cursor display instruction indicates a cursor display code operable to process said cursor display instruction to modify said cursor image to said cursor image in the shape and appearance of said specific image responsive to movement of said cursor image over a specified location on said display of said user's terminal.

74. An internet browser computer program stored on a computer readable medium, said internet browser configured to modify a cursor image to a specific image having a desired shape and appearance displayed on a display of a remote user's terminal, said internet browser comprising:

program code operable to receive specified content information from a remote server, said specified content information comprising information to be displayed on said remote user's terminal and at least one cursor display instruction, wherein said specific image includes content corresponding to at least a portion of said information to be displayed on said remote user's terminal, and wherein said cursor display instruction indicates cursor image data corresponding to said specific image;

program code operable to recognize said cursor display instruction in connection with processing said information to be displayed on said display; and

program code operable to execute a cursor display code, responsive to said cursor display instruction and movement of said cursor image over a display of said at least a portion of said information to on said remote user's terminal, said cursor display code being operable to modify said cursor image to said specific image.

75. An internet browser computer program stored on a computer readable medium, said internet browser configures to modify a cursor image to a specific image having a desired shape and appearance displayed on a display of a remote user's terminal, said internet browser comprising:

program code operable to receive specified content information from a remote server, said specified content information comprising information to be displayed on said remote user's terminal and at least one cursor display instruction, wherein said specific image includes content corresponding to at least a portion of said information to be displayed on said remote user's terminal, and wherein said cursor display instruction indicates cursor image data corresponding to said specific image;

program code operable to recognize said cursor display instruction in connection with processing said information to be displayed on said display; and

program code operable to execute a cursor display code, responsive to said cursor display instruction and movement of said cursor image over a specified location on said display, said cursor display code being operable to modify said cursor image to said specific image.

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