IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

ORACLE CORPORATION and ORACLE U.S.A. INC.,	)	
Plaintiffs/Counterclaim Defendants,	)	C.A. No. 06-414-SLR
v.	)	**JURY TRIAL DEMANDED**
EPICREALM LICENSING, LP,	)	**PUBLIC VERSION**
Defendant/Counterclaim Plaintiff.	)	

APPENDIX IN SUPPORT OF DEFENDANTS' CLAIM CONSTRUCTION BRIEF

VOLUME I of II

EXHIBITS 1 to 6

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Dated: July 31, 2008
876823 / 31393 / Oracle

Public Version Dated: August 7, 2008

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CERTIFICATE OF SERVICE

I, David E. Moore, hereby certify that on August 7, 2008, the attached document was electronically filed with the Clerk of the Court using CM/ECF which will send notification to the registered attorney(s) of record that the document has been filed and is available for viewing and downloading.

I further certify that on August 7, 2008, the attached document was Electronically Mailed to the following person(s):

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Exhibit 1

US005894554A

United States Patent [19]

Lowery et al.

[11] Patent Number: 5,894,554

[45] Date of Patent: Apr. 13, 1999

[54] **SYSTEM FOR MANAGING DYNAMIC WEB PAGE GENERATION REQUESTS BY INTERCEPTING REQUEST AT WEB SERVER AND ROUTING TO PAGE SERVER THEREBY RELEASING WEB SERVER TO PROCESS OTHER REQUESTS**

[75] Inventors: **Keith Lowery**, Richardson; **Andrew B. Levine**, Plano; **Ronald L. Howell**, Rowlett, all of Tex.

[73] Assignee: **InfoSpinner, Inc.**, Richardson, Tex.

[21] Appl. No.: **08/636,477**

[22] Filed: **Apr. 23, 1996**

[51] **Int. Cl.**[6] **G06F 13/14**; G06F 13/20

[52] **U.S. Cl.** **395/200.33**; 395/200.68; 395/200.75; 395/680; 707/10; 707/104

[58] **Field of Search** 358/400; 395/800, 395/700, 200.68, 200.75, 200.53, 680, 200.33; 707/104, 10

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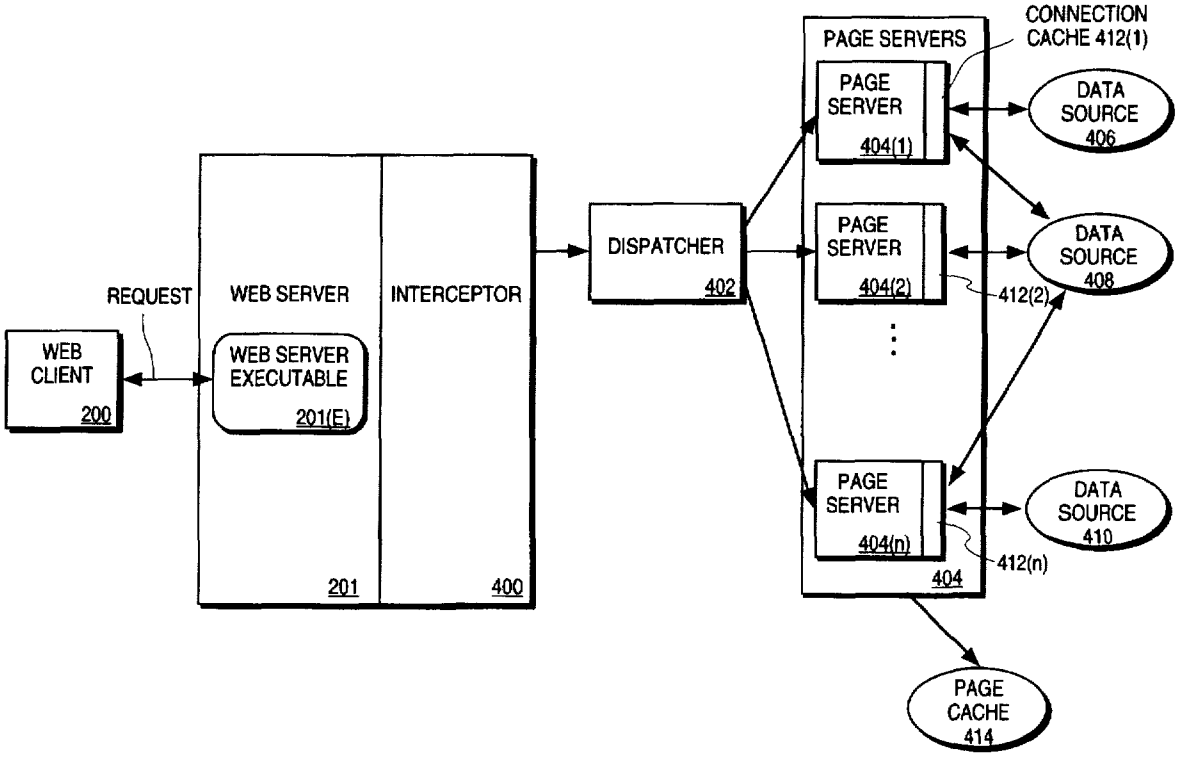
[57] **ABSTRACT**

The present invention teaches a method and apparatus for creating and managing custom Web sites. Specifically, one embodiment of the present invention claims a computer-implemented method for managing a dynamic Web page generation request to a Web server, the computer-implemented method comprising the steps of routing the request from the Web server to a page server, the page server receiving the request and releasing the Web server to process other requests, processing the request, the processing being performed by the page server concurrently with the Web server, as the Web server processes the other requests, and dynamically generating a Web page in response to the request, the Web page including data dynamically retrieved from one or more data sources.

11 Claims, 5 Drawing Sheets



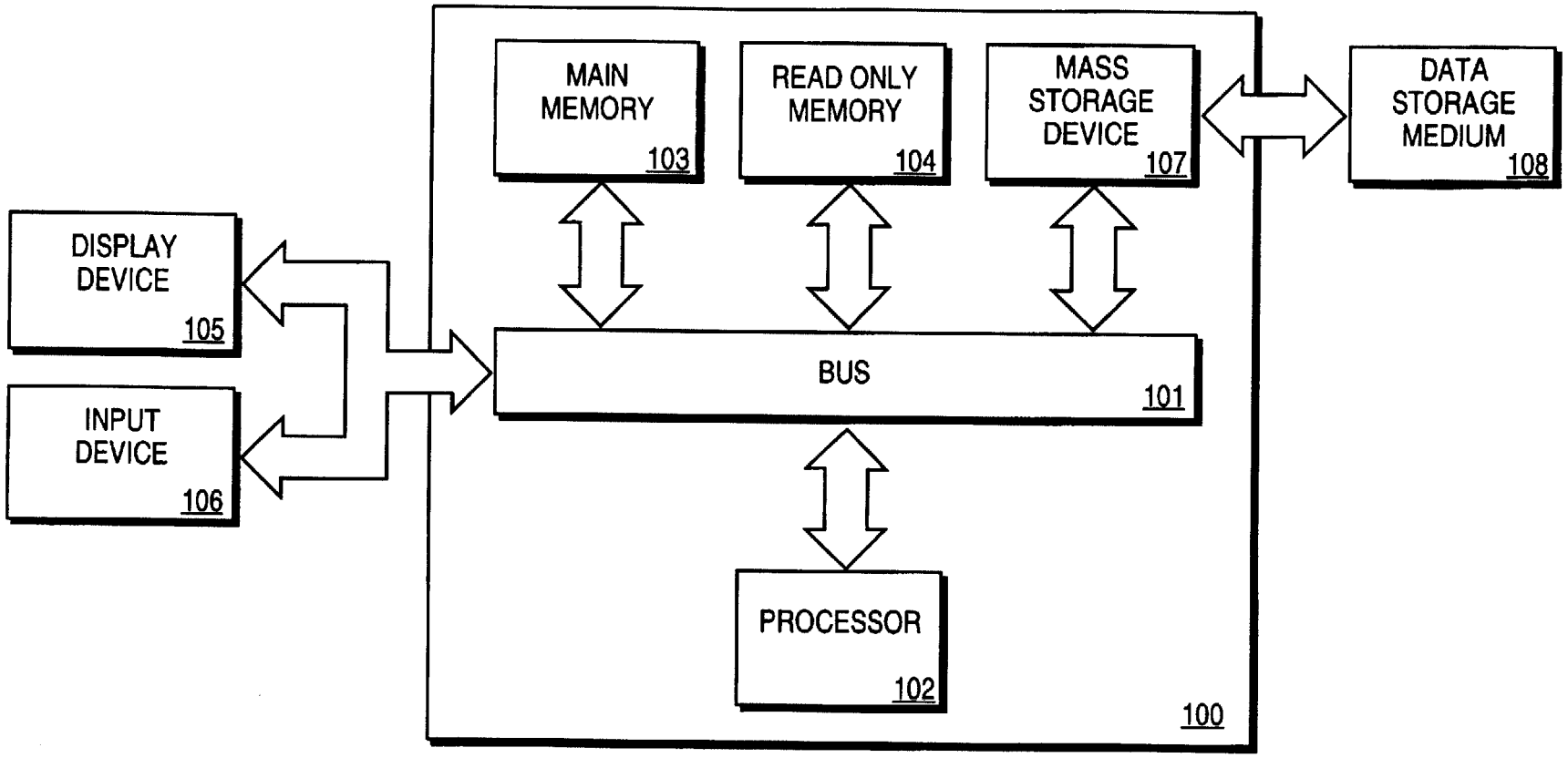

MAIN MEMORY
103
READ ONLY MEMORY
104
MASS STORAGE DEVICE
107
DATA STORAGE MEDIUM
108
DISPLAY DEVICE
105
INPUT DEVICE
106
BUS
101
PROCESSOR
102
100

FIG. 1

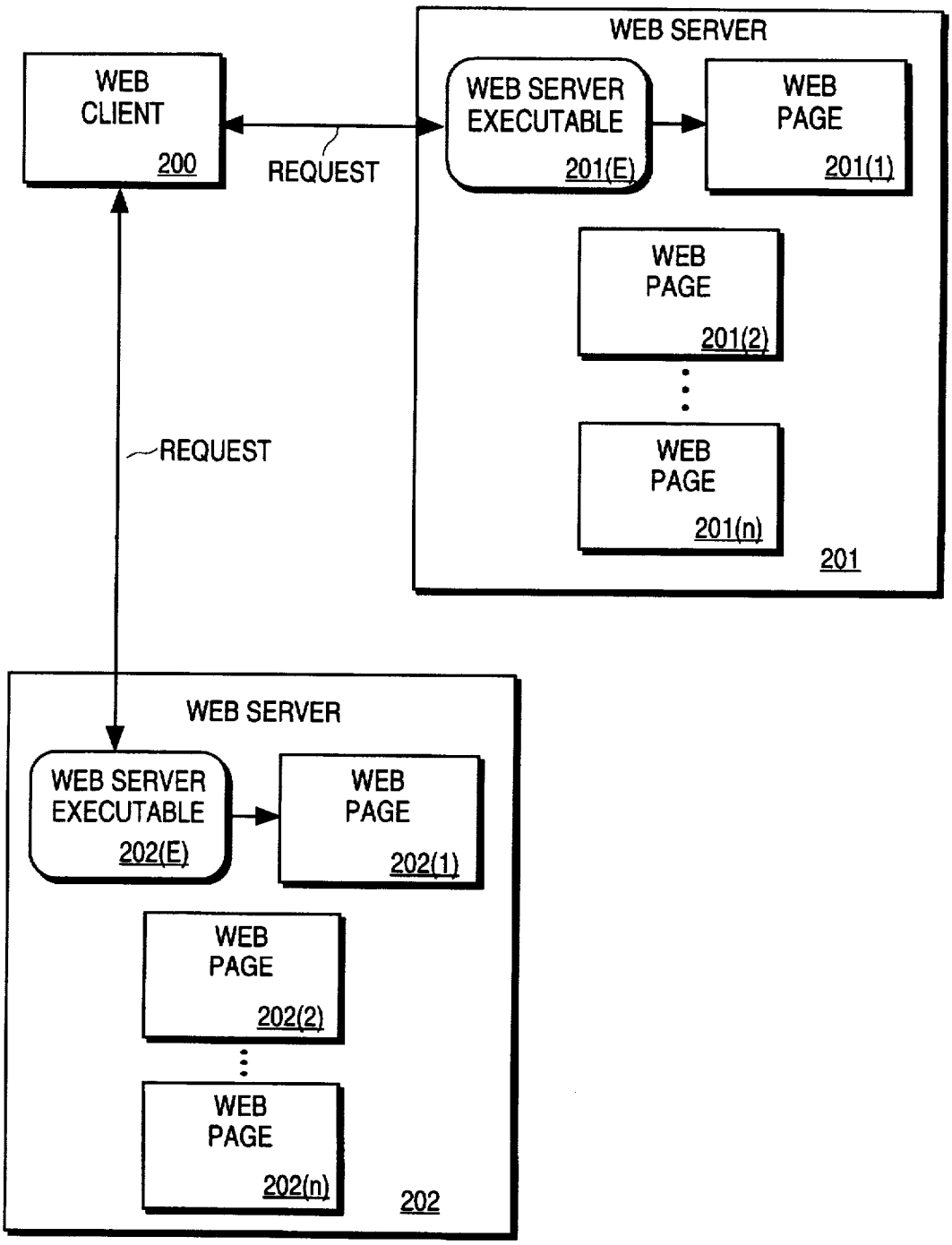


FIG. 2 (PRIOR ART)

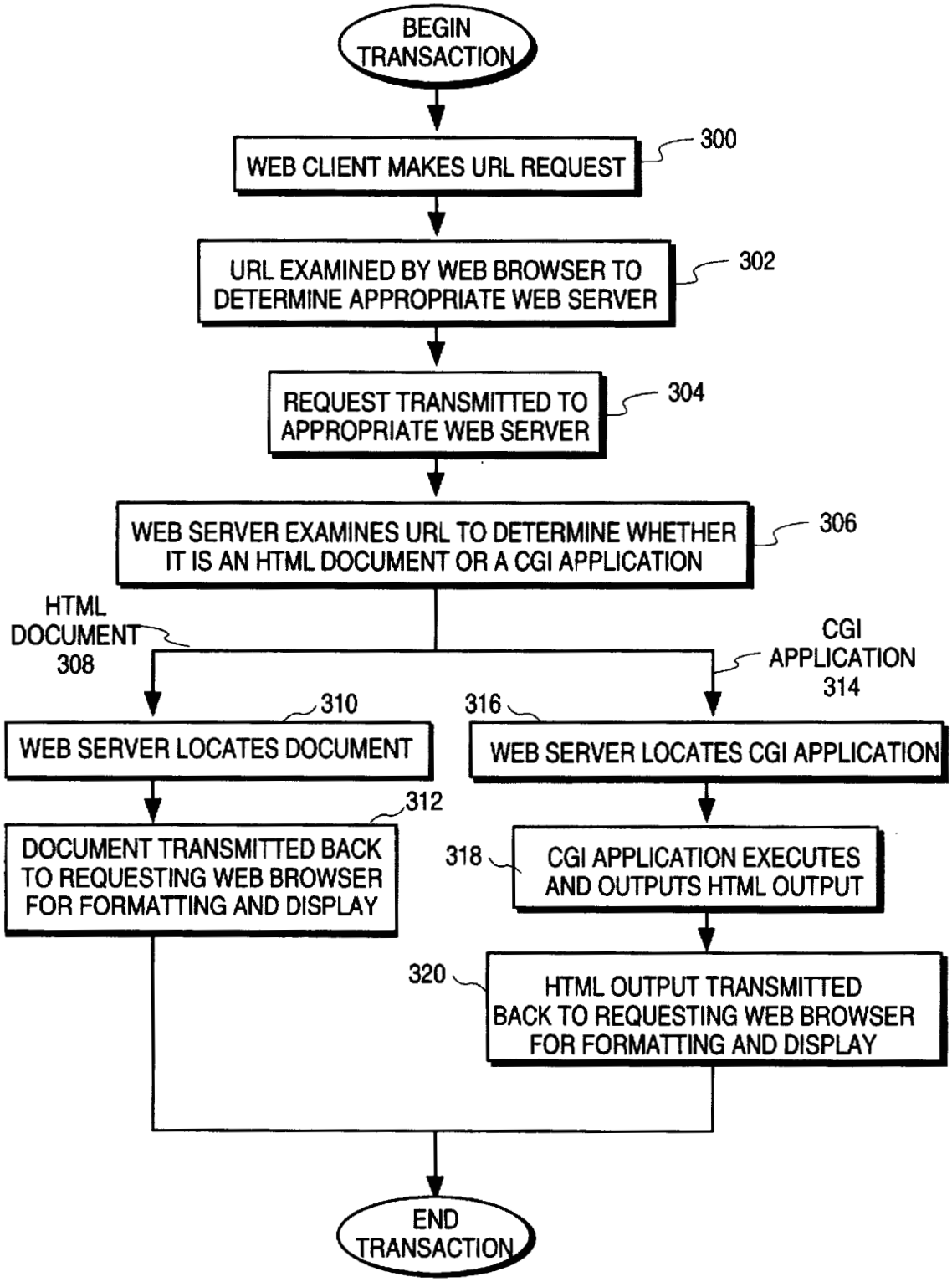


FIG. 3 (PRIOR ART)

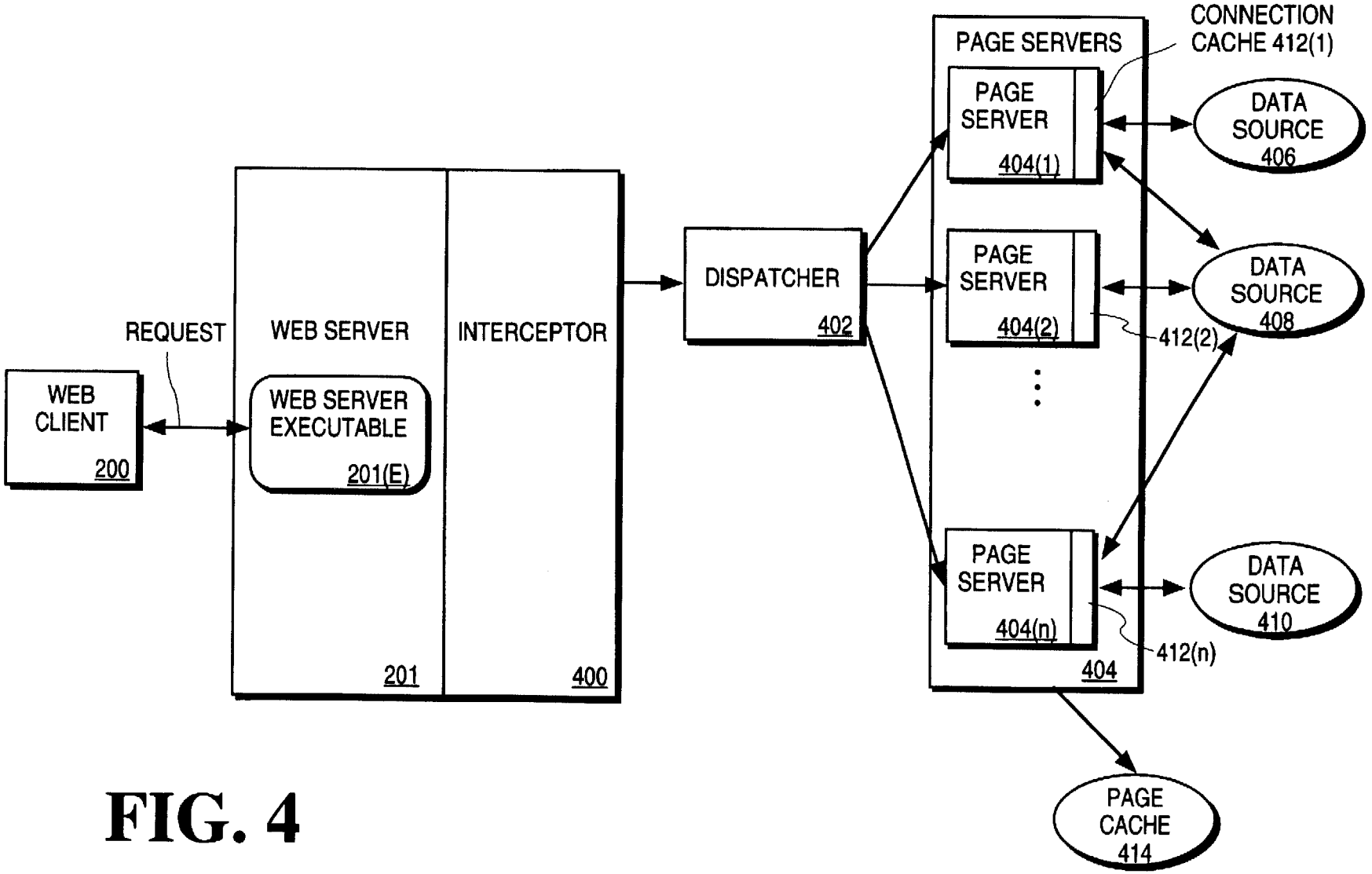

WEB CLIENT
200
REQUEST
WEB SERVER
WEB SERVER EXECUTABLE
201(E)
201
INTERCEPTOR
400
DISPATCHER
402
PAGE SERVERS
CONNECTION CACHE 412(1)
PAGE SERVER
404(1)
DATA SOURCE
406
PAGE SERVER
404(2)
412(2)
DATA SOURCE
408
PAGE SERVER
404(n)
412(n)
404
DATA SOURCE
410
PAGE CACHE
414

FIG. 4

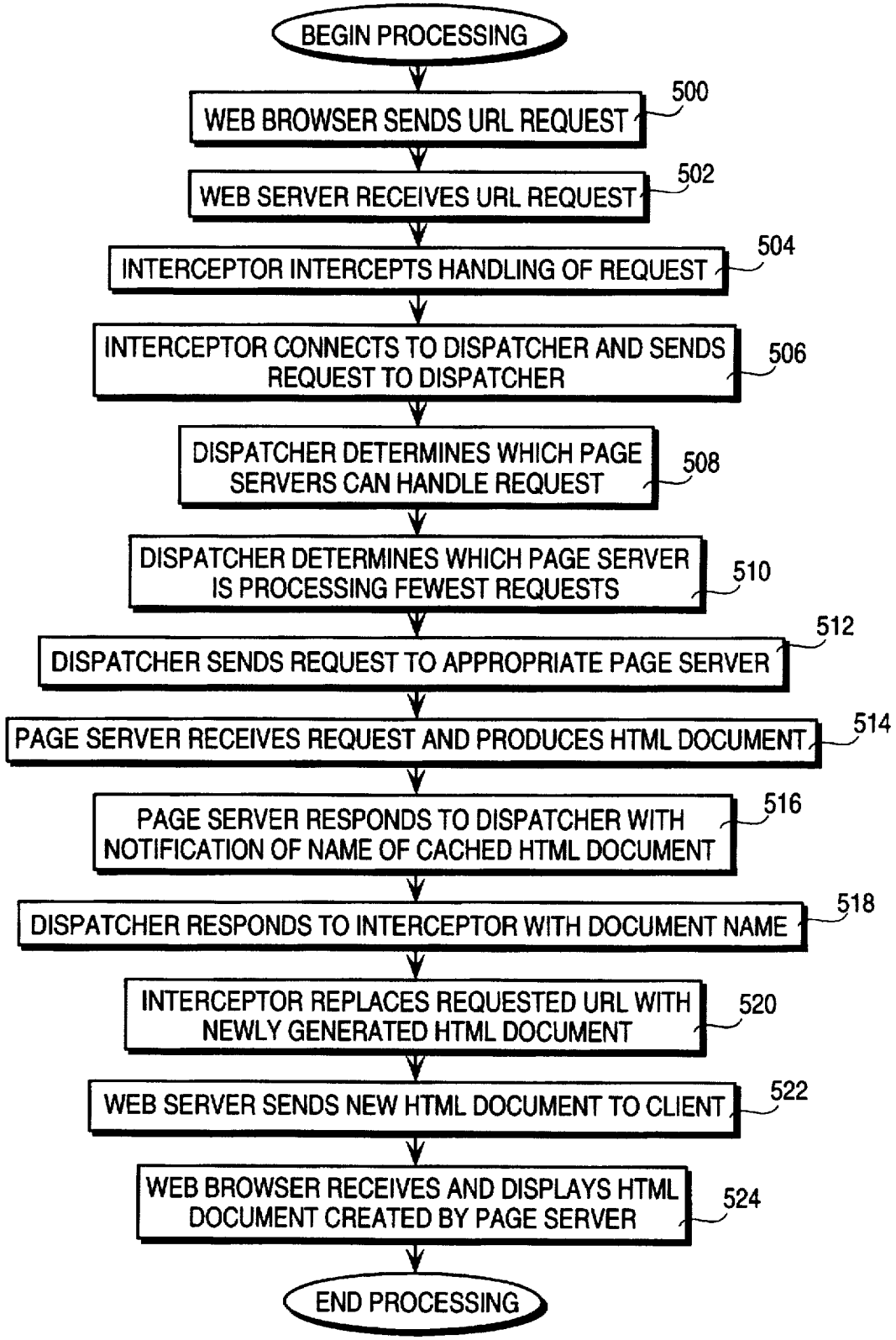

BEGIN PROCESSING
WEB BROWSER SENDS URL REQUEST
500
WEB SERVER RECEIVES URL REQUEST
502
INTERCEPTOR INTERCEPTS HANDLING OF REQUEST
504
INTERCEPTOR CONNECTS TO DISPATCHER AND SENDS REQUEST TO DISPATCHER
506
DISPATCHER DETERMINES WHICH PAGE SERVERS CAN HANDLE REQUEST
508
DISPATCHER DETERMINES WHICH PAGE SERVER IS PROCESSING FEWEST REQUESTS
510
DISPATCHER SENDS REQUEST TO APPROPRIATE PAGE SERVER
512
PAGE SERVER RECEIVES REQUEST AND PRODUCES HTML DOCUMENT
514
PAGE SERVER RESPONDS TO DISPATCHER WITH NOTIFICATION OF NAME OF CACHED HTML DOCUMENT
516
DISPATCHER RESPONDS TO INTERCEPTOR WITH DOCUMENT NAME
518
INTERCEPTOR REPLACES REQUESTED URL WITH NEWLY GENERATED HTML DOCUMENT
520
WEB SERVER SENDS NEW HTML DOCUMENT TO CLIENT
522
WEB BROWSER RECEIVES AND DISPLAYS HTML DOCUMENT CREATED BY PAGE SERVER
524
END PROCESSING

FIG. 5

SYSTEM FOR MANAGING DYNAMIC WEB PAGE GENERATION REQUESTS BY INTERCEPTING REQUEST AT WEB SERVER AND ROUTING TO PAGE SERVER THEREBY RELEASING WEB SERVER TO PROCESS OTHER REQUESTS

FIELD OF THE INVENTION

The present invention relates to the field of Internet technology. Specifically, the present invention relates to the creation and management of custom World Wide Web sites.

DESCRIPTION OF RELATED ART

The World Wide Web (the Web) represents all of the computers on the Internet that offer users access to information on the Internet via interactive documents or Web pages. These Web pages contain hypertext links that are used to connect any combination of graphics, audio, video and text, in a non-linear, non-sequential manner. Hypertext links are created using a special software language known as HyperText Mark-Up Language (HTML).

Once created, Web pages reside on the Web, on Web servers or Web sites. A Web site can contain numerous Web pages. Web client machines running Web browsers can access these Web pages at Web sites via a communications protocol known as HyperText Transport Protocol (HTTP). Web browsers are software interfaces that run on World Wide Web clients to allow access to Web sites via a simple user interface. A Web browser allows a Web client to request a particular Web page from a Web site by specifying a Uniform Resource Locator (URL). A URL is a Web address that identifies the Web page and its location on the Web. When the appropriate Web site receives the URL, the Web page corresponding to the requested URL is located, and if required, HTML output is generated. The HTML output is then sent via HTTP to the client for formatting on the client's screen.

Although Web pages and Web sites are extremely simple to create, the proliferation of Web sites on the Internet highlighted a number of problems. The scope and ability of a Web page designer to change the content of the Web page was limited by the static nature of Web pages. Once created, a Web page remained static until it was manually modified. This in turn limited the ability of Web site managers to effectively manage their Web sites.

The Common Gateway Interface (CGI) standard was developed to resolve the problem of allowing dynamic content to be included in Web pages. CGI "calls" or procedures enable applications to generate dynamically created HTML output, thus creating Web pages with dynamic content. Once created, these CGI applications do not have to be modified in order to retrieve "new" or dynamic data. Instead, when the Web page is invoked, CGI "calls" or procedures are used to dynamically retrieve the necessary data and to generate a Web page.

CGI applications also enhanced the ability of Web site administrators to manage Web sites. Administrators no longer have to constantly update static Web pages. A number of vendors have developed tools for CGI based development, to address the issue of dynamic Web page generation. Companies like Spider™ and Bluestone™, for example, have each created development tools for CGI-based Web page development. Another company, Haht Software™, has developed a Web page generation tool that uses a BASIC-like scripting language, instead of a CGI scripting language.

Tools that generate CGI applications do not, however, resolve the problem of managing numerous Web pages and requests at a Web site. For example, a single company may maintain hundreds of Web pages at their Web site. Current Web server architecture also does not allow the Web server to efficiently manage the Web page and process Web client requests. Managing these hundreds of Web pages in a coherent manner and processing all requests for access to the Web pages is thus a difficult task. Existing development tools are limited in their capabilities to facilitate dynamic Web page generation, and do not address the issue of managing Web requests or Web sites.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a method and apparatus for creating and managing custom Web sites. Specifically, the present invention claims a method and apparatus for managing dynamic web page generation requests.

In one embodiment, the present invention claims a computer-implemented method for managing a dynamic Web page generation request to a Web server, the computer-implemented method comprising the steps of routing the request from the Web server to a page server, the page server receiving the request and releasing the Web server to process other requests, processing the request, the processing being performed by the page server concurrently with the Web server, as the Web server processes the other requests, and dynamically generating a Web page in response to the request, the Web page including data dynamically retrieved from one or more data sources. Other embodiments also include connection caches to the one or more data sources, page caches for each page server, and custom HTML extension templates for configuring the Web page.

Other objects, features and advantages of the present invention will be apparent from the accompanying drawings and from the detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a typical computer system in which the present invention operates.

FIG. **2** illustrates a typical prior art Web server environment.

FIG. **3** illustrates a typical prior art Web server environment in the form of a flow diagram.

FIG. **4** illustrates one embodiment of the presently claimed invention.

FIG. **5** illustrates the processing of a Web browser request in the farm of a flow diagram, according to one embodiment of the presently claimed invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention relates to a method and apparatus for creating and managing custom Web sites. In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be apparent to one of ordinary skill in the art, however, that these specific details need not be used to practice the present invention. In other instances, well-known structures, interfaces and processes have not been shown in detail in order not to unnecessarily obscure the present invention.

FIG. **1** illustrates a typical computer system **100** in which the present invention operates. The preferred embodiment of

the present invention is implemented on an IBM™ Personal Computer manufactured by IBM Corporation of Armonk, N.Y. An alternate embodiment may be implemented on an RS/6000™ Workstation manufactured by IBM Corporation of Armonk, N.Y. It will be apparent to those of ordinary skill in the art that other computer system architectures may also be employed.

In general, such computer systems as illustrated by FIG. 1 comprise a bus **101** for communicating information, a processor **102** coupled with the bus **101** for processing information, main memory **103** coupled with the bus **101** for storing information and instructions for the processor **102**, a read-only memory **104** coupled with the bus **101** for storing static information and instructions for the processor **102**, a display device **105** coupled with the bus **101** for displaying information for a computer user, an input device **106** coupled with the bus **101** for communicating information and command selections to the processor **102**, and a mass storage device **107**, such as a magnetic disk and associated disk drive, coupled with the bus **101** for storing information and instructions. A data storage medium **108** containing digital information is configured to operate with mass storage device **107** to allow processor **102** access to the digital information on data storage medium **108** via bus **101**.

Processor **102** may be any of a wide variety of general purpose processors or microprocessors such as the Pentium™ microprocessor manufactured by Intel™ Corporation or the RS/6000™ processor manufactured by IBM Corporation. It will be apparent to those of ordinary skill in the art, however, that other varieties of processors may also be used in a particular computer system. Display device **105** may be a liquid crystal device, cathode ray tube (CRT), or other suitable display device. Mass storage device **107** may be a conventional hard disk drive, floppy disk drive, CD-ROM drive, or other magnetic or optical data storage device for reading and writing information stored on a hard disk, a floppy disk, a CD-ROM a magnetic tape, or other magnetic or optical data storage medium. Data storage medium **108** may be a hard disk, a floppy disk, a CD-ROM, a magnetic tape, or other magnetic or optical data storage medium.

In general, processor **102** retrieves processing instructions and data from a data storage medium **108** using mass storage device **107** and downloads this information into random access memory **103** for execution. Processor **102**, then executes an instruction stream from random access memory **103** or read-only memory **104**. Command selections and information input at input device **106** are used to direct the flow of instructions executed by processor **102**. Equivalent input device **106** may also be a pointing device such as a conventional mouse or trackball device. The results of this processing execution are then displayed on display device **105**.

The preferred embodiment of the present invention is implemented as a software module, which may be executed on a computer system such as computer system **100** in a conventional manner. Using well known techniques, the application software of the preferred embodiment is stored on data storage medium **108** and subsequently loaded into and executed within computer system **100**. Once initiated, the software of the preferred embodiment operates in the manner described below.

FIG. **2** illustrates a typical prior art Web server environment. Web client **200** can make URL requests to Web server **201** or Web server **202**. Web servers **201** and **202** include Web server executables, **201**(E) and **202**(E) respectively, that perform the processing of Web client requests. Each Web server may have a number of Web pages **201**(1)–(n) and **202**(1)–(n). Depending on the URL specified by the Web client **200**, the request may be routed by either Web server executable **201**(E) to Web page **201** (1), for example, or from Web server executable **202**(E) to Web page **202** (1). Web client **200** can continue making URL requests to retrieve other Web pages. Web client **200** can also use hyperlinks within each Web page to "jump" to other Web pages or to other locations within the same Web page.

FIG. **3** illustrates this prior art Web server environment in the form of a flow diagram. In processing block **300**, the Web client makes a URL request. This URL request is examined by the Web browser to determine the appropriate Web server to route the request to in processing block **302**. In processing block **304** the request is then transmitted from the Web browser to the appropriate Web server, and in processing block **306** the Web server executable examines the URL to determine whether it is a HTML document or a CGI application. If the request is for an HTML document **308**, then the Web server executable locates the document in processing block **310**. The document is then transmitted back through the requesting Web browser for formatting and display in processing block **312**.

If the URL request is for a CGI application **314**, however, the Web server executable locates the CGI application in processing block **316**. The CGI application then executes and outputs HTML output in processing block **318** and finally, the HTML output is transmitted back to requesting Web browser for formatting and display in processing block **320**.

This prior art Web server environment does not, however, provide any mechanism for managing the Web requests or the Web sites. As Web sites grow, and as the number of Web clients and requests increase, Web site management becomes a crucial need.

For example, a large Web site may receive thousands of requests or "hits" in a single day. Current Web servers process each of these requests on a single machine, namely the Web server machine. Although these machines may be running "multi-threaded" operating systems that allow transactions to be processed by independent "threads," all the threads are nevertheless on a single machine, sharing a processor. As such, the Web executable thread may hand off a request to a processing thread, but both threads will still have to be handled by the processor on the Web server machine. When numerous requests are being simultaneously processed by multiple threads on a single machine, the Web server can slow down significantly and become highly inefficient. The claimed invention addresses this need by utilizing a partitioned architecture to facilitate the creation and management of custom Web sites and servers.

FIG. **4** illustrates one embodiment of the presently claimed invention. Web client **200** issues a URL request that is processed to determined proper routing. In this embodiment, the request is routed to Web server **201**. Instead of Web server executable **201**(E) processing the URL request, however, Interceptor **400** intercepts the request and routes it to Dispatcher **402**. In one embodiment, Interceptor **400** resides on the Web server machine as an extension to Web server **201**. This embodiment is appropriate for Web servers such as Netsite™ from Netscape, that support such extensions. A number of public domain Web servers, such as NCSA™ from the National Center for Supercomputing Applications at the University of Illinois, Urbana-Champaign, however, do not provide support for

this type of extension. Thus, in an alternate embodiment, Interceptor **400** is an independent module, connected via an "intermediate program" to Web server **201**. This intermediate program can be a simple CGI application program that connects Interceptor **400** to Web server **201**. Alternate intermediate programs the perform the same functionality can also be implemented.

In one embodiment of the invention, Dispatcher **402** resides on a different machine than Web server **201**. This embodiment overcomes the limitation described above, in prior art Web servers, wherein all processing is performed by the processor on a single machine. By routing the request to Dispatcher **402** residing on a different machine than the Web server executable **201**(E), the request can then be processed by a different processor than the Web server executable **201**(E). Web server executable **201**(E) is thus free to continue servicing client requests on Web server **201** while the request is processed "off-line," at the machine on which Dispatcher **402** resides.

Dispatcher **402** can, however, also reside on the same machine as the Web server. The Web site administrator has the option of configuring Dispatcher **402** on the same machine as Web server **201**, taking into account a variety of factors pertinent to a particular Web site, such as the size of the Web site, the number of Web pages and the number of hits at the Web site. Although this embodiment will not enjoy the advantage described above, namely off-loading the processing of Web requests from the Web server machine, the embodiment does allow flexibility for a small Web site to grow. For example, a small Web site administrator can use a single machine for both Dispatcher **402** and Web server **201** initially, then off-load Dispatcher **402** onto a separate machine as the Web site grows. The Web site can thus take advantage of other features of the present invention regardless of whether the site has separate machines configured as Web servers and dispatchers.

Dispatcher **402** receives the intercepted request and then dispatches the request to one of a number of Page servers **404** (1)–(n). For example, if Page server **404** (1) receives the dispatched request, it processes the request and retrieves the data from an appropriate data source, such as data source **406**, data source **408**, or data source **410**. Data sources, as used in the present application, include databases, spreadsheets, files and any other type of data repository. Page server **404** (1) can retrieve data from more than one data source and incorporate the data from these multiple data sources in a single Web page.

In one embodiment, each Page server **404**(1)–(n) resides on a separate machine on the network to distribute the processing of the request. Dispatcher **402** maintains a variety of information regarding each Page server on the network, and dispatches requests based on this information. For example, Dispatcher **402** retains dynamic information regarding the data sources that any given Page server can access. Dispatcher **402** thus examines a particular request and determines which Page servers can service the URL request. Dispatcher **402** then hands off the request to the appropriate Page server.

For example, if the URL request requires financial data from data source **408**, dispatcher **402** will first examine an information list. Dispatcher **402** may determine that Page server **404**(3), for example, has access to the requisite data in data source **408**. Dispatcher **402** will thus route the URL request to Page server **404**(3). This "connection caching" functionality is described in more detail below, under the heading "Performance."

Alternately, Dispatcher **402** also has the ability to determine whether a particular Page server already has the necessary data cached in the Page server's page cache (described in more detail below, under the heading "Performance"). Dispatcher **402** may thus determine that Page server **404**(1) and **404**(2) are both logged into Data source **408**, but that Page server **404**(2) has the financial information already cached in Page server **404**(2)'s page cache. In this case, Dispatcher **402** will route the URL request to Page server **404**(2) to more efficiently process the request.

Finally, Dispatcher **402** may determine that a number or all Page servers **404**(1)–(n) are logged into Data source **408**. In this scenario, Dispatcher **402** can examine the number of requests that each Page server is servicing and route the request to the least busy page server. This "load balancing" capability can significantly increase performance at a busy Web site and is discussed in more detail below, under the heading "Scalability".

If, for example, Page server **404**(2), receives the request, Page server **404**(2) will process the request. While Page server **404**(2) is processing the request, Web server executable **201**(E) can concurrently process other Web client requests. This partitioned architecture thus allows both Page server **404**(2) and Web server executable **201**(E) to simultaneously process different requests, thus increasing the efficiency of the Web site. Page server **404**(2) dynamically generates a Web page in response to the Web client request, and the dynamic Web page is then either transmitted back to requesting Web client **200** or stored on a machine that is accessible to Web server **201**, for later retrieval.

One embodiment of the claimed invention also provides a Web page designer with HTML extensions, or "dyna" tags. These dyna tags provide customized HTML functionality to a Web page designer, to allow the designer to build customized HTML templates that specify the source and placement of retrieved data. For example, in one embodiment, a "dynatext" HTML extension tag specifies a data source and a column name to allow the HTML template to identify the data source to log into and the column name from which to retrieve data. Alternatively, "dyna-anchor" tags allow the designer to build hyperlink queries while "dynablock" tags provide the designer with the ability to iterate through blocks of data. Page servers use these HTML templates to create dynamic Web pages. Then, as described above, these dynamic Web pages are either transmitted back to requesting Web client **200** or stored on a machine that is accessible to Web server **201**, for later retrieval.

The presently claimed invention provides numerous advantages over prior art Web servers, including advantages in the areas of performance, security, extensibility and scalability.

Performance

One embodiment of the claimed invention utilizes connection caching and page caching to improve performance. Each Page server can be configured to maintain a cache of connections to numerous data sources. For example, as illustrated in FIG. **4**, Page server **404**(1) can retrieve data from data source **406**, data source **408** or data source **410**. Page server **404**(1) can maintain connection cache **412**(1), containing connections to each of data source **406**, data source **408** and data source **410**, thus eliminating connect times from the Page servers to those data sources.

Additionally, another embodiment of the present invention supports the caching of finished Web pages, to optimize

the performance of the data source being utilized. This "page caching" feature, illustrated in FIG. **4** as Page cache **414**, allows the Web site administrator to optimize the performance of data sources by caching Web pages that are repeatedly accessed. Once the Web page is cached, subsequent requests or "hits" will utilize the cached Web page rather than re-accessing the data source. This can radically improve the performance of the data source.

Security

The present invention allows the Web site administrator to utilize multiple levels of security to manage the Web site. In one embodiment, the Page server can utilize all standard encryption and site security features provided by the Web server. In another embodiment, the Page server can be configured to bypass connection caches **412**(1)–(n), described above, for a particular data source and to require entry of a user-supplied identification and password for the particular data source the user is trying to access.

Additionally, another embodiment of the presently claimed invention requires no real-time access of data sources. The Web page caching ability, described above, enables additional security for those sites that want to publish non-interactive content from internal information systems, but do not want real-time Internet accessibility to those internal information systems. In this instance, the Page server can act as a "replication and staging gent" and create Web pages in batches, rather than in real-time. These "replicated" Web pages are then "staged" for access at a later time, and access o the Web pages in this scenario is possible even if the Page server and dispatcher are not present later.

In yet another embodiment, the Page server can make a single pass through a Web library, and compile a Web site that exists in the traditional form of separately available files. A Web library is a collection of related Web books and Web pages. More specifically, the Web library is a hierarchical organization of Web document templates, together with all the associated data source information. Information about an entire Web site is thus contained in a single physical file, thus simplifying the problem of deploying Web sites across multiple Page servers. The process of deploying the Web site in this embodiment is essentially a simple copy of a single file.

Extensibility

One embodiment of the present invention provides the Web site administrator with Object Linking and Embedding (OLE) 2.0 extensions to extend the page creation process. These OLE 2.0 extensions also allow information submitted over the Web to be processed with user-supplied functionality. Utilizing development tools such as Visual Basic, Visual C++ or PowerBuilder that support the creation of OLE 2.0 automation, the Web site administrator can add features and modify the behavior of the Page servers described above. This extensibility allows one embodiment of the claimed invention to be incorporated with existing technology to develop an infinite number of custom web servers.

For example, OLE 2.0 extensions allow a Web site administrator to encapsulate existing business rules in an OLE 2.0 automation interface, to be accessed over the Web. One example of a business rule is the steps involved in the payoff on an installment or mortgage loan. The payoff may involve, for example, taking into account the current balance, the date and the interest accrued since the last payment. Most organizations already have this type of business rule implemented using various applications, such as Visual Basic for client-server environments, or CICS programs on mainframes. If these applications are OLE 2.0 compliant, the Page server "dynaobject" HTML extension tag can be used to encapsulated the application in an OLE 2.0 automation interface. The Page server is thus extensible, and can incorporate the existing application with the new Page server functionality.

Scalability

One embodiment of the claimed invention allows "plug and play" scalability. As described above, referring to FIG. **4**, Dispatcher **402** maintains information about all the Page servers configured to be serviced by Dispatcher **402**. Any number of Page servers can thus be "plugged" into the configuration illustrated in FIG. **4**, and the Page servers will be instantly activated as the information is dynamically updated in Dispatcher **402**. The Web site administrator can thus manage the overhead of each Page server and modify each Page server's load, as necessary, to improve performance. In this manner, each Page server will cooperate with other Page servers within a multi-server environment. Dispatcher **402** can examine the load on each Page server and route new requests according to each Page server's available resources. This "load-balancing" across multiple Page servers can significantly increase a Web site's performance.

FIG. **5** illustrates the processing of a Web browser request in the form of a flow diagram, according to one embodiment of the presently claimed invention. A Web browser sends a URL request to a Web server in processing block **500**. In processing block **502**, the Web server receives the URL request, and an interceptor then intercepts the handling of the request in processing block **504**. The interceptor connects to a dispatcher and sends the URL request to the dispatcher in processing block **506**. In processing block **508**, the dispatcher determines which Page servers can handle the request. The dispatcher also determines which Page server is processing the fewest requests in processing block **510**, and in processing block **512**, the dispatcher sends the URL request to an appropriate Page server. The Page server receives the request and produces an HTML document in processing block **514**. The Page server then responds to the dispatcher with notification of the name of the cached HTML document in processing block **516**. In processing block **518**, the dispatcher responds to the interceptor with the document name, and the interceptor then replaces the requested URL with the newly generated HTML document in processing block **520**. The Web server then sends the new HTML document to the requesting client in processing block **522**. Finally, the Web browser receives and displays the HTML document created by the Page server at processing block **524**.

Thus, a method and apparatus for creating and managing custom Web sites is disclosed. These specific arrangements and methods described herein are merely illustrative of the principles of the present invention. Numerous modifications in form and detail may be made by those of ordinary skill in the art without departing from the scope of the present invention. Although this invention has been shown in relation to a particular preferred embodiment, it should not be considered so limited. Rather, the present invention is limited only by the scope of the appended claims.

We claim:

1. A computer-implemented method for managing a dynamic Web page generation request to a Web server, said computer-implemented method comprising the steps of:

routing said request from said Web server to a page server, said page server receiving said request and releasing

said Web server to process other requests, wherein said routing step further includes the steps of intercepting said request at said Web server, routing said request from said Web server to a dispatcher, and dispatching said request to said page server;

processing said request, said processing being performed by said page server while said Web server concurrently processes said other requests; and

dynamically generating a Web page in response to said request, said Web page including data dynamically retrieved from one or more data sources.

2. The computer-implemented method in claim **1** wherein said step of processing said request includes the step of identifying said one or more data sources from which to retrieve said data.

3. The computer-implemented method in claim **2** wherein said step of dynamically generating said Web page includes the step of dynamically retrieving said data from said one or more data sources.

4. The computer-implemented method in claim **3** wherein said step of processing said request includes the step of said page server maintaining a connection cache to said one or more data sources.

5. The computer-implemented method in claim **3** wherein said step of processing said request includes the step of logging into said one or more data sources.

6. The computer-implemented method in claim **3** wherein said step of dynamically generating said Web page includes the step of maintaining a page cache containing said Web page.

7. The computer-implemented method in claim **3** wherein said page server includes custom HTML extension templates for configuring said Web page.

8. The computer-implemented method in claim **7** wherein said step of processing said request further includes the step of inserting said dynamically retrieved data from said one or more data sources into said custom HTML extension templates.

9. A networked system for managing a dynamic Web page generation request, said system comprising:

one or more data sources;

a page server having a processing means;

a first computer system including means for generating said request; and

a second computer system including means for receiving said request from said first computer, said second computer system also including a router, said router routing said request from said second computer system to said page server, wherein said routing further includes intercepting said request at said second computer, routing said request from said second computer to a dispatcher, and dispatching said request to said page server said page server receiving said request and releasing said second computer system to process other requests, said page server processing means processing said request and dynamically generating a Web page in response to said request, said Web page including data dynamically retrieved from said one or more data sources.

10. The networked system in claim **9** wherein said router in said second computer system includes:

an interceptor intercepting said request at said second computer system and routing said request; and

a dispatcher receiving said routed request from said interceptor and dispatching said request to said page server.

11. A machine readable medium having stored thereon data representing sequences of instructions, which when executed by a computer system, cause said computer system to perform the steps of:

routing a dynamic Web page generation request from a Web server to a page server, said page server receiving said request and releasing said Web server to process other requests wherein said routing step further includes the steps of intercepting said request at said Web server, routing said request from said Web server to a dispatcher, and dispatching said request to said page server;

processing said request, said processing being performed by said page server while said Web server concurrently processes said other requests; and

dynamically generating a Web page, said Web page including data retrieved from one or more data sources.

* * * * *

Exhibit 2

US006415335B1

(12) **United States Patent**
Lowery et al.

(10) **Patent No.: US 6,415,335 B1**
(45) **Date of Patent: *Jul. 2, 2002**

(54) **SYSTEM AND METHOD FOR MANAGING DYNAMIC WEB PAGE GENERATION REQUESTS**

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(73) Assignee: **epicRealm Operating Inc.**, Richardson, TX (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **09/234,048**

(22) Filed: **Jan. 19, 1999**

Related U.S. Application Data

(62) Division of application No. 08/636,477, filed on Apr. 23, 1996, now Pat. No. 5,894,554.

(51) **Int. Cl.**[7] **G06F 13/14**; G06F 13/20
(52) **U.S. Cl.** **710/5**; 710/7; 709/219; 709/223; 709/238
(58) **Field of Search** 709/238, 223, 709/219; 710/5, 7, 20–21

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Assistant Examiner—Rehana Perveen
(74) *Attorney, Agent, or Firm*—Baker Botts L.L.P.

(57) **ABSTRACT**

The present invention teaches a method and apparatus for creating and managing custom Web sites. Specifically, one embodiment of the present invention claims a computer-implemented method for managing a dynamic Web page generation request to a Web server, the computer-implemented method comprising the steps of routing the request from the Web server to a page server, the page server receiving the request and releasing the Web server to process other requests, processing the request, the processing being performed by the page server concurrently with the Web server, as the Web server processes the other requests, and dynamically generating a Web page in response to the request, the Web page including data dynamically retrieved from one or more data sources.

29 Claims, 4 Drawing Sheets

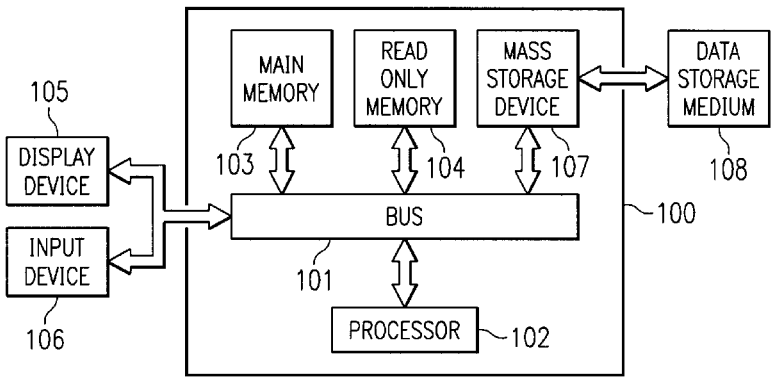

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FIG. 1

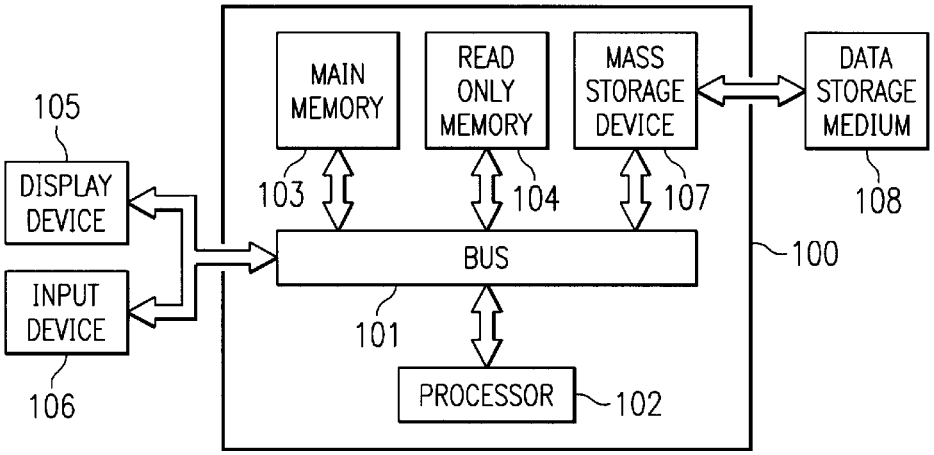


FIG. 2
(PRIOR ART)

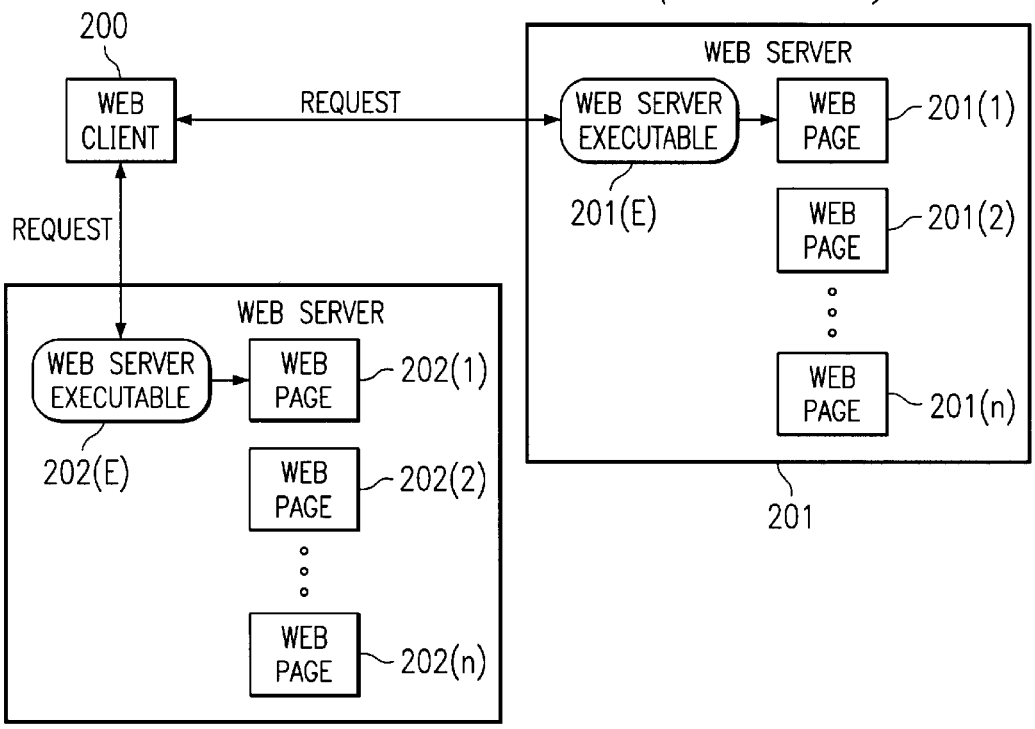


FIG. 3
(PRIOR ART)

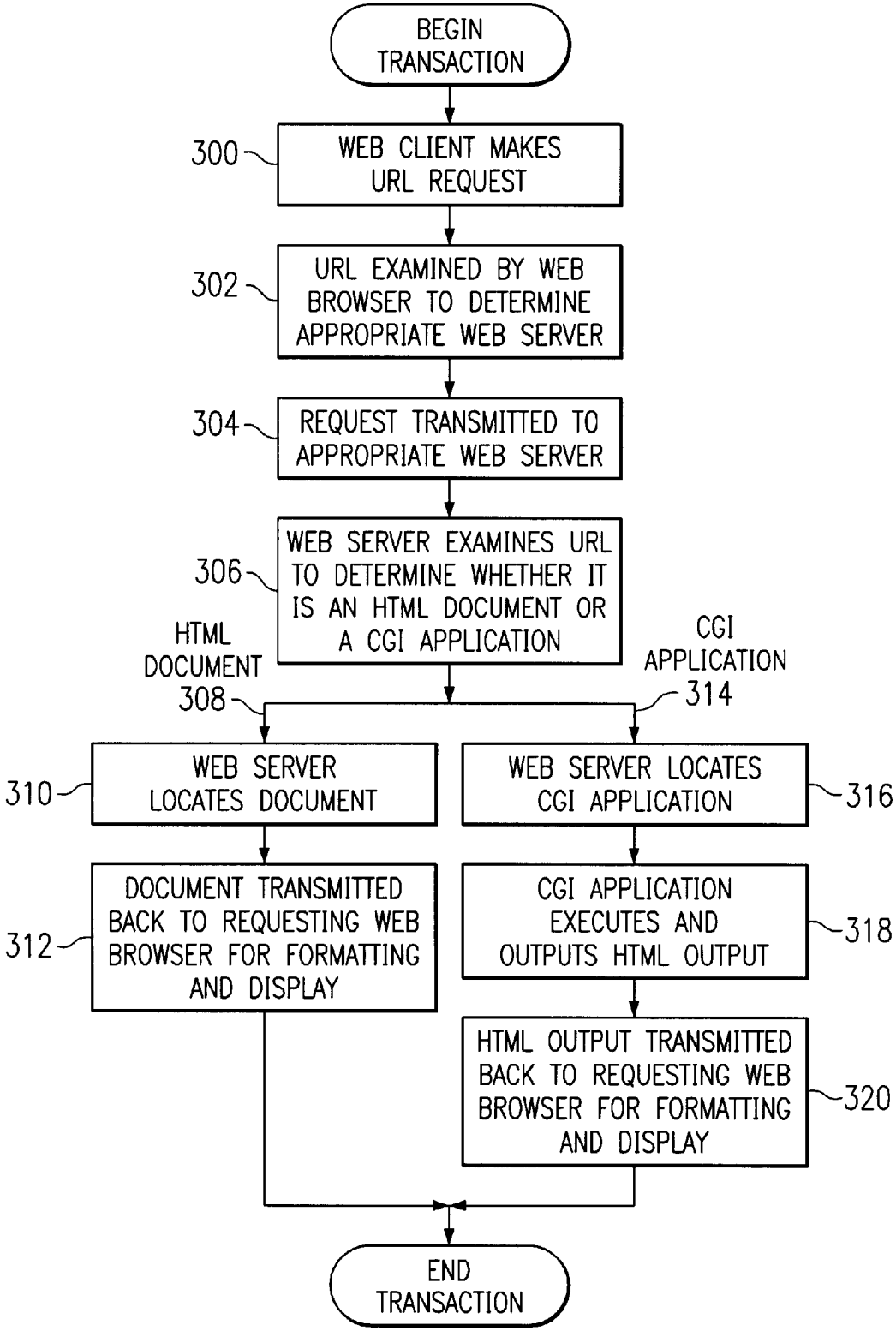


FIG. 4

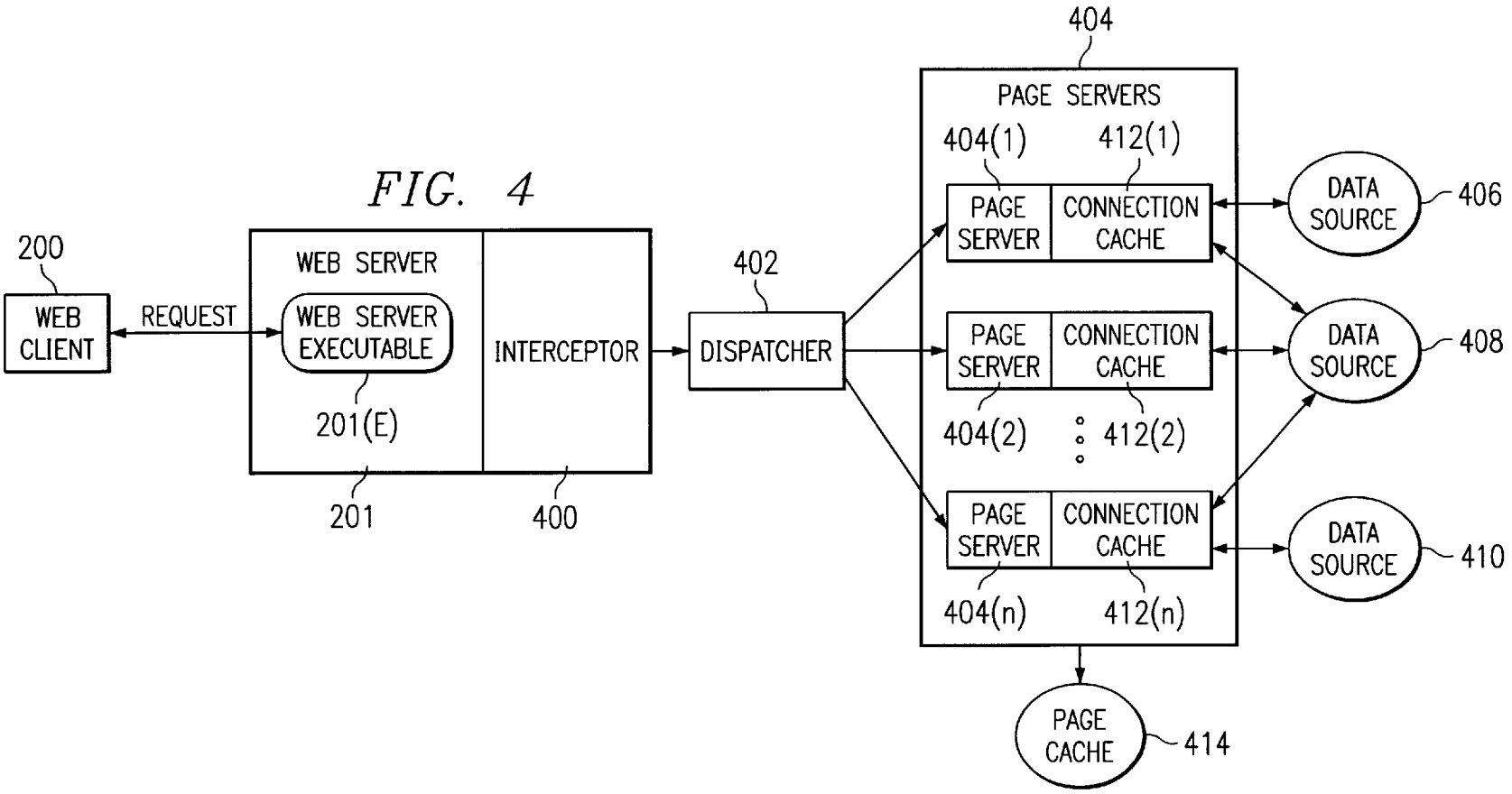
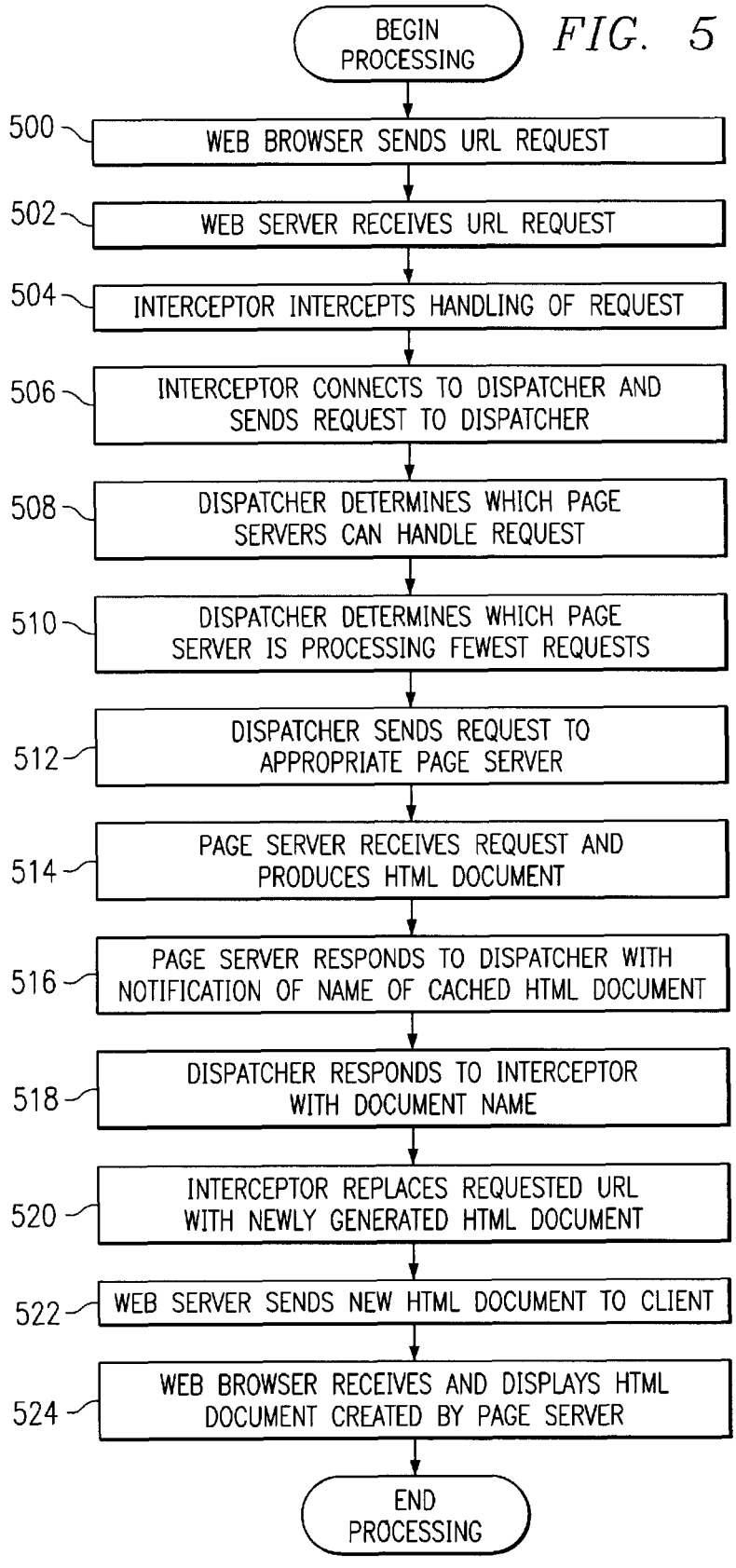

200
WEB CLIENT
REQUEST
WEB SERVER
WEB SERVER EXECUTABLE
201(E)
201
INTERCEPTOR
400
402
DISPATCHER
404
PAGE SERVERS
404(1)
412(1)
PAGE SERVER
CONNECTION CACHE
DATA SOURCE
406
PAGE SERVER
CONNECTION CACHE
DATA SOURCE
408
404(2)
412(2)
PAGE SERVER
CONNECTION CACHE
DATA SOURCE
410
404(n)
412(n)
PAGE CACHE
414

FIG. 5


BEGIN PROCESSING
500
WEB BROWSER SENDS URL REQUEST
502
WEB SERVER RECEIVES URL REQUEST
504
INTERCEPTOR INTERCEPTS HANDLING OF REQUEST
506
INTERCEPTOR CONNECTS TO DISPATCHER AND SENDS REQUEST TO DISPATCHER
508
DISPATCHER DETERMINES WHICH PAGE SERVERS CAN HANDLE REQUEST
510
DISPATCHER DETERMINES WHICH PAGE SERVER IS PROCESSING FEWEST REQUESTS
512
DISPATCHER SENDS REQUEST TO APPROPRIATE PAGE SERVER
514
PAGE SERVER RECEIVES REQUEST AND PRODUCES HTML DOCUMENT
516
PAGE SERVER RESPONDS TO DISPATCHER WITH NOTIFICATION OF NAME OF CACHED HTML DOCUMENT
518
DISPATCHER RESPONDS TO INTERCEPTOR WITH DOCUMENT NAME
520
INTERCEPTOR REPLACES REQUESTED URL WITH NEWLY GENERATED HTML DOCUMENT
522
WEB SERVER SENDS NEW HTML DOCUMENT TO CLIENT
524
WEB BROWSER RECEIVES AND DISPLAYS HTML DOCUMENT CREATED BY PAGE SERVER
END PROCESSING

SYSTEM AND METHOD FOR MANAGING DYNAMIC WEB PAGE GENERATION REQUESTS

This application is a division of Ser. No. 08/636,477, filed Apr. 23, 1996, now U.S. Pat. No. 5,894,554.

FIELD OF THE INVENTION

The present invention relates to the field of Internet technology. Specifically, the present invention relates to the creation and management of custom World Wide Web sites.

DESCRIPTION OF RELATED ART

The World Wide Web (the Web) represents all of the computers on the Internet that offer users access to information on the Internet via interactive documents or Web pages. These Web pages contain hypertext links that are used to connect any combination of graphics, audio, video and text, in a non-linear, non-sequential manner. Hypertext links are created using a special software language known as HyperText Mark-Up Language (HTML).

Once created, Web pages reside on the Web, on Web servers or Web sites. A Web site can contain numerous Web pages. Web client machines running Web browsers can access these Web pages at Web sites via a communications protocol known as HyperText Transport Protocol (HTTP). Web browsers are software interfaces that run on World Wide Web clients to allow access to Web sites via a simple user interface. A Web browser allows a Web client to request a particular Web page from a Web site by specifying a Uniform Resource Locator (URL). A URL is a Web address that identifies the Web page and its location on the Web. When the appropriate Web site receives the URL, the Web page corresponding to the requested URL is located, and if required, HTML output is generated. The HTML output is then sent via HTTP to the client for formatting on the client's screen.

Although Web pages and Web sites are extremely simple to create, the proliferation of Web sites on the Internet highlighted a number of problems. The scope and ability of a Web page designer to change the content of the Web page was limited by the static nature of Web pages. Once created, a Web page remained static until it was manually modified. This in turn limited the ability of Web site managers to effectively manage their Web sites.

The Common Gateway Interface (CGI) standard was developed to resolve the problem of allowing dynamic content to be included in Web pages. CGI "calls" or procedures enable applications to generate dynamically created HTML output, thus creating Web pages with dynamic content. Once created, these CGI applications do not have to be modified in order to retrieve "new" or dynamic data. Instead, when the Web page is invoked, CGI "calls" or procedures are used to dynamically retrieve the necessary data and to generate a Web page.

CGI applications also enhanced the ability of Web site administrators to manage Web sites. Administrators no longer have to constantly update static Web pages. A number of vendors have developed tools for CGI based development, to address the issue of dynamic Web page generation. Companies like Spider™ and Bluestone™, for example, have each created development tools for CGI-based Web page development. Another company, Haht Software™, has developed a Web page generation tool that uses a BASIC-like scripting language, instead of a CGI scripting language.

Tools that generate CGI applications do not, however, resolve the problem of managing numerous Web pages and requests at a Web site. For example, a single company may maintain hundreds of Web pages at their Web site. Current Web server architecture also does not allow the Web server to efficiently manage the Web page and process Web client requests. Managing these hundreds of Web pages in a coherent manner and processing all requests for access to the Web pages is thus a difficult task. Existing development tools are limited in their capabilities to facilitate dynamic Web page generation, and do not address the issue of managing Web requests or Web sites.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a method and apparatus for creating and managing custom Web sites. Specifically, the present invention claims a method and apparatus for managing dynamic web page generation requests.

In one embodiment, the present invention claims a computer-implemented method for managing a dynamic Web page generation request to a Web server, the computer-implemented method comprising the steps of routing the request from the Web server to a page server, the page server receiving the request and releasing the Web server to process other requests, processing the request, the processing being performed by the page server concurrently with the Web server, as the Web server processes the other requests, and dynamically generating a Web page in response to the request, the Web page including data dynamically retrieved from one or more data sources. Other embodiments also include connection caches to the one or more data sources, page caches for each page server, and custom HTML extension templates for configuring the Web page.

Other objects, features and advantages of the present invention will be apparent from the accompanying drawings and from the detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a typical computer system in which the present invention operates.

FIG. **2** illustrates a typical prior art Web server environment.

FIG. **3** illustrates a typical prior art Web server environment in the form of a flow diagram.

FIG. **4** illustrates one embodiment of the presently claimed invention.

FIG. **5** illustrates the processing of a Web browser request in the form of a flow diagram, according to one embodiment of the presently claimed invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention relates to a method and apparatus for creating and managing custom Web sites. In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be apparent to one of ordinary skill in the art, however, that these specific details need not be used to practice the present invention. In other instances, well-known structures, interfaces and processes have not been shown in detail in order not to unnecessarily obscure the present invention.

FIG. **1** illustrates a typical computer system **100** in which the present invention operates. The preferred embodiment of

the present invention is implemented on an IBM™ Personal Computer manufactured by IBM Corporation of Armonk, New York. An alternate embodiment may be implemented on an RS/6000™ Workstation manufactured by IBM Corporation of Armonk, New York. It will be apparent to those of ordinary skill in the art that other computer system architectures may also be employed.

In general, such computer systems as illustrated by FIG. **1** comprise a bus **101** for communicating information, a processor **102** coupled with the bus **101** for processing information, main memory **103** coupled with the bus **101** for storing information and instructions for the processor **102**, a read-only memory **104** coupled with the bus **101** for storing static information and instructions for the processor **102**, a display device **105** coupled with the bus **101** for displaying information for a computer user, an input device **106** coupled with the bus **101** for communicating information and command selections to the processor **102**, and a mass storage device **107**, such as a magnetic disk and associated disk drive, coupled with the bus **101** for storing information and instructions. A data storage medium **108** containing digital information is configured to operate with mass storage device **107** to allow processor **102** access to the digital information on data storage medium **108** via bus **101**.

Processor **102** may be any of a wide variety of general purpose processors or microprocessors such as the Pentium™ microprocessor manufactured by Intel™ Corporation or the RS/6000™ processor manufactured by IBM Corporation. It will be apparent to those of ordinary skill in the art, however, that other varieties of processors may also be used in a particular computer system. Display device **105** may be a liquid crystal device, cathode ray tube (CRT), or other suitable display device. Mass storage device **107** may be a conventional hard disk drive, floppy disk drive, CD-ROM drive, or other magnetic or optical data storage device for reading and writing information stored on a hard disk, a floppy disk, a CD-ROM a magnetic tape, or other magnetic or optical data storage medium. Data storage medium **108** may be a hard disk, a floppy disk, a CD-ROM, a magnetic tape, or other magnetic or optical data storage medium.

In general, processor **102** retrieves processing instructions and data from a data storage medium **108** using mass storage device **107** and downloads this information into random access memory **103** for execution. Processor **102**, then executes an instruction stream from random access memory **103** or read-only memory **104**. Command selections and information input at input device **106** are used to direct the flow of instructions executed by processor **102**. Equivalent input device **106** may also be a pointing device such as a conventional mouse or trackball device. The results of this processing execution are then displayed on display device **105**.

The preferred embodiment of the present invention is implemented as a software module, which may be executed on a computer system such as computer system **100** in a conventional manner. Using well known techniques, the application software of the preferred embodiment is stored on data storage medium **108** and subsequently loaded into and executed within computer system **100**. Once initiated, the software of the preferred embodiment operates in the manner described below.

FIG. **2** illustrates a typical prior art Web server environment. Web client **200** can make URL requests to Web server **201** or Web server **202**. Web servers **201** and **202** include Web server executables, **201**(E) and **202**(E) respectively, that perform the processing of Web client requests. Each Web server may have a number of Web pages **201**(1)–(n) and **202**(1)–(n). Depending on the URL specified by the Web client **200**, the request may be routed by either Web server executable **201**(E) to Web page **201** (1), for example, or from Web server executable **202**(E) to Web page **202** (1). Web client **200** can continue making URL requests to retrieve other Web pages. Web client **200** can also use hyperlinks within each Web page to "jump" to other Web pages or to other locations within the same Web page.

FIG. **3** illustrates this prior art Web server environment in the form of a flow diagram. In processing block **300**, the Web client makes a URL request. This URL request is examined by the Web browser to determine the appropriate Web server to route the request to in processing block **302**. In processing block **304** the request is then transmitted from the Web browser to the appropriate Web server, and in processing block **306** the Web server executable examines the URL to determine whether it is a HTML document or a CGI application. If the request is for an HTML document **308**, then the Web server executable locates the document in processing block **310**. The document is then transmitted back through the requesting Web browser for formatting and display in processing block **312**.

If the URL request is for a CGI application **314**, however, the Web server executable locates the CGI application in processing block **316**. The CGI application then executes and outputs HTML output in processing block **318** and finally, the HTML output is transmitted back to requesting Web browser for formatting and display in processing block **320**.

This prior art Web server environment does not, however, provide any mechanism for managing the Web requests or the Web sites. As Web sites grow, and as the number of Web clients and requests increase, Web site management becomes a crucial need.

For example, a large Web site may receive thousands of requests or "hits" in a single day. Current Web servers process each of these requests on a single machine, namely the Web server machine. Although these machines may be running "multi-threaded" operating systems that allow transactions to be processed by independent "threads," all the threads are nevertheless on a single machine, sharing a processor. As such, the Web executable thread may hand off a request to a processing thread, but both threads will still have to be handled by the processor on the Web server machine. When numerous requests are being simultaneously processed by multiple threads on a single machine, the Web server can slow down significantly and become highly inefficient. The claimed invention addresses this need by utilizing a partitioned architecture to facilitate the creation and management of custom Web sites and servers.

FIG. **4** illustrates one embodiment of the presently claimed invention. Web client **200** issues a URL request that is processed to determined proper routing. In this embodiment, the request is routed to Web server **201**. Instead of Web server executable **201**(E) processing the URL request, however, Interceptor **400** intercepts the request and routes it to Dispatcher **402**. In one embodiment, Interceptor **400** resides on the Web server machine as an extension to Web server **201**. This embodiment is appropriate for Web servers such as Netsite™ from Netscape, that support such extensions. A number of public domain Web servers, such as NCSA™ from the National Center for Supercomputing Applications at the University of Illinois, Urbana-Champaign, however, do not provide support for

this type of extension. Thus, in an alternate embodiment, Interceptor **400** is an independent module, connected via an "intermediate program" to Web server **201**. This intermediate program can be a simple CGI application program that connects Interceptor **400** to Web server **201**. Alternate intermediate programs the perform the same functionality can also be implemented.

In one embodiment of the invention, Dispatcher **402** resides on a different machine than Web server **201**. This embodiment overcomes the limitation described above, in prior art Web servers, wherein all processing is performed by the processor on a single machine. By routing the request to Dispatcher **402** residing on a different machine than the Web server executable **201**(E), the request can then be processed by a different processor than the Web server executable **201**(E). Web server executable **201**(E) is thus free to continue servicing client requests on Web server **201** while the request is processed "off-line," at the machine on which Dispatcher **402** resides.

Dispatcher **402** can, however, also reside on the same machine as the Web server. The Web site administrator has the option of configuring Dispatcher **402** on the same machine as Web server **201**, taking into account a variety of factors pertinent to a particular Web site, such as the size of the Web site, the number of Web pages and the number of hits at the Web site. Although this embodiment will not enjoy the advantage described above, namely off-loading the processing of Web requests from the Web server machine, the embodiment does allow flexibility for a small Web site to grow. For example, a small Web site administrator can use a single machine for both Dispatcher **402** and Web server **201** initially, then off-load Dispatcher **402** onto a separate machine as the Web site grows. The Web site can thus take advantage of other features of the present invention regardless of whether the site has separate machines configured as Web servers and dispatchers.

Dispatcher **402** receives the intercepted request and then dispatches the request to one of a number of Page servers **404 (1)**–(n). For example, if Page server **404 (1)** receives the dispatched request, it processes the request and retrieves the data from an appropriate data source, such as data source **406**, data source **408**, or data source **410**. Data sources, as used in the present application, include databases, spreadsheets, files and any other type of data repository. Page server **404 (1)** can retrieve data from more than one data source and incorporate the data from these multiple data sources in a single Web page.

In one embodiment, each Page server **404(1)**–(n) resides on a separate machine on the network to distribute the processing of the request. Dispatcher **402** maintains a variety of information regarding each Page server on the network, and dispatches requests based on this information. For example, Dispatcher **402** retains dynamic information regarding the data sources that any given Page server can access. Dispatcher **402** thus examines a particular request and determines which Page servers can service the URL request. Dispatcher **402** then hands off the request to the appropriate Page server.

For example, if the URL request requires financial data from data source **408**, dispatcher **402** will first examine an information list. Dispatcher **402** may determine that Page server **404(3)**, for example, has access to the requisite data in data source **408**. Dispatcher **402** will thus route the URL request to Page server **404(3)**. This "connection caching" functionality is described in more detail below, under the heading "Performance." Alternately, Dispatcher **402** also has the ability to determine whether a particular Page server already has the necessary data cached in the Page server's page cache (described in more detail below, under the heading "Performance"). Dispatcher **402** may thus determine that Page server **404(1)** and **404(2)** are both logged into Data source **408**, but that Page server **404(2)** has the financial information already cached in Page server **404(2)**'s page cache. In this case, Dispatcher **402** will route the URL request to Page server **404(2)** to more efficiently process the request.

Finally, Dispatcher **402** may determine that a number or all Page servers **404(1)**–(n) are logged into Data source **408**. In this scenario, Dispatcher **402** can examine the number of requests that each Page server is servicing and route the request to the least busy page server. This "load balancing" capability can significantly increase performance at a busy Web site and is discussed in more detail below, under the heading "Scalability".

If, for example, Page server **404(2)**, receives the request, Page server **404(2)** will process the request. While Page server **404(2)** is processing the request, Web server executable **201**(E) can concurrently process other Web client requests. This partitioned architecture thus allows both Page server **404(2)** and Web server executable **201**(E) to. simultaneously process different requests, thus increasing the efficiency of the Web site. Page server **404(2)** dynamically generates a Web page in response to the Web client request, and the dynamic Web page is then either transmitted back to requesting Web client **200** or stored on a machine that is accessible to Web server **201**, for later retrieval.

One embodiment of the claimed invention also provides a Web page designer with HTML extensions, or "dyna" tags. These dyna tags provide customized HTML functionality to a Web page designer, to allow the designer to build customized HTML templates that specify the source and placement of retrieved data. For example, in one embodiment, a "dynatext" HTML extension tag specifies a data source and a column name to allow the HTML template to identify the data source to log into and the column name from which to retrieve data. Alternatively, "dyna-anchor" tags allow the designer to build hyperlink queries while "dynablock" tags provide the designer with the ability to iterate through blocks of data. Page servers use these HTML templates to create dynamic Web pages. Then, as described above, these dynamic Web pages are either transmitted back to requesting Web client **200** or stored on a machine that is accessible to Web server **201**, for later retrieval.

The presently claimed invention provides numerous advantages over prior art Web servers, including advantages in the areas of performance, security, extensibility and scalability

Performance

One embodiment of the claimed invention utilizes connection caching and page caching to improve performance. Each Page server can be configured to maintain a cache of connections to numerous data sources. For example, as illustrated in FIG. **4**, Page server **404(1)** can retrieve data from data source **406**, data source **408** or data source **410**. Page server **404(1)** can maintain connection cache **412(1)**, containing connections to each of data source **406**, data source **408** and data source **410**, thus eliminating connect times from the Page servers to those data sources.

Additionally, another embodiment of the present invention supports the caching of finished Web pages, to optimize the performance of the data source being utilized. This "page

caching" feature, illustrated in FIG. **4** as Page cache **414**, allows the Web site administrator to optimize the performance of data sources by caching Web pages that are repeatedly accessed. Once the Web page is cached, subsequent requests or "hits" will utilize the cached Web page rather than re-accessing the data source. This can radically improve the performance of the data source.

Security

The present invention allows the Web site administrator to utilize multiple levels of security to manage the Web site. In one embodiment, the Page server can utilize all standard encryption and site security features provided by the Web server. In another embodiment, the Page server can be configured to bypass connection caches **412(1)**–(n), described above, for a particular data source and to require entry of a user-supplied identification and password for the particular data source the user is trying to access.

Additionally, another embodiment of the presently claimed invention requires no real-time access of data sources. The Web page caching ability, described above, enables additional security for those sites that want to publish non-interactive content from internal information systems, but do not want real-time Internet accessibility to those internal information systems. In this instance, the Page server can act as a "replication and staging agent" and create Web pages in batches, rather than in real-time. These "replicated" Web pages are then "staged" for access at a later time, and access to the Web pages in this scenario is possible even if the Page server and dispatcher are not present later.

In yet another embodiment, the Page server can make a single pass through a Web library, and compile a Web site that exists in the traditional form of separately available files. A Web library is a collection of related Web books and Web pages. More specifically, the Web library is a hierarchical organization of Web document templates, together with all the associated data source information. Information about an entire Web site is thus contained in a single physical file, thus simplifying the problem of deploying Web sites across multiple Page servers. The process of deploying the Web site in this embodiment is essentially a simple copy of a single file.

Extensibility

One embodiment of the present invention provides the Web site administrator with Object Linking and Embedding (OLE) 2.0 extensions to extend the page creation process. These OLE 2.0 extensions also allow information submitted over the Web to be processed with user-supplied functionality. Utilizing development tools such as Visual Basic, Visual C++ or PowerBuilder that support the creation of OLE 2.0 automation, the Web site administrator can add features and modify the behavior of the Page servers described above. This extensibility allows one embodiment of the claimed invention to be incorporated with existing technology to develop an infinite number of custom web servers.

For example, OLE 2.0 extensions allow a Web site administrator to encapsulate existing business rules in an OLE 2.0 automation interface, to be accessed over the Web. One example of a business rule is the steps involved in the payoff on an installment or mortgage loan. The payoff may involve, for example, taking into account the current balance, the date and the interest accrued since the last payment. Most organizations already have this type of business rule implemented using various applications, such as Visual Basic for client-server environments, or CICS programs on mainframes. If these applications are OLE 2.0 compliant, the Page server "dynaobject" HTML extension tag can be used to encapsulated the application in an OLE 2.0 automation interface. The Page server is thus extensible, and can incorporate the existing application with the new Page server functionality.

Scalability

One embodiment of the claimed invention allows "plug and play" scalability. As described above, referring to FIG. **4**, Dispatcher **402** maintains information about all the Page servers configured to be serviced by Dispatcher **402**. Any number of Page servers can thus be "plugged" into the configuration illustrated in FIG. **4**, and the Page servers will be instantly activated as the information is dynamically updated in Dispatcher **402**. The Web site administrator can thus manage the overhead of each Page server and modify each Page server's load, as necessary, to improve performance. In this manner, each Page server will cooperate with other Page servers within a multi-server environment. Dispatcher **402** can examine the load on each Page server and route new requests according to each Page server's available resources. This "load-balancing" across multiple Page servers can significantly increase a Web site's performance.

FIG. **5** illustrates the processing of a Web browser request in the form of a flow diagram, according to one embodiment of the presently claimed invention. A Web browser sends a URL request to a Web server in processing block **500**. In processing block **502**, the Web server receives the URL request, and an interceptor then intercepts the handling of the request in processing block **504**. The interceptor connects to a dispatcher and sends the URL request to the dispatcher in processing block **506**. In processing block **508**, the dispatcher determines which Page servers can handle the request. The dispatcher also determines which Page server is processing the fewest requests in processing block **510**, and in processing block **512**, the dispatcher sends the URL request to an appropriate Page server. The Page server receives the request and produces an HTML document in processing block **514**. The Page server then responds to the dispatcher with notification of the name of the cached HTML document in processing block **516**. In processing block **518**, the dispatcher responds to the interceptor with the document name, and the interceptor then replaces the requested URL with the newly generated HTML document in processing block **520**. The Web server then sends the new HTML document to the requesting client in processing block **522**. Finally, the Web browser receives and displays the HTML document created by the Page server at processing block **524**.

Thus, a method and apparatus for creating and managing custom Web sites is disclosed. These specific arrangements and methods described herein are merely illustrative of the principles of the present invention. Numerous modifications in form and detail may be made by those of ordinary skill in the art without departing from the scope of the present invention. Although this invention has been shown in relation to a particular preferred embodiment, it should not be considered so limited. Rather, the present invention is limited only by the scope of the appended claims.

We claim:

1. A computer-implemented method for managing a dynamic Web page generation request to a Web server, said computer-implemented method comprising the steps of:

routing a request from a Web server to a page server, said page server receiving said request and releasing said

Web server to process other requests wherein said routing step further includes the steps of:

intercepting said request at said Web server and routing said request to said page server;

processing said request, said processing being performed by said page server while said Web server concurrently processes said other requests; and

dynamically generating a Web page in response to said request, said Web page including data dynamically retrieved from one or more data sources.

2. The computer-implemented method in claim **1** wherein said step of routing said request includes the steps of:

routing said request from said Web server to a dispatcher; and

dispatching said request to said page server.

3. The computer-implemented method in claim **1** wherein said step of processing said request includes the step of identifying said one or more data sources from which to retrieve said data.

4. The computer-implemented method in claim **1** wherein said step of dynamically generating said Web page includes the step of dynamically retrieving said data from said one or more data sources.

5. The computer-implemented method in claim **1** wherein said step of processing said request includes the step of said page server maintaining a connection cache to said one or more data sources.

6. The computer-implemented method in claim **1** wherein said step of processing said request includes the step of logging into said one or more data sources.

7. The computer-implemented method in claim **1** wherein said step of dynamically generating said Web page includes the step of maintaining a page cache containing said Web page.

8. The computer-implemented method in claim **1** wherein said page server includes tag-based text templates for configuring said Web page.

9. The computer-implemented method in claim **8** wherein said step of processing said request further includes the step of inserting said-dynamically retrieved data from said one or more data sources into said tag-based text templates.

10. The computer-implemented method in claim **8** wherein at least one of said tag-based text templates drives a format of the data dynamically retrieved from said one or more data sources in response to said request.

11. The computer-implemented method in claim **8** wherein said tag-based text templates include HTML templates.

12. The computer-implemented method in claim **1** wherein said step of processing said request further includes the step of dynamically updating data at said one or more data sources.

13. The computer-implemented method in claim **1** wherein said step of processing said request further includes the step of processing an object handling extension.

14. The computer-implemented method in claim **13** wherein said object handling extension is an OLE extension.

15. A computer-implemented method comprising the steps of:

transferring a request from an HTTP-compliant device to a page server, said page server receiving said request and releasing said HTTP-compliant device to process other requests wherein said transferring step further includes the steps of:

intercepting said request at said HTTP-compliant device and transferring said request to said page server;

processing said request, said processing being performed by said page server while said HTTP-compliant device concurrently processes said other requests; and

dynamically generating a page in response to said request, said page including data dynamically retrieved from one or more data sources.

16. The computer-implemented method in claim **15** wherein said step of transferring said request includes the steps of:

transferring said request from said HTTP-compliant device to a dispatcher; and

dispatching said request to said page server.

17. The computer-implemented method in claim **15** wherein said step of processing said request includes the step of identifying said one or more data sources from which to retrieve said data.

18. The computer-implemented method in claim **15** wherein said step of dynamically generating said page includes the step of dynamically retrieving said data from said one or more data sources.

19. The computer-implemented method in claim **15** wherein said step of processing said request includes the step of said page server maintaining a connection cache to said one or more data sources.

20. The computer-implemented method in claim **15** wherein said step of processing said request includes the step of logging into said one or more data sources.

21. The computer-implemented method in claim **15** wherein said step of dynamically generating said page includes the step of maintaining a page cache containing said page.

22. The computer-implemented method in claim **15** wherein said page server includes tag-based text templates for configuring said page.

23. The computer-implemented method in claim **22** wherein said step of processing said request further includes the step of inserting said dynamically retrieved data from said one or more data sources into said tag-based text templates.

24. The computer-implemented method in claim **22** wherein at least one of said tag-based text templates drives a format of the data dynamically retrieved from said one or more data sources in response to said request.

25. The computer-implemented method in claim **22** wherein said tag-based text templates include HTML templates.

26. The computer-implemented method in claim **15** wherein said step of processing said request further includes the step of dynamically updating data at said one or more data sources.

27. The computer-implemented method in claim **15** wherein said step of processing said request further includes the step of processing an object handling extension.

28. The computer-implemented method in claim **27** wherein said object handling extension is an OLE extension.

29. A computer-implemented method comprising the steps of:

transferring a request from an HTTP-compliant device to a dispatcher;

maintaining dynamic information regarding data sources a given page server may access;

dispatching said request to an appropriate page server based on said request and based on said dynamic information, said page server receiving said request and

releasing said HTTP-compliant device to process other requests;

processing said request, said processing being performed by said page server while said HTTP-compliant device concurrently processes said other requests; and

dynamically generating a page in response to said request, said page including data dynamically retrieved from one or more data sources.

* * * * *

Exhibit 3

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

ORACLE CORPORATION and ORACLE U.S.A. INC.,	)	
Plaintiffs,	)	
v.	)	C.A. No. 06-414-SLR
EPICREALM LICENSING, LP,	)	
Defendant.	)	

NOTICE OF SERVICE

I, Benjamin J. Bradford, one of the attorneys for Defendant epicRealm Licensing, LP, hereby certify that copies of the following documents were caused to be served upon the following attorneys of record at the addresses indicated:

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Oracle Corporation and Oracle U.S.A. v. epicRealm Licensing, LP
C.A. No. 06-414-SLR (D. Del.)

QuinStreet, Inc. v. Parallel Networks, LLC
C.A. No. 06-0495 (D. Del.)

PROPOSED CLAIM CONSTRUCTIONS

TERM	**PROPOSED CONSTRUCTION**
Web page	"Web content displayable through a Web browser"
request	"a message that asks for a Web page"
page server	"page-generating software that generates a dynamic Web page"
Web server	"software, or a machine having software, that receives Web page requests and returns Web pages in response to the requests"
HTTP-compliant device	"a device that is compliant with the communication protocol known as HyperText Transport Protocol (HTTP)"
said processing being performed by said page server while said Web server concurrently processes said other requests	This term does not require construction. If the Court determines that this term requires construction, it should be construed to mean "the processing being performed by said page server while said Web server processes said other requests at the same time."
intercepting said request at said Web server	"intercepting the handling of a request at a Web server"
intercepting said request at said HTTP-compliant device	"at least intercepting the handling of a request at a said HTTP-compliant device"

TERM	**PROPOSED CONSTRUCTION**
transferring	This term does not require construction. If the Court determines that this term requires construction, it should be construed to mean "sending."
dispatching	"examining a request to make an informed selection of which page server should process the request based on dynamic information maintained about page servers, the dynamic information indicating which page server can more efficiently process the request, and sending the request to the selected page server"
releasing	"freeing"
means for generating	"'a processor of a computer that is, or has, a Web client running a Web browser' or equivalents thereof"
means for receiving	"'a processor of a computer that is, or has, a Web server running Web server executable' or equivalents thereof"
page server processing means	"'a processor of a computer that runs page server software (wherein page server software is page-generating software that generates a dynamic Web page)' or equivalents thereof"

Exhibit 4

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

ORACLE CORPORATION and ORACLE U.S.A. INC., Plaintiffs, v. EPICREALM LICENSING, LP, Defendant. AND RELATED COUNTERCLAIMS	C.A. No. 06-cv-414 (SLR)

PLAINTIFFS' IDENTIFICATION OF CLAIM TERMS THAT NEED CONSTRUCTION AND PRELIMINARY CLAIM CONSTRUCTIONS

In accordance with the Court's Joint Discovery Plan and Discovery Order, Plaintiffs Oracle Corp. and Oracle U.S.A. Inc. (collectively "Oracle") make the following disclosures.

Oracle reserves the right to supplement, amend or otherwise revise its preliminary claim constructions as necessary. Particularly, Oracle submits its preliminary constructions without the benefit of complete discovery. Oracle may supplement, amend or revise its preliminary contentions in light of Defendant epicRealm Licensing LP's ("epicRealm") infringement contentions or as further evidence is discovered during the course of discovery.

Pursuant to the Court's Order, Oracle is prepared to meet and confer with epicRealm at a mutually agreeable time and place for the purpose of narrowing the claim construction issues and finalizing preparation of the Joint Claim Construction Statement.

Claim Term	Oracle's Proposed Claim Construction
appropriate page server ('335 – claim 29)	a page server determined to be capable of processing said request based on said dynamic information

Claim Term	Oracle's Proposed Claim Construction
computer system ('554 - claims 9, 11)	**first computer system** = a combination of computer hardware and software, under control of a single party, capable of generating a dynamic Web page generation request **second computer system** = a combination of computer hardware and software, under control of a single party, and distinct from said first computer system, capable of receiving a dynamic Web page generation request over a network from said first computer system
computer-implemented method for managing a dynamic Web page generation request to a Web server ('554 - claim 1) ('335 - claim 1)	a method at least partially involving a computer for processing a dynamic Web page generation request sent to a Web server
connection cache ('554 – claim 4) ('335 – claims 5, 19)	a store of information identifying open connections to data sources for eliminating subsequent connect times to those data sources
custom HTML extension templates ('554 – claims 7, 8)	custom files using non-HTML markers for specifying where data from data sources should be inserted to create an HTML file
data dynamically retrieved ('554 – claims 1, 9) ('335 – claims 1, 10, 15, 24, 29)	data retrieved in response to a request at the time it is needed
data sources ('554 – claims 1-5, 8-9, 11) ('335 – claims 1, 3-6, 9-10, 12, 15, 17-20, 23-24, 26 29)	computerized repositories from which data may be retrieved electronically
dispatcher ('554 – 1, 9, 11) ('335 – claims 2, 16, 29)	a software program for determining which page server should be used to process a dynamic web page generation request
dispatching said request to said page server ('554 – claims 1, 9, 11) ('335 – claims 2, 16, 29)	analyzing a request to make an informed selection of which page server should process the request, and sending the request to that page server
dynamic Web page ('554 – claims 1, 9, 11) ('335 – claim 1)	a Web page whose content changes over time and therefore cannot be stored statically

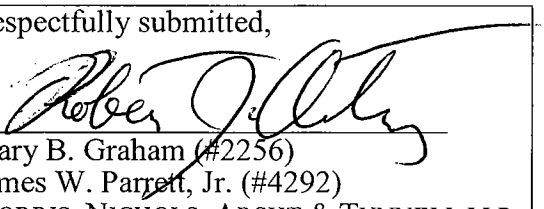
Claim Term	Oracle's Proposed Claim Construction
dynamic Web page generation request ('554 – claims 1, 9, 11) ('335 - claim 1)	a request for generation of a dynamic Web page
dynamically generating a Web page ('554 – 1, 3, 6, 9, 11) ('335 – 1, 4, 7, 15, 18, 21, 29)	creating on demand a Web page that did not previously exist
dynamically retrieving said data ('554 – claim 3) ('335 – claims 4, 18)	retrieving data in response to a request at the time it is needed
HTTP-compliant device ('335 – claims 15, 16, 29)	a device running software that implements the Hypertext Transfer Protocol
identifying said one or more data sources ('554 – claim 2)	listing in an HTML extension tag the location of said one or more data sources
inserting said dynamically retrieved data from said one or more data sources into said custom HTML extension templates ('554 - claim 8)	replacing tags in said custom HTML extension templates with data dynamically retrieved from said one or more data sources
intercepting said request at [said Web server/ second computer system/HTTP-compliant device] ('554 - claims 1, 9, 10, 11) ('335 - claims 1, 15)	receiving a request at the [Web server machine/second computer system/HTTP-compliant device] and diverting the request before the [Web server/second computer system/HTTP-compliant device] executable can process the request
interceptor ('554 - claim 10)	a software component that performs intercepting
logging into ('554 - claim 5)	presenting credentials that allow access to
machine readable medium ('554 - claim 11)	a hard disk, floppy disk, CD-ROM, magnetic tape, or other magnetic or optical data storage medium

Claim Term	Oracle's Proposed Claim Construction
maintaining a connection cache to said one or more data sources ('554 - claim 4) **maintaining** a page cache containing said Web page ('554 - claim 6)	storing and updating
maintaining dynamic information ('335 – claim 29)	storing and updating information that changes over time
managing A computer-implemented method for **managing** a dynamic Web page generation request to a Web server ('554 - claims 1, 9) ('335 - claim 1)	processing
Means for generating said request ('554 – claim 9)	112 ¶6 corresponding function: generating said request structure: A processor of a computer that is, or has, a Web client running a Web browser
means for receiving said request from said first computer ('554 – claim 9)	112 ¶6 corresponding function: receiving said request from said first computer structure: A processor of a computer that is, or has, a Web server running Web server executable
networked system a **networked system** for managing a dynamic Web page generation request ('554 – claim 9)	a system of computers, interconnected by a network, which interacts with the World Wide Web
other requests ('554 – claims 1, 9, 11) ('335 – claims 1, 15, 29)	requests other than said request
page cache ('554 - claim 6) ('335 – claims 7, 21)	a memory that stores finished Web pages which the page server uses to fulfill requests instead of re-accessing the one or more data sources

Claim Term	Oracle's Proposed Claim Construction
page server ('554 patent - claims 1, 4, 7, 9, 10, 11) ('335 patent - claims 1, 2, 5, 8, 15, 16, 19, 22, 29)	a server machine, distinct from the [Web server machine/second computer system/HTTP-compliant device], which generates dynamic Web pages
page server processing means ('554 – claim 9)	112 ¶6 corresponding function: processing structure: a computer programmed to process a dynamic Web page generation request by retrieving data dynamically from one or more data sources and dynamically generating a Web page responsive to said request
request ('554 – all) ('355 – all)	A message that asks for a Web page specified by a URL
router ('554 - claims 9, 10)	a device that intercepts and dispatches dynamic Web page generation requests
routing ('554 - claims 1, 9, 10, 11) ('335 - claims 1, 2)	transmitting
said page server receiving said request and releasing said Web server [second computer system or HTTP-compliant device] to process other requests ('554 – claims 1, 9, 11) ('335 – claims 1, 15, 29)	said page server receiving said request and said page server performing an act (separate from merely receiving the request) that expressly communicates to said [Web server/second computer system/HTTP-compliant device] that it may now resume processing other requests
said processing being performed by said page server while said [Web server/HTTP-compliant device] concurrently processes said other requests ('554 – claims 1, 11) ('335 – claims 1, 15, 29)	said page server generating the requested dynamic Web page while said [Web server/HTTP-compliant device] processes other requests literally at the same time
transferring ('335 – claims 15-16, 29)	sending
Web page ('554 - claims 1, 3, 6, 7, 9, 11) ('335 - 1, 4, 7, 8)	a file containing embedded commands in a Web formatting language such as HTML, capable of being displayed on a Web browser

Claim Term	Oracle's Proposed Claim Construction
Web server ('554 - claims 1, 11) ('335 - 1, 2)	a computer running HTTP-compliant server software which receives Web page requests and returns Web pages in response to the requests

Respectfully submitted,



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Dated: December 14, 2007

61235117 v1

CERTIFICATE OF SERVICE

I, Robert J. Artuz, hereby certify that on December 14, 2007 I caused the foregoing to be served on the following individuals by E-Mail, as indicated:

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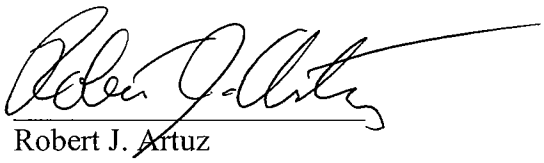

Robert J. Artuz

Exhibit 5

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

ORACLE CORPORATION and ORACLE U.S.A. INC.,	)	
Plaintiffs,	)	
v.	)	C.A. No. 06-414 (SLR)
EPICREALM LICENSING, LP,	)	
Defendant.	)	

PARTIES' PROPOSED ELEMENT-BY-ELEMENT CLAIM CONSTRUCTION CHART

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Dated: June 30, 2008

Claim Term	Oracle's Proposed Construction	epicRealm's Proposed Construction
connection cache ('554 patent – claim 4)	a store of information identifying open connections to data sources for eliminating subsequent connect times to those data sources	no construction is necessary
data sources ('554 patent – claims 1-5, 8-9, 11) ('335 patent – claims [1], [15])[1]	computerized repositories from which data may be retrieved electronically	no construction is necessary
dispatcher ('554 patent – claim 1, 9, 11) ('335 patent – claims 2, 16)	a software program for determining which page server should be used to process a dynamic web page generation request	no construction is necessary
dispatching / dispatching said request to said page server ('554 patent – claims 1, 9, 11) ('335 patent – claims 2, 16)	analyzing a request to make an informed selection of which page server should process the request, and sending the request to that page server	examining a request to make an informed selection of which page server should process the request based on dynamic information maintained about page servers, the dynamic information indicating which page server can more efficiently process the request, and sending the request to the selected page server
HTTP-compliant device ('335 patent – claims 15, 16)	a device running software that implements the Hypertext Transfer Protocol	a device that is compliant with the communication protocol known as HyperText Transport Protocol (HTTP)
intercepting said request at said HTTP-compliant	receiving a request at the HTTP-compliant device and diverting	at least intercepting the handling of a request at a said HTTP-

[1] Claim numbers in brackets signify unasserted independent claims upon which asserted dependent claims rely.

Claim Term	Oracle's Proposed Construction	epicRealm's Proposed Construction
device ('335 patent – claim [1], [15])	the request before the HTTP-compliant device executable can process the request	compliant device
intercepting said request at said second computer system ('554 patent – claims 9, 10)	receiving a request at the second computer system and diverting the request before the second computer system executable can process the request	no construction is necessary
intercepting said request at said Web server ('554 patent – claims 1, 11) ('335 patent – claims [1])	receiving a request at the Web server machine and diverting the request before the Web server executable can process the request	intercepting the handling of a request at a Web server
interceptor ('554 patent – claim 10)	a software component that performs intercepting	no construction is necessary
logging into ('554 patent – claim 5)	presenting credentials that allow access to	no construction is necessary
machine readable medium ('554 patent – claim 11)	a hard disk, floppy disk, CD-ROM, magnetic tape, or other magnetic or optical data storage medium	no construction is necessary
page server ('554 patent – claims 1, 4, 7, 9, 10, 11) ('335 patent – claim [1], [15])	page generating software, running on a processor separate from that of the Web server, that generates dynamic Web pages Claims 9 of the '554 Patent and claims 15 and 29 of the '335 Patent are likewise construed with the substitution of "second computer system" and "HTTP-	page-generating software that generates a dynamic Web page

Claim Term	Oracle's Proposed Construction	epicRealm's Proposed Construction
	compliant device" respectively for "Web server."	
releasing ('554 patent – claims 1, 9, 11) ('335 patent – claims [1], [15])	(see below)	freeing
said page server receiving said request and releasing said Web server [or second computer system or HTTP-compliant device] to process other requests ('554 patent – claims 1, 9, 11) ('335 patent – claims [1], [15])	said page server receiving said request and said page server performing an act (separate from merely receiving the request) to free the Web server to process other requests. Claims 9 of the '554 Patent and claims 15 and 29 of the '335 Patent are likewise construed with the substitution of "second computer system" and "HTTP-compliant device" respectively for "Web server."	(see proposed construction for "releasing" above)
request ('554 patent – all) ('335 patent – all)	a message that asks for a Web page specified by a URL	a message that asks for a Web page
router ('554 patent – claims 9, 10)	a device that intercepts and dispatches dynamic Web page generation requests	no construction is necessary
Web page ('554 patent – claims 1, 3, 6, 7, 9, 11) ('335 patent – claim [1])	a file containing embedded commands in a Web formatting language such as HTML, capable of being displayed on a Web browser	Web content displayable through a Web browser

Claim Term	Oracle's Proposed Construction	epicRealm's Proposed Construction
Web server ('554 patent – claims 1, 11) ('335 patent – claim [1])	HTTP-compliant server software, or a machine running such software, that receives Web page requests and returns Web pages in response to the requests	software, or a machine having software, that receives Web page requests and returns Web pages in response to the requests
Means for generating [said request] ('554 patent – claim 9)	§ 112 ¶6 corresponding function: generating said request structure: a processor of a computer that is, or has, a Web client running a Web browser	"a processor of a computer that is, or has, a Web client running a Web browser" or equivalents thereof
Means for receiving [said request from said first computer] ('554 patent – claim 9)	§ 112 ¶6 corresponding function: receiving said request from said first computer structure: a processor of a computer that is, or has, a Web server running a Web server executable	"a processor of a computer that is, or has, a Web server running Web server executable" or equivalents thereof
Page server processing means ('554 patent – claim 9)	§ 112 ¶6 corresponding function: processing dynamic Web page generation requests corresponding structure: a processor of a computer that runs software for generating dynamic Web pages	"a processor of a computer that runs page server software (wherein page server software is page-generating software that generates a dynamic Web page)" or equivalents thereof

2389667.1

Exhibit 6

08636477

Class	Subclass	ISSUE CLASSIFICATION
395	200.33	CMS

SERIAL NUMBER	PATENT NUMBER	PATENT DATE	ISSUE CLASSIFICATION
08/636477	5894554	APR 13 1999	

SERIAL NUMBER	FILING DATE	CLASS	SUBCLASS	GROUP ART UNIT	EXAMINER
08/636,477	04/23/96	395	200.33	2782	Kim

APPLICANTS

KEITH LOWERY, RICHARDSON, TX; ANDREW D. LEVINE, PLANO, TX; RONALD L. HOWELL, MCKINNEY, TX.

CONTINUING DATA********
VERIFIED

RP

FOREIGN/PCT APPLICATIONS********
VERIFIED

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FOREIGN FILING LICENSE GRANTED 06/05/96

Foreign priority claimed / 35 USC 119 conditions met / Verified and Acknowledged	AS FILED	STATE OR COUNTRY	SHEETS DRWGS.	TOTAL CLAIMS	INDEP. CLAIMS	FILING FEE RECEIVED	ATTORNEY'S DOCKET NO.
☐ yes ☑ no / ☐ yes ☑ no / RP Examiner's Initials		TX	5	16	0	$984.00	02577.P001

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TITLE

8/c ~~MANAGING WEB SITES AND DYNAMIC WEB PAGE GENERATION REQUESTS~~
SYSTEM FOR MANAGING DYNAMIC WEB PAGE GENERATION REQUESTS BY INTERCEPTING REQUEST AT WEB SERVER AND ROUTING TO PAGE SERVER THEREBY RELEASING WEB SERVER TO PROCESS OTHER REQUESTS

PTO-436L (Rev.12-94)

PARTS OF APPLICATION FILED SEPARATELY

PS Harrison
Applications Examiner

NOTICE OF ALLOWANCE MAILED	Assistant Examiner	CLAIMS ALLOWED	
12-29-98	Rehana Perveen	Total Claims: 11	Print Claim: 1

ISSUE FEE		DRAWING		
Amount Due	Date Paid	Sheets Drwg.	Figs. Drwg.	Print Fig.
1210.00	1-19-99	5	5	4

THOMAS C. LEE
SUPERVISORY PATENT EXAMINER
GROUP 2700
Primary Examiner

ISSUE BATCH NUMBER: N34

Label Area

PREPARED FOR ISSUE

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Form PTO-436A
(Rev. 8/92)

ISSUE FEE IN FILE

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APPROVED FOR LICENSE ☐

INITIALS _____

08/636477

PATENT APPLICATION

08636477

CONTENTS

Date Entered or Counted		Date Received or Mailed
	1. Application _____ papers.	
	2. Reg for Corr Tr	8/15/96
7-2	3. reg 3mos w/att	7/3/97
	4. Amdt A	10-7-97 cm 10-1
	5. Info Disclosure Statement	11/21/97
12-22	6. Reg 3 mos	12/31/97
ORIG LOST BY PTO.	7. Amdt B	9-14-98
12-29=	8. EXR AMDT/C & INTERVIEW Summary	12-29-98
2-2-99	9. Formal Drawings 5 [illegible] 1	1-19-99
	10. PTO GRANT APR 13 1999	
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POSITION		ID NO.	DATE
CLASSIFIER		48	5/10/96
EXAMINER		NH	6-4-96
TYPIST	SBN	318	6-5-96
VERIFIER			
CORPS CORR.			
SPEC. HAND			
FILE MAINT.			
DRAFTING			

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INDEX OF CLAIMS

Claim Final	Claim Original	Date 6/24/97	12/15/97	12/17/98					
1	1	✓	✓	=					
	~~2~~	✓	✓						
2	3	✓	✓	=					
3	4	✓	✓	=					
4	5	✓	✓	=					
5	6	✓	✓	=					
6	7	✓	✓	=					
7	8	✓	O	=					
8	9	✓	O	=					
	~~10~~	✓	+						
9	11	✓	✓	=					
10	12	✓	✓	=					
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SYMBOLS

- ✓ ..... Rejected
- = ... Allowed
- - (Through numberal) Canceled
- + ... Restricted
- N ..... Non-elected
- I ..... Interference
- A ..... Appeal
- O ..... Objected

Claim Final	Claim Original	Date							
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SEARCHED

Class	Sub.	Date	Exmr.
358	400	6/27/97	[illegible]
395	800	↓	↓
395	700		
395	200.68		
395	200.75		
395	200.53	6/27/97	[illegible]
UPDATED	SEARCH	12/11/97	[illegible]
707	104	12/17/98	[illegible]
395	680	↓	↓
707	10	12/17/98	[illegible]
395	200.33		
UPDATED SEARCH 12/16/98 [illegible]			

INTERFERENCE SEARCHED

Class	Sub.	Date	Exmr.
395	200.33	12/16/98	[illegible]
395	200.75	↓	↓
395	680		
395	200.68		
707	104		
707	10	12/16/98	[illegible]

SEARCH NOTES

	Date	Exmr.
APS text and image search; JPOABS; EPOABS; See results attached.	6/27/97	[illegible]
APS text and image search; SPI database Search; See results attached.	12/11/97	[illegible]
APS text & image search; See results attached.	12/16/98	[illegible]

(RIGHT OUTSIDE)

STAPLE AREA ☆U.S. GOVERNMENT PRINTING OFFICE: 1998–440-769

PATENT NUMBER

ORIGINAL CLASSIFICATION

CLASS	SUBCLASS
395	200.33

APPLICATION SERIAL NUMBER
08/636,477

APPLICANT'S NAME (PLEASE PRINT)
LOWERY et al

IF REISSUE, ORIGINAL PATENT NUMBER

CROSS REFERENCE(S)

CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)			
395	200.68	200.75	680	
707	10	104		

INTERNATIONAL CLASSIFICATION

G	0	6	F		13 [redacted] / [redacted] 14
G	0	6	F		13 / 20
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					/

GROUP ART UNIT: 2782

ASSISTANT EXAMINER (PLEASE STAMP OR PRINT FULL NAME): Rehana Perveen

PRIMARY EXAMINER (PLEASE STAMP OR PRINT FULL NAME): THOMAS LEE SUPERVISORY PATENT EXAMINER GROUP 2700

PTO 270 (REV. 5-91)

ISSUE CLASSIFICATION SLIP

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

US005894554A

United States Patent [19]

Lowery et al.

[11] Patent Number: 5,894,554

[45] Date of Patent: Apr. 13, 1999

[54] **SYSTEM FOR MANAGING DYNAMIC WEB PAGE GENERATION REQUESTS BY INTERCEPTING REQUEST AT WEB SERVER AND ROUTING TO PAGE SERVER THEREBY RELEASING WEB SERVER TO PROCESS OTHER REQUESTS**

[75] Inventors: **Keith Lowery**, Richardson; **Andrew B. Levine**, Plano; **Ronald L. Howell**, Rowlett, all of Tex.

[73] Assignee: **InfoSpinner, Inc.**, Richardson, Tex.

[21] Appl. No.: **08/636,477**

[22] Filed: **Apr. 23, 1996**

[51] **Int. Cl.**[6] **G06F 13/14**; G06F 13/20

[52] **U.S. Cl.** **395/200.33**; 395/200.68; 395/200.75; 395/680; 707/10; 707/104

[58] **Field of Search** 358/400; 395/800, 395/700, 200.68, 200.75, 200.53, 680, 200.33; 707/104, 10

[56] **References Cited**

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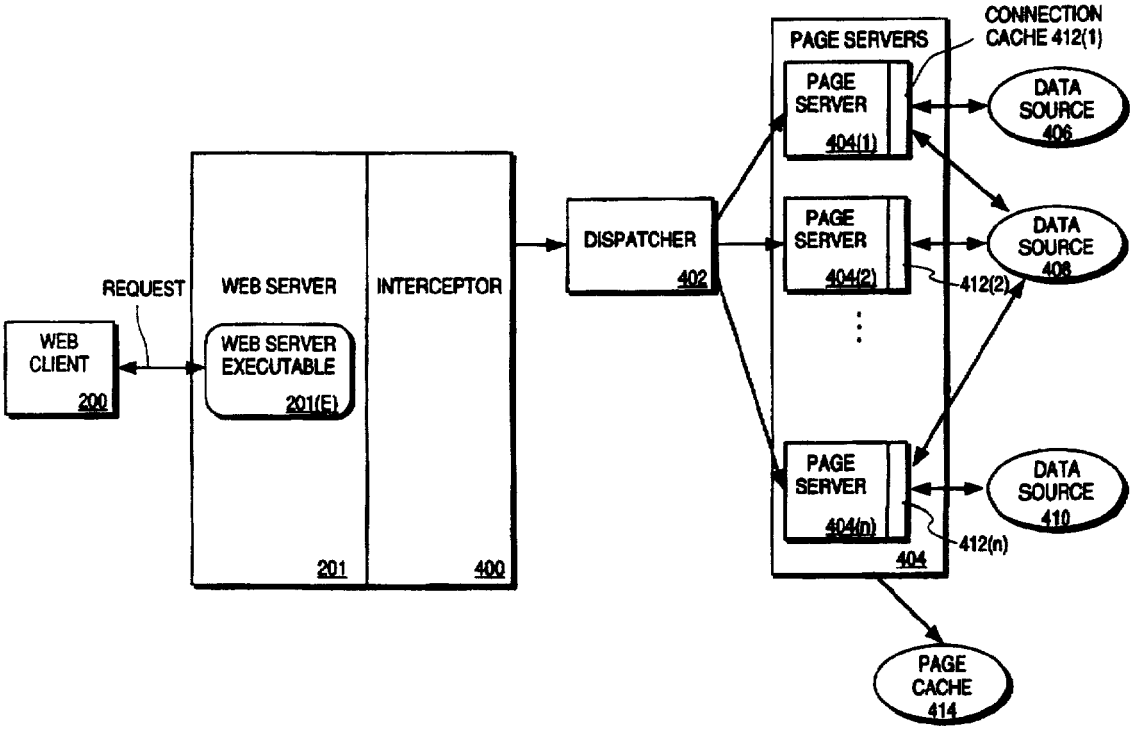
PCT International Search Report, Aug. 21, 1997.

Primary Examiner—Thomas C. Lee
Assistant Examiner—Rehana Perveen
Attorney, Agent, or Firm—Blakely, Sokoloff, Taylor & Zafman LLP

[57] **ABSTRACT**

The present invention teaches a method and apparatus for creating and managing custom Web sites. Specifically, one embodiment of the present invention claims a computer-implemented method for managing a dynamic Web page generation request to a Web server, the computer-implemented method comprising the steps of routing the request from the Web server to a page server, the page server receiving the request and releasing the Web server to process other requests, processing the request, the processing being performed by the page server concurrently with the Web server, as the Web server processes the other requests, and dynamically generating a Web page in response to the request, the Web page including data dynamically retrieved from one or more data sources.

11 Claims, 5 Drawing Sheets



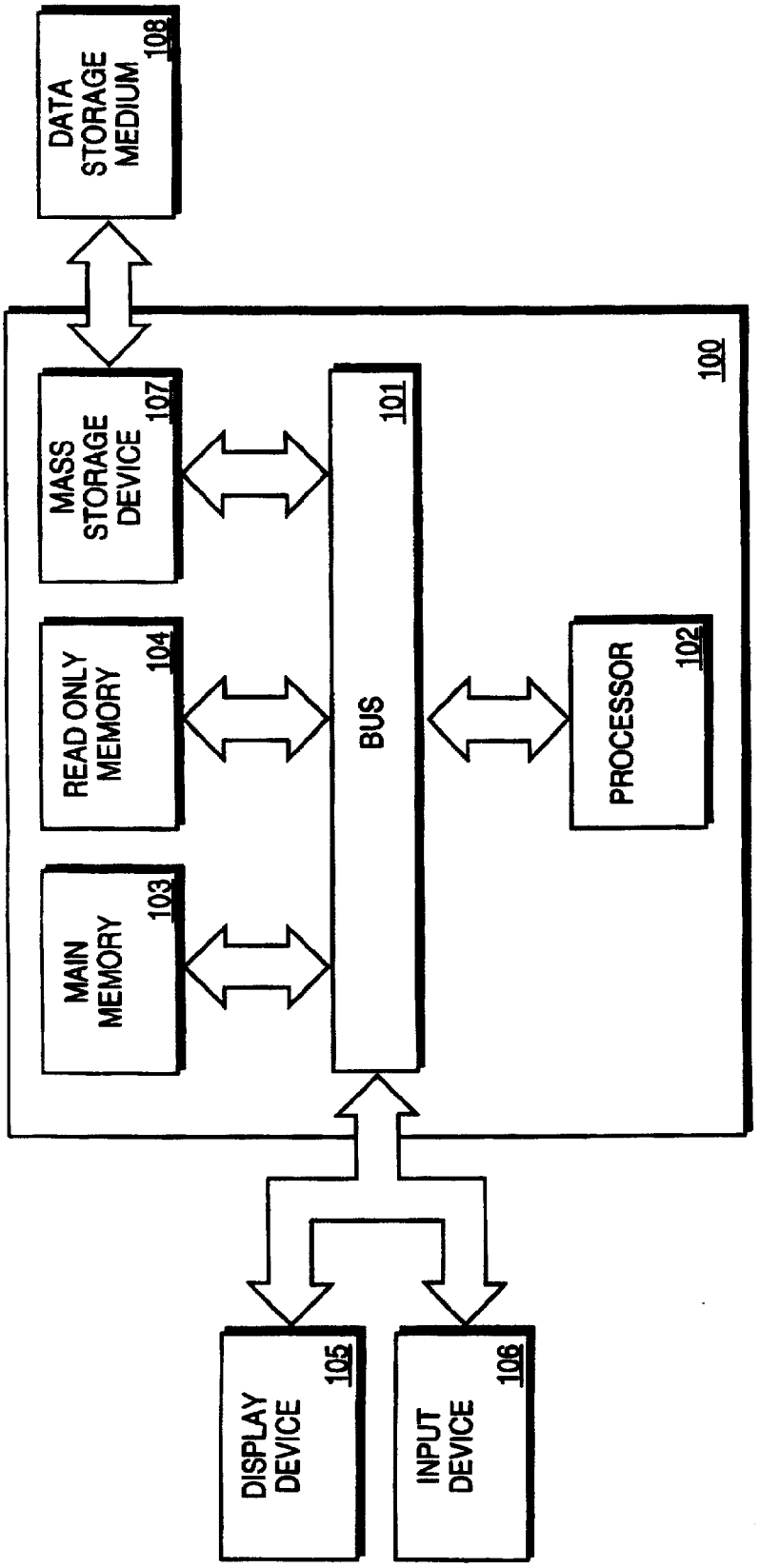

DATA STORAGE MEDIUM
108
100
MASS STORAGE DEVICE
107
101
READ ONLY MEMORY
104
BUS
PROCESSOR
102
MAIN MEMORY
103
DISPLAY DEVICE
105
INPUT DEVICE
106

FIG. 1

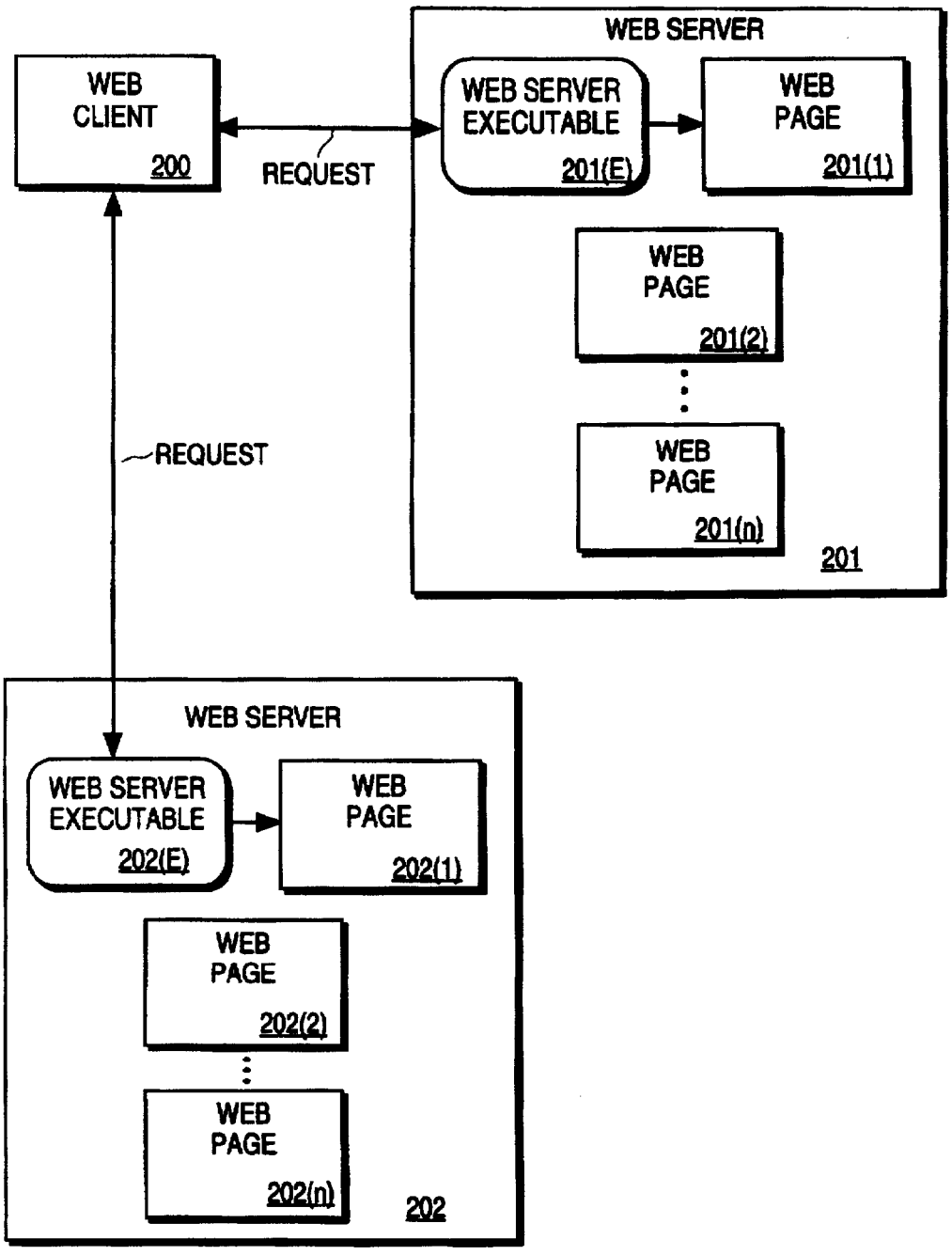
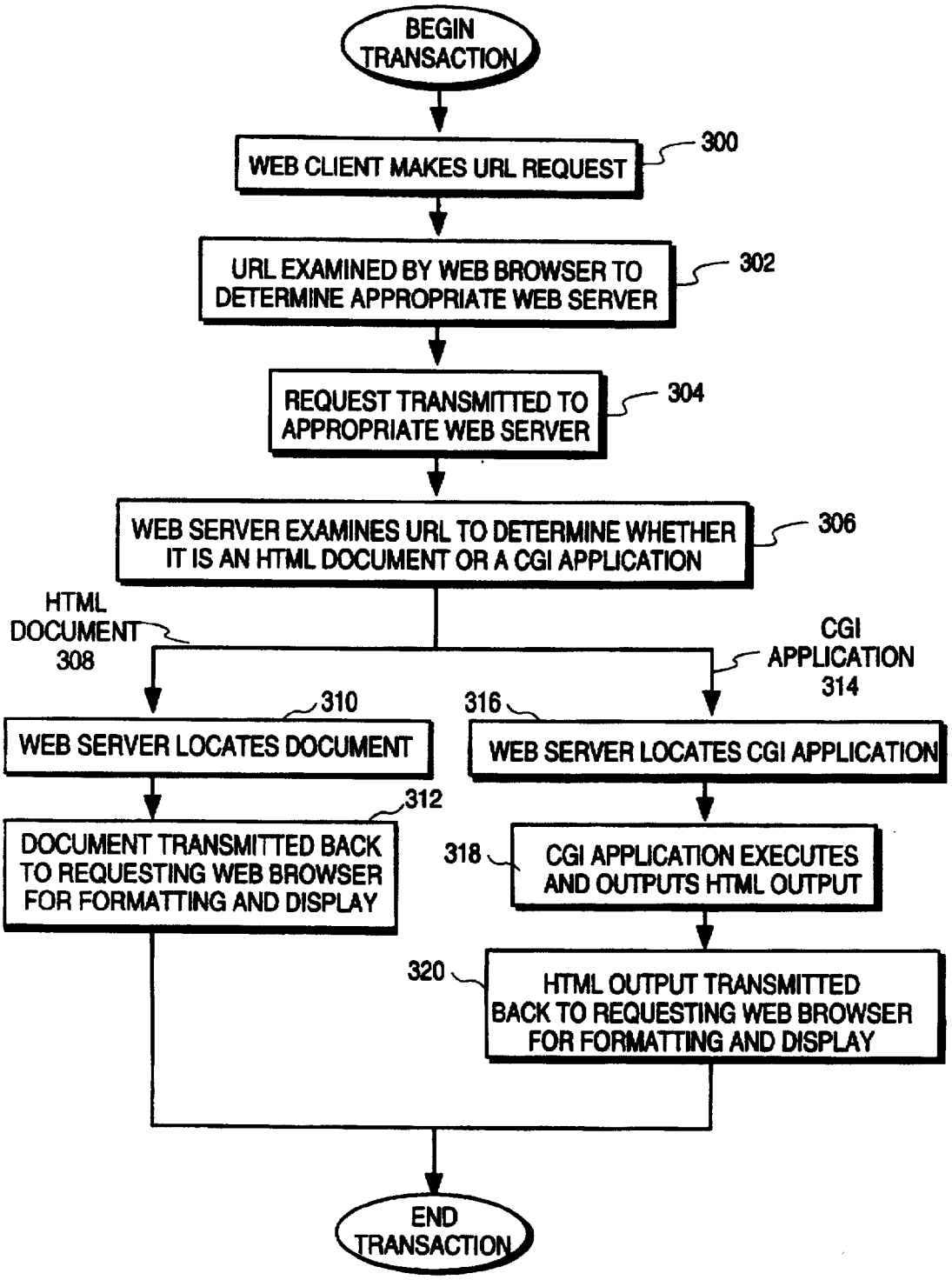


FIG. 2 (PRIOR ART)



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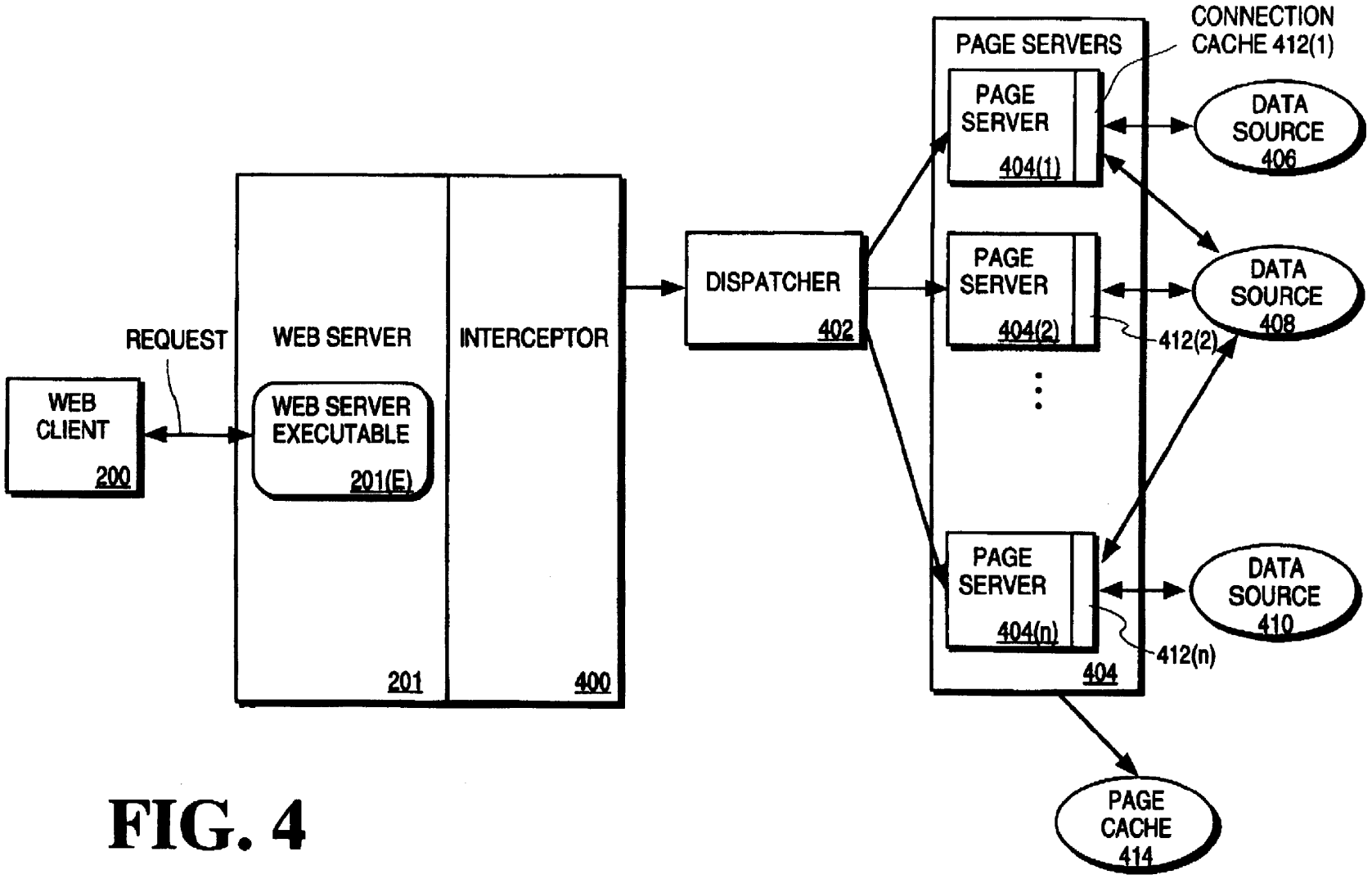
WEB CLIENT
200
REQUEST
WEB SERVER
WEB SERVER EXECUTABLE
201(E)
201
INTERCEPTOR
400
DISPATCHER
402
PAGE SERVERS
CONNECTION CACHE 412(1)
PAGE SERVER
404(1)
PAGE SERVER
404(2)
412(2)
PAGE SERVER
404(n)
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DATA SOURCE
406
DATA SOURCE
408
DATA SOURCE
410
PAGE CACHE
414

FIG. 4

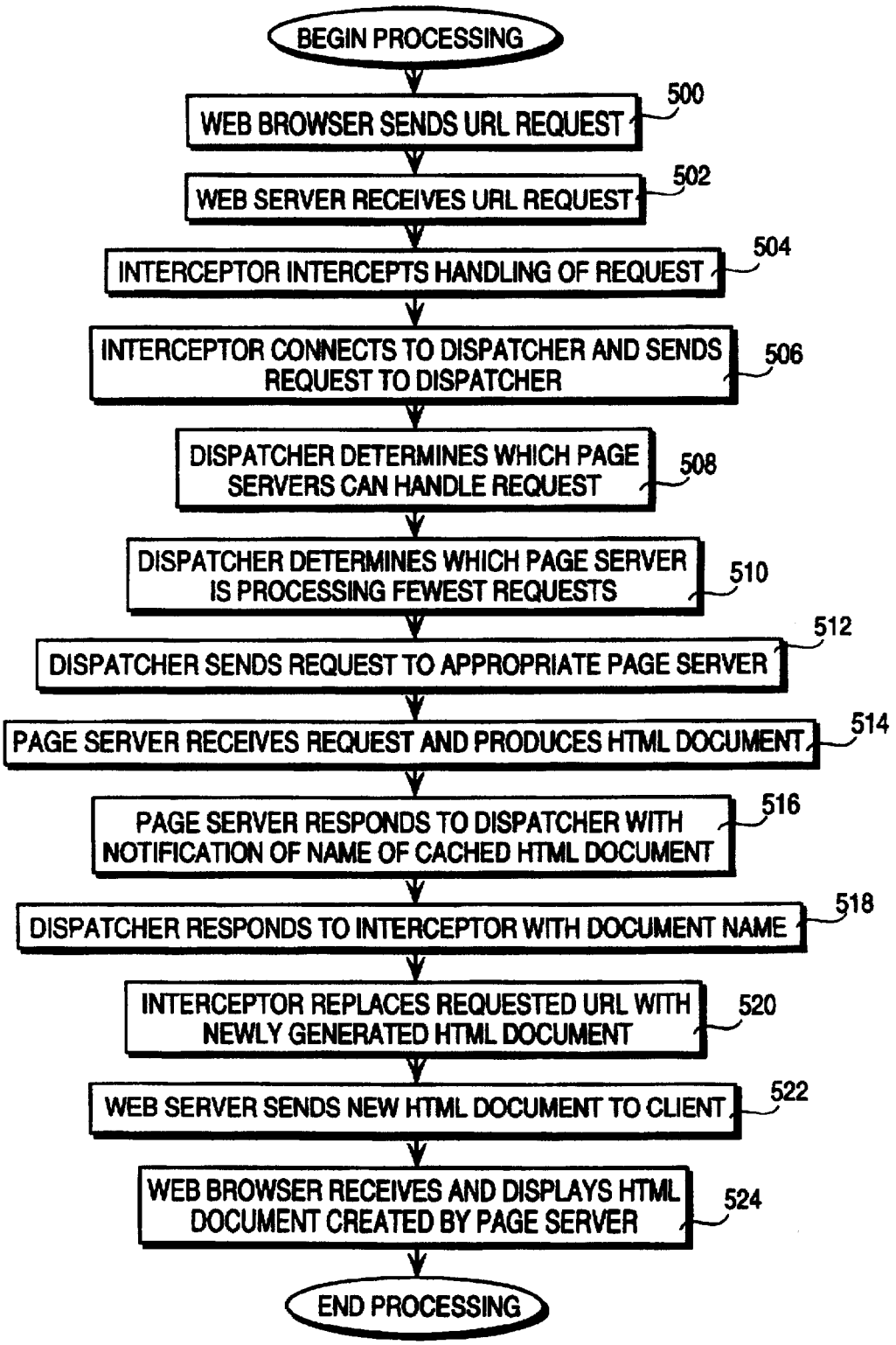
BEGIN PROCESSING
WEB BROWSER SENDS URL REQUEST
500
WEB SERVER RECEIVES URL REQUEST
502
INTERCEPTOR INTERCEPTS HANDLING OF REQUEST
504
INTERCEPTOR CONNECTS TO DISPATCHER AND SENDS REQUEST TO DISPATCHER
506
DISPATCHER DETERMINES WHICH PAGE SERVERS CAN HANDLE REQUEST
508
DISPATCHER DETERMINES WHICH PAGE SERVER IS PROCESSING FEWEST REQUESTS
510
DISPATCHER SENDS REQUEST TO APPROPRIATE PAGE SERVER
512
PAGE SERVER RECEIVES REQUEST AND PRODUCES HTML DOCUMENT
514
PAGE SERVER RESPONDS TO DISPATCHER WITH NOTIFICATION OF NAME OF CACHED HTML DOCUMENT
516
DISPATCHER RESPONDS TO INTERCEPTOR WITH DOCUMENT NAME
518
INTERCEPTOR REPLACES REQUESTED URL WITH NEWLY GENERATED HTML DOCUMENT
520
WEB SERVER SENDS NEW HTML DOCUMENT TO CLIENT
522
WEB BROWSER RECEIVES AND DISPLAYS HTML DOCUMENT CREATED BY PAGE SERVER
524
END PROCESSING

FIG. 5

SYSTEM FOR MANAGING DYNAMIC WEB PAGE GENERATION REQUESTS BY INTERCEPTING REQUEST AT WEB SERVER AND ROUTING TO PAGE SERVER THEREBY RELEASING WEB SERVER TO PROCESS OTHER REQUESTS

FIELD OF THE INVENTION

The present invention relates to the field of Internet technology. Specifically, the present invention relates to the creation and management of custom World Wide Web sites.

DESCRIPTION OF RELATED ART

The World Wide Web (the Web) represents all of the computers on the Internet that offer users access to information on the Internet via interactive documents or Web pages. These Web pages contain hypertext links that are used to connect any combination of graphics, audio, video and text, in a non-linear, non-sequential manner. Hypertext links are created using a special software language known as HyperText Mark-Up Language (HTML).

Once created, Web pages reside on the Web, on Web servers or Web sites. A Web site can contain numerous Web pages. Web client machines running Web browsers can access these Web pages at Web sites via a communications protocol known as HyperText Transport Protocol (HTTP). Web browsers are software interfaces that run on World Wide Web clients to allow access to Web sites via a simple user interface. A Web browser allows a Web client to request a particular Web page from a Web site by specifying a Uniform Resource Locator (URL). A URL is a Web address that identifies the Web page and its location on the Web. When the appropriate Web site receives the URL, the Web page corresponding to the requested URL is located, and if required, HTML output is generated. The HTML output is then sent via HTTP to the client for formatting on the client's screen.

Although Web pages and Web sites are extremely simple to create, the proliferation of Web sites on the Internet highlighted a number of problems. The scope and ability of a Web page designer to change the content of the Web page was limited by the static nature of Web pages. Once created, a Web page remained static until it was manually modified. This in turn limited the ability of Web site managers to effectively manage their Web sites.

The Common Gateway Interface (CGI) standard was developed to resolve the problem of allowing dynamic content to be included in Web pages. CGI "calls" or procedures enable applications to generate dynamically created HTML output, thus creating Web pages with dynamic content. Once created, these CGI applications do not have to be modified in order to retrieve "new" or dynamic data. Instead, when the Web page is invoked, CGI "calls" or procedures are used to dynamically retrieve the necessary data and to generate a Web page.

CGI applications also enhanced the ability of Web site administrators to manage Web sites. Administrators no longer have to constantly update static Web pages. A number of vendors have developed tools for CGI based development, to address the issue of dynamic Web page generation. Companies like Spider™ and Bluestone™, for example, have each created development tools for CGI-based Web page development. Another company, Haht Software™, has developed a Web page generation tool that uses a BASIC-like scripting language, instead of a CGI scripting language.

Tools that generate CGI applications do not, however, resolve the problem of managing numerous Web pages and requests at a Web site. For example, a single company may maintain hundreds of Web pages at their Web site. Current Web server architecture also does not allow the Web server to efficiently manage the Web page and process Web client requests. Managing these hundreds of Web pages in a coherent manner and processing all requests for access to the Web pages is thus a difficult task. Existing development tools are limited in their capabilities to facilitate dynamic Web page generation, and do not address the issue of managing Web requests or Web sites.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a method and apparatus for creating and managing custom Web sites. Specifically, the present invention claims a method and apparatus for managing dynamic web page generation requests.

In one embodiment, the present invention claims a computer-implemented method for managing a dynamic Web page generation request to a Web server, the computer-implemented method comprising the steps of routing the request from the Web server to a page server, the page server receiving the request and releasing the Web server to process other requests, processing the request, the processing being performed by the page server concurrently with the Web server, as the Web server processes the other requests, and dynamically generating a Web page in response to the request, the Web page including data dynamically retrieved from one or more data sources. Other embodiments also include connection caches to the one or more data sources, page caches for each page server, and custom HTML extension templates for configuring the Web page.

Other objects, features and advantages of the present invention will be apparent from the accompanying drawings and from the detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a typical computer system in which the present invention operates.

FIG. 2 illustrates a typical prior art Web server environment.

FIG. 3 illustrates a typical prior art Web server environment in the form of a flow diagram.

FIG. 4 illustrates one embodiment of the presently claimed invention.

FIG. 5 illustrates the processing of a Web browser request in the farm of a flow diagram, according to one embodiment of the presently claimed invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention relates to a method and apparatus for creating and managing custom Web sites. In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be apparent to one of ordinary skill in the art, however, that these specific details need not be used to practice the present invention. In other instances, well-known structures, interfaces and processes have not been shown in detail in order not to unnecessarily obscure the present invention.

FIG. 1 illustrates a typical computer system 100 in which the present invention operates. The preferred embodiment of

the present invention is implemented on an IBM™ Personal Computer manufactured by IBM Corporation of Armonk, N.Y. An alternate embodiment may be implemented on an RS/6000™ Workstation manufactured by IBM Corporation of Armonk, N.Y. It will be apparent to those of ordinary skill in the art that other computer system architectures may also be employed.

In general, such computer systems as illustrated by FIG. 1 comprise a bus **101** for communicating information, a processor **102** coupled with the bus **101** for processing information, main memory **103** coupled with the bus **101** for storing information and instructions for the processor **102**, a read-only memory **104** coupled with the bus **101** for storing static information and instructions for the processor **102**, a display device **105** coupled with the bus **101** for displaying information for a computer user, an input device **106** coupled with the bus **101** for communicating information and command selections to the processor **102**, and a mass storage device **107**, such as a magnetic disk and associated disk drive, coupled with the bus **101** for storing information and instructions. A data storage medium **108** containing digital information is configured to operate with mass storage device **107** to allow processor **102** access to the digital information on data storage medium **108** via bus **101**.

Processor **102** may be any of a wide variety of general purpose processors or microprocessors such as the Pentium™ microprocessor manufactured by Intel™ Corporation or the RS/6000™ processor manufactured by IBM Corporation. It will be apparent to those of ordinary skill in the art, however, that other varieties of processors may also be used in a particular computer system. Display device **105** may be a liquid crystal device, cathode ray tube (CRT), or other suitable display device. Mass storage device **107** may be a conventional hard disk drive, floppy disk drive, CD-ROM drive, or other magnetic or optical data storage device for reading and writing information stored on a hard disk, a floppy disk, a CD-ROM a magnetic tape, or other magnetic or optical data storage medium. Data storage medium **108** may be a hard disk, a floppy disk, a CD-ROM, a magnetic tape, or other magnetic or optical data storage medium.

In general, processor **102** retrieves processing instructions and data from a data storage medium **108** using mass storage device **107** and downloads this information into random access memory **103** for execution. Processor **102**, then executes an instruction stream from random access memory **103** or read-only memory **104**. Command selections and information input at input device **106** are used to direct the flow of instructions executed by processor **102**. Equivalent input device **106** may also be a pointing device such as a conventional mouse or trackball device. The results of this processing execution are then displayed on display device **105**.

The preferred embodiment of the present invention is implemented as a software module, which may be executed on a computer system such as computer system **100** in a conventional manner. Using well known techniques, the application software of the preferred embodiment is stored on data storage medium **108** and subsequently loaded into and executed within computer system **100**. Once initiated, the software of the preferred embodiment operates in the manner described below.

FIG. **2** illustrates a typical prior art Web server environment. Web client **200** can make URL requests to Web server **201** or Web server **202**. Web servers **201** and **202** include Web server executables, **201**(E) and **202**(E) respectively, that perform the processing of Web client requests. Each Web server may have a number of Web pages **201**(1)–(n) and **202**(1)–(n). Depending on the URL specified by the Web client **200**, the request may be routed by either Web server executable **201**(E) to Web page **201** (1), for example, or from Web server executable **202**(E) to Web page **202** (1). Web client **200** can continue making URL requests to retrieve other Web pages. Web client **200** can also use hyperlinks within each Web page to "jump" to other Web pages or to other locations within the same Web page.

FIG. **3** illustrates this prior art Web server environment in the form of a flow diagram. In processing block **300**, the Web client makes a URL request. This URL request is examined by the Web browser to determine the appropriate Web server to route the request to in processing block **302**. In processing block **304** the request is then transmitted from the Web browser to the appropriate Web server, and in processing block **306** the Web server executable examines the URL to determine whether it is a HTML document or a CGI application. If the request is for an HTML document **308**, then the Web server executable locates the document in processing block **310**. The document is then transmitted back through the requesting Web browser for formatting and display in processing block **312**.

If the URL request is for a CGI application **314**, however, the Web server executable locates the CGI application in processing block **316**. The CGI application then executes and outputs HTML output in processing block **318** and finally, the HTML output is transmitted back to requesting Web browser for formatting and display in processing block **320**.

This prior art Web server environment does not, however, provide any mechanism for managing the Web requests or the Web sites. As Web sites grow, and as the number of Web clients and requests increase, Web site management becomes a crucial need.

For example, a large Web site may receive thousands of requests or "hits" in a single day. Current Web servers process each of these requests on a single machine, namely the Web server machine. Although these machines may be running "multi-threaded" operating systems that allow transactions to be processed by independent "threads," all the threads are nevertheless on a single machine, sharing a processor. As such, the Web executable thread may hand off a request to a processing thread, but both threads will still have to be handled by the processor on the Web server machine. When numerous requests are being simultaneously processed by multiple threads on a single machine, the Web server can slow down significantly and become highly inefficient. The claimed invention addresses this need by utilizing a partitioned architecture to facilitate the creation and management of custom Web sites and servers.

FIG. **4** illustrates one embodiment of the presently claimed invention. Web client **200** issues a URL request that is processed to determined proper routing. In this embodiment, the request is routed to Web server **201**. Instead of Web server executable **201**(E) processing the URL request, however, Interceptor **400** intercepts the request and routes it to Dispatcher **402**. In one embodiment, Interceptor **400** resides on the Web server machine as an extension to Web server **201**. This embodiment is appropriate for Web servers such as Netsite™ from Netscape, that support such extensions. A number of public domain Web servers, such as NCSA™ from the National Center for Supercomputing Applications at the University of Illinois, Urbana-Champaign, however, do not provide support for

this type of extension. Thus, in an alternate embodiment, Interceptor **400** is an independent module, connected via an "intermediate program" to Web server **201**. This intermediate program can be a simple CGI application program that connects Interceptor **400** to Web server **201**. Alternate intermediate programs the perform the same functionality can also be implemented.

In one embodiment of the invention, Dispatcher **402** resides on a different machine than Web server **201**. This embodiment overcomes the limitation described above, in prior art Web servers, wherein all processing is performed by the processor on a single machine. By routing the request to Dispatcher **402** residing on a different machine than the Web server executable **201**(E), the request can then be processed by a different processor than the Web server executable 201(E). Web server executable **201**(E) is thus free to continue servicing client requests on Web server **201** while the request is processed "off-line," at the machine on which Dispatcher **402** resides.

Dispatcher **402** can, however, also reside on the same machine as the Web server. The Web site administrator has the option of configuring Dispatcher **402** on the same machine as Web server **201**, taking into account a variety of factors pertinent to a particular Web site, such as the size of the Web site, the number of Web pages and the number of hits at the Web site. Although this embodiment will not enjoy the advantage described above, namely off-loading the processing of Web requests from the Web server machine, the embodiment does allow flexibility for a small Web site to grow. For example, a small Web site administrator can use a single machine for both Dispatcher **402** and Web server **201** initially, then off-load Dispatcher **402** onto a separate machine as the Web site grows. The Web site can thus take advantage of other features of the present invention regardless of whether the site has separate machines configured as Web servers and dispatchers.

Dispatcher **402** receives the intercepted request and then dispatches the request to one of a number of Page servers **404** (1)–(n). For example, if Page server **404** (1) receives the dispatched request, it processes the request and retrieves the data from an appropriate data source, such as data source **406**, data source **408**, or data source **410**. Data sources, as used in the present application, include databases, spreadsheets, files and any other type of data repository. Page server **404** (1) can retrieve data from more than one data source and incorporate the data from these multiple data sources in a single Web page.

In one embodiment, each Page server **404**(1)–(n) resides on a separate machine on the network to distribute the processing of the request. Dispatcher **402** maintains a variety of information regarding each Page server on the network, and dispatches requests based on this information. For example, Dispatcher **402** retains dynamic information regarding the data sources that any given Page server can access. Dispatcher **402** thus examines a particular request and determines which Page servers can service the URL request. Dispatcher **402** then hands off the request to the appropriate Page server.

For example, if the URL request requires financial data from data source **408**, dispatcher **402** will first examine an information list. Dispatcher **402** may determine that Page server **404**(3), for example, has access to the requisite data in data source **408**. Dispatcher **402** will thus route the URL request to Page server **404**(3). This "connection caching" functionality is described in more detail below, under the heading "Performance."

Alternately, Dispatcher **402** also has the ability to determine whether a particular Page server already has the necessary data cached in the Page server's page cache (described in more detail below, under the heading "Performance"). Dispatcher **402** may thus determine that Page server **404**(1) and **404**(2) are both logged into Data source **408**, but that Page server **404**(2) has the financial information already cached in Page server **404**(2)'s page cache. In this case, Dispatcher **402** will route the URL request to Page server **404**(2) to more efficiently process the request.

Finally, Dispatcher **402** may determine that a number or all Page servers **404**(1)–(n) are logged into Data source **408**. In this scenario, Dispatcher **402** can examine the number of requests that each Page server is servicing and route the request to the least busy page server. This "load balancing" capability can significantly increase performance at a busy Web site and is discussed in more detail below, under the heading "Scalability".

If, for example, Page server **404**(2), receives the request, Page server **404**(2) will process the request. While Page server **404**(2) is processing the request, Web server executable **201**(E) can concurrently process other Web client requests. This partitioned architecture thus allows both Page server **404**(2) and Web server executable **201**(E) to simultaneously process different requests, thus increasing the efficiency of the Web site. Page server **404**(2) dynamically generates a Web page in response to the Web client request, and the dynamic Web page is then either transmitted back to requesting Web client **200** or stored on a machine that is accessible to Web server **201**, for later retrieval.

One embodiment of the claimed invention also provides a Web page designer with HTML extensions, or "dyna" tags. These dyna tags provide customized HTML functionality to a Web page designer, to allow the designer to build customized HTML templates that specify the source and placement of retrieved data. For example, in one embodiment, a "dynatext" HTML extension tag specifies a data source and a column name to allow the HTML template to identify the data source to log into and the column name from which to retrieve data. Alternatively, "dyna-anchor" tags allow the designer to build hyperlink queries while "dynablock" tags provide the designer with the ability to iterate through blocks of data. Page servers use these HTML templates to create dynamic Web pages. Then, as described above, these dynamic Web pages are either transmitted back to requesting Web client **200** or stored on a machine that is accessible to Web server **201**, for later retrieval.

The presently claimed invention provides numerous advantages over prior art Web servers, including advantages in the areas of performance, security, extensibility and scalability.

Performance

One embodiment of the claimed invention utilizes connection caching and page caching to improve performance. Each Page server can be configured to maintain a cache of connections to numerous data sources. For example, as illustrated in FIG. **4**, Page server **404**(1) can retrieve data from data source **406**, data source **408** or data source **410**. Page server **404**(1) can maintain connection cache **412**(1), containing connections to each of data source **406**, data source **408** and data source **410**, thus eliminating connect times from the Page servers to those data sources.

Additionally, another embodiment of the present invention supports the caching of finished Web pages, to optimize

the performance of the data source being utilized. This "page caching" feature, illustrated in FIG. 4 as Page cache 414, allows the Web site administrator to optimize the performance of data sources by caching Web pages that are repeatedly accessed. Once the Web page is cached, subsequent requests or "hits" will utilize the cached Web page rather than re-accessing the data source. This can radically improve the performance of the data source.

Security

The present invention allows the Web site administrator to utilize multiple levels of security to manage the Web site. In one embodiment, the Page server can utilize all standard encryption and site security features provided by the Web server. In another embodiment, the Page server can be configured to bypass connection caches 412(1)–(n), described above, for a particular data source and to require entry of a user-supplied identification and password for the particular data source the user is trying to access.

Additionally, another embodiment of the presently claimed invention requires no real-time access of data sources. The Web page caching ability, described above, enables additional security for those sites that want to publish non-interactive content from internal information systems, but do not want real-time Internet accessibility to those internal information systems. In this instance, the Page server can act as a "replication and staging gent" and create Web pages in batches, rather than in real-time. These "replicated" Web pages are then "staged" for access at a later time, and access o the Web pages in this scenario is possible even if the Page server and dispatcher are not present later.

In yet another embodiment, the Page server can make a single pass through a Web library, and compile a Web site that exists in the traditional form of separately available files. A Web library is a collection of related Web books and Web pages. More specifically, the Web library is a hierarchical organization of Web document templates, together with all the associated data source information. Information about an entire Web site is thus contained in a single physical file, thus simplifying the problem of deploying Web sites across multiple Page servers. The process of deploying the Web site in this embodiment is essentially a simple copy of a single file.

Extensibility

One embodiment of the present invention provides the Web site administrator with Object Linking and Embedding (OLE) 2.0 extensions to extend the page creation process. These OLE 2.0 extensions also allow information submitted over the Web to be processed with user-supplied functionality. Utilizing development tools such as Visual Basic, Visual C++ or PowerBuilder that support the creation of OLE 2.0 automation, the Web site administrator can add features and modify the behavior of the Page servers described above. This extensibility allows one embodiment of the claimed invention to be incorporated with existing technology to develop an infinite number of custom web servers.

For example, OLE 2.0 extensions allow a Web site administrator to encapsulate existing business rules in an OLE 2.0 automation interface, to be accessed over the Web. One example of a business rule is the steps involved in the payoff on an installment or mortgage loan. The payoff may involve, for example, taking into account the current balance, the date and the interest accrued since the last payment. Most organizations already have this type of business rule implemented using various applications, such as Visual Basic for client-server environments, or CICS programs on mainframes. If these applications are OLE 2.0 compliant, the Page server "dynaobject" HTML extension tag can be used to encapsulated the application in an OLE 2.0 automation interface. The Page server is thus extensible, and can incorporate the existing application with the new Page server functionality.

Scalability

One embodiment of the claimed invention allows "plug and play" scalability. As described above, referring to FIG. 4, Dispatcher 402 maintains information about all the Page servers configured to be serviced by Dispatcher 402. Any number of Page servers can thus be "plugged" into the configuration illustrated in FIG. 4, and the Page servers will be instantly activated as the information is dynamically updated in Dispatcher 402. The Web site administrator can thus manage the overhead of each Page server and modify each Page server's load, as necessary, to improve performance. In this manner, each Page server will cooperate with other Page servers within a multi-server environment. Dispatcher 402 can examine the load on each Page server and route new requests according to each Page server's available resources. This "load-balancing" across multiple Page servers can significantly increase a Web site's performance.

FIG. 5 illustrates the processing of a Web browser request in the form of a flow diagram, according to one embodiment of the presently claimed invention. A Web browser sends a URL request to a Web server in processing block 500. In processing block 502, the Web server receives the URL request, and an interceptor then intercepts the handling of the request in processing block 504. The interceptor connects to a dispatcher and sends the URL request to the dispatcher in processing block 506. In processing block 508, the dispatcher determines which Page servers can handle the request. The dispatcher also determines which Page server is processing the fewest requests in processing block 510, and in processing block 512, the dispatcher sends the URL request to an appropriate Page server. The Page server receives the request and produces an HTML document in processing block 514. The Page server then responds to the dispatcher with notification of the name of the cached HTML document in processing block 516. In processing block 518, the dispatcher responds to the interceptor with the document name, and the interceptor then replaces the requested URL with the newly generated HTML document in processing block 520. The Web server then sends the new HTML document to the requesting client in processing block 522. Finally, the Web browser receives and displays the HTML document created by the Page server at processing block 524.

Thus, a method and apparatus for creating and managing custom Web sites is disclosed. These specific arrangements and methods described herein are merely illustrative of the principles of the present invention. Numerous modifications in form and detail may be made by those of ordinary skill in the art without departing from the scope of the present invention. Although this invention has been shown in relation to a particular preferred embodiment, it should not be considered so limited. Rather, the present invention is limited only by the scope of the appended claims.

We claim:

1. A computer-implemented method for managing a dynamic Web page generation request to a Web server, said computer-implemented method comprising the steps of:

routing said request from said Web server to a page server, said page server receiving said request and releasing

said Web server to process other requests, wherein said routing step further includes the steps of intercepting said request at said Web server, routing said request from said Web server to a dispatcher, and dispatching said request to said page server;

processing said request, said processing being performed by said page server while said Web server concurrently processes said other requests; and

dynamically generating a Web page in response to said request, said Web page including data dynamically retrieved from one or more data sources.

2. The computer-implemented method in claim 1 wherein said step of processing said request includes the step of identifying said one or more data sources from which to retrieve said data.

3. The computer-implemented method in claim 2 wherein said step of dynamically generating said Web page includes the step of dynamically retrieving said data from said one or more data sources.

4. The computer-implemented method in claim 3 wherein said step of processing said request includes the step of said page server maintaining a connection cache to said one or more data sources.

5. The computer-implemented method in claim 3 wherein said step of processing said request includes the step of logging into said one or more data sources.

6. The computer-implemented method in claim 3 wherein said step of dynamically generating said Web page includes the step of maintaining a page cache containing said Web page.

7. The computer-implemented method in claim 3 wherein said page server includes custom HTML extension templates for configuring said Web page.

8. The computer-implemented method in claim 7 wherein said step of processing said request further includes the step of inserting said dynamically retrieved data from said one or more data sources into said custom HTML extension templates.

9. A networked system for managing a dynamic Web page generation request, said system comprising:

one or more data sources;

a page server having a processing means;

a first computer system including means for generating said request; and

a second computer system including means for receiving said request from said first computer, said second computer system also including a router, said router routing said request from said second computer system to said page server, wherein said routing further includes intercepting said request at said second computer, routing said request from said second computer to a dispatcher, and dispatching said request to said page server said page server receiving said request and releasing said second computer system to process other requests, said page server processing means processing said request and dynamically generating a Web page in response to said request, said Web page including data dynamically retrieved from said one or more data sources.

10. The networked system in claim 9 wherein said router in said second computer system includes:

an interceptor intercepting said request at said second computer system and routing said request; and

a dispatcher receiving said routed request from said interceptor and dispatching said request to said page server.

11. A machine readable medium having stored thereon data representing sequences of instructions, which when executed by a computer system, cause said computer system to perform the steps of:

routing a dynamic Web page generation request from a Web server to a page server, said page server receiving said request and releasing said Web server to process other requests wherein said routing step further includes the steps of intercepting said request at said Web server, routing said request from said Web server to a dispatcher, and dispatching said request to said page server;

processing said request, said processing being performed by said page server while said Web server concurrently processes said other requests; and

dynamically generating a Web page, said Web page including data retrieved from one or more data sources.

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PATENT APPLICATION SERIAL NO. 07/863,477

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

070 PS 05/06/9. 07863477 1 101 984.00 CK 02577.P001

PTO-1556
(5/87)



08/636477

02577/P001

PATENT

UNITED STATES PATENT APPLICATION

for

A METHOD AND APPARATUS FOR CREATING AND MANAGING A CUSTOM WEB SITE

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FIELD OF THE INVENTION

The present invention relates to the field of Internet technology. Specifically, the present invention relates to the creation and management of custom World Wide Web sites.

DESCRIPTION OF RELATED ART

The World Wide Web (the Web) represents all of the computers on the Internet that offer users access to information on the Internet via interactive documents or Web pages. These Web pages contain hypertext links that are used to connect any combination of graphics, audio, video and text, in a non-linear, non-sequential manner. Hypertext links are created using a special software language known as HyperText Mark-Up Language (HTML).

Once created, Web pages reside on the Web, on Web servers or Web sites. A Web site can contain numerous Web pages. Web client machines running Web browsers can access these Web pages at Web sites via a communications protocol known as HyperText Transport Protocol (HTTP). Web browsers are software interfaces that run on World Wide Web clients to allow access to Web sites via a simple user interface. A Web browser allows a Web client to request a particular Web page from a Web site by specifying a Uniform Resource Locator (URL). A URL is a Web address that identifies the Web page and its location on the Web. When the appropriate Web site receives the URL, the Web page corresponding to the requested URL is located, and if required, HTML output is generated. The HTML output is

then sent via HTTP to the client for formatting on the client's screen.

Although Web pages and Web sites are extremely simple to create, the proliferation of Web sites on the Internet highlighted a number of problems. The scope and ability of a Web page designer to change the content of the Web page was limited by the static nature of Web pages. Once created, a Web page remained static until it was manually modified. This in turn limited the ability of Web site managers to effectively manage their Web sites.

The Common Gateway Interface (CGI) standard was developed to resolve the problem of allowing dynamic content to be included in Web pages. CGI "calls" or procedures enable applications to generate dynamically created HTML output, thus creating Web pages with dynamic content. Once created, these CGI applications do not have to be modified in order to retrieve "new" or dynamic data. Instead, when the Web page is invoked, CGI "calls" or procedures are used to dynamically retrieve the necessary data and to generate a Web page.

CGI applications also enhanced the ability of Web site administrators to manage Web sites. Administrators no longer have to constantly update static Web pages. A number of vendors have developed tools for CGI based development, to address the issue of dynamic Web page generation. Companies like Spider™ and Bluestone™, for example, have each created development tools for CGI-based Web page development. Another company, Haht Software™, has developed a Web page generation tool that uses a BASIC-like scripting language, instead of a CGI scripting language.

Tools that generate CGI applications do not, however, resolve the problem of managing numerous Web pages and requests at a Web site. For example, a single company may maintain hundreds of Web pages at their Web site. Current Web server architecture also does not allow the Web server to efficiently manage the Web page and process Web client requests. Managing these hundreds of Web pages in a coherent manner and processing all requests for access to the Web pages is thus a difficult task. Existing development tools are limited in their capabilities to facilitate dynamic Web page generation, and do not address the issue of managing Web requests or Web sites.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a method and apparatus for creating and managing custom Web sites. Specifically, the present invention claims a method and apparatus for managing dynamic web page generation requests.

In one embodiment, the present invention claims a computer-implemented method for managing a dynamic Web page generation request to a Web server, the computer-implemented method comprising the steps of routing the request from the Web server to a page server, the page server receiving the request and releasing the Web server to process other requests, processing the request, the processing being performed by the page server concurrently with the Web server, as the Web server processes the other requests, and dynamically generating a Web page in response to the request, the Web page including data dynamically retrieved from one or more data sources. Other embodiments also include connection caches to the one or more data sources, page caches for each page server, and custom HTML extension templates for configuring the Web page.

Other objects, features and advantages of the present invention will be apparent from the accompanying drawings and from the detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates a typical computer system in which the present invention operates.

Figure 2 illustrates a typical prior art Web server environment.

Figure 3 illustrates a typical prior art Web server environment in the form of a flow diagram.

Figure 4 illustrates one embodiment of the presently claimed invention.

Figure 5 illustrates the processing of a Web browser request in the form of a flow diagram, according to one embodiment of the presently claimed invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention relates to a method and apparatus for creating and managing custom Web sites. In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be apparent to one of ordinary skill in the art, however, that these specific details need not be used to practice the present invention. In other instances, well-known structures, interfaces and processes have not been shown in detail in order not to unnecessarily obscure the present invention.

Figure 1 illustrates a typical computer system 100 in which the present invention operates. The preferred embodiment of the present invention is implemented on an IBM™ Personal Computer manufactured by IBM Corporation of Armonk, New York. An alternate embodiment may be implemented on an RS/6000™ Workstation manufactured by IBM Corporation of Armonk, New York. It will be apparent to those of ordinary skill in the art that other computer system architectures may also be employed.

In general, such computer systems as illustrated by **Figure 1** comprise a bus 101 for communicating information, a processor 102 coupled with the bus 101 for processing information, main memory 103 coupled with the bus 101 for storing information and instructions for the processor 102, a read-only memory 104 coupled with the bus 101 for storing static information and instructions for the processor 102, a display device 105 coupled with the bus 101 for displaying information for a computer user, an input device 106

coupled with the bus 101 for communicating information and command selections to the processor 102, and a mass storage device 107, such as a magnetic disk and associated disk drive, coupled with the bus 101 for storing information and instructions. A data storage medium 108 containing digital information is configured to operate with mass storage device 107 to allow processor 102 access to the digital information on data storage medium 108 via bus 101.

Processor 102 may be any of a wide variety of general purpose processors or microprocessors such as the Pentium™ microprocessor manufactured by Intel™ Corporation or the RS/6000™ processor manufactured by IBM Corporation. It will be apparent to those of ordinary skill in the art, however, that other varieties of processors may also be used in a particular computer system. Display device 105 may be a liquid crystal device, cathode ray tube (CRT), or other suitable display device. Mass storage device 107 may be a conventional hard disk drive, floppy disk drive, CD-ROM drive, or other magnetic or optical data storage device for reading and writing information stored on a hard disk, a floppy disk, a CD-ROM a magnetic tape, or other magnetic or optical data storage medium. Data storage medium 108 may be a hard disk, a floppy disk, a CD-ROM, a magnetic tape, or other magnetic or optical data storage medium.

In general, processor 102 retrieves processing instructions and data from a data storage medium 108 using mass storage device 107 and downloads this information into random access memory 103 for execution. Processor 102, then executes an instruction stream from random access memory 103 or read-only memory 104. Command selections and

information input at input device 106 are used to direct the flow of instructions executed by processor 102. Equivalent input device 106 may also be a pointing device such as a conventional mouse or trackball device. The results of this processing execution are then displayed on display device 105.

The preferred embodiment of the present invention is implemented as a software module, which may be executed on a computer system such as computer system 100 in a conventional manner. Using well known techniques, the application software of the preferred embodiment is stored on data storage medium 108 and subsequently loaded into and executed within computer system 100. Once initiated, the software of the preferred embodiment operates in the manner described below.

Figure 2 illustrates a typical prior art Web server environment. Web client 200 can make URL requests to Web server 201 or Web server 202. Web servers 201 and 202 include Web server executables, 201(E) and 202(E) respectively, that perform the processing of Web client requests. Each Web server may have a number of Web pages 201(1) - (n) and 202(1) - (n). Depending on the URL specified by the Web client 200, the request may be routed by either Web server executable 201(E) to Web page 201 (1), for example, or from Web server executable 202(E) to Web page 202 (1). Web client 200 can continue making URL requests to retrieve other Web pages. Web client 200 can also use hyperlinks within each Web page to "jump" to other Web pages or to other locations within the same Web page.

Figure 3 illustrates this prior art Web server environment in the form of a flow diagram. In processing block 300, the Web client makes a URL

request. This URL request is examined by the Web browser to determine the appropriate Web server to route the request to in processing block 302. In processing block 304 the request is then transmitted from the Web browser to the appropriate Web server, and in processing block 306 the Web server executable examines the URL to determine whether it is a HTML document or a CGI application. If the request is for an HTML document 308, then the Web server executable locates the document in processing block 310. The document is then transmitted back through the requesting Web browser for formatting and display in processing block 312.

If the URL request is for a CGI application 314, however, the Web server executable locates the CGI application in processing block 316. The CGI application then executes and outputs HTML output in processing block 318 and finally, the HTML output is transmitted back to requesting Web browser for formatting and display in processing block 320.

This prior art Web server environment does not, however, provide any mechanism for managing the Web requests or the Web sites. As Web sites grow, and as the number of Web clients and requests increase, Web site management becomes a crucial need.

For example, a large Web site may receive thousands of requests or "hits" in a single day. Current Web servers process each of these requests on a single machine, namely the Web server machine. Although these machines may be running "multi-threaded" operating systems that allow transactions to be processed by independent "threads," all the threads are nevertheless on a single machine, sharing a processor. As such, the Web

executable thread may hand off a request to a processing thread, but both threads will still have to be handled by the processor on the Web server machine. When numerous requests are being simultaneously processed by multiple threads on a single machine, the Web server can slow down significantly and become highly inefficient. The claimed invention addresses this need by utilizing a partitioned architecture to facilitate the creation and management of custom Web sites and servers.

Figure 4 illustrates one embodiment of the presently claimed invention. Web client 200 issues a URL request that is processed to determined proper routing. In this embodiment, the request is routed to Web server 201. Instead of Web server executable 201(E) processing the URL request, however, Interceptor 400 intercepts the request and routes it to Dispatcher 402. In one embodiment, Interceptor 400 resides on the Web server machine as an extension to Web server 201. This embodiment is appropriate for Web servers such as Netsite™ from Netscape, that support such extensions. A number of public domain Web servers, such as NCSA™ from the National Center for Supercomputing Applications at the University of Illinois, Urbana-Champaign, however, do not provide support for this type of extension. Thus, in an alternate embodiment, Interceptor 400 is an independent module, connected via an "intermediate program" to Web server 201. This intermediate program can be a simple CGI application program that connects Interceptor 400 to Web server 201. Alternate intermediate programs the perform the same functionality can also be implemented.

In one embodiment of the invention, Dispatcher 402 resides on a

different machine than Web server 201. This embodiment overcomes the limitation described above, in prior art Web servers, wherein all processing is performed by the processor on a single machine. By routing the request to Dispatcher 402 residing on a different machine than the Web server executable 201(E), the request can then be processed by a different processor than the Web server executable 201(E). Web server executable 201(E) is thus free to continue servicing client requests on Web server 201 while the request is processed "off-line," at the machine on which Dispatcher 402 resides.

Dispatcher 402 can, however, also reside on the same machine as the Web server. The Web site administrator has the option of configuring Dispatcher 402 on the same machine as Web server 201, taking into account a variety of factors pertinent to a particular Web site, such as the size of the Web site, the number of Web pages and the number of hits at the Web site. Although this embodiment will not enjoy the advantage described above, namely off-loading the processing of Web requests from the Web server machine, the embodiment does allow flexibility for a small Web site to grow. For example, a small Web site administrator can use a single machine for both Dispatcher 402 and Web server 201 initially, then off-load Dispatcher 402 onto a separate machine as the Web site grows. The Web site can thus take advantage of other features of the present invention regardless of whether the site has separate machines configured as Web servers and dispatchers.

Dispatcher 402 receives the intercepted request and then dispatches the request to one of a number of Page servers 404 (1) - (n). For example, if Page server 404 (1) receives the dispatched request, it processes the request and

retrieves the data from an appropriate data source, such as data source 406, data source 408, or data source 410. Data sources, as used in the present application, include databases, spreadsheets, files and any other type of data repository. Page server 404 (1) can retrieve data from more than one data source and incorporate the data from these multiple data sources in a single Web page.

In one embodiment, each Page server 404(1) - (n) resides on a separate machine on the network to distribute the processing of the request. Dispatcher 402 maintains a variety of information regarding each Page server on the network, and dispatches requests based on this information. For example, Dispatcher 402 retains dynamic information regarding the data sources that any given Page server can access. Dispatcher 402 thus examines a particular request and determines which Page servers can service the URL request. Dispatcher 402 then hands off the request to the appropriate Page server.

For example, if the URL request requires financial data from data source 408, dispatcher 402 will first examine an information list. Dispatcher 402 may determine that Page server 404(3), for example, has access to the requisite data in data source 408. Dispatcher 402 will thus route the URL request to Page server 404(3). This "connection caching" functionality is described in more detail below, under the heading "Performance."

Alternately, Dispatcher 402 also has the ability to determine whether a particular Page server already has the necessary data cached in the Page server's page cache (described in more detail below, under the heading

"Performance"). Dispatcher 402 may thus determine that Page server 404(1) and 404(2) are both logged into Data source 408, but that Page server 404(2) has the financial information already cached in Page server 404(2)'s page cache. In this case, Dispatcher 402 will route the URL request to Page server 404(2) to more efficiently process the request.

Finally, Dispatcher 402 may determine that a number or all Page servers 404(1) - (n) are logged into Data source 408. In this scenario, Dispatcher 402 can examine the number of requests that each Page server is servicing and route the request to the least busy page server. This "load balancing" capability can significantly increase performance at a busy Web site and is discussed in more detail below, under the heading "Scalability".

If, for example, Page server 404(2), receives the request, Page server 404(2) will process the request. While Page server 404(2) is processing the request, Web server executable 201(E) can concurrently process other Web client requests. This partitioned architecture thus allows both Page server 404(2) and Web server executable 201(E) to simultaneously process different requests, thus increasing the efficiency of the Web site. Page server 404(2) dynamically generates a Web page in response to the Web client request, and the dynamic Web page is then either transmitted back to requesting Web client 200 or stored on a machine that is accessible to Web server 201, for later retrieval.

One embodiment of the claimed invention also provides a Web page designer with HTML extensions, or "dyna" tags. These dyna tags provide customized HTML functionality to a Web page designer, to allow the

designer to build customized HTML templates that specify the source and placement of retrieved data. For example, in one embodiment, a "dynatext" HTML extension tag specifies a data source and a column name to allow the HTML template to identify the data source to log into and the column name from which to retrieve data. Alternatively, "dyna-anchor" tags allow the designer to build hyperlink queries while "dynablock" tags provide the designer with the ability to iterate through blocks of data. Page servers use these HTML templates to create dynamic Web pages. Then, as described above, these dynamic Web pages are either transmitted back to requesting Web client 200 or stored on a machine that is accessible to Web server 201, for later retrieval.

The presently claimed invention provides numerous advantages over prior art Web servers, including advantages in the areas of performance, security, extensibility and scalability.

Performance

One embodiment of the claimed invention utilizes connection caching and page caching to improve performance. Each Page server can be configured to maintain a cache of connections to numerous data sources. For example, as illustrated in **Figure 4**, Page server 404(1) can retrieve data from data source 406, data source 408 or data source 410. Page server 404(1) can maintain connection cache 412(1), containing connections to each of data source 406, data source 408 and data source 410, thus eliminating connect times from the Page servers to those data sources.

Additionally, another embodiment of the present invention supports the caching of finished Web pages, to optimize the performance of the data source being utilized. This "page caching" feature, illustrated in **Figure 4** as Page cache 414, allows the Web site administrator to optimize the performance of data sources by caching Web pages that are repeatedly accessed. Once the Web page is cached, subsequent requests or "hits" will utilize the cached Web page rather than re-accessing the data source. This can radically improve the performance of the data source.

Security

The present invention allows the Web site administrator to utilize multiple levels of security to manage the Web site. In one embodiment, the Page server can utilize all standard encryption and site security features provided by the Web server. In another embodiment, the Page server can be configured to bypass connection caches 412(1)-(n), described above, for a particular data source and to require entry of a user-supplied identification and password for the particular data source the user is trying to access.

Additionally, another embodiment of the presently claimed invention requires no real-time access of data sources. The Web page caching ability, described above, enables additional security for those sites that want to publish non-interactive content from internal information systems, but do not want real-time Internet accessibility to those internal information systems. In this instance, the Page server can act as a "replication and staging

agent" and create Web pages in batches, rather than in real-time. These "replicated" Web pages are then "staged" for access at a later time, and access to the Web pages in this scenario is possible even if the Page server and dispatcher are not present later.

In yet another embodiment, the Page server can make a single pass through a Web library, and compile a Web site that exists in the traditional form of separately available files. A Web library is a collection of related Web books and Web pages. More specifically, the Web library is a hierarchical organization of Web document templates, together with all the associated data source information. Information about an entire Web site is thus contained in a single physical file, thus simplifying the problem of deploying Web sites across multiple Page servers. The process of deploying the Web site in this embodiment is essentially a simple copy of a single file.

Extensibility

One embodiment of the present invention provides the Web site administrator with Object Linking and Embedding (OLE) 2.0 extensions to extend the page creation process. These OLE 2.0 extensions also allow information submitted over the Web to be processed with user-supplied functionality. Utilizing development tools such as Visual Basic, Visual C++ or PowerBuilder that support the creation of OLE 2.0 automation, the Web site administrator can add features and modify the behavior of the Page servers described above. This extensibility allows one embodiment of the claimed invention to be incorporated with existing technology to develop an

infinite number of custom web servers.

For example, OLE 2.0 extensions allow a Web site administrator to encapsulate existing business rules in an OLE 2.0 automation interface, to be accessed over the Web. One example of a business rule is the steps involved in the payoff on an installment or mortgage loan. The payoff may involve, for example, taking into account the current balance, the date and the interest accrued since the last payment. Most organizations already have this type of business rule implemented using various applications, such as Visual Basic for client-server environments, or CICS programs on mainframes. If these applications are OLE 2.0 compliant, the Page server "dynaobject" HTML extension tag can be used to encapsulated the application in an OLE 2.0 automation interface. The Page server is thus extensible, and can incorporate the existing application with the new Page server functionality.

Scalability

One embodiment of the claimed invention allows "plug and play" scalability. As described above, referring to **Figure 4**, Dispatcher 402 maintains information about all the Page servers configured to be serviced by Dispatcher 402. Any number of Page servers can thus be "plugged" into the configuration illustrated in **Figure 4**, and the Page servers will be instantly activated as the information is dynamically updated in Dispatcher 402. The Web site administrator can thus manage the overhead of each Page server and modify each Page server's load, as necessary, to improve performance. In this manner, each Page server will cooperate with other Page servers

within a multi-server environment. Dispatcher 402 can examine the load on each Page server and route new requests according to each Page server's available resources. This "load-balancing" across multiple Page servers can significantly increase a Web site's performance.

Figure 5 illustrates the processing of a Web browser request in the form of a flow diagram, according to one embodiment of the presently claimed invention. A Web browser sends a URL request to a Web server in processing block 500. In processing block 502, the Web server receives the URL request, and an interceptor then intercepts the handling of the request in processing block 504. The interceptor connects to a dispatcher and sends the URL request to the dispatcher in processing block 506. In processing block 508, the dispatcher determines which Page servers can handle the request. The dispatcher also determines which Page server is processing the fewest requests in processing block 510, and in processing block 512, the dispatcher sends the URL request to an appropriate Page server. The Page server receives the request and produces an HTML document in processing block 514. The Page server then responds to the dispatcher with notification of the name of the cached HTML document in processing block 516. In processing block 518, the dispatcher responds to the interceptor with the document name, and the interceptor then replaces the requested URL with the newly generated HTML document in processing block 520. The Web server then sends the new HTML document to the requesting client in processing block 522. Finally, the Web browser receives and displays the HTML document created by the Page server at processing block 524.

Thus, a method and apparatus for creating and managing custom Web

sites is disclosed. These specific arrangements and methods described herein are merely illustrative of the principles of the present invention. Numerous modifications in form and detail may be made by those of ordinary skill in the art without departing from the scope of the present invention. Although this invention has been shown in relation to a particular preferred embodiment, it should not be considered so limited. Rather, the present invention is limited only by the scope of the appended claims.

CLAIMS

We claim:

1. A computer-implemented method for managing a dynamic Web page generation request to a Web server, said computer-implemented method comprising the steps of:

routing said request from said Web server to a page server, said page server receiving said request and releasing said Web server to process other requests;

processing said request, said processing being performed by said page server concurrently with said Web server, as said Web server processes said other requests; and

dynamically generating a Web page in response to said request, said Web page including data dynamically retrieved from one or more data sources.

2. The computer-implemented method in Claim 1 wherein said step of routing said request includes the steps of:

intercepting said request at said Web server;

routing said request from said Web server to a dispatcher; and

dispatching said request to said page server.

2 (once Amended) 3 1
3. The computer-implemented method in Claim ~~2~~ wherein said step of processing said request includes the step of identifying said one or more data sources from which to retrieve said data.

3 2
~~4~~. The computer-implemented method in Claim ~~3~~ wherein said step of dynamically generating said Web page includes the step of dynamically retrieving said data from said one or more data sources.

4 3
~~5~~. The computer-implemented method in Claim ~~4~~ wherein said step of processing said request includes the step of said page server maintaining a connection cache to said one or more data sources.

5 3
~~6~~. The computer-implemented method in Claim ~~4~~ wherein said step of processing said request includes the step of logging into said one or more data sources.

6 3
~~7~~. The computer-implemented method in Claim ~~4~~ wherein said step of dynamically generating said Web page includes the step of maintaining a page cache containing said Web page.

7 3
~~8~~. The computer-implemented method in Claim ~~4~~ wherein said page server includes custom HTML extension templates for configuring said Web page.

8 7
~~9~~. The computer-implemented method in Claim ~~8~~ wherein said step of processing said request further includes the step of inserting said dynamically retrieved data from said one or more data sources into said custom HTML extension templates.

10. A computer-implemented method for managing a Web site including one or more Web servers, each Web server having one or more Web pages, said computer-implemented method comprising the steps of:

creating a master Web management page wherein said master Web management page includes said one or more Web pages from each of said one or more Web servers at said Web site; and

utilizing said Web management page to recreate said Web site at a new location.

9 (once Amended)
~~11~~. A networked system for managing a dynamic Web page generation request, said system comprising:

one or more data sources;

a page server having a processing means;

a first computer system including means for generating said request; and

a second computer system including means for receiving said request from said first computer, said second computer system also including a router, said router routing said request from said second computer system to said page server, said page server receiving said request and releasing said

second computer system to process other requests, said page server processing means processing said request and dynamically generating a Web page in response to said request, said Web page including data dynamically retrieved from said one or more data sources.

10 ~~12~~. The networked system in Claim 9 ~~11~~ wherein said router in said second computer system includes:

an interceptor intercepting said request at said second computer system and routing said request; and

a dispatcher receiving said routed request from said interceptor and dispatching said request to said page server.

13. A Web server for receiving a dynamic Web page generation request, said Web server comprising:

a Web server executable receiving said request; and

intercepting means for intercepting said request and routing said request from said Web server executable to a page server.

14. A page server for receiving a dynamic Web page generation request, said page server comprising:

means for receiving said request;

means for maintaining a connection cache to one or more data sources; and

means for processing said request.

15. The page server in Claim 14 wherein said means for processing said request further includes means for dynamically retrieving data from said one or more data sources.

Sub a2

16. An article of manufacture comprising a computer readable medium having computer instructions embodied therein for causing a processor to manage a dynamic Web page generation request to a Web server, said computer instructions in said article of manufacture causing said processor to perform the steps of:

routing said request from said Web server to a page server, said page server receiving said request and releasing said Web server to process other requests;

processing said request, said processing being performed by said page server; and

dynamically generating a Web page, said Web page including data retrieved from one or more data sources.

08/636,477

ABSTRACT OF THE DISCLOSURE

The present invention teaches a method and apparatus for creating and managing custom Web sites. Specifically, one embodiment of the present invention claims a computer-implemented method for managing a dynamic Web page generation request to a Web server, the computer-implemented method comprising the steps of routing the request from the Web server to a page server, the page server receiving the request and releasing the Web server to process other requests, processing the request, the processing being performed by the page server concurrently with the Web server, as the Web server processes the other requests, and dynamically generating a Web page in response to the request, the Web page including data dynamically retrieved from one or more data sources.

Attorney's Docket No.: 02577.P001 PATENT

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below, next to my name.

I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

A METHOD AND APPARATUS FOR CREATING AND MANAGING A CUSTOM WEB SITE

the specification of which

___X___ is attached hereto.
_____ was filed on _____ as United States Application Number _____ or PCT International Application Number_____ and was amended on _____. (if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment referred to above.

I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d), of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No

I hereby claim the benefit under title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below

(Application Number) Filing Date

(Application Number) Filing Date

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Number)	Filing Date	(Status -- patented, pending, abandoned)
(Application Number)	Filing Date	(Status -- patented, pending, abandoned)

I hereby appoint Aloysius T. C. AuYeung, Reg. No. 35,432; William Thomas Babbitt, Reg. No. 39,591; Kent D. Baker, Reg. No. 38,822; Jordan Michael Becker, Reg. No. 39,602; Bradley J. Bereznak, Reg. No. 33,474; Michael A. Bernadicou, Reg. No. 35,934; Roger W. Blakely, Jr., Reg. No. 25,831; Gregory D. Caldwell, Reg. No. 39,926; Kent M. Chen, Reg. No. 39,630; Lawrence M. Cho, Reg. No. 39,942; Thomas M. Coester, Reg. No. P39,637; Roland B. Cortes, Reg. No. 39,152; William Donald Davis, Reg. No. 38,428; Daniel M. De Vos, Reg. No. 37,813; Karen L. Feisthamel, Reg. No. 40,264; Scot A. Griffin, Reg. No. 38,167; David R. Halvorson, Reg. No. 33,395; Brian Don Hickman, Reg. No. 35,894; Eric Ho, Reg. No. P39,711; George W Hoover II, Reg. No. 32,992; Eric S. Hyman, Reg. No. 30,139; Jeffrey D. Jacobs, Reg. No. 40,029; Dag H. Johansen, Reg. No. 36,172; Stephen L. King, Reg. No. 19,180; Dolly M. Lee, Reg. No. 39,742; Daniel C. Mallery, Reg. No. 33,532; Michael J. Mallie, Reg. No. 36,591; Kimberley G. Nobles, Reg. No. 38,255; Ronald W. Reagin, Reg. No. 20,340; James H. Salter, Reg. No. 35,668; William W. Schaal, Reg. No. 39,018; James C. Scheller, Reg. No. 31,195; Maria McCormack Sobrino, Reg. No. 31,639; Stanley W. Sokoloff, Reg. No. 25,128; Allan T. Sponseller, Reg. No. 38,318; Steven R. Sponseller, Reg. No. 39,384; David R. Stevens, Reg. No. 38,626; Edwin H. Taylor, Reg. No. 25,129; Lester J. Vincent, Reg. No. 31,460; John Patrick Ward, Reg. No. 40,216; Ben J. Yorks, Reg. No. 33,609; and Norman Zafman, Reg. No. 26,250; my attorneys; and Gary B. Goates, Reg. No. 35,159; Michael Anthony DeSanctis, Reg. No. 39,957; Charles E. Shemwell, Reg. No. 40,171; Edwin A. Sloane, Reg. No. 34,728; and Judith A. Szepesi, Reg. No. 39,393; my patent agents, of BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN, with offices located at 12400 Wilshire Boulevard, 7th Floor, Los Angeles, California 90025, telephone (310) 207-3800, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith.

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Send correspondence to James H. Salter, BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN, 12400 Wilshire Boulevard 7th Floor, Los Angeles, California 90025 and direct telephone calls to James H. Salter, (408) 720-8598.
(Name of Attorney or Agent)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Rev. 04/01/96 (D2) cak -2-

2-00

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Rowlett, Texas 75030

Title 37, Code of Federal Regulations, Section 1.56
Duty to Disclose Information Material to Patentability

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclosure information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclosure all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

(1) Prior art cited in search reports of a foreign patent office in a counterpart application, and

(2) The closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made or record in the application, and

(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application;

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.

PRINT OF DRAWINGS
AS ORIGINALLY FILED

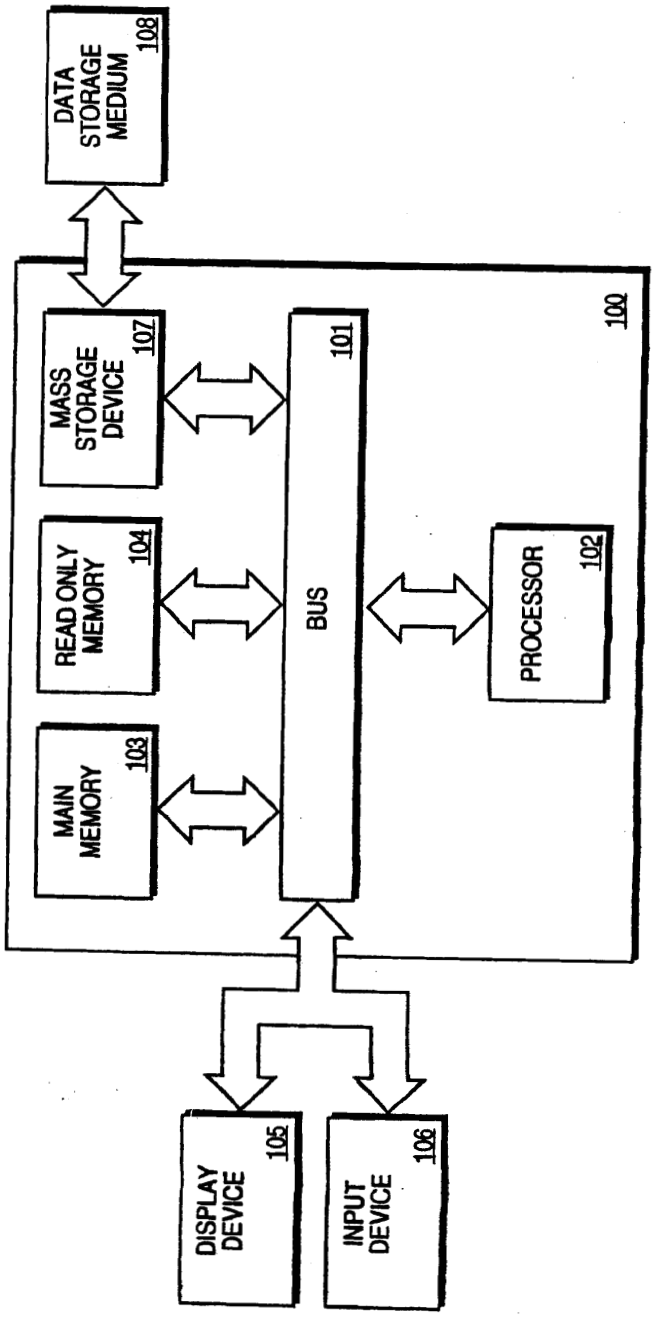

FIG. 1

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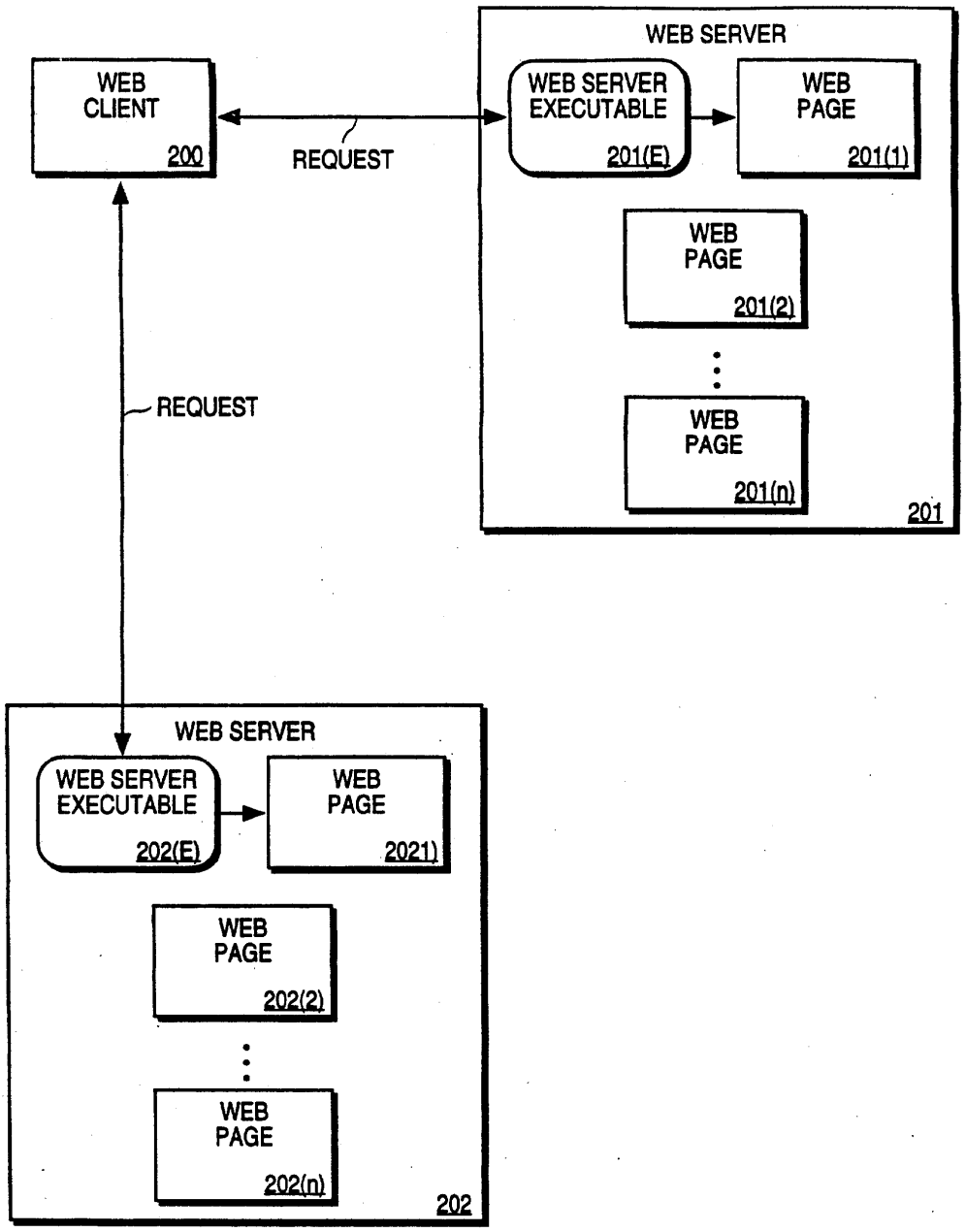

FIG. 2 (PRIOR ART)

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AS ORIGINALLY FILED

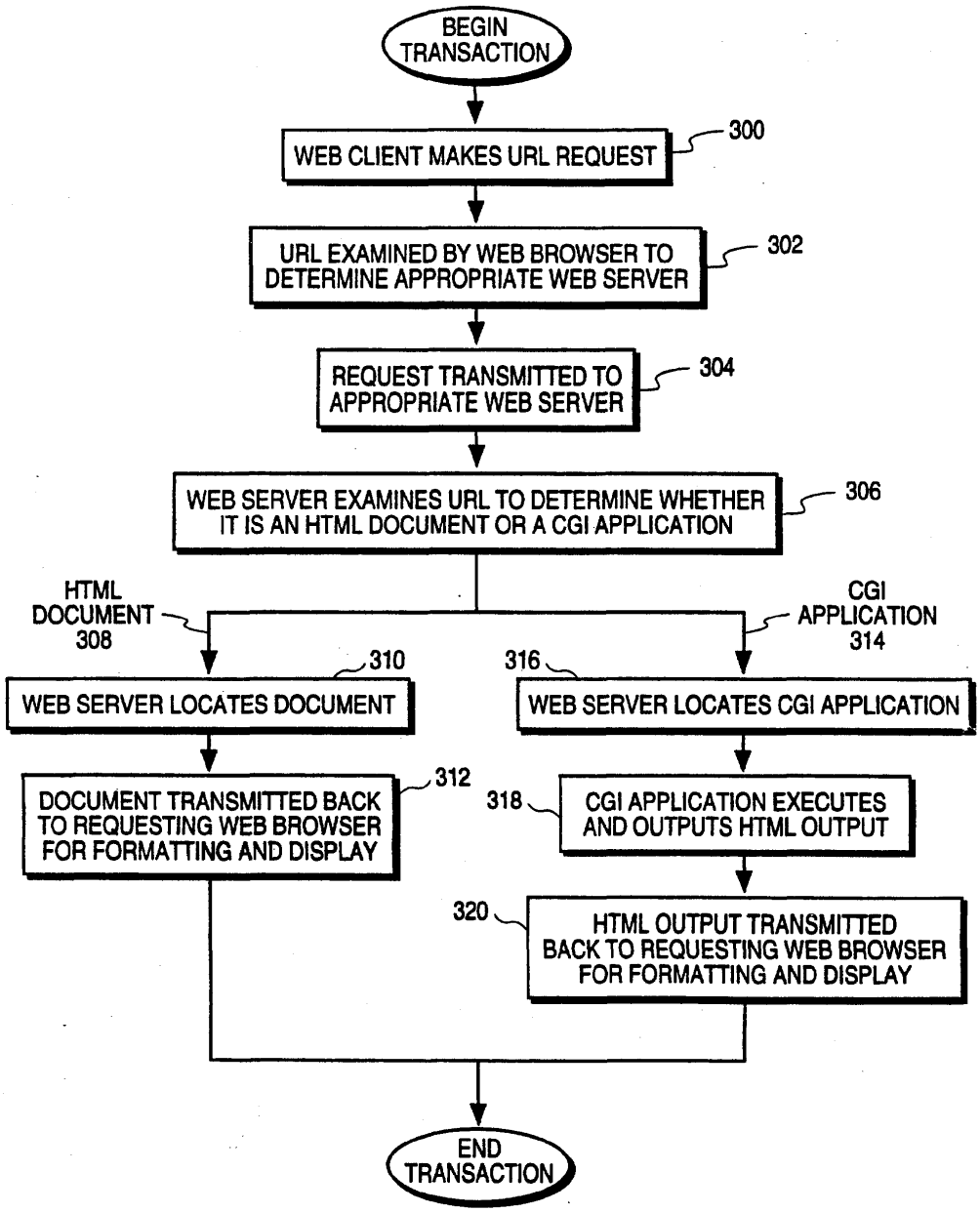

FIG. 3 (PRIOR ART)

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AS ORIGINALLY FILED

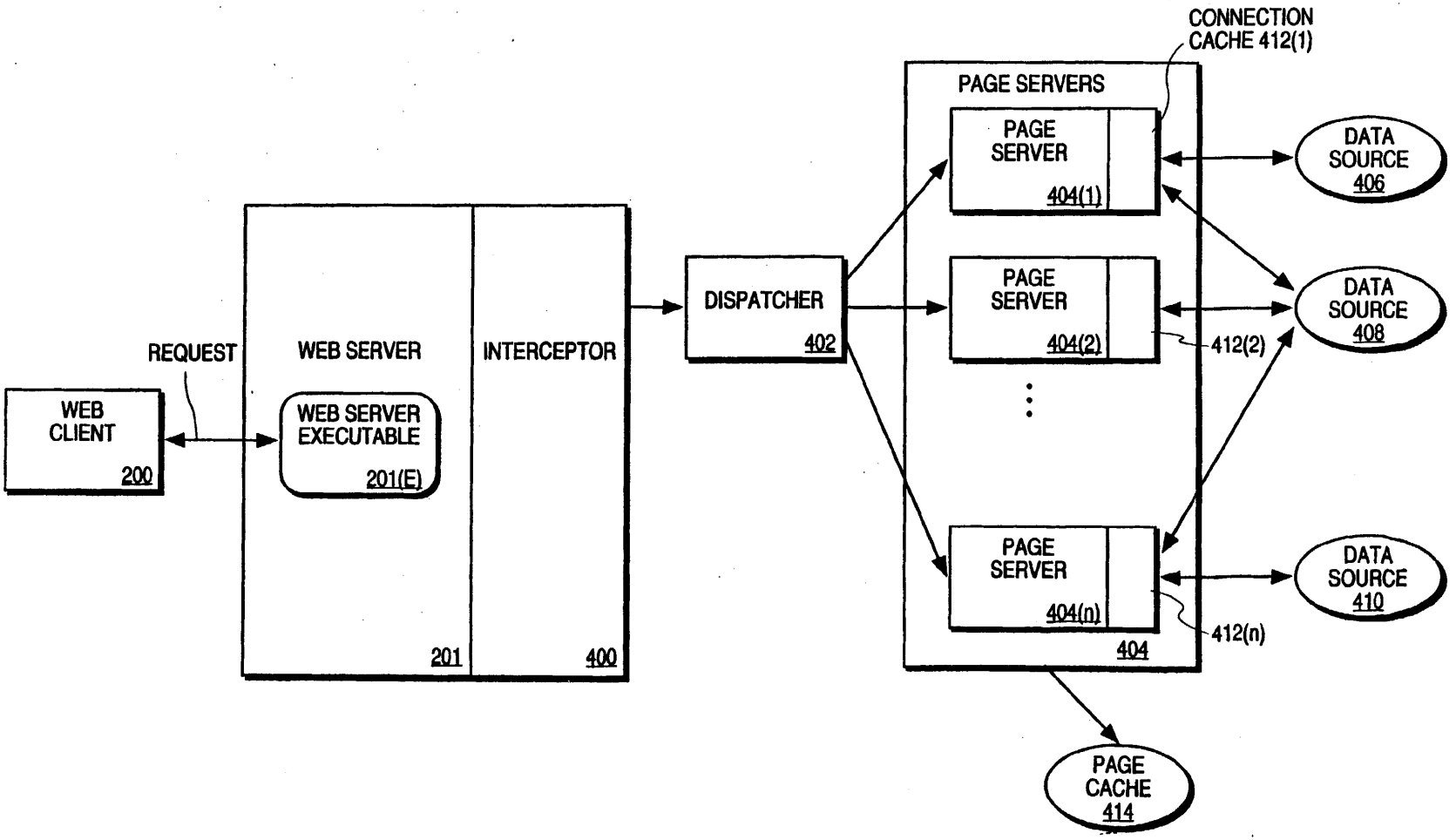


FIG. 4

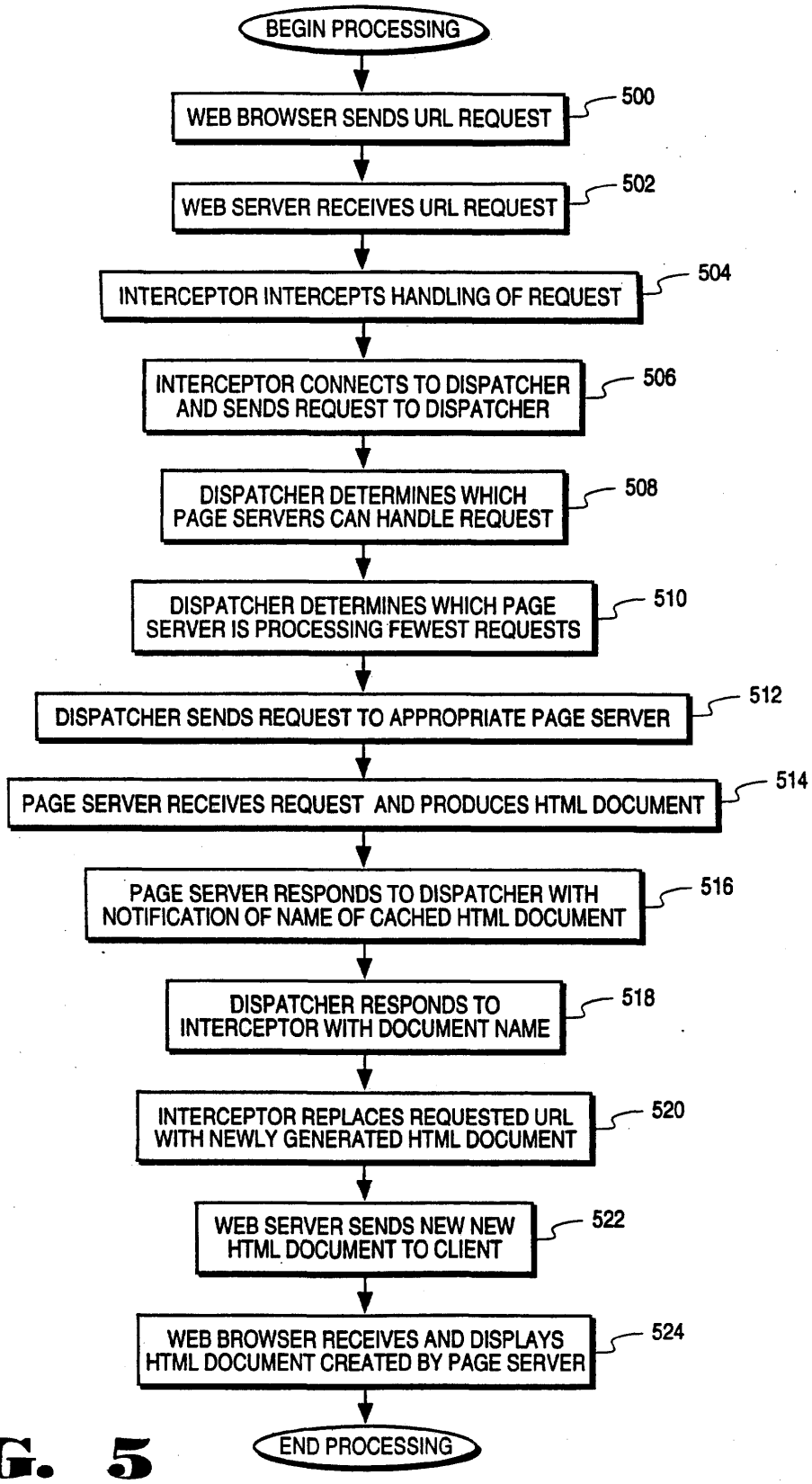

BEGIN PROCESSING
WEB BROWSER SENDS URL REQUEST
500
WEB SERVER RECEIVES URL REQUEST
502
INTERCEPTOR INTERCEPTS HANDLING OF REQUEST
504
INTERCEPTOR CONNECTS TO DISPATCHER AND SENDS REQUEST TO DISPATCHER
506
DISPATCHER DETERMINES WHICH PAGE SERVERS CAN HANDLE REQUEST
508
DISPATCHER DETERMINES WHICH PAGE SERVER IS PROCESSING FEWEST REQUESTS
510
DISPATCHER SENDS REQUEST TO APPROPRIATE PAGE SERVER
512
PAGE SERVER RECEIVES REQUEST AND PRODUCES HTML DOCUMENT
514
PAGE SERVER RESPONDS TO DISPATCHER WITH NOTIFICATION OF NAME OF CACHED HTML DOCUMENT
516
DISPATCHER RESPONDS TO INTERCEPTOR WITH DOCUMENT NAME
518
INTERCEPTOR REPLACES REQUESTED URL WITH NEWLY GENERATED HTML DOCUMENT
520
WEB SERVER SENDS NEW NEW HTML DOCUMENT TO CLIENT
522
WEB BROWSER RECEIVES AND DISPLAYS HTML DOCUMENT CREATED BY PAGE SERVER
524
END PROCESSING

FIG. 5

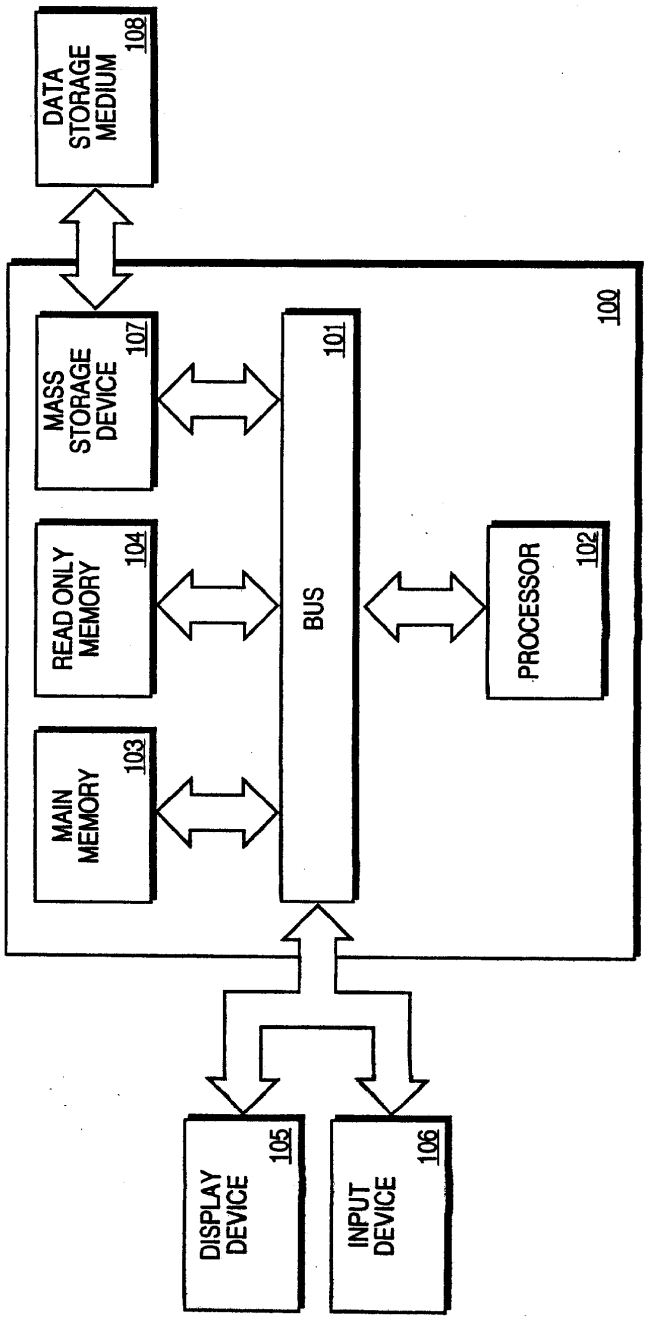

DATA STORAGE MEDIUM
108
100
MASS STORAGE DEVICE
107
BUS
101
READ ONLY MEMORY
104
PROCESSOR
102
MAIN MEMORY
103
DISPLAY DEVICE
105
INPUT DEVICE
106

FIG. 1

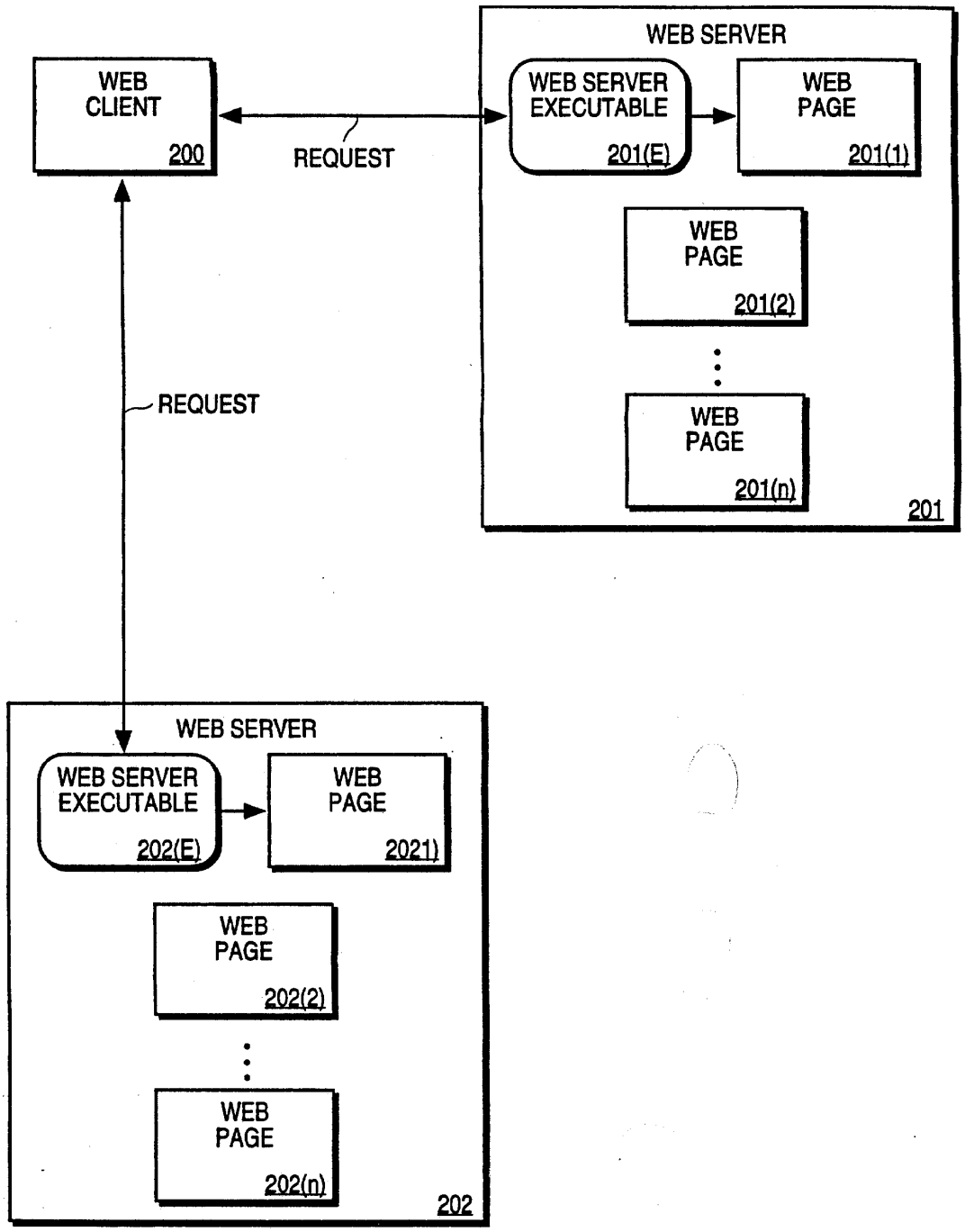


FIG. 2 (PRIOR ART)

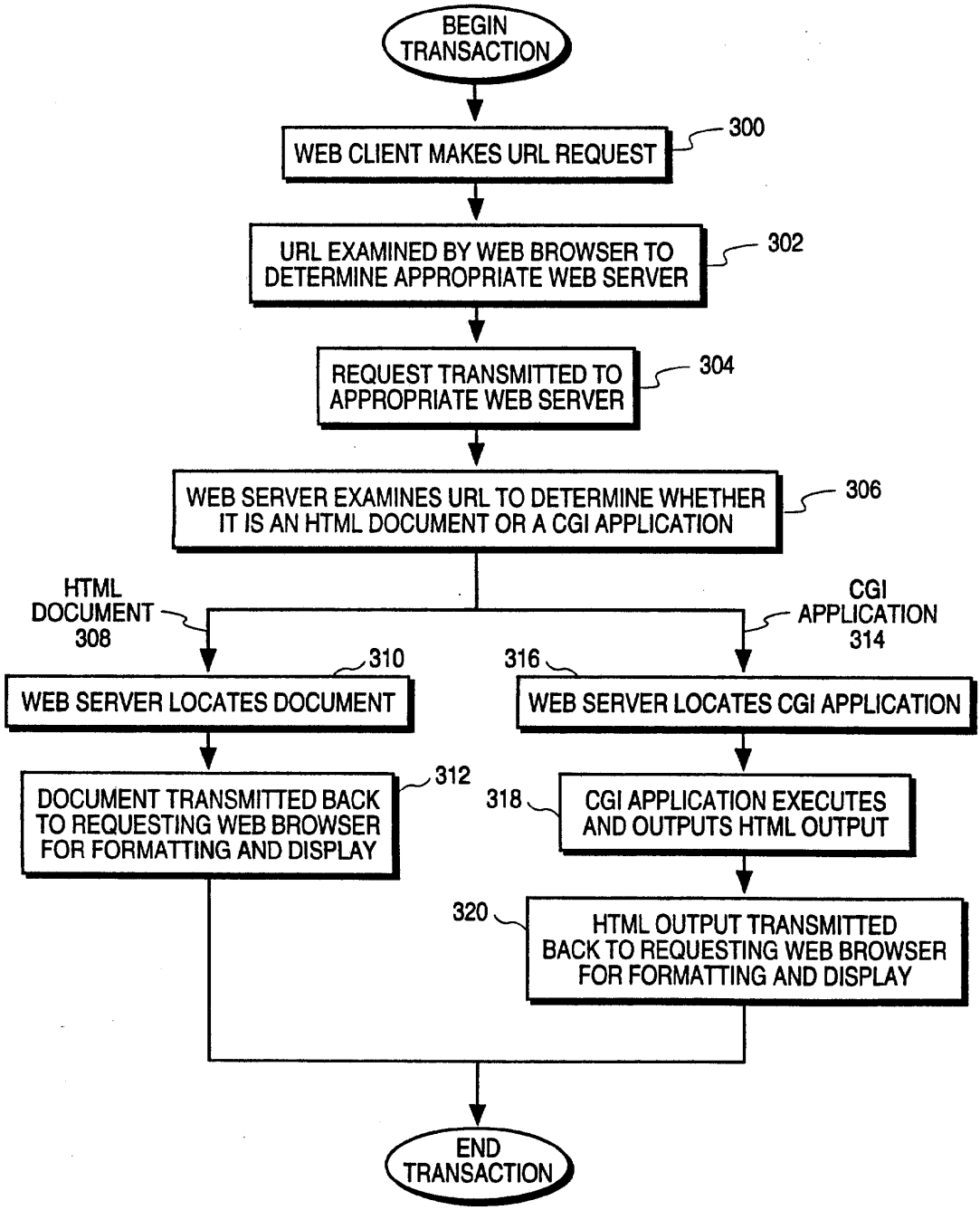


FIG. 3 (PRIOR ART)

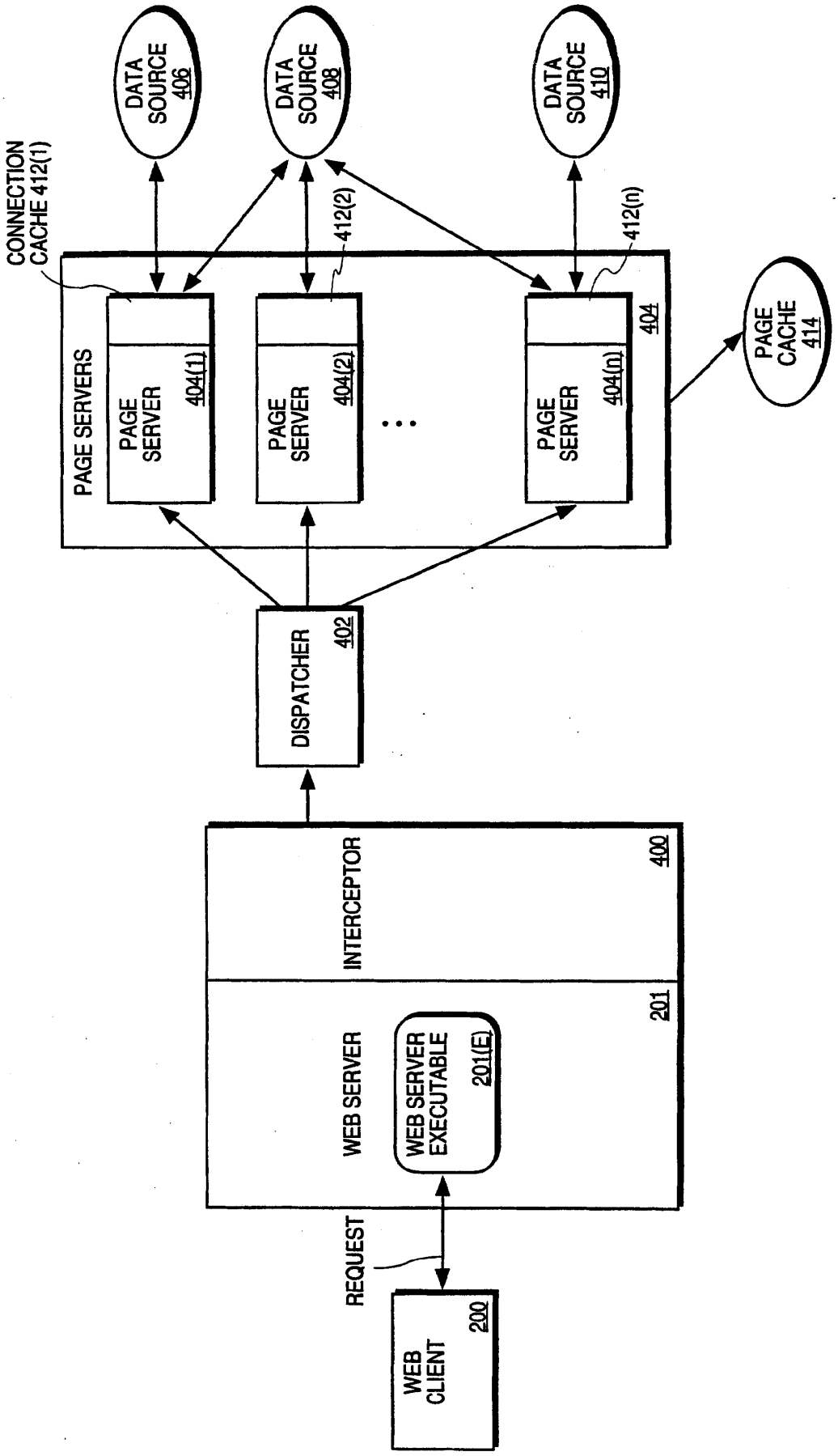

DATA SOURCE 406
DATA SOURCE 408
DATA SOURCE 410
CONNECTION CACHE 412(1)
412(2)
412(n)
PAGE SERVERS
PAGE SERVER 404(1)
PAGE SERVER 404(2)
PAGE SERVER 404(n)
404
PAGE CACHE 414
DISPATCHER 402
INTERCEPTOR 400
201
WEB SERVER
WEB SERVER EXECUTABLE 201(E)
REQUEST
WEB CLIENT 200

FIG. 4

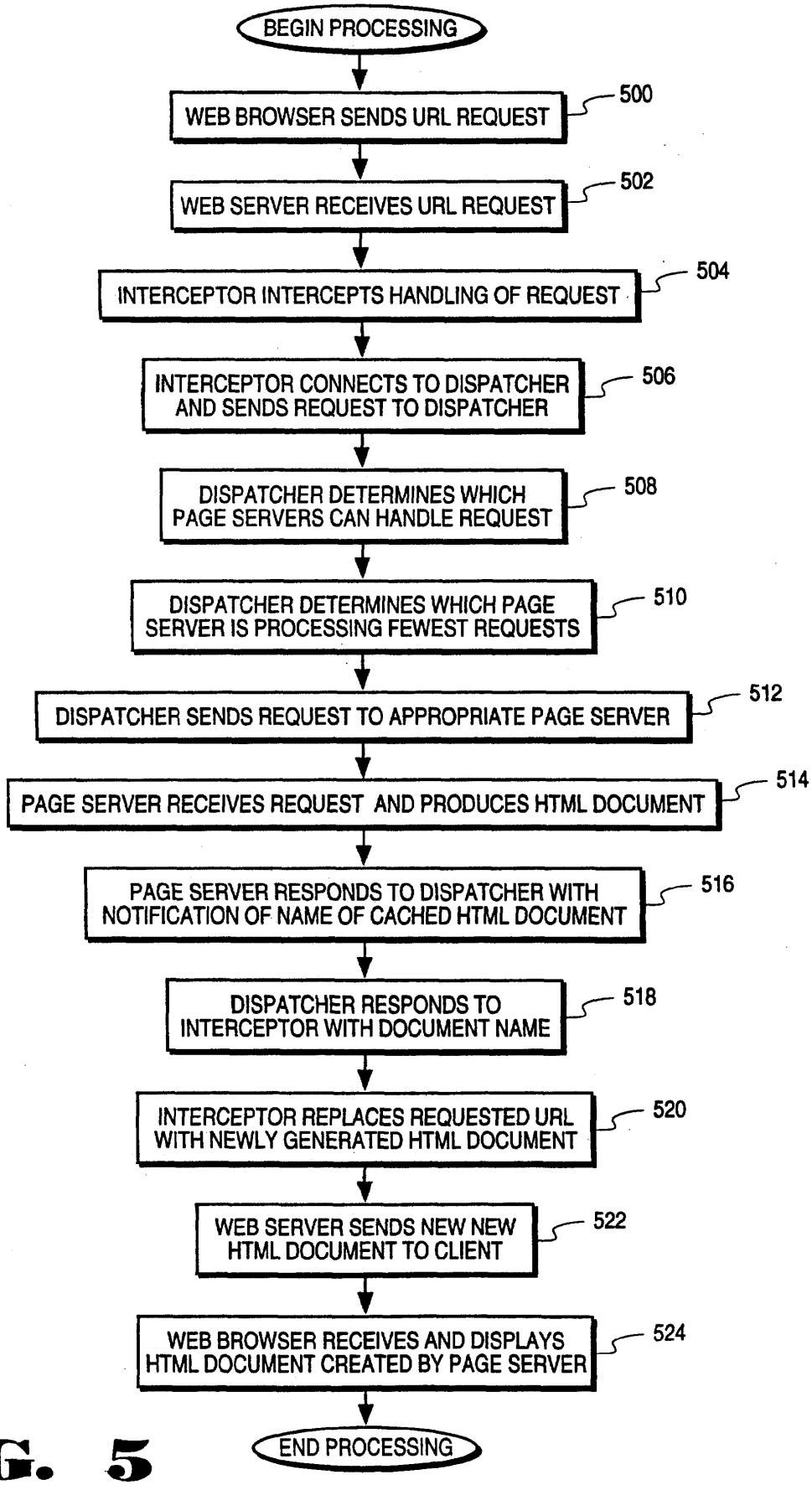

BEGIN PROCESSING
WEB BROWSER SENDS URL REQUEST
500
WEB SERVER RECEIVES URL REQUEST
502
INTERCEPTOR INTERCEPTS HANDLING OF REQUEST
504
INTERCEPTOR CONNECTS TO DISPATCHER AND SENDS REQUEST TO DISPATCHER
506
DISPATCHER DETERMINES WHICH PAGE SERVERS CAN HANDLE REQUEST
508
DISPATCHER DETERMINES WHICH PAGE SERVER IS PROCESSING FEWEST REQUESTS
510
DISPATCHER SENDS REQUEST TO APPROPRIATE PAGE SERVER
512
PAGE SERVER RECEIVES REQUEST AND PRODUCES HTML DOCUMENT
514
PAGE SERVER RESPONDS TO DISPATCHER WITH NOTIFICATION OF NAME OF CACHED HTML DOCUMENT
516
DISPATCHER RESPONDS TO INTERCEPTOR WITH DOCUMENT NAME
518
INTERCEPTOR REPLACES REQUESTED URL WITH NEWLY GENERATED HTML DOCUMENT
520
WEB SERVER SENDS NEW NEW HTML DOCUMENT TO CLIENT
522
WEB BROWSER RECEIVES AND DISPLAYS HTML DOCUMENT CREATED BY PAGE SERVER
524
END PROCESSING

FIG. 5

PATENT APPLICATION FEE DETERMINATION RECORD

Effective October 1, 1995

Application or Docket Number: 636477

CLAIMS AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE	SMALL ENTITY FEE	OR	OTHER THAN SMALL ENTITY RATE	OTHER THAN SMALL ENTITY FEE
BASIC FEE				375.00	OR		750.00
TOTAL CLAIMS	16 minus 20 =	*	x$11=		OR	x$22=	
INDEPENDENT CLAIMS	6 minus 3 =	* 3	x39=		OR	x78=	234
MULTIPLE DEPENDENT CLAIM PRESENT			+125=		OR	+250=	
			TOTAL		OR	TOTAL	984

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
AMENDMENT A	Total	*	Minus	**	=
	Independent	*	Minus	***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				

SMALL ENTITY RATE	SMALL ENTITY ADDITIONAL FEE	OR	OTHER THAN SMALL ENTITY RATE	OTHER THAN SMALL ENTITY ADDITIONAL FEE
x$11=		OR	x$22=	
x39=		OR	x78=	
+125=		OR	+250=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
AMENDMENT B	Total	*	Minus	**	=
	Independent	*	Minus	***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				

SMALL ENTITY RATE	SMALL ENTITY ADDITIONAL FEE	OR	OTHER THAN SMALL ENTITY RATE	OTHER THAN SMALL ENTITY ADDITIONAL FEE
x$11=		OR	x$22=	
x39=		OR	x78=	
+125=		OR	+250=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
AMENDMENT C	Total	*	Minus	**	=
	Independent	*	Minus	***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				

SMALL ENTITY RATE	SMALL ENTITY ADDITIONAL FEE	OR	OTHER THAN SMALL ENTITY RATE	OTHER THAN SMALL ENTITY ADDITIONAL FEE
x$11=		OR	x$22=	
x39=		OR	x78=	
+125=		OR	+250=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

FORM PTO-875
(Rev. 10/95)

Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

Form PTO 1130 (REV 2/94)

U.S. DEPARTMENT OF COMMERCE Patent and Trademark Office

PACE DATA ENTRY CODING SHEET

1ST EXAMINER NH DATE 6-4-96

2ND EXAMINER DATE

APPLICATION NUMBER	TYPE APPL	FILING DATE MONTH DAY YEAR	SPECIAL HANDLING	GROUP ART UNIT	CLASS	SHEETS OF DRAWING
08/636477	1	04 23 96		2312	395	5

TOTAL CLAIMS	INDEPENDENT CLAIMS	SMALL ENTITY?	FILING FEE	FOREIGN LICENSE	ATTORNEY DOCKET NUMBER
16	6		984	X	02577.P001

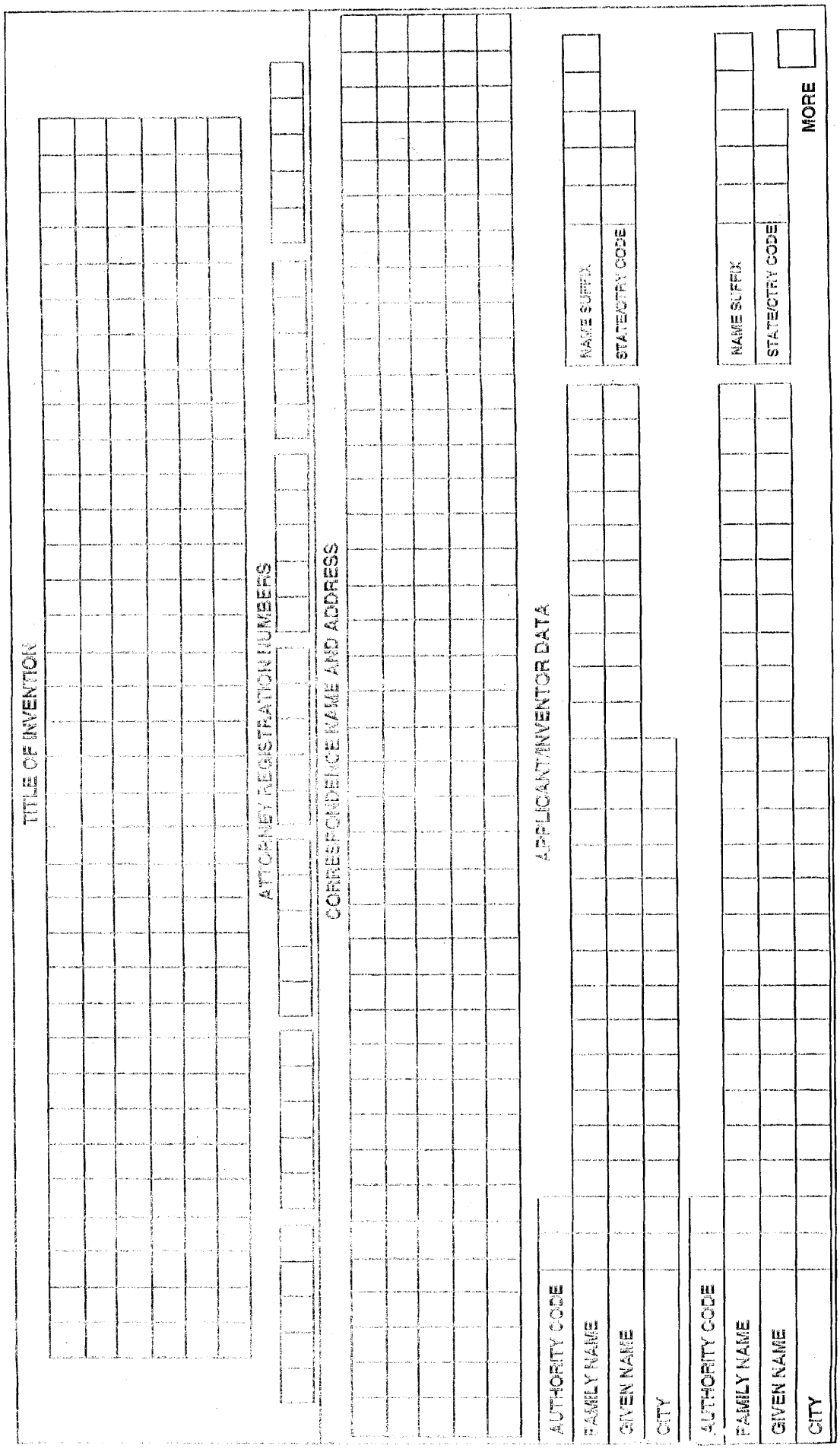
CONTINUITY DATA

CONT CODE	STATUS CODE	PARENT APPLICATION SERIAL NUMBER	POT APPLICATION SERIAL NUMBER	PARENT PATENT NUMBER	PARENT FILING DATE MONTH DAY YEAR
			P O T		
			P O T		
			P O T		
			P O T		
			P O T		

POT/FOREIGN APPLICATION DATA

FOREIGN PRIORITY CLAIMED	COUNTRY CODE	POT/FOREIGN APPLICATION SERIAL NUMBER	FOREIGN FILING DATE MONTH DAY YEAR
N			

☆ U.S. GPO: 1995-401-465


TITLE OF INVENTION
ATTORNEY REGISTRATION NUMBERS
CORRESPONDENCE NAME AND ADDRESS
APPLICANT/INVENTOR DATA
AUTHORITY CODE
FAMILY NAME
GIVEN NAME
CITY
NAME SUFFIX
STATE/CTRY CODE
AUTHORITY CODE
FAMILY NAME
GIVEN NAME
CITY
NAME SUFFIX
STATE/CTRY CODE
MORE

BAR CODE LABEL

U.S. PATENT APPLICATION

SERIAL NUMBER	FILING DATE	CLASS	GROUP ART UNIT
08/636,477	04/23/96	395	2312

APPLICANT

KEITH LOWRY, RICHARDSON, TX; ANDREW B. LEVINE, PLANO, TX; RONALD L. HOWELL, ROWLETT, TX.

CONTINUING DATA********
VERIFIED

_____

FOREIGN/PCT APPLICATIONS********
VERIFIED

_____

FOREIGN FILING LICENSE GRANTED 06/05/96

STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS	FILING FEE RECEIVED	ATTORNEY DOCKET NO.
TX	5	16	6	$984.00	02577.P001

ADDRESS

JAMES H SALTER
BLAKELY SOKOLOFF TAYLOR ADN ZAFMAN
12400 WILSHIRE BOULEVARD
7TH FLOOR
LOS ANGELES CA 90025

TITLE

METHOD AND APPARATUS FOR CREATING AND MANAGING A CUSTOM WEB SITE

This is to certify that annexed hereto is a true copy from the records of the United States Patent and Trademark Office of the application which is identified above.

By authority of the
COMMISSIONER OF PATENTS AND TRADEMARKS

Date Certifying Officer

MAIL ROOM APR 23 1996 PAT. & TRADEMARK OFFICE

08/636477

Patent

Attorney's Docket No. 02577.P001

THE COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

Sir: Transmitted herewith for filing is the **nonprovisional patent application** of

Inventor(s): Keith Lowery, Andrew B. Levine, and Ronald L. Howell

For: A METHOD AND APPARATUS FOR CREATING AND MANAGING A CUSTOM WEB SITE

(Title)

Enclosed are:

- X 5 sheet(s) of Drawings.
- X An Assignment of the invention to InfoSpinner, Inc.
- X Assignment Cover Sheet Form PTO-1595.
- X A Declaration and Power of Attorney (X signed/ _____ unsigned).

The Filing Fee has been calculated as shown below:

	(Col. 1)		(Col. 2)	SMALL ENTITY		OTHER THAN A SMALL ENTITY	
For:	No. Filed		No. Extra	Rate	Fee	Rate	Fee
Basic Fee:					$ 375		$ 750
Total Claims:	16	- 20	* 0	x 11	$	x 22	$ 0
Indep. Claims:	6	- 3	* 3	x 39	$	x 78	$ 234
	Multiple Dependent Claim(s) Presented			+125	$	+250	$
				TOTAL	$	TOTAL	$ 984

* If the difference is less than zero, enter "0" in Col. 2.

- X A check for $ 984.00 for the filing fee is enclosed.
- X A check for $ 40.00 for recordation of the Assignment is enclosed.
- X The Commissioner is hereby authorized to charge payment of the following fees associated with this communication, or credit any overpayment, to our Deposit Account No. 02-2666. **A duplicate copy of this sheet is enclosed.**
  - X Any additional filing fees required under 37 C.F.R. § 1.16.
  - X Any patent application processing fees under 37 C.F.R. § 1.17.
- X The Commissioner is hereby authorized to charge payment of the following fees during the pendency of this application, or credit any overpayment, to our Deposit Account No. 02-2666. **A duplicate copy of this sheet is enclosed.**
  - X Any processing fees under 37 C.F.R. § 1.17, including any extension fees.
  - X Any filing fees under 37 C.F.R. § 1.16 for presentation of extra claims.
- X Send all correspondence to the undersigned at BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN, 12400 Wilshire Boulevard, Seventh Floor, Los Angeles, California 90025, and direct all telephone calls to the undersigned at (408) 720-8598.

Respectfully submitted,

BLAKELY SOKOLOFF TAYLOR & ZAFMAN

Date: 4/23, 1996

By _____
James H. Salter

Reg. No.: 35,668

12400 Wilshire Boulevard
Seventh Floor
Los Angeles, California 90025
(408) 720-8598

(LJV/cak 10/02/95)

"Express Mail" mailing label number EM 511 190 030 US

Date of Deposit April 23, 1996

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Rhonda Olmo
(Typed or printed name of person mailing paper or fee)

Rhonda Olmo
(Signature of person mailing paper or fee)

08/636477

Attorney's Docket No. 02577.P001 Patent

THE COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

SIR: Transmitted herewith for filing is the **nonprovisional patent application** of

Inventor(s): Keith Lowery, Andrew B. Levine, and Ronald L. Howell

For: A METHOD AND APPARATUS FOR CREATING AND MANAGING A CUSTOM WEB SITE
(Title)

Enclosed are:

- X 5 sheet(s) of Drawings.
- X An Assignment of the invention to InfoSpinner, Inc.
- X Assignment Cover Sheet Form PTO-1595.
- X A Declaration and Power of Attorney (X signed/ _____ unsigned).

The Filing Fee has been calculated as shown below:

	(Col. 1)		(Col. 2)	SMALL ENTITY		OTHER THAN A SMALL ENTITY	
For:	No. Filed		No. Extra	Rate	Fee	Rate	Fee
Basic Fee:					$ 375		$ 750
Total Claims:	16	- 20	* 0	x 11	$	x 22	$ 0
Indep. Claims:	6	- 3	* 3	x 39	$	x 78	$ 234
	Multiple Dependent Claim(s) Presented			**+125**	**$**	**+250**	**$**
				TOTAL	$	TOTAL	$ 984

* If the difference is less than zero, enter "0" in Col. 2.

- X A check for $ 984.00 for the filing fee is enclosed.
- X A check for $ 40.00 for recordation of the Assignment is enclosed.
- X The Commissioner is hereby authorized to charge payment of the following fees associated with this communication, or credit any overpayment, to our Deposit Account No. 02-2666. **A duplicate copy of this sheet is enclosed.**
  - X Any additional filing fees required under 37 C.F.R. § 1.16.
  - X Any patent application processing fees under 37 C.F.R. § 1.17.
- X The Commissioner is hereby authorized to charge payment of the following fees during the pendency of this application, or credit any overpayment, to our Deposit Account No. 02-2666. **A duplicate copy of this sheet is enclosed.**
  - X Any processing fees under 37 C.F.R. § 1.17, including any extension fees.
  - X Any filing fees under 37 C.F.R. § 1.16 for presentation of extra claims.
- X Send all correspondence to the undersigned at BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN, 12400 Wilshire Boulevard, Seventh Floor, Los Angeles, California 90025, and direct all telephone calls to the undersigned at (408) 720-8598.

Respectfully submitted,
BLAKELY SOKOLOFF TAYLOR & ZAFMAN

Date: 4/23, 1996

By _____
James H. Salter
Reg. No.: 35,668

12400 Wilshire Boulevard
Seventh Floor
Los Angeles, California 90025
(408) 720-8598

(LJV/cak 10/02/95)

"Express Mail" mailing label number EM 511 190 030 US

Date of Deposit April 23, 1996

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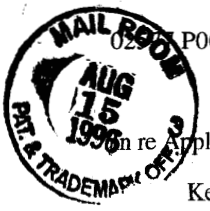
Rhonda Olmo
(Typed or printed name of person mailing paper or fee)

Rhonda Olmo
(Signature of person mailing paper or fee)

Receipt #2



02975.P001 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Keith Lowery, et al.

Serial No.: 08/636,477 Examiner: Not yet known

Filed: April 23, 1996 Art Unit: 2312

For: A METHOD AND APPARATUS FOR CREATING AND MANAGING A CUSTOM WEB SITE

Attn: Application Processing Division's
Customer Correction Branch
Hon. Commissioner of Patents & Trademarks
Washington, D.C. 20231

REQUEST FOR CORRECTION

Dear Sir:

In an Examiner's Filing Receipt dated June 13, 1996, the inventor's name was recorded incorrectly as follows:

Keith **Lowry**

The inventor's correct name is as follows:

Keith **Lowery**

RECEIVED
OCT 2 4 1996
GROUP 2300

Please have the Filing Receipt changed to reflect the Inventor's correct name. Enclosed are copies of the Examiner's Filing Receipt, Form PTO-103X.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

Dated: 8/9, 1996

James H. Salter
Reg. No. 35,668

12400 Wilshire Boulevard
Seventh Floor
Los Angeles, California 90025
(408)720-8598

FIRST CLASS CERTIFICATE OF MAILING
(37 C.F.R. § 1.8(a))

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231

on August 12, 1996
Date of Deposit

Sherri L. Quattrini
Name of Person Mailing Correspondence

Sherri L. Quattrini 8-12-96
Signature Date

PTO-103X
(Rev. 8-95)

FILING RECEIPT





UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
ASSISTANT SECRETARY AND COMMISSIONER
OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NUMBER	FILING DATE	GRP ART UNIT	FIL FEE REC'D	ATTORNEY DOCKET NO.	DRWGS	TOT CL	IND CL
08/636,477	04/23/96	2312	$984.00	02577.P001	5	16	6

JAMES H SALTER
BLAKELY SOKOLOFF TAYLOR ADN ZAFMAN
12400 WILSHIRE BOULEVARD
7TH FLOOR
LOS ANGELES CA 90025



BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN
LOS ANGELES

Receipt is acknowledged of this nonprovisional Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please write to the Application Processing Division's Customer Correction Branch within 10 days of receipt. Please provide a copy of the Filing Receipt with the changes noted thereon.

Applicant(s)

KEITH LOWRY, RICHARDSON, TX; ANDREW B. LEVINE, PLANO, TX; RONALD L. HOWELL, ROWLETT, TX.

FOREIGN FILING LICENSE GRANTED 06/05/96
TITLE
METHOD AND APPARATUS FOR CREATING AND MANAGING A CUSTOM WEB SITE

PRELIMINARY CLASS: 395

(see reverse)

67

UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

SERIAL NUMBER	FILING DATE	FIRST NAMED INVENTOR		ATTORNEY DOCKET NO.
08/636,477	04/23/96	LOWERY	K	02577.P001

B3M1/0703

JAMES H SALTER
BLAKELY SOKOLOFF TAYLOR ADN ZAFMAN
12400 WILSHIRE BOULEVARD
7TH FLOOR
LOS ANGELES CA 90025

EXAMINER	
KRICK,R	
ART UNIT	**PAPER NUMBER**
2317	3

DATE MAILED: 07/03/97

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

☑ This application has been examined ☐ Responsive to communication filed on _____ ☐ This action is made final.

A shortened statutory period for response to this action is set to expire 3 month(s), 0 days from the date of this letter.
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☑ Notice of References Cited by Examiner, PTO-892.
2. ☑ Notice of Draftsman's Patent Drawing Review, PTO-948.
3. ☐ Notice of Art Cited by Applicant, PTO-1449.
4. ☐ Notice of Informal Patent Application, PTO-152.
5. ☐ Information on How to Effect Drawing Changes, PTO-1474.
6. ☐ _____.

Part II SUMMARY OF ACTION

1. ☑ Claims 1-16 are pending in the application.
   Of the above, claims _____ are withdrawn from consideration.
2. ☐ Claims _____ have been cancelled.
3. ☐ Claims _____ are allowed.
4. ☑ Claims 1-16 are rejected.
5. ☐ Claims _____ are objected to.
6. ☐ Claims _____ are subject to restriction or election requirement.
7. ☐ This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.
8. ☐ Formal drawings are required in response to this Office action.
9. ☐ The corrected or substitute drawings have been received on _____. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable; ☐ not acceptable (see explanation or Notice of Draftsman's Patent Drawing Review, PTO-948).
10. ☐ The proposed additional or substitute sheet(s) of drawings, filed on _____. has (have) been ☐ approved by the examiner; ☐ disapproved by the examiner (see explanation).
11. ☐ The proposed drawing correction, filed _____, has been ☐ approved; ☐ disapproved (see explanation).
12. ☐ Acknowledgement is made of the claim for priority under 35 U.S.C. 119. The certified copy has ☐ been received ☐ not been received ☐ been filed in parent application, serial no. _____; filed on _____.
13. ☐ Since this application apppears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.
14. ☐ Other

EXAMINER'S ACTION

PTOL-326 (Rev. 2/93)

Part III DETAILED ACTION

1. Claims 1-16 are presented for examination.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
>
> Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

4. Claims 1-16 are rejected under 35 U.S.C. § 103 as being unpatentable over Barbari, patent no. 5,532,838, in view of Goldberg et al, "Beyond the Web: Excavating the Real World Via Mosaic".

5. As to claim 11, Barbari teaches the claimed invention substantially as claimed, including a data processing ['DP'] as claimed, comprising: one or more data sources, a page server having a processing means, a first computer system including generation means for a request, a second computer system including receiving means for the request from the first computer, the second computer system also including a router for routing the request from the second computer system to the page server, the page server receiving the request and releasing the second computer system to process other requests, the page server processing means processing the request and dynamically generating a Web page in response to the request, and the Web page including data dynamically retrieved from the one or more data sources [col. 11 line 39 - col. 12 line 54, and col. 17 line 28 - col. 18 line 20].

6. However, Barbari does not **explicitly** teach a WWW system implementing the disclosed invention.

7. Goldberg et al teach a WWW system having WWW clients and multiple servers so that when a client request comes in, a first server communicates with a second server in order to process the request [fig. 2, pages 5-7].

8. It would have been obvious for one of ordinary skill in the art at the time of the invention to combine teachings of Barbari and Goldberg et al because using Barbari's request processing system in Goldberg et al's WWW system would have increased efficiency and throughput of Goldberg et al's system.

9. As to claim 12, Barbari teaches the router includes an interceptor intercepting the request at the second computer system and routing the request, and the router also includes a dispatcher receiving the routed request from the interceptor and dispatching the request to the page server [col. 17 line 28 - col. 18 line 20].

10. As to independent claim 13, Barbari teaches a Web server executable receiving a dynamic Web page generation request, and intercepting means for intercepting the request and routing the request from the Web server executable to a page server [col. 11 line 39 - col. 12 line 54 and col. 17 line 28 - col. 18 line 20].

11. Goldberg et al teach a WWW system having WWW clients and multiple servers, so that when a client request comes in, a first server communicates with a second server in order to process the request [fig. 2, pages 5-7].

12. As to independent claim 14, Barbari teaches a page server including receiving means for a dynamic Web page generation request and processing means for the request [col. 11 line 39 - col. 12 line 54 and col. 17 line 28 - col. 18 line 20].

13. Goldberg et al teach maintaining means for a connection cache to one or more data sources [page 6].

14. As to claim 15, Barbari teaches processing means for the request further includes dynamically retrieving means for data from the one or more data sources [col. 11 line 39 - col. 12 line 54 and col. 22 line 65 - col. 23 line 32].

15. Claims 1-10 are the corresponding method claims and claim 16 is the corresponding computer-readable medium claim of claims 11-15, and therefore, are rejected under the same rationale.

16. Further references of interest are cited on Form PTO-892 which is an attachment to this office action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rehana Perveen, whose telephone number is (703) 305-8476. The examiner can normally be reached Monday through Friday from 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas C. Lee, can be reached at (703) 305-9717. The fax phone number for this Group is (703) 308-5359.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-9600.

Rehana Perveen
June 30, 1997

CHRISTOPHER B. SHIN
PRIMARY EXAMINER
GROUP 2300

Notice of References Cited

Application No.	Applicant(s)		
08/636,477	LOWERY et al		
Examiner		Group Art Unit	Page 1 of 1
Rehana P. Krick		2317	

U.S. PATENT DOCUMENTS

	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS
A	5,532,838	7/2/96	Barbari	358	400
B	5,404,522	4/4/95	Carmon et al	395	650
C	5,452,460	9/19/95	Distelberg et al	395	700
D	5,392,400	2/21/95	Berkowitz et al	395	200
E	5,341,499	8/23/94	Doragh	395	700
F					
G					
H					
I					
J					
K					
L					
M					

FOREIGN PATENT DOCUMENTS

	DOCUMENT NO.	DATE	COUNTRY	NAME	CLASS	SUBCLASS
N						
O						
P						
Q						
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Beyond the Web: Excavating the Real World Via Mosaic

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THE MERCURY PROJECT.

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(To appear in the Second International WWW Conference, Chicago, IL, Oct 17-21, 1994.)

Abstract

This paper describes a Mosaic server that allows users to "leave the Web" and interact with the real world. An interdisciplinary team of anthropologists, computer scientists and electrical engineers collaborated on the project, desigining a system which consists of a robot arm fitted with a CCD camera and a pneumatic system. By clicking on an ISMAP control panel image, the operator of the robot directs the camera to move vertically or horizontally in order to obtain a desired position and image. The robot is located over a dry-earth surface allowing users to direct short bursts of compressed air onto the surface using the pneumatic system. Thus robot operators can "excavate" regions within the environment by positioning the arm, delivering a burst of air, and viewing the image of the newly cleared region. This paper describes the system in detail, addressing critical issues such as robot interface, security measures, user authentication, and interface design. We see this project as a feasibility study for a broad range of WWW applications.

Goals of the Project

WWW and Mosaic[1]-like servers provide a multi-media interface that spans all major platforms. Thousands of sites have been set up in the past year. Our goal with this project was to provide public access to a teleoperated robot, thus allowing users to reach beyond the digital boundaries of the WWW.

Such a system should be robust as it must operate 24 hours a day and it should be low in cost (we had an extremely limited budget). It is worth noting that the manufacturing industry uses the same criteria to evaluate robots for production. Thus our experience with RISC robotics (see below) proved helpful.

Our secondary goal was to create an evolving WWW site that would encourage repeat visits by users to collectively solve a puzzle. As of this writing we do not have sufficient data to report on the success of the "puzzle" component; therefore this paper focuses on the details of the implementation. We also speculate on how Mosaic might be used for other tele-operated applications.

Related Work

The first "teleoperated robots" were developed over 30 years ago. The basic objective has always been to develop systems capable of working in inhospitable environments (such as radiation sites). Teleoperation began with very simple mock-ups in nuclear power plants [Mos], progressing to more versatile setups for teleoperation of robots in space [Miz]. Over the last 20 years, the development of intuitively operable teleoperation tools has continued to play an important role in the development of robotics in general. The basic objectives have remained the same, even though the methods and technical limitations have changed.

Today, sophisticated "Telerobot Operator Control Stations" [Kan] are equipped with stereoimage-displays, "force reflecting hand controllers" and comprehensive video graphics support. The development of teleoperation stations is currently being pushed further with the help of latest graphics workstations to provide so-called "telepresence." Modern telepresence systems, considered to be pushing the frontier of research in this field, are defined as follows [Aki]: "At the worksite, the manipulator has the dexterity to allow the operator to perform normal human functions. At the control station, the operator receives sufficient quantity and quality of sensory feedback to provide a feeling of actual presence at theworksite."

The Mercury Project does not achieve this level of telepresence but provides a limited level of teleoperation. One of our goals was to provide "teleoperation for the masses." Instead of developing a highly sophisticated, multi-million-dollar testbed, we opted for a simple and reliable end-effector on a commercial robot. Combined with an intuitively operable man-machine-interface, the system gives all WWW users access to teleoperation.

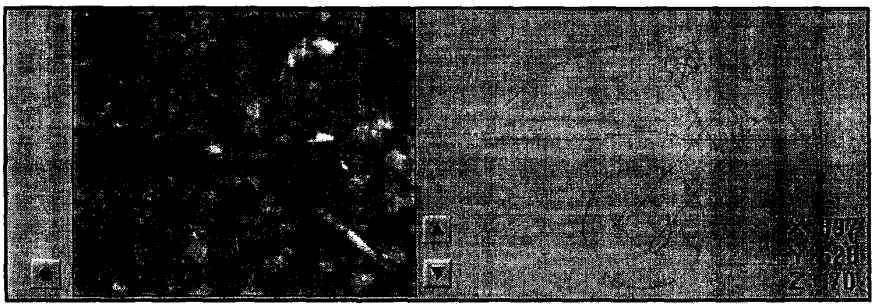
In the Discussion section, we describe a number of other WWW sites that offer interactive capabilities.

User Interface and Environment Design

The interface design for the system was challenging due to the limitations of the HTML/HTTP environment, as well as network traffic considerations. An effective system was created within such limitations by carefully designing the physical environment for the robot, and by fine-tuning the user-machine interface. For example, the initial idea of a live video feed from the camera was dropped in order to maintain compatibility with all visual clients on the Web. (Although we could have implemented some custom clients [2], we decided to stay within the limits of HTML/HTTP to reach as large a user base as possible, making this a truly global system.) In addition, initial simulations using a robot fitted with grippers (simulated in VIRTUS WALKTHROUGH) revealed a high degree of complexity in control functions [3], not suitable for the anticipated 5-10 seconds per frame page loading time, a 2D Mosaic window and a naive/untrained user.

The team chose instead to use a simple environment which would allow relatively easy control of the robot. Here the analogy taken from real world archaeology - using a dry-earth environment and compressed air bursts - allowed us to simplify the robot control dramatically. Thus users could be quickly trained in the operation of the system, through a simple "OperatorÕs Orientation" and a "Level 1 Clearance Test."

Even with a simplified system, users are still able to choose between fine and gross movements of the arm. Fine pitch movements are executed by clicking in the camera image, with the robot moving to center the arm over the X,Y coordinates of the click-point. Crude navigation is provided by clicking on a schematic picture of the robot and it's workspace, with the robot moving to center the arm over the click-point. Two buttons allow navigation in the Z axis (between "up" and "down" positions), with a button to blow air only active when at the Z=O (i.e., "down") position.



(Click to see an animated robot operation session in MPEG - 175K)

Other features of the system were designed to balance functionality with user needs. All HTML documents sent to the clients are carefully designed to minimize network traffic in order to get a high refresh rate. For example, control panel functions are clearly distinguished from text-based information documents. The ÒOperator's LogÓ was

implemented to create a forum for collaborative efforts to solve the puzzle/problem regarding the underlying logic which links the artifacts. (The ÒOperator's LogÓ is readable throughout the system but only writeable after completing an operating session.) A second entry path was also created to the system, which provides a "back-story" explaining the project while also hinting at possible "real world" uses of the system.

Access to the Robot

Most of the HTML documents seen by the user on our site are generated by a script running on the WWW server. Using a random token scheme described below, the system tracks each user as he or she proceeds through the interface and generates appropriate HTML documents. This allows the system to discriminate between "observers" and "operators" so that it presents only accessible options to each.

To operate the robot, the user must read the information on how to use the control panel, and then complete a level-1 clearance test to get a password. Since only one person can operate the robot at a time, the system maintains a queue of pending operators. A typical user will enter his/her password, and then add him/herself to the queue. Each time update button is clicked, the system updates the queue and returns a current status page. When the user's turn arrives, the screen returned is the live operators' control screen.

System Architecture

Below is a Block Diagram for the system. We start with an overview that necessarily glosses over many interesting details.

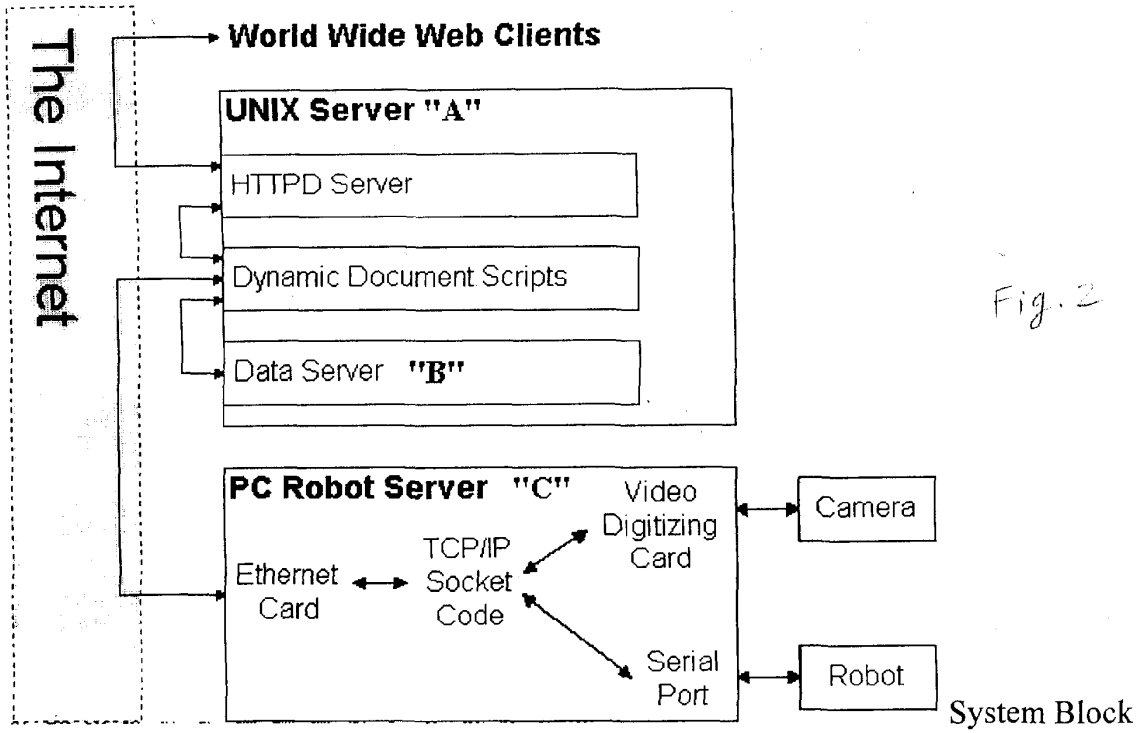


Fig. 2

System Block Diagram

At one end are WWW clients from around the world; at the other end is a robot arm combined with a camera. The robot and camera provide an updated image of the environment, which is combined with a schematic of the robot arm/workspace and control buttons to produce the final GIF image that is send to users.

At any given time there may be dozens of clients interacting with the system. Since there can only be one Operator at a time, one challenge is to keep track of which client is the operator.

The Mercury system is comprised of three communicating servers. The first, call it A, is a standard Mosaic server (NCSA httpd v.1.3, currently running on a Sun SPARCserver 1000, with SunOS Release 5.3. When the RTE Site is requested by an observer, the most recent image, which is stored on server A, is simply returned.

The database of registered users is handled by another server, call it B. In our case, Server B runs on the same machine as server A. The database server is custom programmed for this project, but performs fairly standard database functions.

When a client request comes in, Server A communicates with server B. If that client is an Operator, Server A must then communicate with a third server, call it C, that controls the robot. Server C runs on a Pentium-based PC and communicates with servers A and B via

the Internet. Server A decodes the ISMAP X&Y mouse coordinates, and sends them to server C.

On server C, a custom program decodes these coordinates into a robot command and verifies that the command is legal, e.g., within the robot workspace. If it is, this command is then converted into a robot command format which is sent to the robot over a serial line. Once the robot move is completed server C uses the CCD camera to capture a stable 8 bit 192x165 image of the workspace.

Using a simple set of equations for inverse kinematics server C then generates a schematic view of the robot in its new configuration. This schematic is combined with the camera image, and the up, down, and air control buttons to form a new composite image. Server C then compresses this image into GIF format and returns it to Server A, which updates the most recent image and returns it to the Operator client.

Subsystems

Random Tokens for Cache Avoidance and User Tracking

Following some complex and unwieldy tests, we implemented a random token scheme for tracking users as they use the system. Each time a URL is returned, a large random number is added to the path (which the NCSA HTTPD 1.3 server splits into the PATH_INFO environment variable). This "token" serves two purposes:

The first is to prevent the WWW client from caching the robot view. When a document is requested a second time during a session, it is much faster to swap in a local copy of the document rather than going back over the net to retrieve it a second time. Most implementations of Mosaic support such caching at various memory levels. However in our case we want to repeatedly retrieve the URL containing the robot image because it is updated continuously. In brief, we DON'T WANT users to cache this url. The random token makes each request look different and tricks the client into retrieving a fresh version of the document.

The second use for the token is to identify Operators. When an operator logs in with a correct password, the system begins tracking him/her as he/she moves from viewing the robot to being on the operators' queue to operating the robot. Since the same script is used for all views, the token allows the system to customize the result for every user depending on his/her position in the system.

Scripts

The robot view screen is controlled for the most part by one script at the HTTPD server.

Each call to the main script has a token attached to the URL. The token is decoded by the WWW server, and placed in the PATH_INFO environment variable. The main script then checks the token with the database server to determine the status of the user. Each check of the database generates a system update to keep the queue moving. The user's status is used to generate the custom system status page.

The robot image itself is only changed by the operator when he or she makes a move. Each image is date and time stamped, so WWW clients that cache the image will only retrieve the image when it changes (since its filename will be different, due to a different time stamp).

Due to the client-server architecture of the World Wide Web HTTPD protocol, The robot system (server) has no way to contact the client except at the client's prompting. From the user's point of view, once he or she gets the robot view screen, there is no way for the server to keep sending updates automatically as the robot is moved by the operator. The screen updates must be driven by the user. Since the user must trigger each update, we wanted to provide a button for doing so, since each web client handles reloading the page differently. Some sites have a "reload" hypertext link to the same page, but this doesn't work for any client that caches pages. If a page is being viewed, hitting reload will just re-display the page from the cache, thus not obtaining a new view from the system. Asking the user to disable his/her cache is also problematic, since not all clients allow this option.

One attempt was made to use a mini-form, since the submit button always calls a script and is not cached. that scheme was eventually dropped, since passing registered user identification information to the server via hidden fields only worked on some clients. Using the random token allows for an elegant interface.

Since the robot can only be controlled by one person at a time, a registration scheme was implemented to allow the server to track operators as they move on to the waiting queue and progress to controlling the robot. Since the server only knows the IP address of each user, some user information had to be incorporated into the HTML robot view document itself for re-transmission to the system when the user hits "reload." There are various techniques used by many sophisticated web systems to accomplish user identification between document requests, but we found some problems in many of the standard solutions. In the end, the random token served excellently as a means of identifying registered users.

A preliminary attempt was made to use a small form to identify the user. Hidden fields could hold the user id, but once again, many clients do not implement the hidden field attributes so the interface is cluttered by unnecessary fields. Putting the user's id information into the ACTION field of the form tag is also client dependent. Unfortunately, some clients strip that data before adding the encoded field information.

Since random tokens were already being passed with each update, the system was extended to track the tokens of each registered user. Each time the script is called, the token is exchanged for a new one, and the database is updated with the new token for registered users. One side effect is that the user can not use the client re-load button, since this will not use the new URL (it is embedded in the update HREF).

The Data Server

The data server ("B") is a custom Perl script that handles all of the database work for the project. It continuously runs as a TCP/IP listener, waiting for database transactions from the other system scripts. The data server runs as a single process, handling requests serially to maintain internal data integrity. Typically, transactions are very short, since the data is kept in main memory. The data server could be replaced by an off-the-shelf transaction based DB system in the future. A time-out is set to close the connection if there is too much time elapsed between commands. This was implemented because some WWW clients would crash in the middle of a document request, leaving the system waiting for the connection to be closed.

Internal Network Interface

The networking functionality required by the project was defined by two factors. On one hand, the camera that we purchased required a PC-based platform running an MicroSoft DOS or compatible operating system to run on Server C. On the other hand, the expected load of client requests required a machine capable of more heavy networking duties such as a Sun workstation (Server A). Currently Server A is located across campus from server C.

These servers are connected via Ethernet. Each machine has its own IP address and resides in the usc.edu domain. Communication is achieved using a socket connection between the two machines. The implementation on Server A was done using the standard BSD socket functions provided with the SunOS 4.1 operating system and Perl. On Server C we used a publicly available socket package called Waterloo TCP and Borland C. The Waterloo TCP package was obtained from the ftp site dorm.rutgers.edu in the file /pub/msdos/wattcp/wattcp.zip.

With this software Server A can request a socket connection to Server C to establish a connection. The first step in obtaining a new image is for Server A to write a command consisting of thirty bytes which encodes the (xy) coordinates of the ISMAP event. After Server C completes the moves and generates the new image, it writes the size of the new image to server A so that server A knows exactly how many bytes to expect. Server C then proceeds to write the entire image to the socket and waits for the socket to close to insure deliver of the data. Once server A has read all the specified bytes it closes the

socket. Server C is now ready and waiting for another socket connection. Server A is free to continue processing the Mosaic actions of the current users.

Current throughput is approximately 20 Kbytes/second, which is poor compared to the 0.5 megabyte per second rate that can be achieved between two Sun workstations in close proximity on the campus network. At this time we feel that the delays are being imposed by the MS-DOS operating system because of it's inability to support networking operations and its lack of multitasking abilities, which necessitates busy waiting cycles in the PC software to obtain concurrence between the robotic/camera operations and the networking duties.

Our low data rate is somewhat tolerable because the time for communication between Servers A and C is small compared with Internet delays between clients and server A. One way to speed communication would be to use different methods of image compression such as JPEG to reduce the size of the image. However this may introduce latency due to encoding.

The IBM Robot and Server "C"

The robot we're using is an IBM SR5427 SCARA arm, built around 1980.

SCARA stands for "Selective Compliance Assembly Robot Arm" . Robots with SCARA kinematics are common in industrial assembly for "pick-and-place" operations because they are fast, accurate and have a large 2.5D workspace. However, the SCARA arm can only rotate its gripper about the vertical (Z) axis. We selected this robot over other robots in our lab due to it's excellent durability, large workspace, and because it was gathering dust in the Robot Education Lab.

The IBM SCARA robot is controlled through a 4800 baud serial port by a custom written C library constructed with reference from IBM's BASIC library distributed along with the robot. The commands sent by the library are simple instructions consisting of instruction id, length, data and checksum. The data length and content varies depending on instruction id. The IEEE floating point format is used to represent the necessary data. This command string is then sent over the serial line to the robot to issue the command.

Unfortunately IBM no longer supports this robot and we were forced to read two antiquated BASIC programs and monitor their serial line transmissions to decipher the protocols needed for serial control of the robot. The robot accepts XYZ and Theta commands using IEEE format and checksums. Server C now runs on a Pentium based PC with all custom code written in Borland C.

The first step was implementing a local graphical user interface to control robot movements and monitor subsequent functions such as network flow. We chose two

views of the workspace: a global schematic view for coarse motions, and a local camera view for fine motions. Note that a click on the camera image requires a different relative move if the camera is in the up or down position. To handle it, we implemented an empirical calibration program.

The major difficulty in implementing Server C was to schedule response to the network, the local mouse, and the image capture board. At first we discussed a multi-tasking environment but, upon further study, we realized we could achieve this cooperation within a single DOS task. Another problem, inherent to DOS based applications, is memory management. This complication was solved by careful usage of memory and by utilizing the screen itself as a memory buffer. This careful usage of memory enabled the custom written GIF encoder to use more memory which, combined with an appropriate hash function, sped the GIF encoding process up to a few microseconds.

In future versions of Mercury, we plan to incorporate a more sophisticated PC-based robot simulation system based on COSIMIR [Fre] from the University of Dortmund.

Camera

We are using an EDC 1000 digital CCD camera from Electrim Inc. This camera was chosen based on size and cost. Image data is sent from the camera back through a serial line into a video capture card. The picture captured is always 192 by 165 pixels with 256 shades of gray. The image size and gray shades are fixed. Focus and contrast are manually adjusted. Exposure time can be changed by software to range between 1/200 th to 1/64 th of a second. 1/150th exposure was used to reduced light streaking that the camera is prone to.

Although the robot's control system quickly dampens oscillation about the destination point, dynamic effects can cause image blur. Two solutions were implemented. First the robot was slowed down enough as to reduce some of the vibration but not to hinder the robot access speed considerably. Second, once the robot responds positively to an issued command, the camera captures two pictures each at 1/64 th of a second. These two images are compared to determine a factor of similarity. If this factor is below some set value the image is presumed to be stable, otherwise subsequent pictures are taken until the image pair is determined to be stable. More then 5 trials results in a time-out in which case the most current image is used and the program continues. This image comparison procedure reduces movement streaks seen in pictures of moving objects.

Lighting the workspace has been problematic. The work space is primarily luminated by standard florescent ceiling fixtures and augmented by two additional florescent lamps to reduce shadows and raise the overall ambient light levels. We tested a contrast enhancement routine to normalize the lighting of each image captured from the camera. This increased the visual aesthetics of the image but subjected it to drastic light and dark

changes as the robot moved onto different objects with different light reflecting qualities. In response, a global lighting adjustment was implemented but found to reduce certain areas to unacceptable darkness. Certainly a better lighting system is required.

Due to the manual focus adjustment of the camera, the focus adjustment could not be changed between the up and down position of the camera. This resulted in a compromise focus adjustment that is not perfect for the up or down position of the robot arm, but accepatable in both positions.

To decrease compressed image size and thus increase network transfer rate the image is reduced from 256 to 64 gray scales since most systems available can only display 256 colors or 64 shades of gray. Thus the gray scale reduction did not reduce image quality but reduced compressed image size by about 10K.

Robustness and Soft Resets

All robot motions are monitored by Server C. Each command sent to the robot is verified to be within the robot's workspace. Acknowledgments from the robot are monitored to detect errors. When an error is detected, Server C automatically resets the robot controller, recalibrates, and returns the robot to its previous position.

Performance

History and Statistics

Daily statistics are available and may be correlated with project milestones. As of the writing of this paper, the system has been online for over 4 weeks and there are approximately 100 users per day. There is also a list of all hosts that have visited the system. As of this writing the system has been visted by hosts from all of the major continents except the polar caps.

Refresh Rates via Ethernet

System response time seems to be mostly dependent on network link speeds. Locally, we get screen refreshes at rates of 5-10 seconds per page. Similar response times have been reported from Europe. Obviously, a slow local link or SLIP connection will drastically affect the update speed, since the robot control image is essential to the system. Updates are also strongly affected by the speed of the WWW client application.

Uptime

The system is designed for 24 hour use. The WWW server scripts are generally

modified, tested and then loaded into the running system. Background programs monitor the system and notify the team members if there are problems.

Operators' Logs

When an operator has finished driving, he or she is prompted to make a textual entry into an "Operator's log". The Operator's log provides an ongoing forum for discussion of the system and record of artifacts discovered in the sand.

For example, several skeptics have claimed that the system is an elaborate hoax where all images are taken from a prestored library (much like the celebrated Apollo Moonwalk hoax of 25 years ago). We have had encouraging comments from the robotics community, including several researchers at NASA.

Discussion and Future Applications:

This project is an initial step in an ongoing educational and research project at the University of Southern California. It brings together faculty and students of different backgrounds to collaborate in the design and implementation of a networked system that combines robotics with archaeology and interactive art.

This system exemplifies RISC Robotics, which advocates Reduced Intricacy in Sensing and Control. The SCARA-type robot requires only 4 axes, is relatively inexpensive and robust, and it is easy to avoid singularities. The end effector we've used here is also about the minimum. For more on RISC as applied to industrial robotics, please see RISC for Industrial Robots: Recent Results and Open Problems, (with J. Canny),1994 IEEE Conference on Robotics and Automation.

We see the project leading in several directions. For Mosaic and the WWW, the required interface design prompted new developments related to several issues, including user authentication, user queuing and interface security (as discussed above).

For this project we chose a very simple application. The server can be extended to a variety of platforms that permit remote inspection and manipulation of objects -- for example, providing unique and unedited access and views of priceless and otherwise inaccessible resources (a Grecian urn, a Gutenberg Bible, etc.), thus providing an alternative to pre-stored libraries which are limited in terms of perspective, depth of resolution, etc. (Cite Recent NY Times article on the Metropolitan Museum of Art).

Further extensions for this project might include: the robot could be placed out in the field, in a remote anthropological site or on the moon; the camera could be replaced with a scanning electron microscope; or the remote operator could be a doctor examining a

patient or a specialist performing remote inspection or manufacturing. All of these areas also have significant implications for education, as they present the opportunity for virtual "field trips" to a live site while permitting remote manipulation from the classroom.

Anthropologists have conventionally recorded the diverse cultural heritage of humankind by means of varied media: written text, graphics, film, sound and still images. The advantage of a system like the one described in this paper lies in the fact that you do not have to rely on prerecorded media. It enables the user to view and possibly record her or his own "slice of reality". We see the Web as a perfect medium for updating pre-recorded media as described in [Mas] Interactive Education: Transitioning CD-ROMs to the WEB, a paper presented at the First WWW Conference, Geneva 94. Furthermore, we now have the possibility to combine updateable prerecorded media of all sorts with live recordings and live remote interactions. The possibilites of a system that combines global access to up-datable prerecorded media and combines it with the possibility of live remote interactions are just beginning to unfold, and are a central focus of interest for the anthropologists from the E-LAB involved in this project.

In view of other interactie WWW sites, we propose a three-tiered system describing interactively on the WWW. Under Level I, interaction is solely between digital information stored on computers or created by scripts running on such machines, and connected or communicating with the WWW and Mosaic clients. In Level II sites, the clients are able to observe the "real world" by means of a camera observing and digitizing visual and, hopefully soon, audio-visual information. The camera acts as an "eye" for the Web, providing multiple "real world images" from a global theater. A number of Web sites fall into this category, such as the Coffee Pot and the Fishtank sites. All have the same characteristic of passively observing the real world. We also know of one restricted site that allows the user to alter the user's point of view (see LEGO pan and tilt site.)

The Mercury Project introduces a third level. Level III sites reach beyond the digital domain to allow users to alter a remote physical environment. We envision this project as a first glimpse into the possibilities available at Level III. We might also speculate about other levels, which might allow remote users to control a mobile robot and thus "tele-ambulate".

Footnotes

[1]
To simplify we mention only Mosaic as a WWW client but we are aware of the fact that there are different WWW clients similar to Mosaic, e.g. MacWeb, Cello, etc.

[2]
MBONE broadcasting, REFERENCE to MIT LIVE VIDEO SITE [diversion -

possible fixes to client refresh problem to show we know about the X stuff etc.] There are two possible fixes to this problem, One is to release specially modified clients that set up a two-way communication, the second is to use some other software to display the current system on the user's client workstation. Since many clients are used to view the WWW, making modifications would be difficult, especially since they are being updated all the time. Even if source code could be obtained for every major client, changes would have to made to every release of all these be on each release of these applications, The second possibility is to write a separate program to run on the clients' workstation. The problem here is to write a robots client that can be released for enough platforms to be useful, Since this would be an esoteric piece of the system, it is not likely that other sites would customize the software for different systems like is done for the major systems. One technique is to use the X windows protocol to display a client application on the users workstation running an X server. (weather, movies) We felt that this would be a limited audience, however. It also may compromise security from the user's point of view. Both these approaches may be attempted in version 2.0 of the system to allow more enhanced use of the system for some users. The HTTPD protocol could be extended to allow these sort of connections, though - maybe we need a new protocol for passing media only back that doesn't have all the hooks into system calls like X Windows and Display PostScript.

[3]

3D control of a robot needs: 3 dimensions of spatial movement, 3 dimensions of orientation and 1 to 3 dimensions of gripper control.

Acknowledgments

- Rick Lacy, Mark Brown, and the Center for Scholarly Technology,
- Depts. of CS and Anthro,
- Prof. Peter Danzig (CS)
- The alpha and beta testers
- The Laika Foundation
- The Los Angeles Museum of Miniatures

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   ___ Mylar, velum paper is not acceptable (too thin). Fig(s) _____
5. SIZE OF PAPER. 37 CFR 1.84(f): Acceptable sizes:
   21.6 cm. by 35.6 cm. (8 1/2 by 14 inches)
   21.6 cm. by 33.1 cm. (8 1/2 by 13 inches)
   21.6 cm. by 27.9 cm. (8 1/2 by 11 inches)
   21.0 cm. by 29.7 cm. (DIN size A4)
   ___ All drawing sheets not the same size. Sheet(s)_____
   ___ Drawing sheet not an acceptable size. Sheet(s) _____
6. MARGINS. 37 CFR 1.84(g): Acceptable margins:

Paper size

21.6 cm. X 35.6 cm. (8 1/2 X 14 inches)	21.6 cm X 33.1 cm. (8 1/2 X 13 inches)	21.6 cm. X 27.9 cm. (8 1/2 X 11 inches)	21.0 cm. X 29.7 cm. (DIN Size A4)
T 5.1 cm. (2")	2.5 cm. (1")	2.5 cm. (1")	2.5cm.
L .64 cm. (1/4")	.64 cm. (1/4")	.64 cm. (1/4")	2.5 cm.
R .64 cm. (1/4")	.64 cm. (1/4")	.64 cm. (1/4")	1.5 cm.
B .64 cm. (1/4")	.64 cm. (1/4")	.64 cm. (1/4")	1.0 cm.

   Margins do not conform to chart above.
   Sheet(s) 1 2
   X Top (T) ___ Left (L) ___ Right (R) X Bottom (B)
7. VIEWS. 37 CFR 1.84(h)
   REMINDER: Specification may require revision to correspond to drawing changes.
   ___ All views not grouped together. Fig(s)_____
   ___ Views connected by projection lines or lead lines. Fig(s)_____
   Partial views. 37 CFR 1.84(h) 2
   ___ View and enlarged view not labled separatly or properly. Fig(s)_____
   Sectional views. 37 CFR 1.84 (h) 3
   ___ Hatching not indicated for sectional portions of an object. Fig(s)_____
   ___ Cross section not drawn same as view with parts in cross section with regularly spaced parallel oblique strokes. Fig(s)_____
8. ARRANGEMENT OF VIEWS. 37 CFR 1.84(i)
   ___ Words do not appear on a horizontal, left-to-right fashion when page is either uptight or turned so that the top becomes the right side, except for graphs. Fig(s)_____
9. SCALE. 37 CFR 1.84(k)
   ___ Scale not large enough to show mechanism with crowding when drawing is reduced in size to two-thirds in reproduction. Fig(s)_____
   ___ Indication such as "actual size" or scale 1/2" not permitted. Fig(s)_____
10. CHARACTER OF LINES, NUMBERS, & LETTERS. 37 CFR 1.84(l)
   ___ Lines, numbers & letters not uniformly thick and well defined, clean, durable, and black (except for color drawings). Fig(s)_____
11. SHADING. 37 CFR 1.84(m)
   ___ Solid black shading areas not permitted. Fig(s)_____
   ___ Shade lines, pale, rough and blurred. Fig(s)_____
12. NUMBERS, LETTERS, & REFERENCE CHARACTERS. 37 CFR 1.84(p)
   ___ Numbers and reference characters not plain and legible. 37 CFR 1.84(p)(l) Fig(s)_____
   ___ Numbers and reference characters not oriented in same direction as the view. 37 CFR 1.84(p)(l) Fig(s)_____
   ___ English alphabet not used. 37 CFR 1.84(p)(2) Fig(s)_____
   ___ Numbers, letters, and reference characters do not measure at least .32 cm. (1/8 inch) in height. 37 CFR(p)(3) Fig(s)_____
13. LEAD LINES. 37 CFR 1.84(q)
   ___ Lead lines cross each other. Fig(s)_____
   ___ Lead lines missing. Fig(s)_____
14. NUMBERING OF SHEETS OF DRAWINGS. 37 CFR 1.84(t)
   ___ Sheets not numbered consecutively, and in Arabic numerals, beginning with number 1. Sheet(s)_____
15. NUMBER OF VIEWS. 37 CFR 1.84(u)
   ___ Views not numbered consecutively, and in Arabic numerals, beginning with number 1. Fig(s)_____
   ___ View numbers not preceded by the abbreviation Fig. Fig(s)_____
16. CORRECTIONS. 37 CFR 1.84(w)
   ___ Corrections not made from prior PTO-948. Fig(s)_____
17. DESIGN DRAWING. 37 CFR 1.152
   ___ Surface shading shown not appropriate. Fig(s)_____
   ___ Solid black shading not used for color contrast. Fig(s)_____

COMMENTS:

ATTACHMENT TO PAPER NO. 3 REVIEWER _____ DATE 6/10/96

Copy

OIPE OCT 07 1997 PATENT & TRADEMARK OFFICE

Attorney's Docket No.: 02577.P001 PATENT

#4/A BH 10-16-97

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Keith Lowery, et al.

U.S. Serial No: 08/636,477

Filed: April 23, 1996

For: MANAGING WEB SITES AND DYNAMIC WEB PAGE GENERATION REQUESTS (as amended)

Examiner: Krick, R.

Art Unit: 2317

Assistant Commissioner For Patents
Washington, D.C. 20231

AMENDMENT PURSUANT TO 37 C.F.R. § 1.111

Dear Sir:

In response to the Office Action mailed July 3, 1997, please enter this Amendment and consider the following remarks in accordance with the provisions of 37 C.F.R. § 1.111.

IN THE TITLE:

Please replace the title with the following:

--Managing Web Sites and Dynamic Web Page Generation Requests--

IN THE CLAIMS:

Please amend the claims as follows:

1. (Twice Amended) A computer-implemented method for managing a dynamic Web page generation request to a Web server, said computer-implemented method comprising the steps of:

routing said request from said Web server to a page server, said page server receiving said request and releasing said Web server to process other requests;

processing said request, said processing being performed by said page server [concurrently with said Web server, as] while said Web server concurrently processes said other requests; and

dynamically generating a Web page in response to said request, said Web page including data dynamically retrieved from one or more data sources.

~~16.~~ (Twice Amended) [An article of manufacture comprising a computer readable medium having computer instructions embodied therein for causing a processor to manage a dynamic Web page generation request to a Web server, said computer instructions in said article of manufacture causing said processor] A machine readable medium having stored thereon data representing sequences of instructions, which when executed by a computer system, cause said computer system to perform the steps of:

routing [said] a dynamic Web page generation request from [said] a Web server to a page server, said page server receiving said request and releasing said Web server to process other requests;

processing said request, said processing being performed by said page server while said Web server concurrently processes said other requests; and

dynamically generating a Web page, said Web page including data retrieved from one or more data sources.

REMARKS

Applicants respectfully request consideration of the subject application as amended herein. This Amendment is submitted in response to an Office Action dated July 3, 1997. Claims 1-16 stand rejected. In this Amendment, the title of the invention has been replaced and Claims 1 and 16 have been amended

In the July 3, 1997, Office Action, the Examiner objected to the title of the invention as not being descriptive. Applicants have amended the title of the invention to overcome the Examiner's objection. The Examiner also rejected Claims 1-16 under 35 U.S.C. §103 as being unpatentable over Barbari ("Barbari" U.S. Patent No. 5,532,838) in view of Goldberg et al. "Beyond the Web: Excavating the Real World Via Mosaic" ("Goldberg). Applicants respectfully traverse the Examiner's contention that the combination of these references renders the claimed invention unpatentable.

Applicants respectfully contend that neither Barbari nor Goldberg apply to the presently claimed invention. More specifically, Barbari does not teach the invention substantially as claimed, as submitted by the Examiner. Instead, Barbari is directed at a "computerized system for dynamically creating a document from a database responsive to telephonic input from a remote user, and transmitting the document to the user's facsimile machine" (Barbari, Abstract).

Barbari thus simply describes a particular type of database application. The use of databases to store information, and the use of applications to retrieve this information from the database is well known in the art. Additionally, the use of applications to dynamically create lists of information is also well known in the art. Barbari purports to apply this generally well

known techniques to allowing an individual to access a database using a telephone, to direct queries to the database that results not in the transmission of a "canned" or pre-defined message but in a document created and formatted suitable to the individual's specific needs, and then have that document transmitted to a facsimile receiving unit to which the individual has access.

There is no teaching or suggestion in Barbari that remotely resembles the presently claimed invention. Specifically, the present invention is directed at managing Web sites and dynamic Web page generation. The actual creation of dynamic Web pages via CGI applications is known in the art, as described under the heading "Description of related art" in the application (Pages 1-3). Page 3, lines 8-10, describes that "existing development tools are limited in their capabilities to facilitate dynamic Web page generation, and do not address the issue of managing Web requests or Web sites." Thus, the focus of the claimed invention is clearly not in the generation or creation of dynamic Web pages but rather at the management of Web requests or Web sites.

There is no teaching or suggestion in Barbari for managing Web requests or Web sites. Additionally, there is no support in Barbari for the Examiner's contention that Barbari teaches using a "page server" as claimed. Barbari does not teach, for example, receiving a request on a page server and releasing the Web server to process other requests, as claimed. A page server in the context of the presently claimed invention is not simply a server that has "pages" on it, as is the "page server" in Barbari. Instead, as illustrated in Figure 4 and described in the specification on Pages 10-14, a page server according to one embodiment of the presently claimed invention intercepts

Web requests from a Web client and appropriately routes the requests after releasing the Web server to service other requests.

More specifically, the page server interacts with the Web server via an interceptor an a dispatcher. As described in the specification, when a Web request is made to a Web server, the interceptor intercepts the request and routes the request to the dispatcher. The dispatcher receives the request and dispatches the request to one of multiple page servers. The dispatcher maintains a variety of information regarding each page server on the network and dispatches the requests based on this information. There is no teaching or suggestion in Barbari for this type of "page server" or this type of interaction between a Web server and a page server.

The combination of Goldberg with Barbari also does not teach the claimed invention. Goldberg does not remotely address the issue of managing Web requests. Instead, Goldberg simply describes "a teleoperated robot" that allows users to reach beyond the digital boundaries of the Web (Goldberg, Page 1). The Examiner points to a portion of Goldberg that describes a first server communicating with a second server. Communications between servers on a network is known in the art. The claimed invention is not addressed to a first server communicating with a second server but rather to managing requests from a client to a Web server with the use of page servers. The combination of Barbari with Goldberg therefore does not render the claimed invention unpatentable. Applicants respectfully submit that Barbari and Goldberg, alone or in combination, do not apply to the presently claimed invention and therefore do not render the claimed invention unpatentable. As such, and request the Examiner to withdraw the rejection to the claims under 35 U.S.C. §103.

In conclusion, it is respectfully submitted that in view of the amendments and remarks set forth herein, that all objections and rejections have been overcome. All claims are now in condition for allowance and such action is earnestly solicited.

If there are any additional charges, please charge them to our Deposit Account Number 02-2666. If a telephone conference would facilitate the prosecution of this application, the Examiner is invited to contact Jim H. Salter at (408) 720-8598.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Date: 10/1, 1997

James H. Salter
Registration Number: 35,668

12400 Wilshire Boulevard
Seventh Floor
Los Angeles, CA 90025-1026
(408) 720-8598

FIRST CLASS CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231 on October 1, 1997

Date of Deposit
Cindy Murphy
Name of Person Mailing Correspondence

Signature 10-1-97 Date

OIPE OCT 07 1997 PATENT & TRADEMARK OFFICE

Attorney's Docket No.: 02577.P001 Patent

In the Application of: Keith Lowery, et al.
(inventor(s))

Application No.: 08/636,477

Filed: April 23, 1996

For: MANAGING WEB SITES AND DYNAMIC WEB PAGE GENERATION REQUESTS (as amended)
(title)

ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

SIR: Transmitted herewith is an Amendment for the above application.

_____ Small entity status of this application under 37 C.F.R. §§ 1.9 and 1.27 has been established by a verified statement previously submitted.

_____ A verified statement to establish small entity status under 37 C.F.R. §§ 1.9 and 1.27 is enclosed.

XX No additional fee is required.

_____ _____

The fee has been calculated as shown below:

	(Col. 1) Claims Remaining After Amd.		(Col. 2) Highest No. Previously Paid For	(Col. 3) Present Extra	SMALL ENTITY Rate	SMALL ENTITY Additional Fee	OTHER THAN A SMALL ENTITY Rate	OTHER THAN A SMALL ENTITY Additional Fee
Total Claims	* 20	Minus	** 20	0	x11	$	x22	$
Indep. Claims	* 6	Minus	*** 6	0	x40	$	x80	$
☐	**First Presentation of Multiple Dependent Claim(s)**				**+130**	**$**	**+260**	**$**
					Total Add. Fee	$	Total Add. Fee	$0

* If the entry in Col. 1 is less than the entry In Col. 2, write "0" in Col. 3.

** If the "Highest No. Previously Paid For" IN THIS SPACE is less than 20, write "20" in this space.

*** If the "Highest No. Previously Paid For" IN THIS SPACE is less than 3, write "3" in this space. The "Highest No. Previously Paid For" (Total or Independent) is the highest number found from the equivalent box in Col. 1 of a prior amendment or the number of claims originally filed.

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on October 1, 1997
Date of Deposit

Cindy Murphy
Name of Person Mailing Correspondence

Cindy Murphy 10-1-97
Signature Date

_____ A check in the amount of $_____ is attached for presentation of additional claim(s).
_____ Applicant(s) hereby Petition(s) for an Extension of Time of _____ month(s) pursuant to 37 C.F.R. § 1.136(a).
_____ A check for $_____ is attached for processing fees under 37 C.F.R. § 1.17.
_____ Please charge my Deposit Account No. 02-2666 the amount of $_____.
A duplicate copy of this sheet is enclosed.
_X_ The Commissioner of Patents and Trademarks is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 02-2666 **(a duplicate copy of this sheet is enclosed)**:
_X_ Any additional filing fees required under 37 C.F.R. § 1.16 for presentation of extra claims.
_X_ Any extension or petition fees under 37 C.F.R. § 1.17.

BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP

Date: 10/4/97

James H. Salter

Reg. No. 35,668

Seventh Floor
Los Angeles, California 90025
(408) 720-8598

01/2317



Attorney Docket No.: 02577.P001 Patent

In re the application of: Keith Lowery, et al.
(inventor(s))

Application No.: 08/636,477

Filed: April 23, 1996

For: MANAGING WEB SITES AND DYNAMIC WEB PAGE GENERATION REQUESTS (as amended)
(title)

ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

SIR: Transmitted herewith is an Amendment for the above application.

_____ Small entity status of this application under 37 C.F.R. §§ 1.9 and 1.27 has been established by a verified statement previously submitted.

_____ A verified statement to establish small entity status under 37 C.F.R. §§ 1.9 and 1.27 is enclosed.

__XX__ No additional fee is required.

_____

The fee has been calculated as shown below:

	(Col. 1) Claims Remaining After Amd.		(Col. 2) Highest No. Previously Paid For	(Col. 3) Present Extra	SMALL ENTITY Rate	SMALL ENTITY Additional Fee	OTHER THAN A SMALL ENTITY Rate	OTHER THAN A SMALL ENTITY Additional Fee
Total Claims	* 20	Minus	** 20	0	x11	$	x22	$
Indep. Claims	* 6	Minus	*** 6	0	x40	$	x80	$
☐ First Presentation of Multiple Dependent Claim(s)					+130	$	+260	$
					Total Add. Fee	$	Total Add. Fee	$0

* If the entry in Col. 1 is less than the entry In Col. 2, write "0" in Col. 3.

** If the "Highest No. Previously Paid For" IN THIS SPACE is less than 20, write "20" in this space.

*** If the "Highest No. Previously Paid For" IN THIS SPACE is less than 3, write "3" in this space. The "Highest No. Previously Paid For" (Total or Independent) is the highest number found from the equivalent box in Col. 1 of a prior amendment or the number of claims originally filed.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

on October 1, 1997
Date of Deposit

Cindy Murphy
Name of Person Mailing Correspondence

Cindy Murphy
Signature

10-1-97
Date

_____ A check in the amount of $_____ is attached for presentation of additional claim(s).
_____ Applicant(s) hereby Petition(s) for an Extension of Time of _____ month(s) pursuant to 37 C.F.R. § 1.136(a).
_____ A check for $_____ is attached for processing fees under 37 C.F.R. § 1.17.
_____ Please charge my Deposit Account No. 02-2666 the amount of $_____.
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_X_ The Commissioner of Patents and Trademarks is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 02-2666 **(a duplicate copy of this sheet is enclosed)**:
_X_ Any additional filing fees required under 37 C.F.R. § 1.16 for presentation of extra claims.
_X_ Any extension or petition fees under 37 C.F.R. § 1.17.

Date: 10/1/97

BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP

James H. Salter

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Los Angeles, California 90025
(408) 720-8598

OIPE JC29 NOV 21 1997 PATENT & TRADEMARK OFFICE

GP - 2317

#5 12/1/97

Attorney's Docket No. 02577.P001 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Patent Application of:	)	
Keith Lowery, et al.	)	Examiner: Krick, R.
Application No.: 08/636,477	)	Art Unit: 2317
Filed: April 23, 1996	)	
For: Method And Apparatus For Creating And Managing A Custom Web Site	)	

Assistant Commissioner for Patents
Washington, D.C. 20231

INFORMATION DISCLOSURE STATEMENT

Sir:

Enclosed is a copy of Information Disclosure Citation Form PTO-1449 together with copies of the documents cited on that form. It is respectfully requested that the cited documents be considered and that the enclosed copy of Information Disclosure Citation Form PTO-1449 be initialed by the Examiner to indicate such consideration and a copy thereof returned to applicant(s).

Pursuant to 37 C.F.R. § 1.97, the submission of this Information Disclosure Statement is not to be construed as a representation that a search has been made and is not to be construed as an admission that the information cited in this statement is material to patentability.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to the Assistant Commissioner for Patents, Washington, D. C. 20231 on November 17, 1997.
(Date of Deposit)

Cindy Murphy
(Typed or printed name of person mailing correspondence)

(Signature of person mailing correspondence)

Pursuant to 37 C.F.R. § 1.97, this Information Disclosure Statement is being submitted under one of the following (as indicated by an "X" to the left of the appropriate paragraph):

_____ 37 C.F.R. §1.97(b).

_____ 37 C.F.R. §1.97(c). If so, then enclosed with this Information Disclosure Statement is one of the following:

XXX A certification pursuant to 37 C.F.R. §1.97(e) or

____ A check for $240.00 for the fee under 37 C.F.R. § 1.17(p).

_____ 37 C.F.R. §1.97(d). If so, then enclosed with this Information Disclosure Statement are the following:

(1) A certification pursuant to 37 C.F.R. §1.97(e);

(2) A petition requesting consideration of the Information Disclosure Statement; and

(3) A check for $_____ for the fee under 37 C.F.R. §1.17(i) for submission of the Information Disclosure Statement.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: 11/14, 1997

James H. Salter
Reg. No. 35,668

12400 Wilshire Blvd.
Seventh Floor
Los Angeles, CA 90025-1026
(408) 720-8598

OIPE JC29 NOV 21 1997 PATENT & TRADEMARK OFFICE

Sheet 1 of 1

Form PTO-1449 (REV. 8-83)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY. DOCKET NO. 02577.P001	SERIAL NO. 08/636,477
INFORMATION DISCLOSURE CITATION		APPLICANT Lowery, et al.	
(Use several sheets if necessary)		FILING DATE 4-23-96	GROUP 2782 ~~2317~~

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
AP		5 4 0 4 5 2 3	4/4/95	DellaFera, et al.	395	650	11/10/93

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

			PCT International Search Report, 8-21-97

EXAMINER	DATE CONSIDERED
	12/9/97

*EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US97/06840

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :H04N 1/00; G06F 17/00
US CL :358/400, 403, 442,444; 395/200.01, 671, 675
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 358/400, 403, 442,444; 395/200.01, 671, 675

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

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

Please See Extra Sheet.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,P	US, 5,532,838 A (BARBARI) 02 July 1996, the abstract, col. 11 line 39 - col. 12 line 54, and col. 17 line 28 - col. 18 line 50	1-16
A	US, 5,452,460 A (DISTELBERG ET AL) 19 September 1995, the abstract and col. 5 line 5 - col. 6 line 12	1-16
A	US, 5,404,523 A (DELLAFERA et al) 04 April 1995, the abstract and col. 4 line 33 - col. 6 line 24	1-16
A	US, 5,392,400 A (BERKOWITZ ET AL) 21 February 1995, the abstract and col. 1 line 62 - col. 2 line 59	1-16

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 30 JUNE 1997	Date of mailing of the international search report 21 AUG 1997
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer THOMAS C LEE Telephone No. (703) 305-9717

Form PCT/ISA/210 (second sheet)(July 1992)*

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US97/06840

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, 5,341,499 A (DORAGH) 23 August 1994, the abstract and col. 3 line 12 - col. 4 line 23	1-16
Y	GOLDBERG ET AL, Second International WWW Conference, Oct 17-21, 1994, "Beyond the Web: E xcavating the Real World Via Mosaic", pages 1-15, especially pages 5-7	1-16

Form PCT/ISA/210 (continuation of second sheet)(July 1992)*

UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/636,477	04/23/96	LOWERY K	02577.P001

LM21/1231

JAMES H SALTER
BLAKELY SOKOLOFF TAYLOR ADN ZAFMAN
12400 WILSHIRE BOULEVARD
7TH FLOOR
LOS ANGELES CA 90025

EXAMINER	
KRICK,R	
ART UNIT	**PAPER NUMBER**
2782	60

DATE MAILED: 12/31/97

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

PTO-90C (Rev. 2/95)

1- File Copy

Office Action Summary	Application No. 08/636,477	Applicant(s) LOWERY et al
	Examiner Rehana Perveen	Group Art Unit 2317

☒ Responsive to communication(s) filed on *Oct 7, 1997*.

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire *3* month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) *1-16* is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) *1-7 and 11-16* is/are rejected.

☒ Claim(s) *8 and 9* is/are objected to.

☒ Claims *10* are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐approved ☐disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- *SEE OFFICE ACTION ON THE FOLLOWING PAGES* ---

Response to Amendment

1. Claims 1 and 16 have been amended by applicant's amendment (A) filed on 07 October 1997. The following rejections now apply.

Election/Restriction

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-9 and 11-16, drawn to system and method for managing and routing requests, classified in class 395, subclass 200.68.

II. Claim 10, drawn to method for managing and recreating a site at a new location, classified in class 395, subclass 200.53.

3. Claims 1-9 and 11-16 are being considered in this application in order to expedite prosecution of this application.

4. Claims 8 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten

in independent form including all of the limitations of the base claim and any intervening claims.

5. Claims 1-7 and 11-16 are rejected under 35 U.S.C. § 103 as being unpatentable over Irwin et al, patent no. 5,404,527.

6. As to claim 11, Irwin et al teach the claimed invention substantially as claimed, including a data processing ['DP'] as claimed, comprising: one or more data sources (computer systems 50 or 60, fig. 1, col. 3 lines 52-62), a page server having a processing means (computer system 50 or 60, fig. 1 col. 3 lines 52-54), a first computer system including generation means for a request (PC 20, 30, or 40, fig. 1, col. 3 lines 32-35 and 48-51), a second computer system including receiving means for the request from the first computer (interface processor 10, fig. 1, col. 3 lines 50-54), the second computer system (interface processor) also including a router (intercept means) for routing the request from the second computer system to the page server (col. 3 lines 52-62 and col. 13 lines 23-34), the page server receiving the request and releasing the second computer

system to process other requests (inherently, interface processor is able to process other requests, col. 13 lines 35-42), the page server processing means processing the request and dynamically generating a response to the request (providing boot services, col. 14 lines 22-27), and the response including data dynamically retrieved from the one or more data sources (col. 13 lines 35-42).

7. However, Irwin et al do not **explicitly** teach a WWW system implementing the disclosed invention.

8. It would have been obvious for one of ordinary skill in the art at the time of the invention to modify teachings of Irwin et al and implement it into a WWW environment because using Irwin et al's request processing system in a WWW system would have increased efficiency and throughput of existing WWW systems.

9. As to claim 12, Irwin et al teach the router includes an interceptor intercepting the request at the second computer system and routing the request (interceptor means in interface processor and routing to selected computer

system, fig. 1, col. 13 lines 23-34), and the router also includes a dispatcher receiving the routed request from the interceptor and dispatching the request to the page server (sending means for the formatted request, col. 13 lines 31-34).

10. As to independent claim 13, Irwin et al teach a server receiving a request, and intercepting means for intercepting the request and routing the request from the server to another server (col. 13 lines 11-42).

11. As to independent claim 14, Irwin et al teach a server including receiving means for a request, processing means for the request (col. 13 lines 31-42), and maintaining means for a connection cache to one or more data sources (virtual disk, col. 3 lines 55-62).

12. As to claim 15, Irwin et al teach processing means for the request further includes dynamically retrieving means for data from the one or more data sources (fig. 1, col. 3 lines 55-62).

13. Claims 1-7 are the corresponding method claims and claim 16 is the corresponding computer-readable medium claim of claims 11-15, and therefore, are rejected under the same rationale. Amended claims 1 and 16 further include limitation that the page server (computer system) processes the request concurrently with Web server (PC) servicing other requests, which is also taught by Irwin et al (inherently, concurrent processing is taking place, col. 13 lines 35-42)

14. Further references of interest are cited on Form PTO-892 which is an attachment to this office action.

15. Applicant's arguments with respect to claims 1-7 and 11-16 have been considered but are deemed to be moot in view of the new grounds of rejection.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(703) 308-9051, (for formal communications intended for entry)

Or:

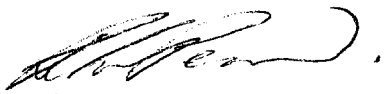
(703) 308-5359 (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington. VA., Sixth Floor (Receptionist).

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rehana Perveen, whose telephone number is (703) 305-8476. The examiner can normally be reached Monday through Friday from 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas C. Lee, can be reached at (703) 305-9717. The fax phone number for this Group is (703) 308-5359.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-9600.



Rehana Perveen
December 16, 1997

Notice of References Cited

Application No.	Applicant(s)		
08/636,477	LOWERY et al		
Examiner		Group Art Unit	Page 1 of 1
Rehana Perveen		2317	

U.S. PATENT DOCUMENTS

		DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS
	A	5,404,527	4/4/95	Irwin et al	395	700
	B	4,866,706	9/12/89	Christophersen et al	370	85.7
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

		DOCUMENT NO.	DATE	COUNTRY	NAME	CLASS	SUBCLASS
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	Q						
	R						
	S						
	T						

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		DOCUMENT (Including Author, Title, Source, and Pertinent Pages)	DATE
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Attorney's Docket No.: 02577.P001 Patent

In re the Application of: Keith Lowery, et al.
(inventor(s))

Application No.: 08/636,477

Filed: April 23, 1996

For: Managing Web Sites And Dynamic Web Page Generation Requests
(title)

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Washington, D.C. 20231

SIR: Transmitted herewith is an Amendment for the above application.

_____ Small entity status of this application under 37 C.F.R. §§ 1.9 and 1.27 has been established by a verified statement previously submitted.

_____ A verified statement to establish small entity status under 37 C.F.R. §§ 1.9 and 1.27 is enclosed.

__X__ No additional fee is required.

_____ _____

The fee has been calculated as shown below:

	(Col. 1) Claims Remaining After Amd.		(Col. 2) Highest No. Previously Paid For	(Col. 3) Present Extra	SMALL ENTITY Rate	SMALL ENTITY Additional Fee	OTHER THAN A SMALL ENTITY Rate	OTHER THAN A SMALL ENTITY Additional Fee
Total Claims	* 16	Minus	**20	0	x11	$	x22	$
Indep. Claims	* 5	Minus	***6	0	x41	$	x82	$
☐	First Presentation of Multiple Dependent Claim(s)				+135	$	+270	$
					Total Add. Fee	$	Total Add. Fee	$0

* If the entry in Col. 1 is less than the entry In Col. 2, write "0" in Col. 3.

** If the "Highest No. Previously Paid For" IN THIS SPACE is less than 20, write "20" in this space.

*** If the "Highest No. Previously Paid For" IN THIS SPACE is less than 3, write "3" in this space. The "Highest No. Previously Paid For" (Total or Independent) is the highest number found from the equivalent box in Col. 1 of a prior amendment or the number of claims originally filed.

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on March 31, 1998
Date of Deposit

Cindy Murphy
Name of Person Mailing Correspondence

Cindy Murphy 3/31/98
Signature Date

(LJV/cak 10/01/97)

_____ A check in the amount of $_____ is attached for presentation of additional claim(s).
_____ Applicant(s) hereby Petition(s) for an Extension of Time of _____ month(s) pursuant to 37 C.F.R. § 1.136(a).
_____ A check for $_____ is attached for processing fees under 37 C.F.R. § 1.17.
_____ Please charge my Deposit Account No. 02-2666 the amount of $_____.
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_X_ Any extension or petition fees under 37 C.F.R. § 1.17.

BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP

Date: 3/31/98

Sharmini Green

Sharmini Nathan Green

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(LJV/cak 10/01/97)

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Attorney's Docket No.: 02577.P001 Patent

In re the Application of: Keith Lowery, et al.
(inventor(s))

Application No.: 08/636,477

Filed: April 23, 1996

For: Managing Web Sites And Dynamic Web Page Generation Requests
(title)

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__X__ Any extension or petition fees under 37 C.F.R. § 1.17.

BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP

Date: 3/31/98

Sharmini Nathan Green

Reg. No. 41,410

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(408) 720-8598

(LJV/cak 10/01/97)

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APR - 6 1998
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Attorney's Docket No.: 02577.P001 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Keith Lowery, et al.

U.S. Serial No: 08/636,477

Filed: April 23, 1996

For: MANAGING WEB SITES AND DYNAMIC WEB PAGE GENERATION REQUESTS

Examiner: Krick, R.

Art Unit: 2317

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Assistant Commissioner For Patents
Washington, D.C. 20231

AMENDMENT PURSUANT TO 37 C.F.R. § 1.111

Dear Sir:

In response to the Office Action dated December 31, 1997, please enter this amendment and consider the following remarks in accordance with the provisions of 37 C.F.R. § 1.111.

IN THE CLAIMS:

Please cancel Claim 10 without prejudice to the filing of continuations or divisionals.

REMARKS

Applicants respectfully request consideration of the subject application as amended herein. This Amendment is submitted in response to an Office

Action dated December 31, 1997. Claims 1-7 and 11-16 stand rejected. Claims 8-9 are objected to as being dependent on rejected base claims, and Claim 10 is subject to a restriction or election requirement. In this Amendment, Applicants affirm the election of Claims 1-9 and 11-16 for examination in the present case and request cancellation of Claim 10 without prejudice to the filing of continuations or divisionals.

In the December 31, 1997, Office Action, the Examiner rejected Claims 1-7 and 11-16 under 35 U.S.C. 103 as being unpatentable over Irwin et al. ("Irwin" U.S. Patent No. 5, 404, 527). The Examiner contends that Irwin teaches the invention substantially as claimed. Applicants respectfully traverse the Examiner's rejection.

Irwin is directed at a system and method for remote program load. More specifically, as described in Irwin:

> "One method used to intercept and process boot strap loader requests from the ROM-BIOS is to use a LAN interface card in the workstation to intercept requests generated by the main processor under control of the ROM-BIOS and bootstrap loader during the boot process of the workstation. In the exemplary embodiment of the invention, a program in the LAN interface card interacts with other systems on the LAN to allow one of several servers on the LAN to provide the boot program and DOS."

(emphasis added) Irwin, Col. 3, lines 59-68:

Applicants respectfully submit that the description of Irwin above shows that the reference is directed at a completely different area of technology than the presently claimed invention and is therefore an improper reference. Irwin is directed at a method and system for intercepting and processing boot strap loader requests from a ROM-BIOS. As described in Irwin, "boot" in the context of the reference means to initialize a system to run an operating system which is stored as a disk file (Irwin, Col. 1, lines 56-57). Irwin discloses a PC selecting a file server on a network that is running a

virtual disk process and is able to service data requests. Then, the data to be stored and requests for data to be read are transmitted from the PC to the server which was selected. The PC and file server then interact to allow the PC to load the DOS code into the RAM of the PC (Irwin, Col. 3, lines 29-68 - Col. 4, lines 1-56). Irwin is thus clearly not disclosing any technology relevant to the presently claimed invention of a method and system for managing web sites and dynamic web page generation requests. Applicants therefore respectfully submit that Irwin is not a proper reference in the present case.

Additionally, assuming arguendo that the reference is proper, Irwin does not teach or suggest any type of management of Internet sites. More specifically, Irwin does not teach or suggest a method and system for managing web sites and dynamic web page generation requests, as presently claimed. There is no teaching or suggestion in Irwin for any type of "page server" that processes a request from a Web server while the Web server concurrently processes a different request, as claimed. The boot strapping loader requests in Irwin cannot be equated with requests for dynamic web page generation on the World Wide Web. As described above, "boot" in the context of Irwin means to initialize a system to run an operating system which is stored as a disk file (Irwin, Col. 1, lines 56-57). This type of "request" is clearly unrelated to the Web page generation requests of the present invention.

Finally, Irwin does not teach or suggest dynamically generating a Web page in response to a request wherein the Web page includes data dynamically retrieved from one or more data sources, as claimed. Applicants therefore respectfully submit that even if Irwin is considered a proper reference, it does not render the claimed invention unpatentable. As such,

Applicants respectfully request the Examiner to withdraw the 35 U.S.C. 103 rejection to Claims 1-7 and 11-16.

In conclusion, it is respectfully submitted that in view of the amendments and remarks set forth herein, that all objections and rejections have been overcome. All claims are now in condition for allowance and such action is earnestly solicited.

If there are any additional charges, please charge them to our Deposit Account Number 02-2666. If a telephone conference would facilitate the prosecution of this application, the Examiner is invited to contact the undersigned at (408) 720-8598.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Date: 3/31/1998

Sharmini Nathan Green
Registration Number: 41,410

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Attorney's Docket No.: 02577.P001 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Keith Lowery, et al.

U.S. Serial No: 08/636,477

Filed: April 23, 1996

For: MANAGING WEB SITES AND DYNAMIC WEB PAGE GENERATION REQUESTS

Examiner: Krick, R.

Art Unit: 2317

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Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Date: 3/31/1998

Sharmini Nathan Green
Registration Number: 41,410

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Signature 3/31/98 Date

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Art Unit: 2317

TELEPHONE: **(703) 305-8476** FACSIMILE: **(703) 308-5359**

FROM: **James H. Salter; Reg.No. 35,668**

DATE: **September 14, 1998** TIME: **11:03 AM/PST**

TOTAL NUMBER OF PAGES, INCLUDING COVER SHEET: 11

OPERATOR: **Barbara Skliba** MATTER NO: 02577.P001

RE: **Serial No. 08/636,477; Filed April 23, 1996; entitled:**
MANAGING WEB SITES AND DYNAMIC WEB PAGE GENERATION REQUESTS

Attached please find the Amendment filed 3/31/98 in response to the Office Action mailed 12/31/97 for the above-referenced case. Included is a copy of the returned postcard showing the PTO stamp.

==========

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BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN
LOS ANGELES

Serial/Patent No.: 08/636,477 Filing/Issue Date: April 23, 1996
Client: Info Spinner, Inc.
Title: Managing Web Sites And Dunamic Web Page Generation Requests

BSTZ File No.: 02577.P001 Atty/Secty Initials: JHS/SNG/cm
Date Mailed: March 31, 1998 Docket Due Date: March 31, 1998

The following has been received in the U.S. Patent & Trademark Office on the date stamped hereon:

- [x] Amendment/Response (4 pgs.)
- [ ] Appeal Brief (____ pgs.) (in triplicate)
- [ ] Application - Utility (____ pgs., with cover and abstract)
- [ ] Application - Rule 1.60 Continuation (____ pgs.)
- [ ] Application - Rule 1.60 Division (____ pgs.)
- [ ] Application - Rule 1.60 CIP (____ pgs.)
- [ ] Application - Rule 1.62 Transmittal (____ pgs.)
- [ ] Application - Design (____ pgs.)
- [ ] Application - PCT (____ pgs.)
- [ ] Application - Provisional (____ pgs.)
- [ ] Assignment and Cover Sheet
- [x] Certificate of Mailing
- [ ] Declaration & POA (____ pgs.)
- [ ] Disclosure Docs & Orig & Copy of Inventor's Signed Letter (____ pgs.)
- [ ] Drawings: ____ # of sheets includes ____ figures
- [ ] Express Mail No.: ____ Check No.: ____
- [ ] ____ Month(s) Extension of Time Amt: ____
- [ ] Information Disclosure Statement & PTO-1449 (__ pgs.) Check No.: ____
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- [ ] Notice of Appeal
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- [ ] Preliminary Amendment (____ pgs.)
- [ ] Reply Brief (____ pgs.)
- [ ] Response to Notice of Missing Parts
- [ ] Request to Incorporate Disclosure Document (____ pgs.)
- [ ] Small Entity Declaration for Indep. Inventor/Small Business
- [x] Transmittal Letter (original & copy)

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- [ ] Other: ____

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Date Mailed: March 31, 1998 Docket Due Date: March 31, 1998

The following has been received in the U.S. Patent & Trademark Office on the date stamped hereon:

- ☒ Amendment/Response (4 pgs.)
- ☐ Appeal Brief (____ pgs.) (in triplicate)
- ☐ Application - Utility (____ pgs., with cover and abstract)
- ☐ Application - Rule 1.60 Continuation (____ pgs.)
- ☐ Application - Rule 1.60 Division (____ pgs.)
- ☐ Application - Rule 1.60 CIP (____ pgs.)
- ☐ Application - Rule 1.62 Transmittal (____ pgs.)
- ☐ Application - Design (____ pgs.)
- ☐ Application - PCT (____ pgs.)
- ☐ Application - Provisional (____ pgs.)
- ☐ Assignment and Cover Sheet
- ☒ Certificate of Mailing
- ☐ Declaration & POA (____ pgs.)
- ☐ Disclosure Docs & Orig & Copy of Inventor's Signed Letter (____ pgs.)
- ☐ Drawings: ____ # of sheets includes ____ figures
- ☐ Express Mail No.: ____ ☐ Check No. ____ Amt: ____
- ☐ ____ Month(s) Extension of Time
- ☐ Information Disclosure Statement & PTO-1449 (__ pgs.) ☐ Check No. ____ Amt: ____
- ☐ Issue Fee Transmittal
- ☐ Notice of Appeal
- ☐ Petition for Extension of Time
- ☐ Petition for ____
- ☒ Postcard
- ☐ Power of Attorney (____ pgs.)
- ☐ Preliminary Amendment (____ pgs.)
- ☐ Reply Brief (____ pgs.)
- ☐ Response to Notice of Missing Parts
- ☐ Request to Incorporate Disclosure Document (____ pgs.)
- ☐ Small Entity Declaration for Indep. Inventor/Small Business
- ☒ Transmittal Letter (original & copy)

☐ Other: ____

Attorney's Docket No.: 02577.P001 Patent

In re the Application of: Keith Lowery, et al.
(inventor(s))

Application No.: 08/636,477

Filed: April 23, 1996

For: Managing Web Sites And Dynamic Web Page Generation Requests
(title)

ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

SIR: Transmitted herewith is an Amendment for the above application.

_____ Small entity status of this application under 37 C.F.R. §§ 1.9 and 1.27 has been established by a verified statement previously submitted.

_____ A verified statement to establish small entity status under 37 C.F.R. §§ 1.9 and 1.27 is enclosed.

__X__ No additional fee is required.

The fee has been calculated as shown below:

	(Col. 1) Claims Remaining After Amd.		(Col. 2) Highest No. Previously Paid For	(Col. 3) Present Extra	SMALL ENTITY Rate	SMALL ENTITY Additional Fee	OTHER THAN A SMALL ENTITY Rate	OTHER THAN A SMALL ENTITY Additional Fee
Total Claims	* 16	Minus	**20	0	x11	$	x22	$
Indep. Claims	* 5	Minus	***6	0	x41	$	x82	$
[ ] First Presentation of Multiple Dependent Claim(s)					+135	$	+270	$
					Total Add. Fee	$	Total Add. Fee	$0

* If the entry in Col. 1 is less than the entry in Col. 2, write "0" in Col. 3.

** If the "Highest No. Previously Paid For" IN THIS SPACE is less than 20, write "20" in this space.

*** If the "Highest No. Previously Paid For" IN THIS SPACE is less than 3, write "3" in this space. The "Highest No. Previously Paid For" (Total or Independent) is the highest number found from the equivalent box in Col. 1 of a prior amendment or the number of claims originally filed.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

on March 31, 1998.
Date of Deposit

Cindy Murphy
Name of Person Mailing Correspondence

Cindy Murphy 3/31/98
Signature Date

(LJV/cak 10/01/97)

_____ A check in the amount of $_____ is attached for presentation of additional claim(s).
_____ Applicant(s) hereby Petition(s) for an Extension of Time of _____ month(s) pursuant to 37 C.F.R. § 1.136(a).
_____ A check for $_____ is attached for processing fees under 37 C.F.R. § 1.17.
_____ Please charge my Deposit Account No. 02-2666 the amount of $_____.
A duplicate copy of this sheet is enclosed.
_X_ The Commissioner of Patents and Trademarks is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 02-2666 **(a duplicate copy of this sheet is enclosed):**
_X_ Any additional filing fees required under 37 C.F.R. § 1.16 for presentation of extra claims.
_X_ Any extension or petition fees under 37 C.F.R. § 1.17.

BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP

Date: 3/31/98

Sharmini Nathan Green

Reg. No. 41,410

12400 Wilshire Boulevard
Seventh Floor
Los Angeles, California 90025
(408) 720-8598

(LJV/cak 10/01/97)

Attorney's Docket No.: 02577.P001 Patent

In re the Application of: Keith Lowery, et al.
(inventor(s))

Application No.: 08/636,477

Filed: April 23, 1996

For: Managing Web Sites And Dynamic Web Page Generation Requests
(title)

ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

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_____ A verified statement to establish small entity status under 37 C.F.R. §§ 1.9 and 1.27 is enclosed.

__X__ No additional fee is required.

_____

The fee has been calculated as shown below:

	(Col. 1) Claims Remaining After Amd.		(Col. 2) Highest No. Previously Paid For	(Col. 3) Present Extra
Total Claims	* 16	Minus	**20	0
Indep. Claims	* 5	Minus	***6	0
[ ]	First Presentation of Multiple Dependent Claim(s)			

	SMALL ENTITY Rate	SMALL ENTITY Additional Fee	OTHER THAN A SMALL ENTITY Rate	OTHER THAN A SMALL ENTITY Additional Fee
	x11	$	x22	$
	x41	$	x82	$
	+135	$	+270	$
Total Add. Fee		$		$0

* If the entry in Col. 1 is less than the entry in Col. 2, write "0" in Col. 3.

** If the "Highest No. Previously Paid For" IN THIS SPACE is less than 20, write "20" in this space.

*** If the "Highest No. Previously Paid For" IN THIS SPACE is less than 3, write "3" in this space. The "Highest No. Previously Paid For" (Total or Independent) is the highest number found from the equivalent box in Col. 1 of a prior amendment or the number of claims originally filed.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

on March 31, 1998
Date of Deposit

Cindy Murphy
Name of Person Mailing Correspondence

Cindy Murphy 3/31/98
Signature Date

(LJV/cak 10/01/97)

_____ A check in the amount of $_____ is attached for presentation of additional claim(s).
_____ Applicant(s) hereby Petition(s) for an Extension of Time of _____ month(s) pursuant to 37 C.F.R. § 1.136(a).
_____ A check for $_____ is attached for processing fees under 37 C.F.R. § 1.17.
_____ Please charge my Deposit Account No. 02-2666 the amount of $_____.
A duplicate copy of this sheet is enclosed.
__X__ The Commissioner of Patents and Trademarks is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 02-2666 **(a duplicate copy of this sheet is enclosed)**:
__X__ Any additional filing fees required under 37 C.F.R. § 1.16 for presentation of extra claims.
__X__ Any extension or petition fees under 37 C.F.R. § 1.17.

BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP

Date: 3/31/98

Sharmini Green

Sharmini Nathan Green

Reg. No. 41,410

12400 Wilshire Boulevard
Seventh Floor
Los Angeles, California 90025
(408) 720-8598

(LJV/cak 10/01/97)

UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/636,477	04/23/96	LOWERY	K 02577.P001

LM21/1229

JAMES H SALTER
BLAKELY SOKOLOFF TAYLOR ADN ZAFMAN
12400 WILSHIRE BOULEVARD
7TH FLOOR
LOS ANGELES CA 90025

EXAMINER	
PERVEEN, R	
ART UNIT	**PAPER NUMBER**
2782	8/C

DATE MAILED: 12/29/98

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

PTO-90C (Rev. 2/95)
*U.S. GPO: 1998-437-638/80022

1- File Copy

File Copy

Notice of Allowability	Application No. 08/636,477	Applicant(s) LOWERY et al #8/C
	Examiner Rehana Perveen	Group Art Unit 2782

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance and Issue Fee Due or other appropriate communication will be mailed in due course.

☒ This communication is responsive to *Amdt B filed on 9/14/98*.

☒ The allowed claim(s) is/are *1, 3-9, 11, 12, and 16*.

☐ The drawings filed on _____ are acceptable.

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

A SHORTENED STATUTORY PERIOD FOR RESPONSE to comply with the requirements noted below is set to EXPIRE **THREE MONTHS** FROM THE "DATE MAILED" of this Office action. Failure to timely comply will result in ABANDONMENT of this application. Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

☐ Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL APPLICATION, PTO-152, which discloses that the oath or declaration is deficient. A SUBSTITUTE OATH OR DECLARATION IS REQUIRED.

☒ Applicant MUST submit NEW FORMAL DRAWINGS

☒ because the originally filed drawings were declared by applicant to be informal.

☒ including changes required by the Notice of Draftsperson's Patent Drawing Review, PTO-948, attached hereto or to Paper No. *3*.

☐ including changes required by the proposed drawing correction filed on _____, which has been approved by the examiner.

☐ including changes required by the attached Examiner's Amendment/Comment.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the reverse side of the drawings. The drawings should be filed as a separate paper with a transmittal lettter addressed to the Official Draftsperson.

☐ Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Any response to this letter should include, in the upper right hand corner, the APPLICATION NUMBER (SERIES CODE/SERIAL NUMBER). If applicant has received a Notice of Allowance and Issue Fee Due, the ISSUE BATCH NUMBER and DATE of the NOTICE OF ALLOWANCE should also be included.

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

☒ Interview Summary, PTO-413

☒ Examiner's Amendment/Comment

☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

☐ Examiner's Statement of Reasons for Allowance

THOMAS C. LEE
SUPERVISORY PATENT EXAMINER
GROUP 2700

U. S. Patent and Trademark Office
PTO-37 (Rev. 9-95) **Notice of Allowability** Part of Paper No. 9

File Copy

Part III EXAMINER'S AMENDMENT

1. An Examiner's Amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 C.F.R. § 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the Issue Fee.

2. Authorization for this Examiner's Amendment was given in a telephone interview with Mr. James Salter on 12/17/98.

3. Cancel claims 2 and 13-15.

Claim 1,

.line 1, insert before 'Amended', -- Twice --;

.line 6, insert after 'requests', -- , wherein said routing step further includes the steps of intercepting said request at said Web server, routing said request from said Web server to a dispatcher, and dispatching said request to said page server --

Claim 3,

.line 1, insert before 'The', -- (Once Amended) --;

.line 1, change '2' to read -- 1 --;

Claim 11,

.line 1, insert before 'A', -- (Once Amended) --;

.line 5, insert after ';', -- and --;

.line 9, insert after 'server,' (first occurrence), -- wherein said routing further includes intercepting said request at said second computer, routing said request from said second computer to a dispatcher, and dispatching said request to said page server --; and

C2

Claim 16,

.line 1, insert before 'Amended', -- Twice --;

.line 10, insert after 'requests', -- , wherein said routing step further includes the steps of intercepting said request at said Web server, routing said request from said Web server to a dispatcher, and dispatching said request to said page server --.

C3

4. Pursuant to MPEP 606.01, the title has been changed to read:

-- SYSTEM FOR MANAGING DYNAMIC WEB PAGE GENERATION REQUESTS BY INTERCEPTING REQUEST AT WEB SERVER AND ROUTING TO PAGE SERVER THEREBY RELEASING WEB SERVER TO PROCESS OTHER REQUESTS --.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(703) 308-9051, (for formal communications intended for entry)

Or:

(703) 308-5359 (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rehana Perveen, whose telephone number is (703) 305-8476. The examiner can normally be reached Monday through Friday from 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas C. Lee, can be reached at (703) 305-9717. The fax phone number for this Group is (703) 308-5359.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-9600.

Rehana Perveen
December 17, 1998

THOMAS C. LEE
SUPERVISORY PATENT EXAMINER
GROUP 2700

Interview Summary	Application No. 08/636,477	Applicant(s) LOWERY et al
	Examiner Rehana Perveen	Group Art Unit 2782

All participants (applicant, applicant's representative, PTO personnel):

(1) *Rehana Perveen* (3) _____

(2) *MR. JAMES SALTER* (4) _____

Date of Interview *Dec 17, 1998*

Type: ☒ Telephonic ☐ Personal (copy is given to ☐ applicant ☐ applicant's representative).

Exhibit shown or demonstration conducted: ☐ Yes ☒ No. If yes, brief description:

Agreement ☒ was reached. ☐ was not reached.

Claim(s) discussed: *1-9 and 11-16*

Identification of prior art discussed:
prior art of record

Description of the general nature of what was agreed to if an agreement was reached, or any other comments:
Applicants agreed to cancel dependent claim 2 to include the limitations of claim 2 into independent claims 1, 11, and 16; applicants also agreed to cancel independent claim 13, independent claim 14, and dependent claim 15, as set forth in the attached examiner's amendment.

(A fuller description, if necessary, and a copy of the amendments, if available, which the examiner agreed would render the claims allowable must be attached. Also, where no copy of the amendents which would render the claims allowable is available, a summary thereof must be attached.)

1. ☒ It is not necessary for applicant to provide a separate record of the substance of the interview.

Unless the paragraph above has been checked to indicate to the contrary, A FORMAL WRITTEN RESPONSE TO THE LAST OFFICE ACTION IS NOT WAIVED AND MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a response to the last Office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW.

2. ☐ Since the Examiner's interview summary above (including any attachments) reflects a complete response to each of the objections, rejections and requirements that may be present in the last Office action, and since the claims are now allowable, this completed form is considered to fulfill the response requirements of the last Office action. Applicant is not relieved from providing a separate record of the interview unless box 1 above is also checked.

Examiner Note: You must sign and stamp this form unless it is an attachment to a signed Office action.

Notice of References Cited

Application No.	Applicant(s)		
08/636,477	LOWERY et al		
Examiner		Group Art Unit	Page 1 of 1
Rehana Perveen		2782	

U.S. PATENT DOCUMENTS

*		DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS
x	A	5,761,673	6/2/98	Bookman et al	707	104
x	B	5,751,956	5/12/98	Kirsch	395	200.33
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		DOCUMENT NO.	DATE	COUNTRY	NAME	CLASS	SUBCLASS
	N						
	O						
	P						
	Q						
	R						
	S						
	T						

NON-PATENT DOCUMENTS

*		DOCUMENT (Including Author, Title, Source, and Pertinent Pages)	DATE
	U		
	V		
	W		
	X		

* A copy of this reference is not being furnished with this Office action.
(See Manual of Patent Examining Procedure, Section 707.05(a).)

UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office

NOTICE OF ALLOWANCE AND ISSUE FEE DUE

LM21/1229

JAMES H SALTER
BLAKELY SOKOLOFF TAYLOR ZAFMAN
12400 WILSHIRE BOULEVARD
7TH FLOOR
LOS ANGELES CA 90025

APPLICATION NO.	FILING DATE	TOTAL CLAIMS	EXAMINER AND GROUP ART UNIT	DATE MAILED
08/836,477	04/23/96	011	PERVEEN, R 2732	12/29/98

First Named Applicant: LOWERY,

35 USC 154(b) term ext. = 0 Days.

TITLE OF INVENTION: SYSTEM FOR MANAGING DYNAMIC WEB PAGE GENERATION REQUESTS BY INTERCEPTING REQUEST AT WEB SERVER AND ROUTING TO PAGE SERVER THEREBY RELEASING WEB SERVER TO PROCESS OTHER REQUESTS (AS AMENDED)

ATTY'S DOCKET NO.	CLASS-SUBCLASS	BATCH NO.	APPLN. TYPE	SMALL ENTITY	FEE DUE	DATE DUE
2 02577.P001	395-200.38	004	UTILITY	NO	$1210.00	03/29/99

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED.

THE ISSUE FEE MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED.

HOW TO RESPOND TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.
If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is changed, pay twice the amount of the FEE DUE shown above and notify the Patent and Trademark Office of the change in status, or
B. If the status is the same, pay the FEE DUE shown above.

If the SMALL ENTITY is shown as NO:

A. Pay FEE DUE shown above, or

B. File verified statement of Small Entity Status before, or with, payment of 1/2 the FEE DUE shown above.

II. Part B-Issue Fee Transmittal should be completed and returned to the Patent and Trademark Office (PTO) with your ISSUE FEE. Even if the ISSUE FEE has already been paid by charge to deposit account, Part B Issue Fee Transmittal should be completed and returned. If you are charging the ISSUE FEE to your deposit account, section "4b" of Part B-Issue Fee Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give application number and batch number.
Please direct all communications prior to issuance to Box ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PATENT AND TRADEMARK OFFICE COPY

PTOL-85 (REV. 10-96) Approved for use through 06/30/99. (0651-0033)

PART B—ISSUE FEE TRANSMITTAL

Complete and mail this form, together with a able fees, to: **Box ISSUE FEE**
Assistant Commissioner for Pa nts
Washington, D.C. 20231

PATENT & TRADEMARK OFFICE JC57 JAN 19 1999

B7

2

MAILING INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE. Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Issue Fee Receipt, the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)

LM21/1229

JAMES H SALTER
BLAKELY SOKOLOFF TAYLOR ADN ZAFMAN
12400 WILSHIRE BOULEVARD
7TH FLOOR
LOS ANGELES CA 90025

Note: The certificate of mailing below can only be used for domestic mailings of the Issue Fee Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing.

Certificate of Mailing

I hereby certify that this Issue Fee Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Box Issue Fee address above on the date indicated below.

Barbara Skliba (Depositor's name)
Barbara Skliba (Signature)
1/14/99 (Date)

APPLICATION NO.	FILING DATE	TOTAL CLAIMS	EXAMINER AND GROUP ART UNIT		DATE MAILED
08/636,477	04/23/96	011	PERVEEN, R	2782	12/29/98

First Named Applicant: LOWERY, — 35 USC 154(b) term ext. = 0 Days.

TITLE OF INVENTION: SYSTEM FOR MANAGING DYNAMIC WEB PAGE GENERATION REQUESTS BY INTERCEPTING REQUEST AT WEB SERVER AND ROUTING TO PAGE SERVER THEREBY RELEASING WEB SERVER TO PROCESS OTHER REQUESTS (AS AMENDED)

ATTY'S DOCKET NO.	CLASS-SUBCLASS	BATCH NO.	APPLN. TYPE	SMALL ENTITY	FEE DUE	DATE DUE
2 02577.P001	395-200.330	N34	UTILITY	NO	$1210.00	03/29/99

1. Change of correspondence address or indication of " Fee Address" (37 CFR 1.363). Use of PTO form(s) and Customer Number are recommended, but not required.

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47) attached.

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Blakely, Sokoloff, Taylor & Zafman LLP
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)
PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropiate when an assignment has been previously submitted to the PTO or is being submitted under separate cover. Completion of this form is NOT a subsititue for filing an assignment.

(A) NAME OF ASSIGNEE
InfoSpinner, Inc.
(B) RESIDENCE: (CITY & STATE OR COUNTRY)
Richardson, Texas

Please check the appropriate assignee category indicated below (will not be printed on the patent)
☐ Individual XX ☐ corporation or other private group entity ☐ government

4a. The following fees are enclosed (make check payable to Commissioner of Patents and Trademarks):
XX Issue Fee
XX Advance Order - # of Copies 10

4b. The following fees or deficiency in these fees should be charged to:
DEPOSIT ACCOUNT NUMBER
(ENCLOSE AN EXTRA COPY OF THIS FORM)
☐ Issue Fee
☐ Advance Order - # of Copies

The COMMISSIONER OF PATENTS AND TRADEMARKS IS requested to apply the Issue Fee to the application identified above.

(Authorized Signature) James H. Salter (Reg.No.35,668) (Date) 1/14/99

NOTE; The Issue Fee will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the Patent and Trademark Office.

01/27/1999 RTSEGAY1 00000025 08636477
01 FC:142 1210.00 OP
02 FC:561 30.00 OP

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending on the needs of the individual case. Any comments on the amount of time required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND FEES AND THIS FORM TO: Box Issue Fee, Assistant Commissioner for Patents, Washington D.C. 20231

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMIT THIS FORM WITH FEE

02577.P001

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

#9 CMS

In re Application of: Keith Lowery, et al.

Serial No.: 08/636,477

Filed: April 23, 1996

Examiner: Perveen, R.

Art Unit: 2782

For: SYSTEM FOR MANAGING DYNAMIC WEB PAGE GENERATION REQUESTS BY INTERCEPTING REQUEST AT WEB SERVER TO PROCESS OTHER REQUESTS (As Amended)

OIPE JC57 JAN 19 1999 PATENT & TRADEMARK OFFICE

BOX ISSUE FEE
Assistant Commissioner for Patents
Washington, D.C. 20231

SUBMISSION OF FORMAL DRAWINGS

Dear Sir:

Enclosed herewith for submission in the United States patent application referenced above are five (5) sheets of formal drawings.

If there are any further charges please charge them to Deposit Account No. **02-2666**.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Date: 1/14, 1999

James H. Salter (Reg. No. 35,668)

12400 Wilshire Boulevard
Seventh Floor
Los Angeles, California 90025
(408) 720-8598

FIRST CLASS CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: BOX ISSUE FEE, Assistant Commissioner for Patents, Washington, D.C. 20231 on January 14, 1999 .

Barbara Skliba
Name of Person Mailing Correspondence

Barbara Skliba — 1/14/99
Signature — Date

APPROVED BY DRAFTSMAN	C.G. FIG.	
	CLASS	SUBCLASS

5894554

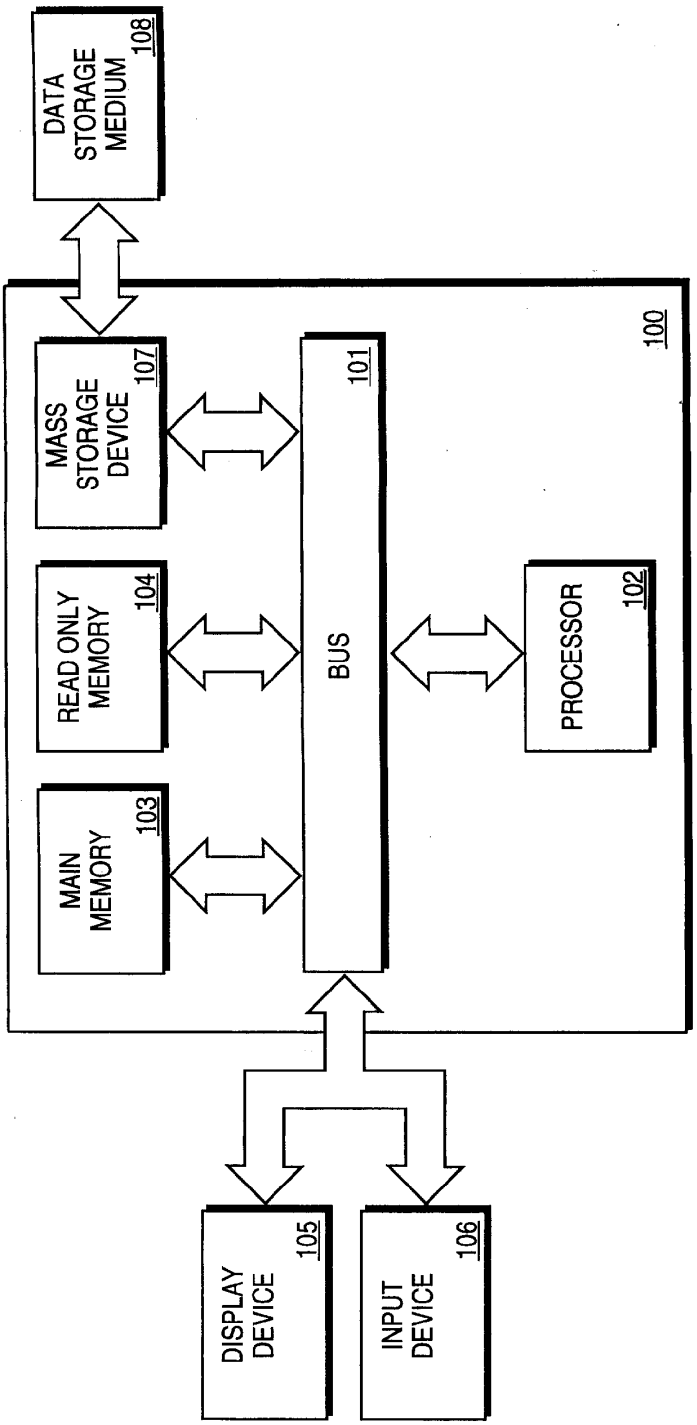


FIG. 1

APPROVED BY DRAFTSMAN | C.G. FIG. | CLASS | SUBCLASS

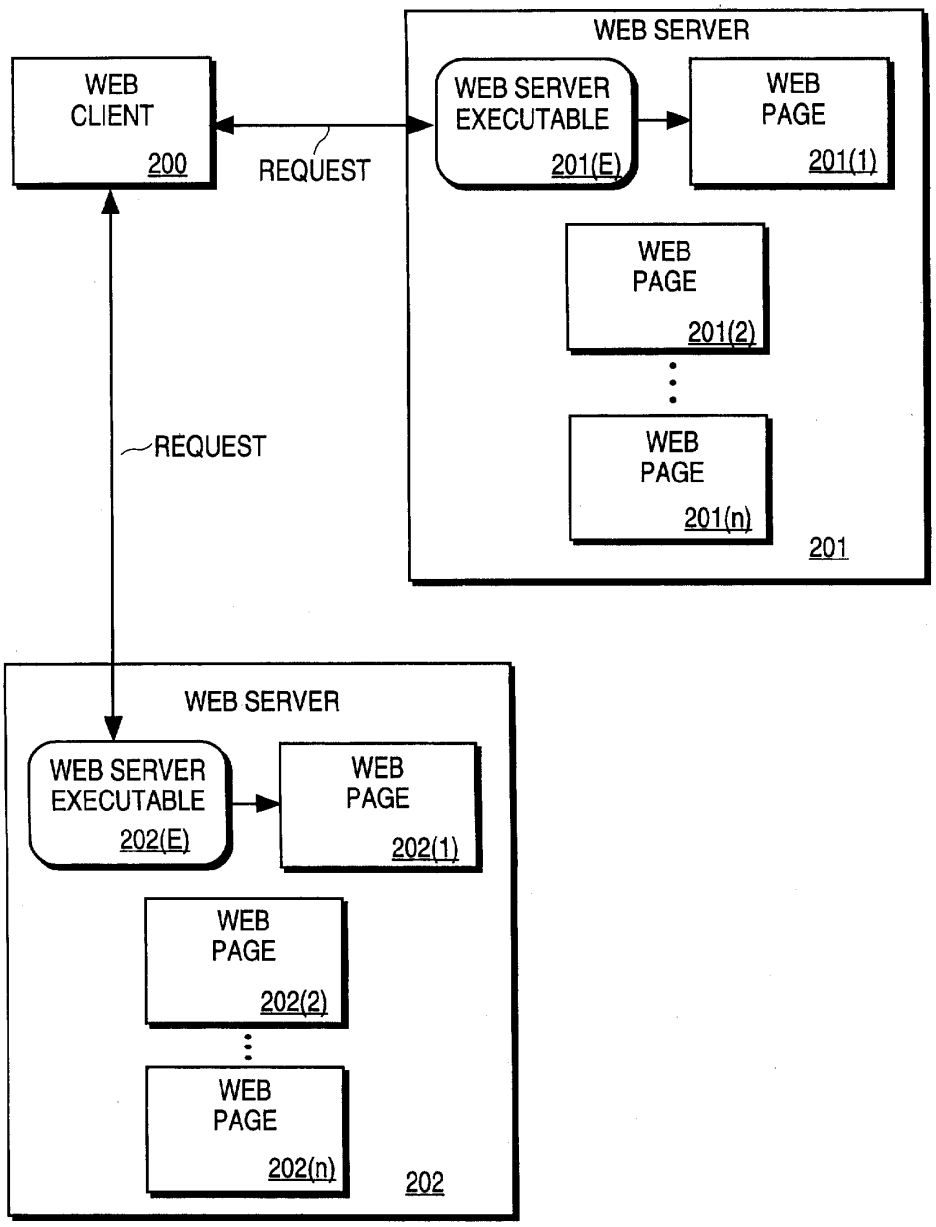


FIG. 2 (PRIOR ART)

APPROVED BY DRAFTSMAN | C.G. FIG. | CLASS | SUBCLASS

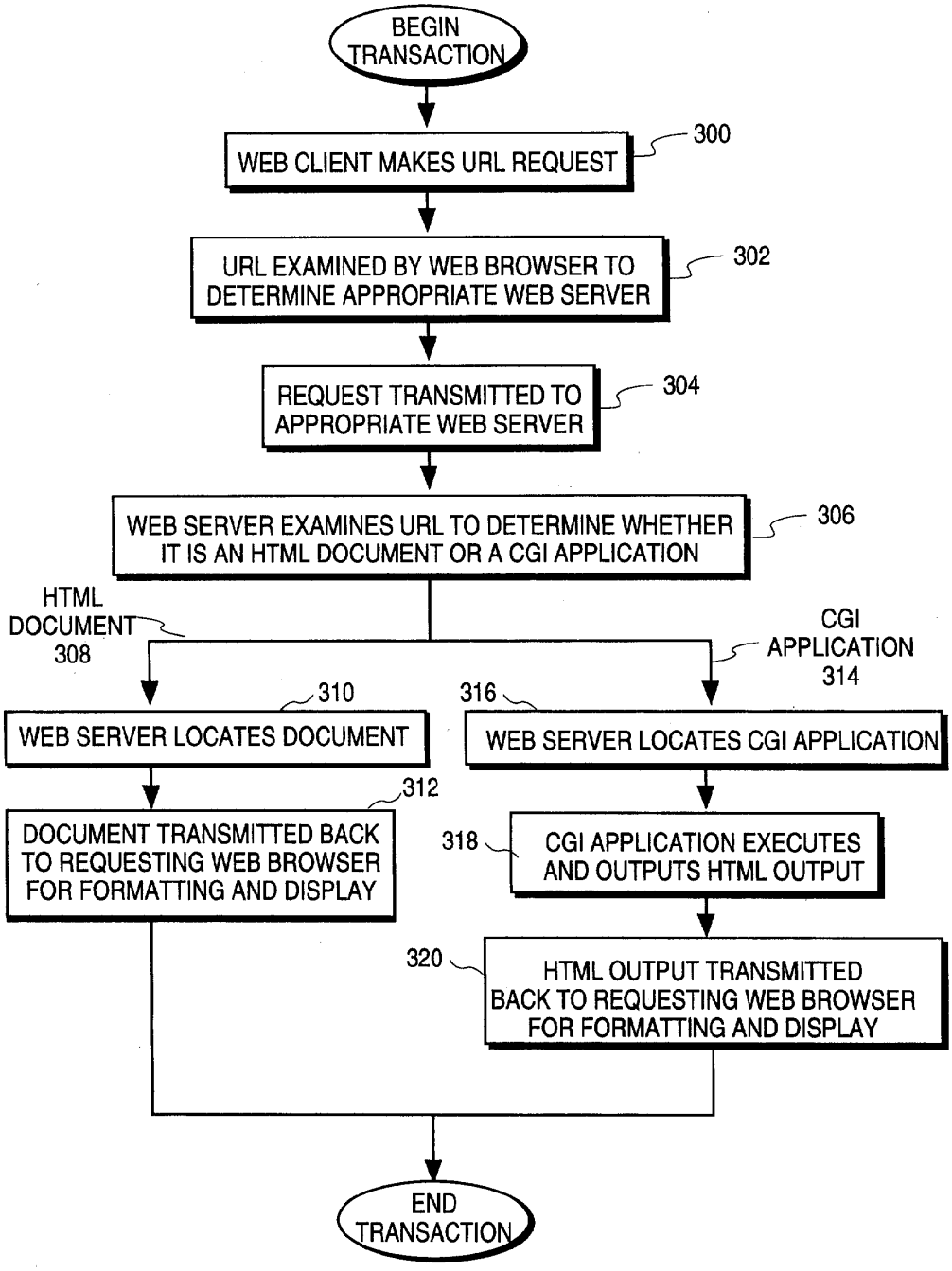


FIG. 3 (PRIOR ART)

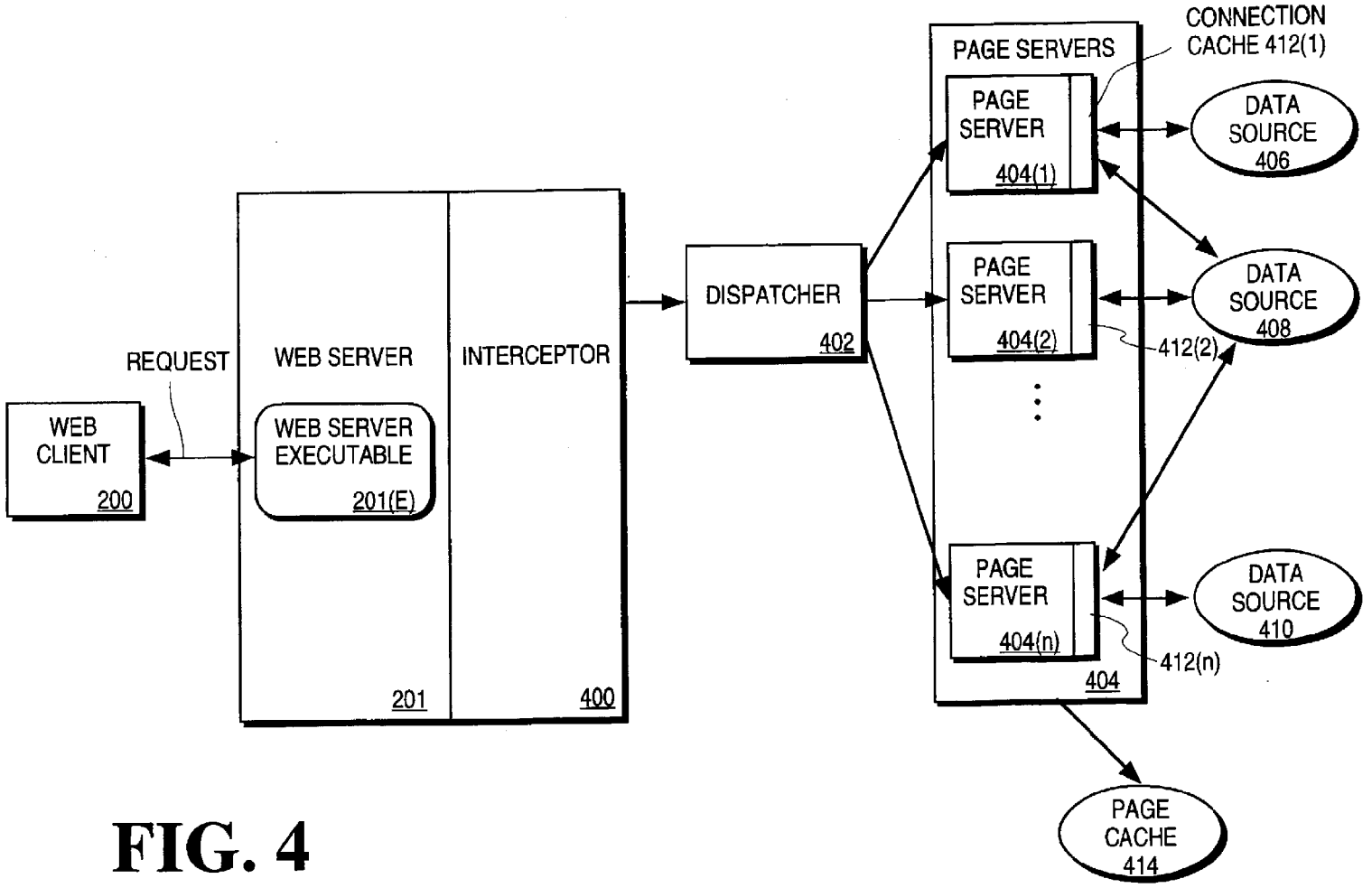


FIG. 4

EPIC000318

APPROVED BY DRAFTSMAN | C.G. FIG. | CLASS | SUBCLASS

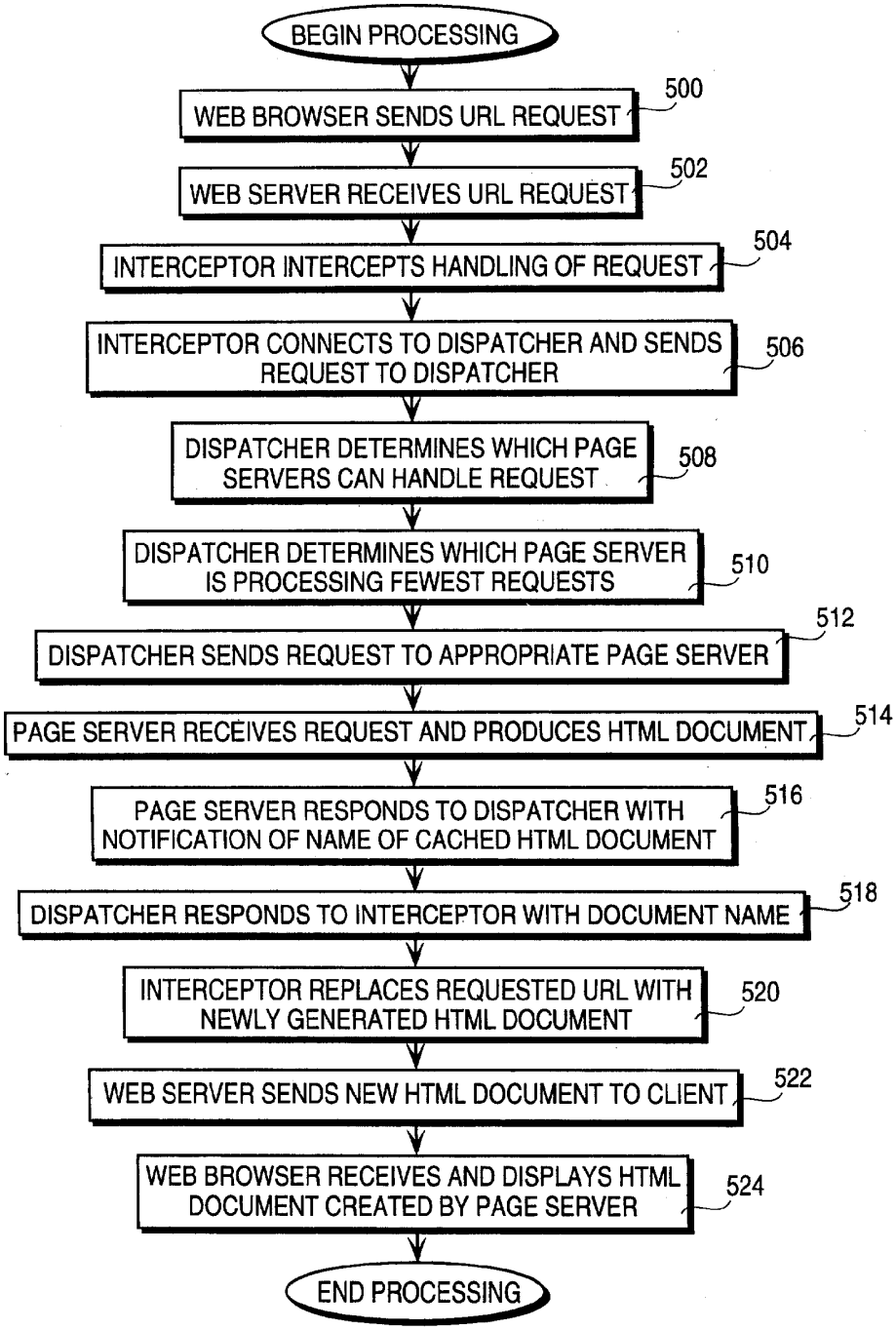
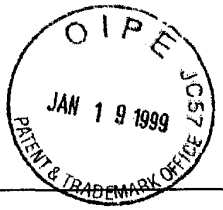


FIG. 5



PTO/SB/17(10/96)
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Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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FEE TRANSMITTAL

TOTAL AMOUNT OF PAYMENT ($) 1,240.00

Complete if Known:

Application No.	08/636,477
Filing Date	April 23, 1996
First Named Inventor	Keith Lowery, et al.
Group Art Unit	2782
Examiner Name	Perveen, R.
Attorney Docket No.	02577.P001

METHOD OF PAYMENT (check one)

1. [ ] **The Commissioner is hereby authorized to charge indicated fees and credit any over payments to:**

   Deposit Account Number _____
   Deposit Account Name _____

   [X] **Charge Any Additional Fee Required Under 37 CFR 1.16 and 1.17 and credit any over payments to Deposit Account Number 02-2666**

   [ ] **Charge the Issue Fee Set in 37 CFR 1.18 at the Mailing of the Notice of Allowance, 37 CFR 1.131(b)**

2. X **Payment Enclosed**
   X **Check**
   _____ **Money Order**
   _____ **Other**

FEE CALCULATION (fees effective 10/01/97)

1. **FILING FEE**

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
101	760	201	380	Utility application filing fee	
106	310	206	155	Design application filing fee	
107	480	207	240	Plant filing fee	
108	760	208	380	Reissue filing fee	
114	150	214	75	Provisional application filing fee	

SUBTOTAL (1) $ 0

2. **CLAIMS**

			Extra		Fee from below		Fee Paid
Total Claims	_____	– 20 =	_____	X	_____	=	_____
Independent Claims	_____	– 3 =	_____	X	_____	=	_____
Multiple Dependent Claims			_____	X	_____	=	_____

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
103	18	203	9	Claims in excess of twenty	
102	78	202	39	Independent claims in excess of 3	
104	260	204	130	Multiple dependent claim	
109	78	209	39	Reissue independent claims over original patent	
110	18	210	9	Reissue claims in excess of 20 and over original patent	

SUBTOTAL (2) $ 0

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
105	130	205	65	Surcharge - late filing fee or oath	
127	50	227	25	Surcharge - late provisional filing fee or cover sheet	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	
115	110	215	55	Extension for response within first month	
116	380	216	190	Extension for response within second month	
117	870	217	435	Extension for response within third month	
118	1,360	218	680	Extension for response within fourth month	
128	1,850	228	925	Extension for response within fifth month	
119	300	219	150	Notice of Appeal	
120	300	220	150	Filing a brief in support of an appeal	
121	260	221	130	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive unavoidably abandoned application	
141	1,210	241	605	Petition to revive unintentionally abandoned application	
142	1,210	242	605	Utility issue fee (or reissue)	1,210.00
143	430	243	215	Design issue fee	
144	580	244	290	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Petitions related to provisional applications	
126	240	126	240	Submission of Information Disclosure Stmt	
581	40	581	40	Recording each patent assignment per property (times number of properties)	
146	760	246	380	For filing a submission after final rejection	
149	760	249	380	For each additional invention to be examined	
		Other		Ten (10) copies of patent @ $3.00/copy	30.00

SUBTOTAL (3) $ 1,240.00

***Reduced by Basic Filing Fee Paid**

SUBMITTED BY:

Typed or Printed Name: James H. Salter

Signature _____ **Date** 1/14/99

Reg. Number 35,668 **Deposit Account User ID** _____ (complete if applicable)

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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to BOX ISSUE FEE, Assistant Commissioner for Patents, Washington, D.C. 20231 on January 14, 1999 .

Barbara Skliba
Name of Person Mailing Correspondence

Barbara Skliba 1/14/99
Signature Date



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Typed or Printed Name: James H. Salter

Signature _____ Date 1/14/99

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Barbara Skliba
Name of Person Mailing Correspondence

Barbara Skliba 1/14/99
Signature Date

PTO UTILITY GRANT
Paper Number 10

The Commissioner of Patents and Trademarks

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law.

If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.

If this application was filed on or after June 8, 1995, the term of this patent is twenty years from the U.S. filing date, subject to an statutory extension. If the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121 or 365(c), the term of the patent is twenty years from the date on which the earliest application was filed, subject to any statutory extension.

Bruce Lehman
Commissioner of Patents and Trademarks

Attest Melvinia Hart

The United States of America

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