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(71) Applicant(s)

International Business Machines Corporation
(Incorporated in USA - New York)
Armonk, New York 10504, United States of America

(72) Inventor(s)

Leo Y Liu
Dong Liu
XiaoPei Zhang
Xiao Yan Chen

(74) Agent and/or Address for Service

G M Zerbi
IBM United Kingdom Limited, Intellectual Property
Dept, Hursley Park, WINCHESTER, Hampshire,
SO21 2JN, United Kingdom

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(56) Documents Cited

EP 0762297 A2 WO 98/45793 A1 WO 98/37503 A1
WO 00/73935 A2 WO 00/62169 A1 US 6052730 A
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COMPUTER, IEL, Selected Internet sites

(54) Abstract Title

Dynamically adding new functions for Web pages

(57) A method for dynamically adding new functions for web pages comprises steps of: 1) capturing a web page which is returned to a web client 103 by a web server 104; 2) adding a new URL into intercepted web page, which directs to a predetermined processing server 102 utilized for implementing new functions, and thus forming a new web page; 3) returning the new web page to the web client; 4) implementing the new functions by the predetermined processing server if it receives a request sent by the web client based on the new URL. In step 2), the new URL may be used to replace an original URL for the purpose of linkage contained in an original hyperlink, or be directly added into a new hyperlink. The web page may be captured by a content conversion server 101. The method could be used for web page translation, collection of user information, online advertising management, and a billing system.

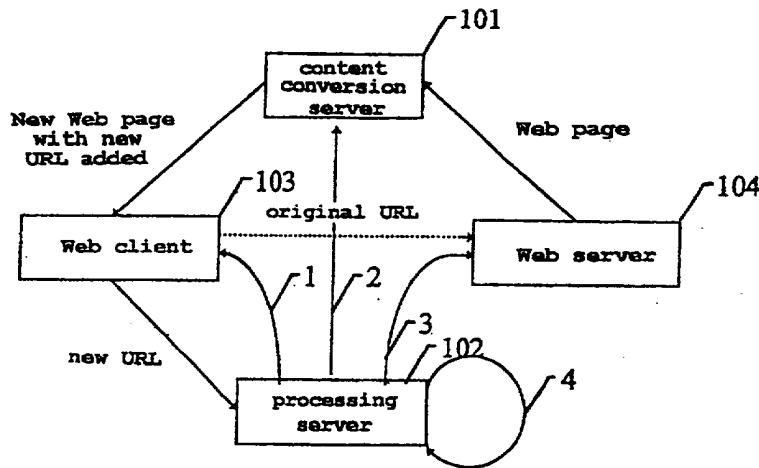


FIG. 1

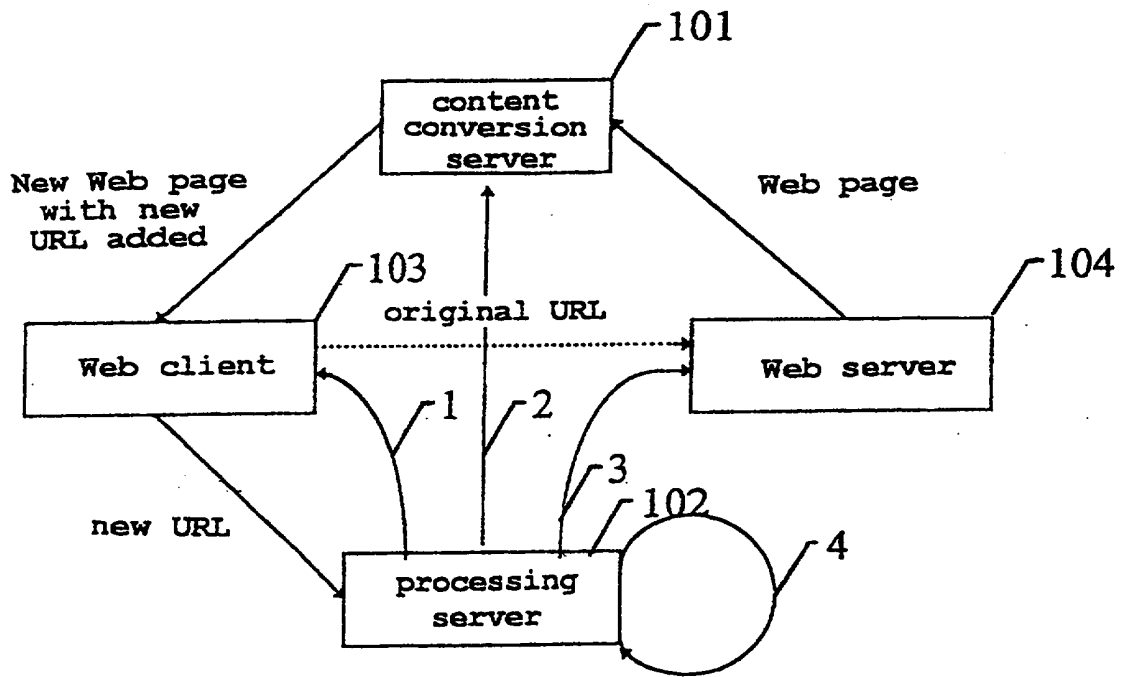


FIG. 1

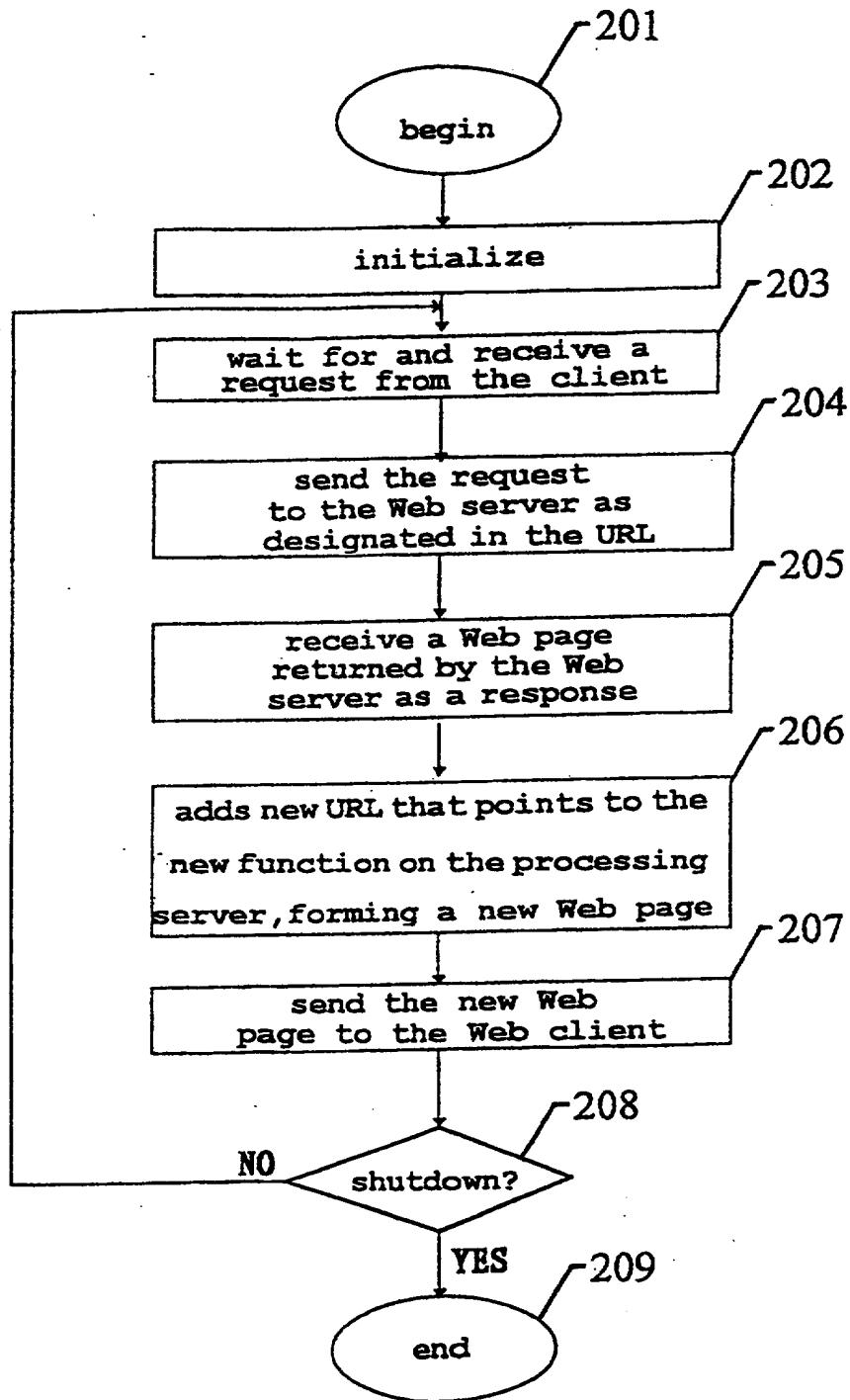


FIG. 2

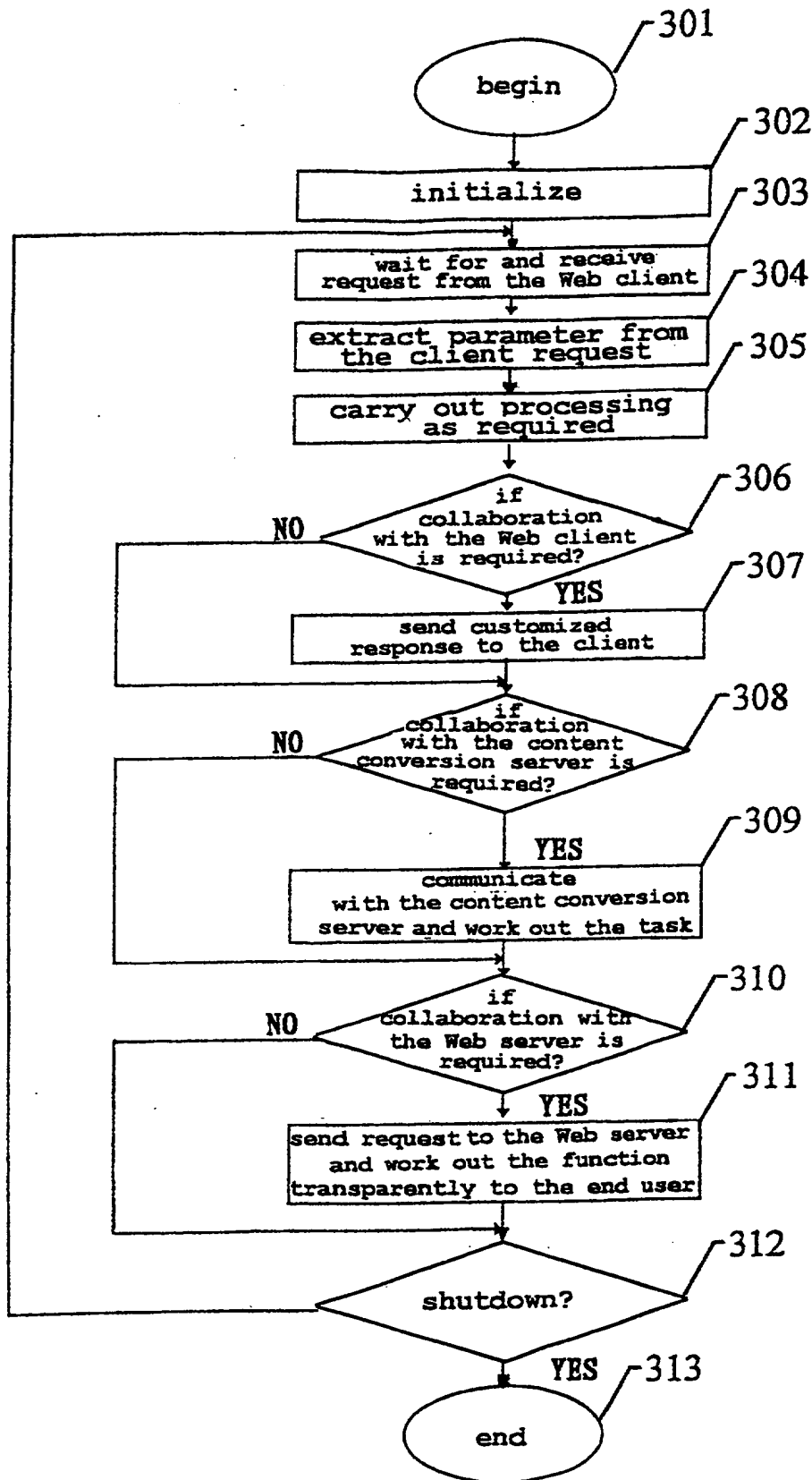


FIG. 3

METHOD AND SYSTEM FOR DYNAMICALLY ADDING
NEW FUNCTIONS FOR WEB PAGES

The present invention relates to World Wide Web (WWW) application,
5 and specifically, to a system and method for adding new functionality to
Web pages dynamically.

World Wide Web (WWW) or the Web in short, is the Internet multimedia
information search system. In the Web environment, the client machine uses
10 Hypertext Transfer Protocol (HTTP) to achieve transaction processing with
the Web server, and HTTP is a well-known Internet protocol. It helps user
rely on the so called Hypertext Markup Language (HTML) as the standard
page description language to describe various files (e.g., text, graphics,
image, audio, video, and etc.). HTML provides basic file format and allows
15 the developers to define hyper links between files on different servers.

HTTP based Web is a client/server structure. Client machines of the
Web services use client side software like Web browser to send requests to
the Web server and interpret, display or play the response in HTML format
20 and various multimedia formats from the Web server.

In the web environment, browser inside the client machine connects to
the Web server and gets information from there for the user. The
corresponding server software which packages the information as a HTTP
25 response runs on the server. The HTTP response can be HTML Web pages, other
data generated by other server, e.g., the information in XML format.

The HTML compatible browsers inside the client machines use URL to
define hyper link. The client sends request to the server as identified in
30 the URL and gets HTML formatted files or other server generated data from
the Web server.

The HTML formatted or various multimedia data formatted information
is predefined and stored as files on the server. Thus the functionality
35 that the client can get from the Web server is fixed and can not be
modified dynamically. That is to say, without modifying the Web pages new
functionality to the Web pages stored on the Web server can not be added.

It is an object of the present invention to provide a technique which
40 alleviates the above drawbacks.

According to the present invention we provide a method of dynamically adding new functions for web pages, characterized by comprising steps of:

1) capturing a web page which is returned to a web client by a web server; 2) adding a new URL into said web page, which directs to a predetermined processing server utilized for implementing new functions, and thus forming a new web page; 3) returning said new web page to said web client; 4) implementing said new functions by said predetermined processing server if it receives a request sent by said web client based on said new URL.

Also according to the present invention we provide A system for dynamically adding new functions for web pages, characterized by comprising: a content converting server which comprises: web page capturing means for capturing a web page which is returned to a web client by a web server; web page modifying means for adding a new URL into said web page, which directs to a predetermined processing server utilized for implementing new functions, and thus forming a new web page; web page returning means for returning said new web page to said web client; said system further comprising: a predetermined processing server for implementing said new functions if it receives a request sent by said web client based on said new URL.

According to a preferred embodiment of this invention, an old URL inside the original hyper link can be replaced with a new URL that points to the predefined processing server which can carry out the new functionality. As such, user can continue to see the description of the original hyper link, but will have new function when click on the description. Another approach is to fulfill the new function and work out the old function as defined by the old URL. This process is transparent to the end user. Of course, one can add brand new hyper link to the Web page with description of the new function and new URL that points to the predefined processing server which in turn carry out the new function. With these features, the invention can be used wildly in WWW applications, e.g., online translation, collection of user information, management of online ads, and billing.

The above features and advantages of the present invention would be more obvious after reading the detail description of a preferred embodiment of the present invention in conjunction with the attached drawings, in which

Fig. 1 is a high level overview of this invention.

Fig. 2 is the workflow of the content conversion server in Fig. 1.

5 Fig. 3 is the workflow of the processing server in Fig. 1.

Below is a description of a preferred embodiment with reference to the diagrams.

10 As a background, The URL and the hyper link are briefly introduced.

Internet application uses Uniform Resource Locator (URL) to define the network path to a server. URL has the syntax to define network connection. A typical URL is in the format like:
15 http://somehost/somedirectory? parameters, the Somehost is the URL's host address, and the somedirectory is the directory that can find the Web page. The normal way to disassemble a URL into a Web server's actual IP address is through the domain name server. In Internet or Intranet, domain name server turns host name inside URL into IP address. The process that a
20 Web client request domain and IP address is called resolution. In TCP/IP, the domain name server turn the host name into its IP address and return the IP address back to the HTTP client. Each IP address represents a server which will process the request from the browser.

25 Hyper link is a way to query information interactively. Hyper link can be part of hypermedia or hypertext. These files allow user to 'click' on the title of the hyper link to get the file or surf a site. In this invention, information inside a hyper link is separated into 2 parts: description and URL. These kinds of hyper link can be found in Web pages.
30 When a Web client displays the Web page, the description is displayed at a proper location as a text or image. When user clicks on the text or image, the Web client sends request to the URL that is embedded in the hyper link.

Fig. 1 is the diagram that shows how the invented system adds new
35 function to the Web page dynamically. Numerals 103 and 104 are used to represent the Web client and server using current technology. As said in the background description, Web client 103 sends request to the Web server 104 through Internet. Web server 104 sends back a response to the Web client also through Internet. The response is actually a HTML file or other
40 file formats that the Web client can process.

It should be noted that though HTML is mentioned several times in this application, HTML itself does not restrict this invention. This invention can be used with any other markup language, e.g., XML.

5 Numeral 101 represents a content conversion server. Though not listed on the diagram, the content conversion server can include: means for intercepting Web pages on their way from the Web server to the Web client; means for modifying Web pages by adding new URL which points to the predefined processing server in the intercepted Web pages; means for
10 returning the modified Web pages to the Web client.

Based on the nature of the application, the means for modifying Web pages can treat the intercepted Web pages differently. For example, it can replace the old URL in the original hyper link with a new URL which points
15 to the new function on the predefined processing server. It can also add a new hyper link in the Web pages and the new hyper link contains description of the new function and new URL which points to the predefined processing server who will carry out the new function. Also, the new URL can contain one or more parameters. These parameters define the new function. The old
20 URL can also be a parameter in the new URL.

So the output of the content conversion server can contain three types of hyper links:

- 25 (1) the original hyper link without any modification;
- (2) new hyper links replacing the original hyper link for linking purpose;
- 30 (3) new hyper link (with or without parameters).

Upon receiving the Web pages, the Web client 103 interprets, displays/plays the received content. For the type 1 and type 2 hyper links, the original description is displayed. As to the type 3 hyper link, new
35 function's description is displayed.

Numeral 102 represents the predefined processing server used to receive requests from the Web client 103 and carry out the predefined function. These functions are predefined and falls into four categories:

- (1) function that requires the collaboration with the Web client 103, shown as numeral 1;
- (2) function that requires the collaboration with the content conversion server 101, shown as numeral 2;
- (3) function that requires the collaboration with the Web server 104, shown as numeral 3; and
- (4) function by processing server itself only, shown as numeral 4.

Thus the request received by the processing server can contain different parameters to identify the object required to collaborate. These parameters are added into the Web pages by the content conversion server 101. As mentioned, the old URL can be a parameter of the new URL. With that, the processing server 102 can obtain the old URL from the new URL's parameter list, and sends request based on the old URL so as to carry out original function as defined by the original hyper link. This process can be totally transparent to the end user.

It should be noted that though content conversion server 101 and processing server are separate servers in the diagram, they can actually be implemented on one server.

Fig. 2 is the workflow of content conversion server in Fig. 1. At step 201, the content conversion server is started; At step 202, it is initialized; At step 203, it waits for and receives request from the Web client. At step 204, it sends the received request to the designated Web server. At step 205, it receives the response - Web page from the Web server.

The purpose of the above steps is to intercept the Web pages from the Web server on its way to the Web client. Beyond the proxy method outlined above, there are many other ways to capture Web pages. Detailed description is omitted here.

Then, at step 206, a new URL which points to the new function on the predefined processing server is added to the Web page, thus resulting in a new Web pages. At step 207, the new Web page is sent back to the Web client. Step 208 it checks if the above process should be continued. If yes, goes to step 203, or goes to step 209. At step 209, the process is terminated.

When implemented, step 203 - 207 can be implemented as multithread process.

5 Depends on the nature of the application, the Web pages can be treated differently at step 206. For example, it can replace the old URL in the original hyper link with a new URL which points to the new function on the predefined processing server. It can also add a new hyper link in the Web pages and the new hyper link contains description of the new function and new URL which points to the predefined processing server that will
10 carry out the new function. Also, the new URL can contain one to more parameters. These parameters define the new function. The old URL can also be a parameter in the new URL.

15 Fig. 3 is the workflow of the processing server in Fig. 1. At step 301, the processing server 102 is started. At step 302, it is initialized. At step 303, it waits for and receives request from the Web client. As noted above, requests received by the processing server are all generated by the Web client as a result of the new URL added during step 206 in Fig. 2. At step 304, parameters in the request are extracted. These parameters
20 were added during step 206 in Fig. 2. For real applications, the parameters can be used in various ways. At step 305, it carries out predefined function. Depends on the application environment, these functions here can be of various purposes. For example, collecting user information or analyzing the usage of advertisement, and so on.

25 At step 306, checking if the collaboration with the Web client is required. The check can be done according to one to more parameters. If yes, it sends back customized response to the client at step 307; At step 308, checking if the collaboration with the content conversion server is
30 required. If yes, it then communicates with the content conversion server to work out the task at step 309; At step 310, it checks if the collaboration with the Web server is required. If yes, it then sends request to the Web server at step 311. The process is transparent to the end user.

35 Steps 306, 308, and 310 above can be based on the parameter. For example, if there is a URL in the parameter list, then the collaboration with the Web server is required. Thus after finishing the predefined function, sending a request to the Web server as designated by the URL.
40

And then, at step 312 it checks if the process is to be continued. If yes, going back to step 303. Or it goes to step 313, and the process is terminated.

5 A few simple examples are listed to describe the applications of this invention below.

Translate Web pages dynamically

10 The content conversion server changes every sentence in a Web pages into a hyper link. When user clicks the hyper link, the browser sends the sentence as a parameter to the processing server. The processing server returns the translation of the sentence.

Collect user information

15 The content conversion server can change the hyper link in the original Web so that when clicked, a request is sent to the processing server automatically for analysis, processing, and collection.

Online advertisement management

20 The processing server collects the number of click on the Ads for billing purpose. The processing server can be maintained by a third party that is trusted by the Ads supplier and the enterprise who pays for ads.

Service Charging

25 The processing server can be used to authenticate a user or collect required payment before the user is allowed to download a file. The processing server can work for multiple Web server. With that, the user no longer requires multiple user accounts on each of the Web servers, thus user's operation is simplified. On the other hand, the Web server which
30 receives billing services from the billing server can save cost, as it no longer requires a billing system which is expensive and difficult to maintain.

35 Though outlined above is a preferred embodiment of this invention, those skilled in the art can change or modify the embodiment in a variety of ways without derivation from the spirit and scope of this invention. Thus, the scope of this invention is defined by the appended claims only.

CLAIMS

1. A method of dynamically adding new functions for web pages, characterized by comprising steps of:

- 5 1) capturing a web page which is returned to a web client by a web server;
- 2) adding a new URL into said web page, which directs to a predetermined processing server utilized for implementing new functions, and thus forming a new web page;
- 10 3) returning said new web page to said web client;
- 4) implementing said new functions by said predetermined processing server if it receives a request sent by said web client based on said new URL.

15 2. The method according to claim 1, characterized in that step 2) comprises a step of:

 replacing an original URL used for the purpose of linkage contained in an original hyperlink in said web page with said new URL.

20 3. The method according to claim 2, characterized in that said new URL in step 2) carries at least one parameter, and said request received in step 4) contains said at least one parameter based on which said predetermined processing server implements corresponding functions.

25 4. The method according to claim 3, characterized in that said at least one parameter in step 2) is said original URL, and said corresponding functions in step 4) comprise functions designated by said original URL.

30 5. The method according to claim 1, characterized in that step 2) comprises a step of:

 adding a new hyperlink into said web page, which is composed of said new URL and a prompt information for said new functions.

35 6. The method according to claim 5, characterized in that said new URL in step 2) carries at least one parameter, and said request received in step 4) contains said at least one parameter based on which said predetermined processing server implements corresponding functions.

40 7. The method according to any preceding claim, characterized in that steps 1) to 3) are performed in a content converting server.

8. The method according to claim 7, characterized in that said content converting server and said predetermined processing server are identical.

5 9. A system for dynamically adding new functions for web pages, characterized by comprising:

a content converting server which comprises:

web page capturing means for capturing a web page which is returned to a web client by a web server;

10 web page modifying means for adding a new URL into said web page, which directs to a predetermined processing server utilized for implementing new functions, and thus forming a new web page;

web page returning means for returning said new web page to said web client;

said system further comprising:

15 a predetermined processing server for implementing said new functions if it receives a request sent by said web client based on said new URL.

20 10. The system according to claim 9, characterized in that said web page modifying means replaces an original URL used for the purpose of linkage contained in an original hyperlink in said web page with said new URL.

25 11. The system according to claim 10, characterized in that said web page modifying means further adds at least one parameter for said new URL, and said predetermined processing server receives a request containing said at least one parameter and performs corresponding functions based on said at least one parameter.

30 12. The system according to claim 11, characterized in that one of said at least one parameter added by said web page modifying means is said original URL, and said corresponding functions performed by said predetermined processing server comprise functions designated by said original URL.

35 13. The system according to claim 9, characterized in that said web page modifying means adds a new hyperlink into said web page, which is composed of said new URL and a prompt information for said new functions.

40 14. The system according to claim 13, characterized in that said web page modifying means further adds at least one parameter for said new URL, and said predetermined processing server receives a request containing said at

least one parameter and performs corresponding functions based on said at least one parameter.

5 15. The system according to any one of claims 9 to 14, characterized in that said content converting server and said predetermined processing server are identical.



INVESTOR IN PEOPLE

Application No: GB 0022785.0
Claims searched: 1-15

Examiner: Ben Micklewright
Date of search: 25 June 2001

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK CI (Ed.S): G4A (AUSB)
Int CI (Ed.7): G06F (17/30)
Other: Online: WPI, EPODOC, PAJ, INSPEC, XPESP, COMPUTER, IEL, Selected Internet sites

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	EP 0762297 A2 (SUN) See e.g. the abstract	1,5-9,13-15
X,E	WO 00/73935 A2 (SHOP-NOW.COM) See whole document, e.g. pages 7,8	1-3,5-11,13-15
X,E	WO 00/62169 A1 (THIRDVOICE) See e.g. pages 8 and 9	1,5-9,13-15
X	WO 98/45793 A1 (TECHWAVE) See e.g. page 5 lines 3-22, page 9 lines 27,28	1,5-9,13-15
X	WO 98/37503 A1 (IBM) See e.g. page 7	1,5-9,13-15
X,P	US 6052730 (ALTMAN) See e.g. the abstract	1-15
X	US 5948061 (MERRIMAN) See e.g. column 3	1,5-9,13-15
X	US 5933811 (ANGLES) See e.g. the abstract	1,5-9,13-15
X	US 5712979 (WEINBERGER) See e.g. the abstract	1-15

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.



INVESTOR IN PEOPLE

Application No: GB 0022785.0
Claims searched: 1-15

12
Examiner: Ben Micklewright
Date of search: 25 June 2001

Category	Identity of document and relevant passage	Relevant to claims
X	Information Processing & Management, vol. 35, no. 5, pages 679-689, September 1999, "Constructing and navigating personalised views of the Web", S Greenhill et al.	1,5-9,13-15

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.