CUSTOMIZATION OF NETWORK DOCUMENTS BY ACCESSING CUSTOMIZATION INFORMATION ON A SERVER COMPUTER USING UNIQUE USER IDENTIFIERS

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Field of Search .................................. 707/501, 513, 707/514, 10, 104; 345/329, 333, 715/501.1, 513, 514

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ABSTRACT
User-selected customization information for a network (e.g., HTML) document is stored at a server with reference to user identifying information that uniquely identifies the user. Whenever the user navigates back to the network address of the HTML document, the user is identified automatically and receives a customized HTML document formed in accordance with the customization information.

20 Claims, 6 Drawing Sheets
FIG. 2

INTERNET

MODEM

COMPUTER

WWW SITE

HTML DOCUMENT

DEPENDENCIES

Address: http://www.microsoft.com

DOCUMENT DISPLAY AREA
Fig. 3

User navigates client to customizable network address

Previous customization?

Yes

Return custom HTML document

User navigates link and server returns HTML customization document to user client

User selects customization options in HTML customization document and returns options to server

Server stores customization options referenced to customization persistent client state information

Server returns customization persistent client state information to user client

No

Return default HTML document
### Fig. 4

![Internet Explorer interface](image)

<table>
<thead>
<tr>
<th>FAVORITE LINKS</th>
<th>Latest Updates</th>
<th>Link of the Day</th>
<th>URL</th>
<th>Address</th>
<th>Site Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>http://</td>
<td><a href="http://www.microsoft.com">www.microsoft.com</a></td>
<td>MS Information</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>http://</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>http://</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NEWS**
- World News
- National News

**COMMERCE**
- Commerce News
- Investor News

Stock Ticker - Enter stock symbols to track stocks

**SPORTS**
- Sports News
- Sports Scores
- Baseball
- NFL
- NHL

**ENTERTAINMENT**
- Culture & Opinion
- Music News
- Movie Reviews
- Movie Times
- TV Listings
- Concerts & Events

**SCI-TECH**
- Sci-Tech News
- Computer News

**WEATHER**
- National
- World

[ACCEPT] [CANCEL]
User with customization persistent client state information navigates client to customizable network address

Client passes customization persistent client state information to customizable network address

Server at customizable network address correlates customization persistent client state information with customization options

Server at customizable network address returns customized HTML document
Fig. 6

Internet Explorer

FAVORITE LINKS  Link of the Day  MS Information Link

NEWS
  National News
  [News display window]

COMMERCE
  Commerce News
  [Commerce news display window]

SPORTS
  Sports Scores
  [Sports scores display window: Baseball, NFL NBA]

ENTERTAINMENT
  Culture and Opinion Display Window
  Movie Reviews Display Window
  Music News Display Window
  Concerts & Events Display Window

SCI-TECH
  Computer News Display Window

WEATHER
  World Weather Display Window
CUSTOMIZATION OF NETWORK DOCUMENTS BY ACCESSING CUSTOMIZATION INFORMATION ON A SERVER COMPUTER USING UNIQUE USER IDENTIFIERS

FIELD OF THE INVENTION

This invention relates generally to providing information to a user who accesses a document at a site on a computer network like the Internet or an Intranet and, in particular, to automatically providing selected or customized information to the user.

BACKGROUND AND SUMMARY OF THE INVENTION

The Internet is a well-known, global network of cooperatively interconnected computer networks. The world-wide web portion of the Internet is a collection of server computers (referred to as "sites") on the Internet which store HTML documents that can be publicly accessed by computer users having a connection to the Internet. There are many such world wide web sites on the Internet.

Software, generally known as "Internet browsers," is now in wide-spread use for retrieving (also known as "downloading") from the world-wide web and viewing electronic documents in hyper-text markup language (HTML) format. Originally, these HTML documents were simply ASCII coded character files generally consisting of text and HTML "tags" that specify formatting of the document, links (referred to as "hyper-links") to related documents on the network, and other files that contain information (e.g., sound, images, video, etc.) to be combined into the document. Typical HTML documents found on the world wide web, sometimes referred to as web pages, include both text and tags specifying files that are to be displayed with the text. In use, browser software allows a user to navigate (also known as "browse") between documents and sites on the world-wide web.

Conventional HTML documents found on the world wide web are static in that the document is simply transferred to each user who navigates to the document. Although the document may include images or other media formats, the HTML document transferred to each user is the same. The strength of such a document format is that it includes links to other documents or sites by which the user can navigate to a desired document or site.

A common type of document on the world-wide web is the top-level or trunk document for a particular site, often referred to as its home page. A home page typically provides a user who accesses it with general information about the provider of the network site and organizational information about, and access to, lower levels of the network site. Another common type of document provides users with a convenient gateway to the world wide web. These types of documents commonly provide access to network search tools or services, news or other current event highlights, links to other sites of interest, etc. Such a network gateway type document may be a home page or a lower-level document for a particular network site.

It is a shortcoming of conventional HTML documents that all users who access a document receive the same information and links. In the context of a home page or a network gateway document, the static nature of HTML documents requires that only generalized information and links are included in the document so that it appeals to the widest base of users. Excessive information and links in the document would cause it to be too large to be practicable for most users. For users accessing the world-wide web over conventional "POTS" telephone connections and modems, excessively large HTML documents can require more time for transmission than many users are willing to accept.

To overcome these shortcomings of conventional HTML documents, an HTML document customization method obtains and stores for a user customizing information for a customizable HTML document on a computer network like the Internet or an Intranet. The customizable HTML document may be a top-level, trunk, or home page for a network site or a world-wide web gateway, or could be of any level at the network site and provide virtually any functionality of an HTML document.

One aspect of the method occurs when a user navigates to the network address (e.g., Uniform Resource Locator) associated with the customizable HTML document and is offered the ability to customize the HTML document. The user might not have been to the network address before, or not elected to customize the HTML document during a previous access of it, or will elect to revise customization options selected for the HTML document during a previous access of it. The server returns an HTML customization document to the user. In one embodiment, the HTML customization document is an HTML form that includes topical groupings of customization options relating to, for example, favorite links, news, sports, financial matters, entertainment, science and technology, life, weather, etc. that a user selects with graphical check boxes, buttons, etc. The customization options may relate to links to sites that provide information on indirect links to the selected topics. In addition, the HTML customization document can allow the user to designate specific network addresses or URLs to be included on the customized HTML document. The user returns the selected customization options to the server as customization information.

The customization information is stored at the server with reference to user identifying information that uniquely identifies the user, and the server returns the user identifying information to the user (i.e., the browser on the user computer or client). In one embodiment, the user identifying information is customization persistent client state information, sometimes referred to as a "cookie." The customization persistent client state information is or includes, for example, 128-bit globally unique identifiers ("GUID") that are capable of uniquely identifying each and every user.

Whenever the user navigates back to the network address associated with the customizable HTML document, the browser on the user client passes the customization persistent client state information or "cookie" back to the server. The server correlates the customization persistent client state information with the customization options stored at server and returns to the user client a customized HTML document formed in accordance with the customized options stored at server. The customized HTML document may include information on the selected topics, obtained from other sites, for example, or direct links to the other sites that have the information.

This HTML or network document customization is capable or providing each user who accesses a network address with an HTML document that is matched to that user's preferences. This customization adds to the strength of linked information provided by HTML documents by providing each user with the information, or links to information, that the user actually wants. Customization of
HTML documents is particularly beneficial for home pages, network gateway pages, or any other pages that potentially provide direct access to a wide variety of links or information.

Additional features and advantages of the invention will be made apparent from the following detailed description of an illustrated embodiment which proceeds with reference to the accompanying drawings.

**BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a block diagram of a computer system that may be used to implement a method and apparatus embodying the invention.

FIG. 2 is a block diagram of the computer system of FIG. 1 connected to a remote computer network (e.g., the Internet) for locally browsing electronic documents residing at a remote computer site.

FIG. 3 is a flow diagram representing an HTML document customization method.

FIG. 4 is an illustration of a simplified HTML document customization document as it would appear when rendered on the display of a user’s computer.

FIG. 5 is a flow diagram of a customized HTML document delivery method.

FIG. 6 is an illustration of a simplified customized HTML document.

**DETAILED DESCRIPTION OF EMBODIMENT**

Referring to FIG. 1, an operating environment for an illustrated embodiment of the present invention is a computer system 20 with a computer 22 that comprises at least one high-speed processing unit (CPU) 24, in conjunction with a memory system 26, an input device 28, and an output device 30. These elements are interconnected by at least one bus structure 32.

The illustrated CPU 24 is of familiar design and includes an ALU 34 for performing computations, a collection of registers 36 for temporary storage of data and instructions, and a control unit 38 for controlling operation of the system 20. The CPU 24 may be a processor having any of a variety of architectures including Alpha from Digital, MIPS from MIPS Technology, NEC, IDT, Siemens, and others, x86 from Intel and others, including Cyrix, AMD, and Nexgen, and the PowerPC from IBM and Motorola.

The memory system 26 generally includes high-speed main memory 40 in the form of a medium such as random access memory (RAM) and read only memory (ROM) semiconductor devices, and secondary storage 42 in the form of long term storage mediums such as floppy disks, hard disks, tape, CD-ROM, Flash memory, etc. and other devices that store data using electrical, magnetic, optical or other recording media. The main memory 40 also can include video display memory for displaying images through a display device. Those skilled in the art will recognize that the memory 26 can comprise a variety of alternative components having a variety of storage capacities.

The input and output devices 28, 30 also are familiar. The input device 28 can comprise a keyboard, a mouse, a physical transducer (e.g., a microphone), etc. The output device 30 can comprise a display, a printer, a transducer (e.g., a speaker), etc. Some devices, such as a network interface or a modem, can be used as input and/or output devices.

As is familiar to those skilled in the art, the computer system 20 further includes an operating system and at least one application program. The operating system is the set of software which controls the computer system's operation and the allocation of resources. The application program is the set of software that performs a task desired by the user, using computer resources made available through the operating system. Both are resident in the illustrated memory system 26. Preferably, the operating system employs a graphical user interface where the display output of an application program is presented in a rectangular area (sometimes referred to as a "Window") on the screen of the output device 30 and is also multi-tasking (allowing application programs to execute computing tasks in multiple threads), such as Microsoft Corporation's Windows® NT or Windows® OS/2 operating system, IBM's OS/2 Warp operating system, Apple's Macintosh System 7 operating system, X-Windows, etc.

In accordance with the practices of persons skilled in the art of computer programming, the present invention is described below with reference to acts and symbolic representations of operations that are performed by computer system 20, unless indicated otherwise. Such acts and operations are sometimes referred to as being computer-executed. It will be appreciated that the acts and symbolically represented operations include the manipulation of data bits which causes a resulting transformation or reduction of the electrical signal representation, and the maintenance of data bits at memory locations in memory system 26 to thereby reconfigure or otherwise alter the computer system’s operation, as well as other processing of signals. The memory locations where data bits are maintained are physical locations that have particular electrical, magnetic, or optical properties corresponding to the data bits.

FIG. 2 shows a browsing environment 50 in which computer 20 (FIG. 1) as a client runs software, referred to herein as a “browser,” for unified browsing of electronic documents and other data from local sources (e.g., the secondary storage 42 of FIG. 1) and from a remote computer network 52. The browser can be integrated with the operating system software, or can be separate application software. The illustrated remote computer network 52 may be the Internet or an intranet. In the illustrated browsing environment 50, the computer 20 connects to the computer network 52 over a telephone line 54 with a modem 56. Other physical connections to the computer network alternatively can be used, such as an ISDN, T1 or like high-speed telephone line and modem, a television cable and modem, a satellite link, an optical fiber link, an Ethernet or other local area network technology wire and adapter card, radio or optical transmission devices, etc. The invention can alternatively be embodied in a browsing environment for other public or private computer networks, such as a computer network of a commercial on-line service or an internal corporate local area network (LAN), an intranet, or like computer network.

Documents for browsing with the illustrated browser can reside as files of a file system stored in the computer’s secondary storage 42 (FIG. 1), or reside as resources at a remote computer 58 (also referred to as a “site” or server) connected to the computer network 52, such as a world-wide web site on the Internet. The illustrated document 60 residing at the site 58 conforms with HTML standards, and may include extensions and enhancements of HTML standards. However, the illustrated browser also can browse documents having other data formats (e.g., Microsoft® Word documents, etc.) from the computer 20 or remote computer 58. In conformance with HTML, the illustrated document 60
can incorporate other additional information content 62, such as images, audio, video, executable programs, etc. (hereafter simply “images” 62), which also reside at the remote computer 58. The document 60 and images 62 preferably are stored as files in a file system of the remote computer 58. The document 60 incorporates the images 62 using HTML tags that specify the location of files or other Internet resource containing the images on the Internet 52.

When used for browsing documents, the illustrated browser displays the document in a window 68 or rectangular area of the computer’s display 30 allocated to the browser by the operating system. The illustrated window 68 comprises a frame 70, a document display area 72, and user interface controls 74. The browser displays the document within the document display area 72 of the window 68.

FIG. 3 is a flow diagram of an HTML document customization method 80 by which customizing information for a customizable HTML document on computer network 52 is obtained and stored for a user of client 20. The customizable HTML document is described as a top-level, trunk, or home page for site 58 functioning as a world wide web gateway. It will be appreciated, however, that the customizable HTML document could alternatively be of any level at site 58 and provide virtually any functionality of an HTML document. Process block 82 indicates that a user navigates client 20 to the network address (e.g., Uniform Resource Locator) of customizable HTML document at site 58. Client 20 in this step might not been to the network address before, or might not have elected to customize the HTML document during a previous access of it, or might have elected to customize the HTML document during a previous access of it.

Decision block 84 represents an inquiry whether client 20 has customized the HTML document during a previous access of it. Decision block 84 proceeds to process 86 if client 20 has customized the HTML document during a previous access of it, and otherwise proceeds to process block 88.

Process block 86 indicates that server 58 returns a customized HTML document to client 20 via the browser. The customized HTML document includes a link by which the user can navigate to an HTML customization document 92 (FIG. 4).

Process block 88 indicates that server 58 returns a default HTML document (not shown) to client 20 via the browser. The default HTML document includes a link by which the user can navigate to HTML customization document 92.

Process block 96 indicates that the user navigates or activates the link to HTML customization document 92 so that server 58 returns the document to user client 20. In one embodiment, HTML customization document 92 is an HTML form that includes topical groupings of customization options relating to, for example, news, sports, financial matters, entertainment, science and technology, life, weather, etc. (not all of which are shown), that a user selects with graphical check boxes, buttons, etc. The customization options may relate to links to sites that provide information on, or direct links to, the selected topics. In addition, HTML customization document 92 can allow the user to designate specific URLs to be included on the customized document. The user returns the selected customization options to server 58 as customization information.

Process block 98 indicates that the user selects customization options and returns them to server 58. Process block 100 indicates that the customization information is stored at server 58 with reference to user identifying information that uniquely identifies the user. Process block 102 indicates that server 58 returns the user identifying information to the browser on user client 20. In one embodiment, the user identifying information is customization persistent client state information, sometimes referred to as a “cookie.” The customization persistent client state information is or includes, for example, 128-bit globally unique identifiers (“GUID”) that are capable of uniquely identifying each user that elects customization. Such identifiers may be created for example with a function call named “CoCreateGUID” from the Win32™ library of functions available in the Windows 95 and Windows NT operating systems available from Microsoft Corporation.

Although described as using a persistent client state to carry identifying information between user client 20 and server 58, the customization of HTML or other network documents is substantially independent of how the identifying information is conveyed between user client 20 and server 58. The information can be conveyed in any of a wide variety of formats or formats, including basic authentication as set forth in the hypertext transfer protocol standard (e.g., HTTP 1.1), any other client certification standards, or even simple usernames or passwords. Utilization of usernames and passwords for identifying clients is incorporated, for example, in the Internet Information Server (IIS) feature in the Windows NT operating system of Microsoft Corporation. With identifying information from the user, regardless of the format or manner conveyed, the customization options selected by a user can be correlated with and returned to that user.

A persistent client state, or “cookie,” is generally arbitrary text information (e.g., of up to 255 characters) returned to user client 20 by server 58 when it is accessed by user client 20. The information includes one or more network addresses (e.g., Uniform Resource Locators, URLs) for which the persistent client state is applicable. For a browser that accommodates client states, user client 20 stores the client state information. On subsequent accesses of any of the specified network addresses by the browser on user client 20, selected information in the client state is returned to server 58. A benefit of using a persistent client state to carry the information is that it is automatic and transparent to the user.

A persistent client state is specified by a Set-Cookie HTTP response header of the form:

```
Set-Cookie: name=VALUE; expires=DATE; path=PATH;domain=DOMAIN_NAME; secure.
```

For example, when it requests an HTML document from a network address on server 58, the browser determines whether the address matches or corresponds to the addresses or paths specified in any of the stored persistent client states. For each persistent client state matching or corresponding to the address, the browser transmits the name and value of the persistent client state with the HTML document request. The format of the transmission is:

```
Cookie: name1=VALUE1; name2=VALUE2, . . .
```

The attributes of the Set-Cookie header are:

```
- name=VALUE
```

This attribute specifies the name and content of the persistent client state data and is the only required attribute on the Set-Cookie header. The name and its value can be any sequence of characters, except semi-colon, comma and white space. For example, this attribute can have the name ‘User’ and the content or value can be a 128-bit globally
This attribute specifies an expiration date for the persistent client state. After expiration, the persistent client state is no longer stored or returned to the server at the originating network address. The \text{DATE} is formatted as: \text{Wdy, DD-Mon-YYYY HH:MM:SS GMT}

If this attribute is not set, then the persistent client state expires immediately after leaving the specified network address. Accordingly, this attribute is set to allow customization information to be retrieved for a user during subsequent accesses of the specified network addresses.

\texttt{domain=DOMAIN NAME}

This attribute specifies a top level or "tail" domain to be initially examined when searching for a valid persistent state client in a list of persistent state clients. The top level or "tail" domain requires at least three periods, such as \texttt{"custom.home.uk"}, except that only two periods are required in the top level domains \texttt{"com", "edu", "gov", \textit{"int"}, \textit{"mil"}, \textit{"net"}, and \textit{"org"}}. A persistent state client with a matching top level domain match proceeds to path matching. The default value of this attribute is the host name of the server generating the persistent state client.

\texttt{path=PATH}

The path attribute specifies the network addresses (e.g., \texttt{URLs}) within a domain for which the persistent state client is valid (i.e., retrieved by the browser on user client \texttt{20} when the specified network address is requested or accessed). The format for this attribute is \texttt{\textit{path}=/\textit{foo}}, and the persistent state client is returned only if the browser requests a network address (e.g., \texttt{URL}) in the path \texttt{"/foo"} or lower, such as \texttt{"/foo/default"}. The most general specification is \texttt{\textit{path}=\textit{/}}. If this attribute is not specified, the default path is the same as the path for the document with which the persistent state client is associated.

\texttt{secure}

If this attribute is set, the persistent state client is transmitted from user client \texttt{20} only if the communication channel with server \texttt{58} is secure (e.g., utilizing a secure socket layer). If this attribute is not specified, the persistent state client is sent regardless of the security of the channel.

\texttt{domain=DOMAIN NAME}

This attribute specifies a top level or "tail" domain to be initially examined when searching for a valid persistent state client in a list of persistent state clients. The top level or "tail" domain requires at least three periods, such as \texttt{"custom.home.uk"}, except that only two periods are required in the top level domains \texttt{"com", "edu", "gov", \textit{"int"}, \textit{"mil"}, \textit{"net"}, and \textit{"org"}}. A persistent state client with a matching top level domain match proceeds to path matching. The default value of this attribute is the host name of the server generating the persistent state client.

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\texttt{secure}

If this attribute is set, the persistent state client is transmitted from user client \texttt{20} only if the communication channel with server \texttt{58} is secure (e.g., utilizing a secure socket layer). If this attribute is not specified, the persistent state client is sent regardless of the security of the channel.
5. The method of claim 1 in which obtaining customization information from the user includes providing the user with a form that includes topical groupings of customization options.

6. The method of claim 5 in which the topical groupings of customization options relate to one or more of: news, sports, financial matters, entertainment, science and technology, life, and weather.

7. The method of claim 5 in which the form is of an HTML format.

8. The method of claim 1 in which the network includes the Internet.

9. The method of claim 1 in which storing the customization information includes storing the user identifier as a database index to the customization information.

10. The method of claim 9 in which the network addresses include uniform resource locators.

11. In a method of providing an HTML document to a user at a client computer over a computer network, the improvement comprising:

obtaining HTML document customization information from the user of the client computer, the HTML document customization information indicating user preferences for an HTML document available to the user over the network; and

assigning to the HTML document customization information a unique user identifier corresponding to the user and storing the HTML document customization information on a server computer on the network in association with the unique user identifier.

12. The method of claim 11 in which the user identifier is determined on the network remote from the client computer and is returned to the client computer.

13. The method of claim 12 in which the user identifier is returned to the client computer as persistent client state information.

14. The method of claim 11 in which obtaining HTML document customization information from the user includes providing the user with an HTML form for indicating the user preferences.

15. The method of claim 14 in which the HTML form includes topical groupings of customization options.

16. The method of claim 11 in which the computer network includes the Internet.

17. In a method of providing an HTML document to a user at a client computer over a computer network, the improvement comprising:

during a first accessing of the network by the user client computer, obtaining HTML document customization information from the user of the client computer, the HTML document customization information indicating user preferences for an HTML document available to the user over the network;

storing the HTML document customization information on a server computer on the computer network; and during a subsequent accessing of the network by the user client computer, retrieving the HTML document customization information stored on the server computer and providing to the client computer an HTML document customized according to the HTML document customization information.

18. On a computer-readable medium, computer-executable instructions for providing an HTML document to a user at a client computer over a computer network, comprising:

instructions for obtaining HTML document customization information from the user of the client computer, the HTML document customization information indicating user preferences for an HTML document available to the user over the network; and

instructions for assigning to the HTML document customization information a user identifier corresponding to the user and storing the HTML document customization information on a computer, other than the client computer, on the network in association with the user identifier.

19. On a computer-readable medium, computer-executable instructions for providing an HTML document to a user at a client computer over a computer network, comprising:

instructions for obtaining HTML document customization information from the user of the client computer during a first accessing of the network by the user client computer, the HTML document customization information indicating user preferences for an HTML document available to the user over the network; and

instructions for storing the HTML document customization information on a network server computer; and

instructions for providing to the client computer an HTML document customized according to the HTML document customization information during a subsequent accessing of the network by the user client computer.

20. A method of providing customized documents to multiple users on client computers, the method comprising the steps of:

obtaining customization information from a first client computer;

storing the customization information obtained from the first client computer on a network server computer using a unique identifier associated the first client computer;

obtaining customization information from a second client computer that is different from the customization information from the first client computer; and

storing the customization information received from the second client computer on the server computer using a unique identifier associated with the second client computer.
It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title page, Item [54] and Column 1, line 4, Title, “UNIQUE” should read -- UNIQUE --.

Title page, Item [56], References Cited, OTHER PUBLICATIONS, “Proposal for Extending Persistent Client State HTTP Cookies”, reference, “ext13 cookie” should read -- ext_cookie --.

Column 1, Line 54, “levels the network site” should read -- levels of the network site --.

Column 5, Line 28, “not been” should read --not have been --.

Column 6, Line 26, “Windows TM” should read -- Windows ™ --.

Column 7, Lines 16, 17, 21, 24, 27, 30 and 38, “persistent state client” should read -- persistent client state --.

Column 10, Line 45, “fist” should read -- first --.
Line 46, “associated the first” should read -- associated with the first --.

Signed and Sealed this
Fifteenth Day of June, 2004

JON W. DUDAS
Acting Director of the United States Patent and Trademark Office