

allow distribution servers, described hereinafter in detail, to share and access compressed content. The control server can be used to update software and to update the cache manager of the distribution servers. The control server can also be used to monitor the distribution servers' activity, generate reports, and transfer the compressed content to increase bandwidth. As mentioned herein, the control server can be used as an alternate route for providing content in the network in order to increase reliability. The control server also performs a form of multicasting by accepting subscriptions from distribution servers for multicast, and sending data to the distribution servers. The distribution servers then buffer the content in their cache and distribute it to their clients that have made multicasts requests.

[0044] The distribution server has a connection with the Internet and a direct connection with the control server and other distribution servers. The distribution server is capable of compressing content and retrieving compressed content from other distribution servers or from the control server. The distribution server maintains a large cached content which is optionally compressed by a "black box" compressor, described hereinafter. The compression of the content is performed to save valuable bandwidth in communicating with a user upon a content delivery request. Distribution servers, in addition to having the capability of requesting content from the control server and the Internet, have the capability of requesting content from other distribution servers, not explicitly shown in the Figures. Each distribution server has access to all the public content in the network. If the content requested by the distribution server is present in another distribution server, the content is delivered compressed and will be provided in compressed form the first time it is requested by the user. Optionally, the distribution servers can function without the compression and edit functionalities, instead retrieving the compressed content from the control server or from other distribution servers that have compression and edit capability. The distribution servers communicate with users using a variety of network protocols and can be configured using web browser forms, applets and/or configuration files. Content can be delivered to a particular user or to a group of users in a predefined format according to the preferences of the user or group of users.

[0045] The distribution server has features and properties that are similar to the control server, described hereinabove, and the stealth distribution server, described hereinafter. The stealth/distribution/control servers support both secure and insecure Hypertext Transfer Protocol (HTTP/HTTPS). As with other protocols, the support for the HTTP will be in an object factory scheme, thus allowing new versions to be plugged in when needed. In addition, the stealth/distribution/control servers may support NEWS, FTP and/or MAIL in a factory formatting, so that newer versions may be plugged in when needed. The servers may also support standard mime and other data types, preferably through object factories so that new types may be added later. Servlets and Common Gateway Interface (CGI) may be supported by the web server object so that functionality may be added.

[0046] FIG. 7 illustrates an exemplary method in flow-chart form for the control/distribution server of the present invention. The client, sometimes referred to as user or client terminal, sends a request to the control/distribution server

(702), which authenticates the request(706). If the client is allowed to utilize Lathe control/distribution server (708), the process continues as described hereinbelow, otherwise, service is refused (710). The control/distribution server checks for the object in the cache (712). If the object requested is in the cache and is up to date (714), it is sent to the client (716). If the object is not in the cache (712) or is not up to date (714), the control/distribution server connects to the proxy server (718) to make the request for the object (720). The object is sent to the distribution server and to its cache (722). The distribution server also checks whether the edit mode is activated (724). If the edit mode is enabled, the server checks the content (726). If the content is an image or other media, the cache manager is notified (728) and the logs are updated (730). However, if the object is HTML content, the HTML editor is notified (732) and the N-depth compression server is notified, which performs an N-depth compression on the HTML document (734). The cache manager is notified of the procedure (728) and the logs are updated (730).

[0047] The HTML edit server connected to the distribution server and to the compression server modifies web pages so that the pages reflect the changes needed to display compressed content in a user browser. The edit server includes both SGML and control language edit servers. The edit server may optionally work with distribution servers, control servers, cache managers, and/or compression servers to compose a compressed URL object. The edit server, sometimes referred to as the HTML edit server, communicates with and may be controlled by the distribution/control server through sockets and RMI using a control object. As will be explained later with respect to FIG. 8, the edit server parses and edits HTML pages. The edit server also supports HTML, XML and Javascript in preferably an object factory scheme, allowing new HTML, XML and Javascript to be plugged in when needed. The editing will be performed to replace the existing content tags with compressed content tags. Anchor "<a" and image "<img" tags are examples of tags that need to be modified. These tags will be replaced with "<embed" tags. Also, parameters inside the tag needs to be modified to reflect the tag modification. Therefore, tags pointing to images are replaced by tags pointing to embedded objects. For example, "" will be replaced with "<embed type=x-image/XXXX/trans src=myimage.jpg.trans width=100 height=100>." The x in the x-image mime means that it is not a registered mime type.

[0048] An important distinction to notice in the new tag is that an additional extension is added to the image name. This is performed to avoid confusion caused by replacing the original extension of the image. This is important if two images in the same URL have the same name but different extensions. Therefore, an additional extension is appended to the compressed image name and extension. This process is explained in detail hereinafter. This compressed image resides on the local servers and not in the original server.

[0049] For clients with handheld devices such as a personal digital assistant (PDA) or a wireless phone capable of receiving content, the edit server may output text-only versions of HTML pages. The images may be replaced with tables, image description and/or text resulting from an image reformatting. Images may optionally be downsampled and