SYSTEMS AND METHODS FOR REDIRECTING USERS ATTEMPTING TO ACCESS A NETWORK SITE

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority from U.S. Utility Patent Application Serial No. 09/458,569, filed December 8, 1999, entitled "Systems And Methods For Redirecting Users Having Transparent Computer Access To A Network Using A Gateway Device Having Redirection Capability", U.S. Provisional Application Serial No. 09/458,602, filed December 8, 1999, titled "Systems and Methods For Authorizing, Authenticating and Accounting Users Having Transparent Computer Access To A Network Using A Gateway Device", U.S. Provisional Application Serial No. 60/161,182, filed October 22, 1999, entitled "Systems and Methods for Dynamic Bandwidth Management on a Per Subscriber Basis in a Computer Network", U.S. Provisional Application Serial No. 60/160,890, filed October 22, 1999, titled "Systems and Methods for Creating Subscriber Tunnels by a Gateway Device in a Computer Network", U.S. Provisional Application Serial No. 60/161,139, filed October 22, 1999, titled "Information And Control Console For Use With A Network Gateway Interface", U.S. Provisional Application Serial No. 60/161,189, filed October 22, 1999, titled "Systems and Methods for Transparent Computer Access and Communication with a Service Provider Network Using a Network Gateway Device", U.S. Provisional Application Serial No. 60/160,973, filed October 22, 1999, titled "Systems and Methods for Enabling Network Gateway Devices to Communicate with Management Systems to Facilitate Subscriber Management", U.S. Provisional Application Serial No. 60/161,181, filed October 22, 1999, titled "Gateway Device Having an XML Interface and Associated Method", and U.S. Provisional Application Serial No. 60/161,093, filed October 22, 1999, titled "Location-Based Identification and Authorization for use With a Gateway Device." All of the above applications are incorporated by reference in their entirety.

FIELD OF THE INVENTION

The present invention relates generally to network redirection, and, more particularly, to systems and methods for redirecting users from one requested network destination to one or more different network destinations.

BACKGROUND OF THE INVENTION

Through gateway devices or routers, Internet Service Providers (ISPs) or enterprise network (such as a LANs) providers can permit a wide variety of users access to their networks and to other online services. To take advantage of user access to their computer networks and online services enterprise networks or ISPs should be able to redirect users to network destinations, such as web pages or customized portal pages, that the enterprise or Internet service providers wish the user to access or view. For instance, where a user is located at an airport, the service provider at the airport may wish to direct the user to a portal page airport information (e.g., flight arrival and departure information), to a portal page having the user's itinerary thereon, or to a web page related to the airport or city in which the airport is located to provide the user an incentive to access the network, even though the user requests another page, such as a home page at his enterprise. ISPs, for example, may wish users to access the ISP's web page for up to the date news and weather, information regarding the user's Internet service, and paid advertisements.

Web page redirection has been previously accomplished. For example, America Online (AOL) users, upon accessing the Internet, are directed to an AOL home page from which the users can select a variety of AOL services, and which includes advertising from various companies. Typically, direction of users to such a page benefits the ISP because advertisers pay money to the ISP each time a user accesses the Internet, as subscribers are a captive audience to advertising. Advertisers pay for such advertising not only because of the captive audience, but because advertisers can tailor advertisements based upon the typical audience accessing the Internet. Furthermore, AOL may market its services through its home page, and its home page may be attractive to potential subscribers. Directing users to a particular web page or portal page may serve an additional function.

Users may be directed to a portal page, such as a login page, so that the user may enter login information to be authenticated and authorized access on the network. Furthermore, users may wish to establish their own specialized page, such as a page including favorite links, a page linking the user to the user's business, or a page including any other items relevant to the user.

However, such redirection of users to web pages has been traditionally based upon software installed on a user's computer and/or configurations of user computers in communication with a primary network. For example, where a user's computer is appropriately configured for access to a primary network, the user's computer can be configured to access a particular web page (or home page) on that network. This can be the case, for example, in businesses where users' computers are configured to access an intranet home page or an Internet page specific to that company and located on the Internet.

Therefore, methods and systems would be desirable that enable users transparent access to a computer network employing a gateway device where the computer network can provide access to users and redirect the users to network destinations (e.g., web pages or portal pages) established by the user, network administrator or another entity. Furthermore, such redirection should be able to redirect users to a login page when the system determines that the user does not otherwise have access to online services or networks, so that the user may establish access rights to the network.

SUMMARY OF THE INVENTION

The present invention includes a method and system for redirecting users to network destinations, such as web pages, where users have transparent access to a computer network in communication with such network destinations via a gateway or similar hardware device. The method and system advantageously operates in a manner transparent to the user since the user need not reconfigure their computer and no additional software need be added to the computer for reconfiguration purposes.

According to one embodiment of the present invention, there is disclosed a method for redirecting a user's request for access to a destination address, via a computer in communication with a network. The method includes receiving at a

gateway device a request from the user for access to the destination address via the user's computer, determining if the user is entitled access to the network, and collecting any additional login information from the user that is required to access the network. The method further includes redirecting the user's computer to a portal page at an address different than the destination address following collection of any additional login information from the user and a determination that the user is entitled access to the secondary network.

According to one aspect of the present invention, redirecting the user's computer to a portal page includes redirecting the user's computer to a user-customized page. According to another aspect of the present invention, redirecting the user's computer to a portal page includes redirecting the user's computer to a customized portal page based upon the location of the user's computer. Additionally, redirecting the user's computer to a portal page can include redirecting the user's computer to a portal page after a period of time has lapsed or upon the occurrence of some other condition, such as the user's attempt to access a particular destination. Redirecting the user's computer to a portal page can also include redirecting the user's computer to a portal page created by an administrator associated with the portal page.

According to another embodiment of the present invention, there is disclosed a method for redirecting a user's request for access to a destination address, via a computer in communication with a network. The method includes receiving at a gateway device a request from the user for access to the destination address via the user's computer, determining if the user is entitled access to the network, and redirecting the user's computer to a web page at an address different than the destination address following a determination that the user is entitled access to the network..

According to one aspect of the invention, redirecting the user to a web page includes redirecting the user to a portal page created by an administrator associated with the portal page. According to another aspect of the present invention, redirecting the user's computer to a web page comprises redirecting the user's computer to a portal page customized by the user. Redirecting the user's computer to a web page can further include redirecting the user's computer to a portal page after a period of time has lapsed.

According to yet another embodiment of the present invention, there is disclosed a system for redirecting a user's request for access to a destination address, via a computer in communication with a network. The system includes a gateway device for receiving a request from the user for access to the destination address via the user's computer, and a portal page redirection unit in communication with the gateway device for redirecting the user's computer to a portal page at an address different than the destination address following collection of any login information required from the user to access the network.

According to one aspect of the present invention, the portal page redirection unit is located within the gateway device. According to another aspect of the invention, the portal page redirection unit redirects the user's computer to a user customized portal page. The portal page redirection unit can also redirect the user's computer to a portal page after a period of time has lapsed or upon the occurrence of another condition or act by the user, such as the request of a particular destination site. According to yet another aspect of the present invention, the portal page redirection unit can redirect the user's computer to a portal page created by an administrator associated with the portal page.

According to yet another embodiment of the present invention, there is disclosed a system for redirecting a user's request for access to a destination address, via a computer in communication with a secondary network. The system includes a gateway device for receiving a request from the user for access to the destination address via the user's computer, and a portal page redirection unit in communication with the gateway device for redirecting the user's computer to a portal page that presents information tailored to the user, said redirecting comprising redirecting the user's computer to the portal page at an address different than the destination address following a determination that the user is entitled access to the network.

According to one aspect of the invention, the portal page redirection unit is located within the gateway device. According to another aspect of the invention, the portal page redirection unit redirects the user's computer to a user customized portal page. Furthermore, according to yet another aspect of the present invention, the portal page redirection unit redirects the user's computer to a portal page after a

specific period of time has lapsed, or upon the occurrence of another condition that may be defined by a network administrator.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of a computer system that includes a gateway device for automatically redirecting computer browsers from a requested network destination to a different network destination, according to one embodiment of the present invention.

FIG. 2 is a block diagram illustrating the steps taken by a browser and server in a conventional web page request.

FIG. 3 is a block diagram illustrating the redirection function of the method and system of the present invention, according to one aspect of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout.

Referring now to FIG. 1, a computer system **10** for implementing a redirection method according to one embodiment of the invention is illustrated in block diagram form. The computer system **10** includes a plurality of computers **14** that can communicate with one or more online services **22** or networks via a gateway device **12** providing the interface between the computers **14** and the various networks **20** or online services **22**. One embodiment of such a gateway device has been described in U.S. Patent Application No. 08/816,174 and U.S. Provisional Application No. 60/111,497 (collectively referred to herein as the Gateway Device Applications), the contents of which are incorporated herein by reference. Briefly, the gateway device **12** facilitates transparent computer access to the online services **22** or networks **22**, such that the computers **14** can access any networks via the device **12** regardless of their network configurations.

Additionally, the gateway device **12** includes the ability to recognize computers attempting to access a network **20**, the location of computers attempting to access a network, the identity of users attempting to gain network access, and additional attributes, as is discussed in the Gateway Device Applications.

As illustrated in FIG. 1, the computer system **10** also includes an access concentrator **16** positioned between the computers **14** and the gateway device **12** for multiplexing the signals received from the plurality of computers onto a link to the gateway device **12**. Depending upon the medium by which the computers **14** are connected to the access concentrator, the access concentrator **16** can be configured in different manners. For example, the access concentrator can be a digital subscriber line access multiplexer (DSLAM) for signals transmitted via regular telephone lines, a cable head end (a Cable Modem Termination Shelf (CMTS)) for signals transmitted via coaxial cables, a wireless access point (WAP) for signals transmitted via a wireless network, an Ethernet switch, or the like.

The computer system **10** further includes one or more routers **18** and/or servers (not shown in FIG. 1) to control or direct traffic to and from a plurality of computer networks **20** or other online services **22**. While the computer system **10** is depicted to have a single router, the computer system **10** can have a plurality of routers, switches, bridges, or the like that are arranged in some hierarchical fashion in order to appropriately route traffic to and from the various networks **20** or online services **22**. In this regard, the gateway device **12** typically establishes a link with one or more routers. The routers, in turn, establish links with the servers of the networks **20** or online services **22**, based upon the user's selection. It will be appreciated by one of ordinary skill in the art that one or more devices illustrated in FIG. 1 may be combinable. For example, although not shown, the router **18** may be located entirely within the gateway device **12**. Furthermore, additional elements may be included in the computer system **10**, such as elements disclosed in the Gateway Device Applications, or network elements known to those of ordinary skill in the art.

As described in the Gateway Device Applications, the gateway device **12** is specifically designed to adapt to the configuration of each of the computers **14** that log onto the computer system **10** in a manner that is transparent to the user and the computer networks **20** or online services **22**. In the embodiment shown in FIG. 1,

the computer system **10** employs dynamic host configuration protocol (DHCP) service, which is a protocol well known to those of skill in the art and currently implemented in many computer networks. In DHCP networks an IP address is assigned to an individual computer of the plurality of computers **14** when the computer logs onto the computer network through communication with the gateway device **12**. The DHCP service can be provided by an external DHCP server **24** or it can be provided by an internal DHCP server located within the gateway device.

In order to allow a user of the computer to communicate transparently with computer networks **20** or online services **22**, the gateway device must be able to communicate with the user computer, as well as the various online services **22** or networks **20**. In order to support this communication, the gateway device **12** generally performs a packet translation function that is transparent to both the user and the network. In this regard, for outbound traffic from a computer to a network or on-line service, the gateway device **12** changes attributes within the packet coming from the user, such as the source address, checksum, and application specific parameters, to meet the criteria of the network to which the user has accessed. In addition, the outgoing packet includes an attribute that will direct all incoming packets from the accessed network to be routed through the gateway device. In contrast, the inbound traffic from the computer network or other online service that is routed through the gateway device undergoes a translation function at the gateway device so that the packets are properly formatted for the user's host computer. In this manner, the packet translation process that takes place at the gateway device **12** is transparent to the host, which appears to send and receive data directly from the accessed computer network. It will be appreciated that the ability to intercept data, and the ability to interface with user computers and networks, is essential to the redirection method of the present invention as described in detail below.

In conventional network access systems, a user typically communicates with a network through the use of a browser, which the user also utilizes to request a particular network destination. For example, when accessing the Internet through an ISP, a user can input a specific URL or web address into the browser, which then accesses a particular web page for the user. This is accomplished in four

steps, illustrated in FIG. 2. First, after the user requests a particular web page (block 30), the browser sends a Transmission Control Protocol (TCP) request to the origin server, which is the location of the web page requested (e.g., www.yahoo.com). TCP requests are well known to those of skill in the art, and may be referred to hereinafter as web page requests. Next, the browser receives an acknowledgment response from the origin server that the web page request has been received (block 32). Third, after the browser receives the acknowledgment response, the browser then sends an HTTP request to receive the web page. Finally, upon receipt of the HTTP request the web page will send the web page material to the browser (block 32), which receives the web page (block 38).

Systems and methods of the present invention interrupt this conventional process to redirect users to a destination other than that requested by the user. This is accomplished by a gateway device, as described above, or similar hardware which stands between the user's computer and network destinations for permitting network access. The hardware must include one or more processors and network interface devices to intercept data transmitted from computers to the networks, process and manipulate the data, forward the data to desired network locations, and vice versa. Thus, although a gateway device will be used herein to illustrate the redirection capability of systems and methods of the present invention, it will be appreciated that any hardware performing an intermediate role between computers and networks can implement the present invention.

The redirection of users may be accomplished by the entity maintaining such hardware, such as an ISP, or an entity maintaining a local network. For instance, according to one aspect of the invention, the redirection method of the present invention may first direct a user to a login page and require that a user enter a login name and password so that the ISP or other entity maintaining the gateway device 12 can identify the user. This may occur where the gateway device or a similar authentication device, such as a AAA server described in the Gateway Device Applications, is unable to identify and/or determine access rights of the source requesting access. Alternatively, the user may be redirected to a particular network destination (e.g., an Internet web page), or to a portal page established by the entity redirecting the user.

According to one embodiment of the invention, redirecting users is accomplished by a Home Page Redirect (HPR) process performed by the gateway device **12**, or by a redirect unit **28** in communication with and internal to or external to the gateway device **12**. Although the redirect unit **28** may be used to implement the redirection function, the gateway device will be solely referred to herein for purposes of brevity. A redirection function according to one aspect of the invention is illustrated in FIG. 3.

To accomplish the redirection of a user to a portal page, the gateway device **12** intercepts a original web page request sent by the user's browser to the origin server (user-requested destination) (blocks **40, 42**), and records the identity of the origin server. After intercepting the request the gateway device **12** modifies the request (block **42**) so that the request is sent to a redirection server, which is a temporary server located internal or external to the gateway device **12**. After receiving the redirected web page request (block **42**), the redirection server sends a response (block **44**), through the gateway device (block **46**), to the user's browser. The gateway device **12** intercepts the response and redirection from the redirection server and modifies the response so that the response will appear as though it is coming from the origin server. Specifically, the gateway device **12** may modify the IP header in the response to indicate that the gateway device **12** is the web page requested by the user (block **46**). The response from the redirection server indicates that the redirection server is the requested web page. The response additionally includes instructions redirecting the browser to the portal page, and an autorefresh message. After the user's browser receives the redirect message (block **48**), the browser will trigger a get request for the portal page (block **48**), which is received by the portal page (block **52**). The portal page then sends (block **52**) the portal page to the user's browser (block **54**).

As a result of this stack address translation and redirection, which can be implemented entirely within the gateway device, when the browser receives a response to the browser's web page request, the browser does not appreciate that the requested web page was never retrieved. Therefore, the role of the gateway device is transparent to the browser.

According to one aspect of the invention, the redirection server's protocol stack pretends to be the user-entered destination long enough to complete a

connection or 'handshake', after which the protocol stack directs the user to the portal server, which can be local to the gateway device to facilitate higher speed communication. This redirection to the portal server can be accomplished by redirecting web pages only, rather than all traffic, including E-mails, FTPs, or any other traffic. Therefore, once authorized, if a user does not attempt to access a web page through the user's Internet browser, the gateway device can forward the communication transparently to the user's requested destination without requiring the user to access the portal page.

According to one aspect of the invention, upon entering a requested network destination a user may be redirected to a particular portal page based on the user's identity, computer, location or one or more additional attributes, as described in detail in the Gateway Device Applications. For example, if, according the AAA process a user is not recognized, the user may be redirected via the above described method to a portal page, such as a login page established to validate new users or allow users to purchase network access. The login page enables new users to subscribe to the computer network so that they may subsequently obtain access to networks or online services transparently through the gateway device. Thus, new users can gain access to networks or online services without being predefined in any type of user database, such as a RADIUS database.

Thereafter, the redirect unit **28** can forward the user to the user's requested destination, or can direct them to a different page, depending upon the design of the system. This redirection can be permanent, such that the user is directed to a specific destination and may not access other destinations, or may be temporary, such that a user is forced to a specific destination after which the user can access any destination. Furthermore, after being redirected to a portal page, a user may be required to take some type of action before being routed to their desired destination, such as providing information in response to a request to do so.

By re-directing the user to the portal page via the redirect unit the gateway administrator or network operator is provided the opportunity to present the user with updated information pertaining to the network or the user's location. This is particularly useful where the redirection is implemented through a network device on a local network, such as a corporate, hotel or airport network. By way of example, the portal page may provide for links to the corporate home page, a travel

site on the Internet, an Internet search engine and a network provider home page. Additionally, the buttons or any other field within the portal page may include other types of information options, such as advertising fields or user-specific links or fields based upon data found in the user's profile or inputted by the user.

It will be appreciated that the portal page is not limited to supplying information related to the user's billing and service plans. It is also possible to configure the portal page to include information that is customized to the user or the location/site from which the user is remotely located, where the gateway device has the ability to identify such information. For example, the user may be located at a hotel for the purpose of attending a specific convention or conference either in the hotel or within the immediate vicinity of the hotel. The gateway device 12 may have "learned" this information about the user through an initial login profile inquiry or the gateway administrator may have inputted this information into a database. Thus, the gateway device can be configured to recognize the user and customize or tailor the portal page accordingly. In the hotel scenario, the portal page may include a link for convention or conference services offered by the hotel. The gateway device can store source profile information within a user-specific database, such as a RADIUS database, or it can store and retrieve data from external databases.

According to one aspect of the present invention, the redirection function of the system and method of the present invention can be utilized to redirect the user to a destination any time the user enters a destination request. Therefore, the present invention is not limited to redirecting the user to a particular destination or portal page upon the user's initial attempt to access the secondary network or destinations via the secondary network. Therefore, where a user accesses the Internet through the gateway device the present invention can monitor each packet transmitted from the user's computer and perform a redirection function when desired. For example, a user may surf the Internet without limitation until the user attempts to access a particular auto manufacturer's website. Thereafter, the system and method of the present invention could automatically direct the user to another manufacturer's website using the redirection capability of the present invention. The user may be presented with an advertisement from a particular manufacturer before being forwarded to the requested destination. According to yet another

aspect of the invention, the user's browser or computer may be redirected to receive a pop-up advertisement or frame during the forwarding of the user to the requested destination, periodically, or after the user has already been granted access to the requested destination.

In another example of location specific portal page data, the user may be remotely accessing the gateway device while located in a specific airport terminal. The gateway device will be configured so that it is capable of providing ready access to information related to that specific airport terminal, i.e. information pertaining to the current flights scheduled to depart and arrive that terminal, the retail services offered in that specific terminal, etc. In this manner, the portal page may include a link for terminal specific flight information and/or terminal specific retail services available to the user.

It will also be appreciated that the HPR may be configured so that the portal page redirection unit 28 redirects a user to a portal page upon specific default occurrences, such as a time out, or according to preset time. For example, the portal page may act as a screen-saver, where the user is redirected to a portal page after a given period of inactivity. These functions may be established by the ISP or enterprise network administrator.

Customization of the information comprising the portal page is not limited to the gateway administrator or the network operator. The user may also be able to customize the information that is provided in the portal page. The user customization may be accomplished either directly by the user configuring the portal page manually or indirectly from the gateway device configuring the portal page in response to data found in the user-specific profile. In the manual embodiment the user may be asked to choose which information or type of information they would like supplied in the portal page for that specific network session. For instance, the user may require an alarm clock counter to insure an appointment is met or the user may require periodic updates of a specific stock quote. The information that a user customizes for the portal page may be network session specific, may be associated with the duration of a gateway subscription or may be stored in a source profile for an indefinite period of time. The gateway device's ability to communicate with numerous user databases provides the basis for storing user specific profiles for extended periods of time.

Many modifications and other embodiments of the invention will come to mind to one skilled in the art to which this invention pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the invention is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

THAT WHICH IS CLAIMED:

1. A method for redirecting an original destination address access request to a redirected destination address, the method comprising the steps of:

receiving, at a gateway device, all original destination address access requests originating from a computer;

determining, at the gateway device, which of the original destination address requests require redirection;

storing the original destination address if redirection is required;

modifying, at the gateway device, the original destination address access request and communicating the modified request to a redirection server if redirection is required;

responding, at the redirection server, to the modified request with a browser redirect message that reassigns the modified request to an administrator-specified, redirected destination address;

intercepting, at the gateway device, the browser redirect message and modifying it with the stored original destination address; and

sending the modified browser redirect message to the computer, which automatically redirects the computer to the redirected destination address.

2. The method of Claim 1, further comprising the step of directing the computer to the stored original destination address after the computer has been automatically redirected to the redirected destination address.

3. The method of Claim 2, wherein the step of directing the computer to the stored original destination address occurs after a predetermined length of time.

4. The method of Claim 2, wherein the step of directing the computer to the stored original destination address occurs after a predetermined computer input event has occurred.

5. The method of Claim 1, wherein the step of responding, at the redirection server, to the modified request with a browser redirect message that reassigns the modified request to an administrator-specified, redirected destination address further comprises responding, at the redirection server, to the modified request with a browser redirect message that reassigns the modified request to a redirected destination address associated with a login page.

6. A system for redirecting an original destination address access request to a redirected destination address, the system comprising:

a computer that initiates original destination address requests;

a gateway device in communication with the computer, that receives the original destination address requests from the computer, determines if redirection of any of the original destination address requests is required, stores the original destination address request if redirection is required and modifies the original destination address request if redirection is required, and

a redirection server in communication with the gateway device that receives the modified request from the gateway device and responds with a browser redirect message that reassigns the request to an administrator-specified, redirect destination address,

wherein the gateway device intercepts the browser redirect message and modifies the response with the stored original destination address before forwarding the browser redirect message to the computer and wherein the computer receives the modified browser redirect message and the computer is automatically redirected to the redirect destination address.

7. The system of Claim 6, further comprising a user profile database in communication with the gateway device that includes stored user-access information.

8. The system of Claim 6, further comprising an Authentication, Authorization and Accounting (AAA) server in communication with the gateway device and user profile database, the AAA server determines if a user of the computer is entitled to access the original destination address requests based upon the user-access information stored within the user profile database.

9. The system of Claim 6, wherein the redirection server is located within the gateway device.

10. The system of Claim 7, wherein the user-profile database is located within the gateway device.

11. The system of Claim 8, wherein the AAA server is located within the gateway device.