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(54) SYSTEM AND METHOD FOR SYNCHRONIZING LOGIN PROCESSES

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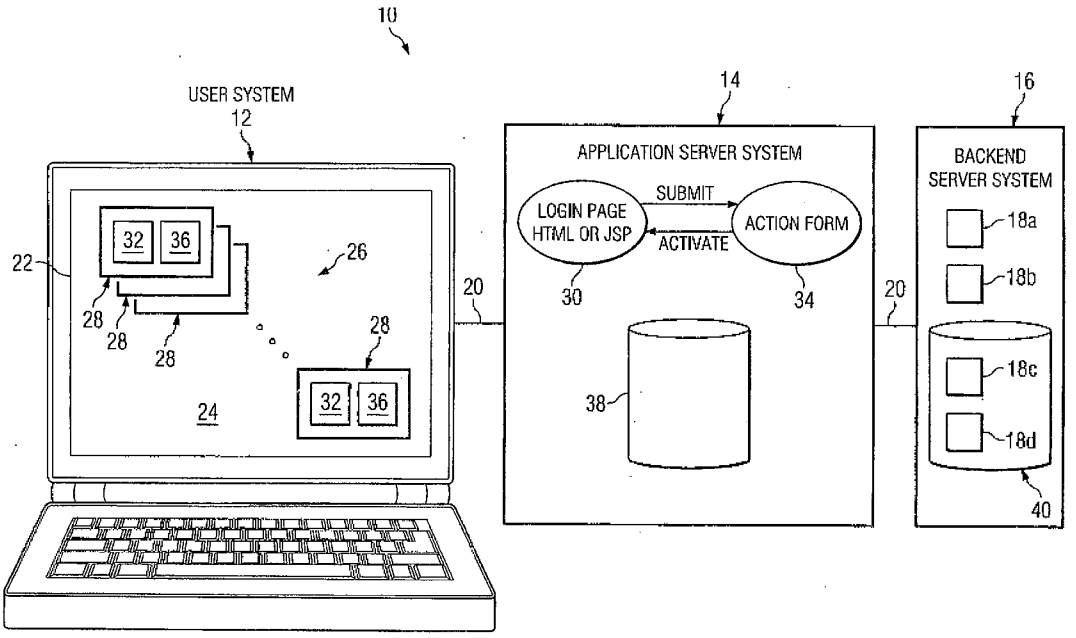
(57) **ABSTRACT**

In certain embodiments, a method for synchronizing login processes in a web environment includes receiving user authentication information for a particular one of a plurality of access points, each access point operable to provide a user system that submitted the user authentication information access to one or more target items. The method includes authenticating the user authentication information to determine whether the user system associated with the user authentication information is authorized to access the one or more target items associated with the particular access point. The method includes initiating a successful login to the particular access point if it is determined that the user system associated with the user authentication information is authorized to access the one or more target items and automatically propagating the successful login to the particular access point to one or more of the other access points based at least on the successful login to the particular access point.



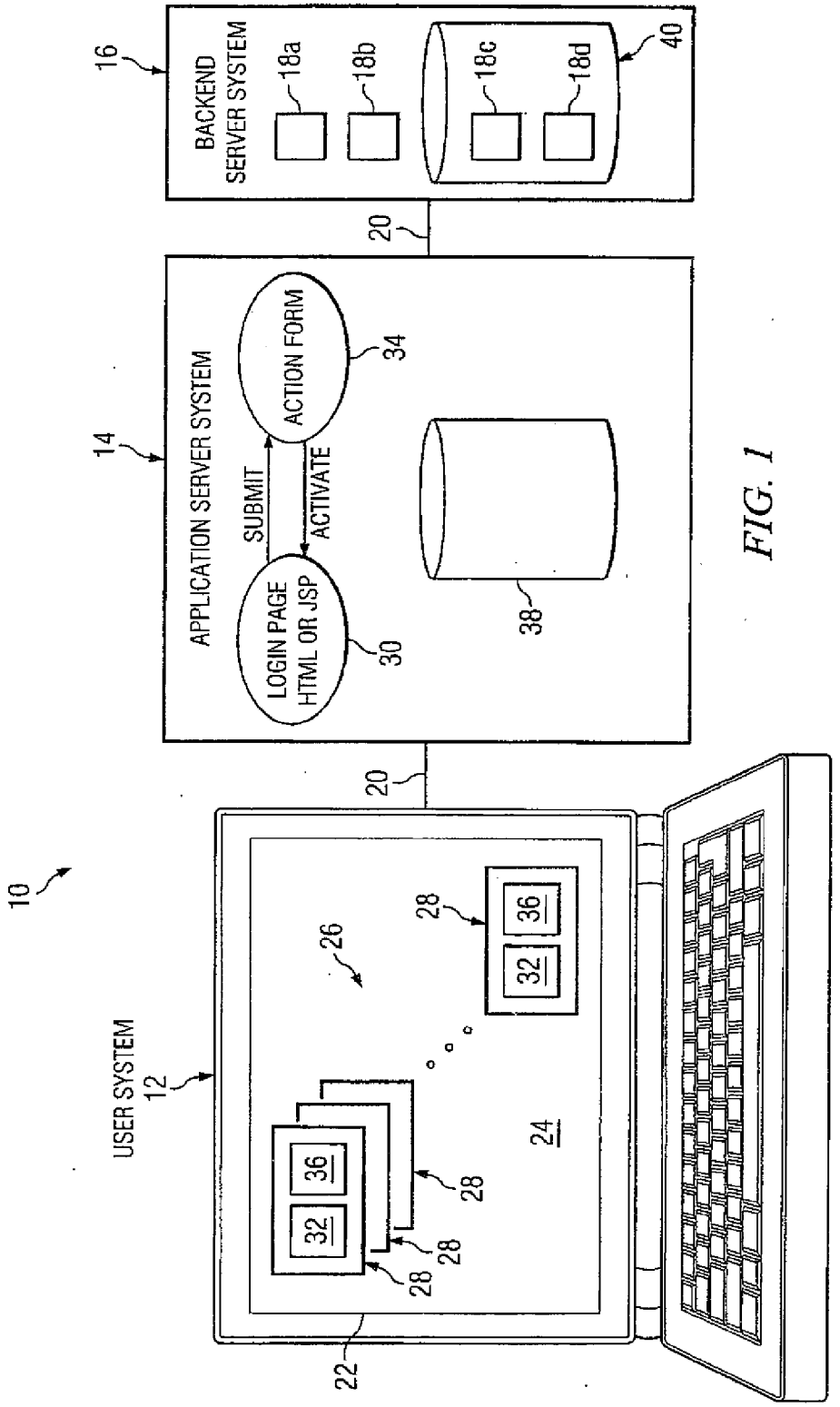

10
USER SYSTEM
12
22
24
26
28
32
36
20
APPLICATION SERVER SYSTEM
14
LOGIN PAGE
HTML OR JSP
30
SUBMIT
ACTIVATE
ACTION FORM
34
38
BACKEND
SERVER SYSTEM
16
18a
18b
18c
18d
40

FIG. 1

FIG. 2

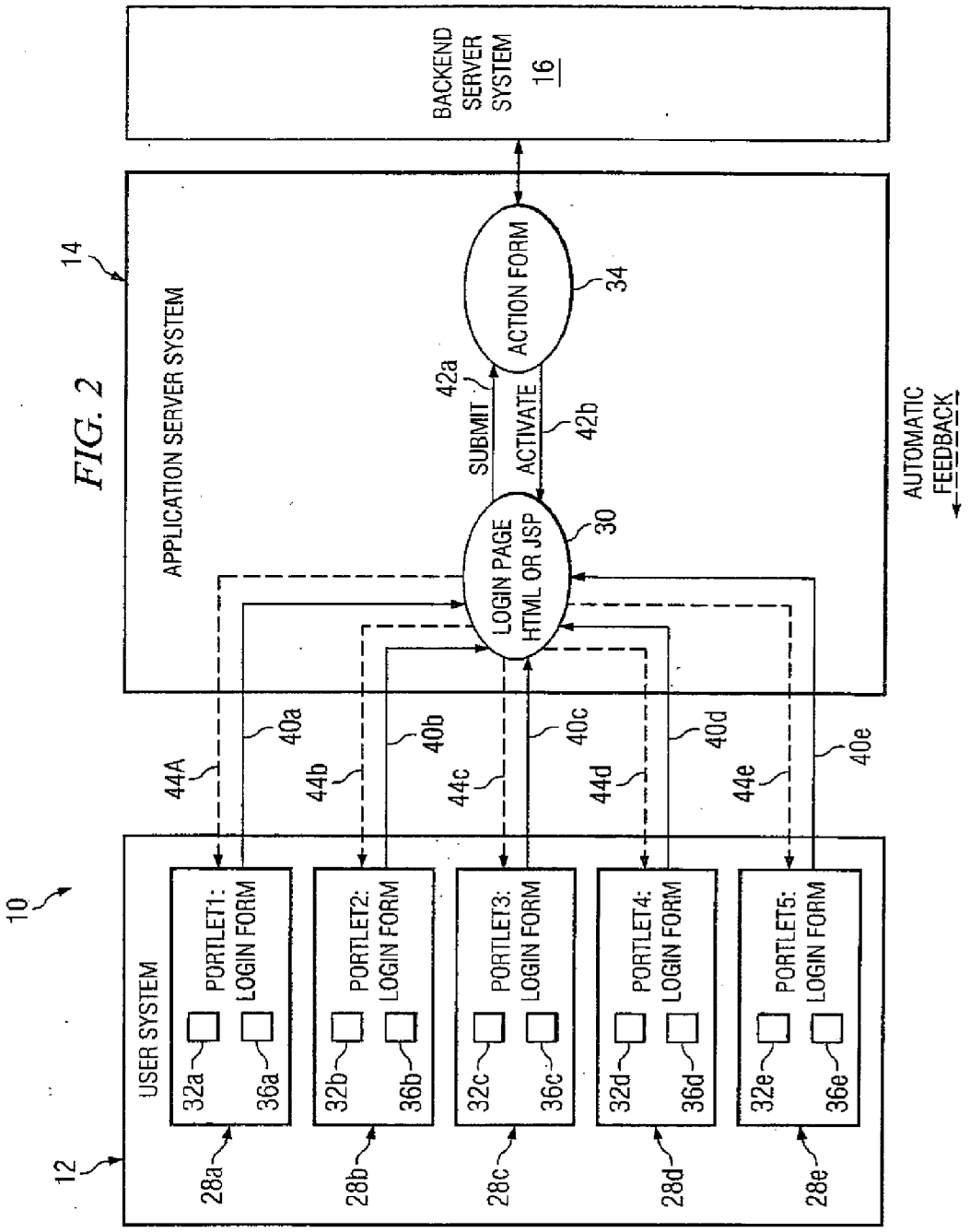
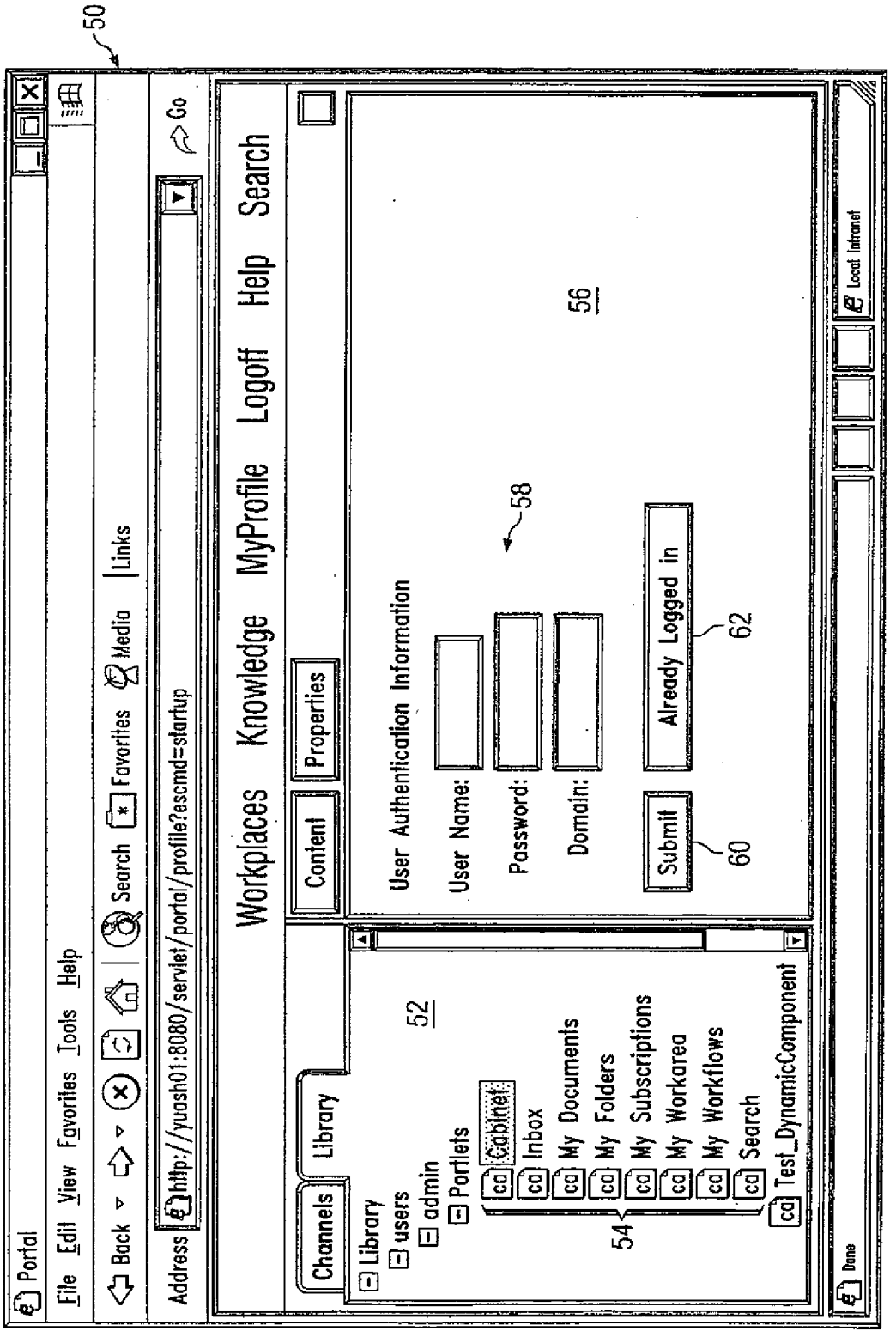

BACKEND SERVER SYSTEM 16
APPLICATION SERVER SYSTEM
14
ACTION FORM
34
42a
SUBMIT
ACTIVATE
42b
LOGIN PAGE HTML OR JSP
30
AUTOMATIC FEEDBACK
10
12
USER SYSTEM
PORTLET1: LOGIN FORM
PORTLET2: LOGIN FORM
PORTLET3: LOGIN FORM
PORTLET4: LOGIN FORM
PORTLET5: LOGIN FORM
32a
36a
32b
36b
32c
36c
32d
36d
32e
36e
28a
28b
28c
28d
28e
44A
44b
44c
44d
44e
40a
40b
40c
40d
40e

FIG. 3A


50
Portal
File Edit View Favorites Tools Help
Back Search Favorites Media Links
Address http://yuosh01:8080/servlet/portal/profile?escmd=startup
Go
Workplaces Knowledge MyProfile Logoff Help Search
Channels Library
Content Properties
Library
users
admin
Portlets
Cabinet
Inbox
My Documents
My Folders
My Subscriptions
My Workarea
My Workflows
Search
Test_DynamicComponent
52
54
User Authentication Information
User Name:
Password:
Domain:
Submit
Already Logged in
56
58
60
62
Done
Local Intranet

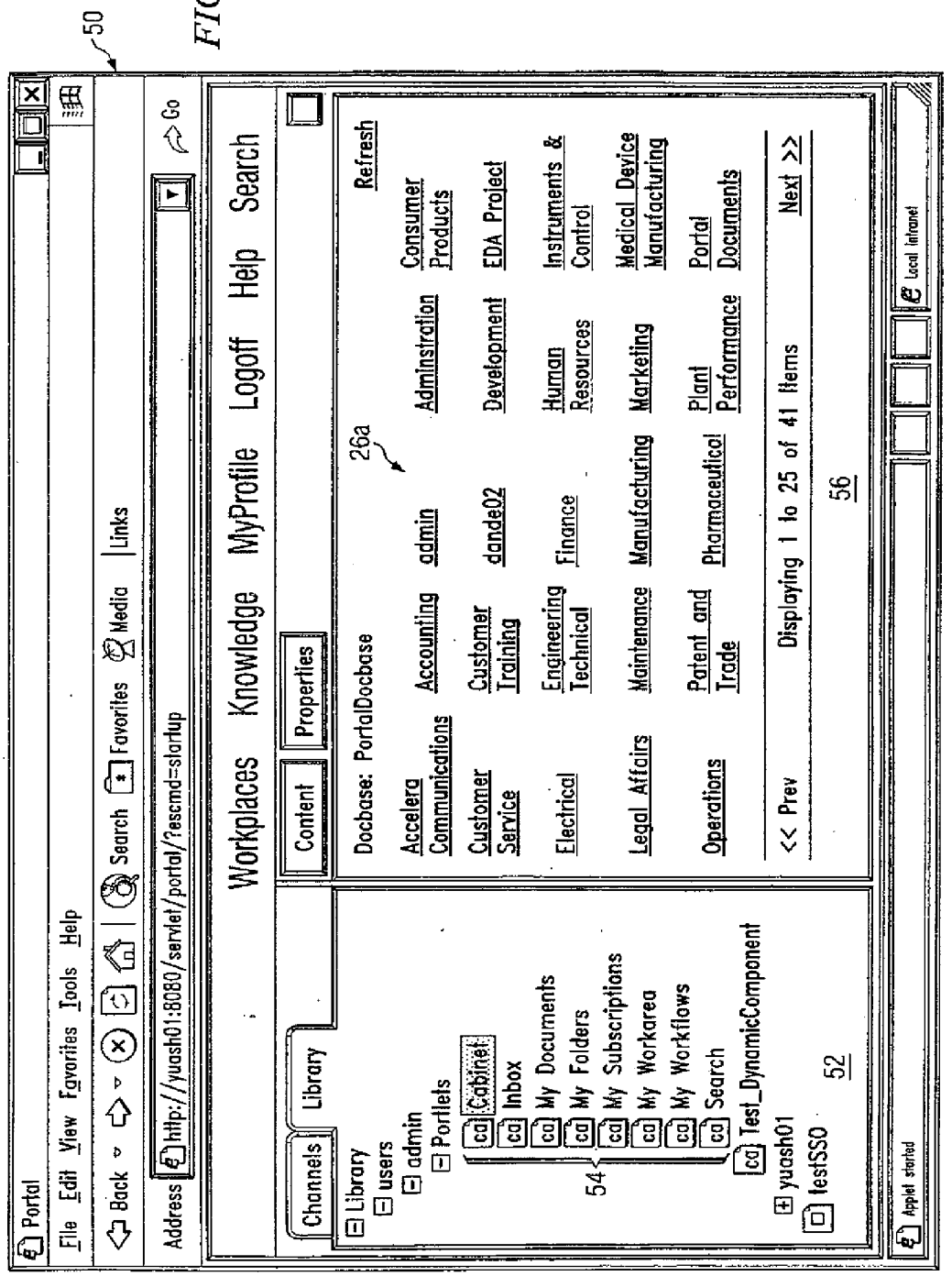

50
Portal
File Edit View Favorites Tools Help
Back Search Favorites Media Links
Address http://yuash01:8080/servlet/portal/?escmd=startup
Go
Workplaces Knowledge MyProfile Logoff Help Search
Channels Library
Content Properties
Library
users
admin
Portlets
Cabinet
Inbox
My Documents
My Folders
My Subscriptions
My Workarea
My Workflows
Search
Test_DynamicComponent
yuash01
testSSO
52
54
Docbase: PortalDocbase
26a
Refresh
Accelera Communications
Accounting
admin
Administration
Consumer Products
Customer Service
Customer Training
dande02
Development
EDA Project
Electrical
Engineering Technical
Finance
Human Resources
Instruments & Control
Legal Affairs
Maintenance
Manufacturing
Marketing
Medical Device Manufacturing
Operations
Patent and Trade
Pharmaceutical
Plant Performance
Portal Documents
<< Prev
Displaying 1 to 25 of 41 items
Next >>
56
Applet started
Local intranet

FIG. 3B

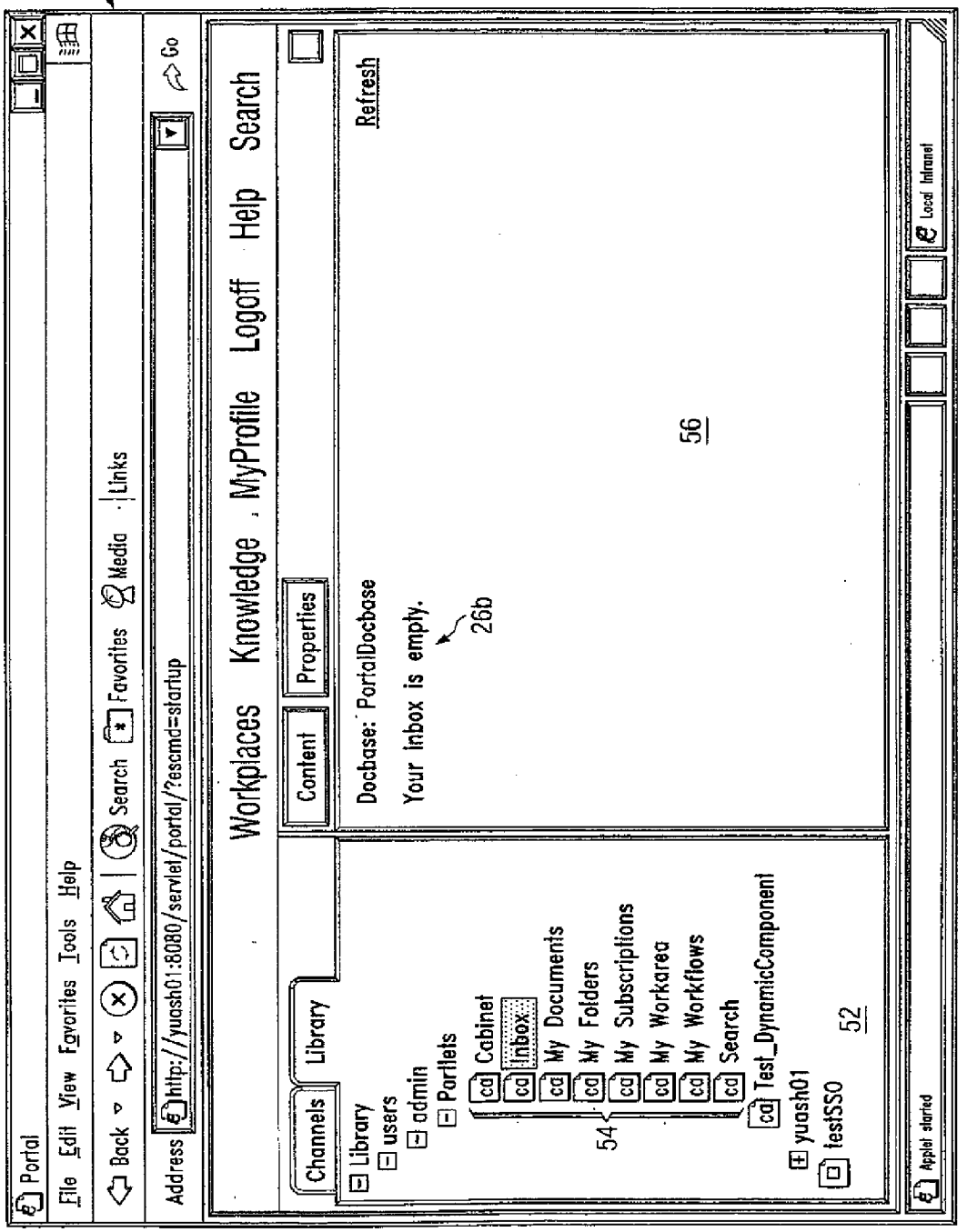

50
Portal
File Edit View Favorites Tools Help
Back Search Favorites Media Links
Address http://yuash01:8080/servlet/portal/?escmd=startup
Go
Workplaces Knowledge MyProfile Logoff Help Search
Channels
Library
Content
Properties
Library
users
admin
Portlets
Cabinet
Inbox
My Documents
My Folders
My Subscriptions
My Workarea
My Workflows
Search
Test_DynamicComponent
yuash01
testSSO
52
54
Docbase: PortalDocbase
Refresh
Your inbox is empty.
26b
56
Applet started
Local intranet

FIG. 3C

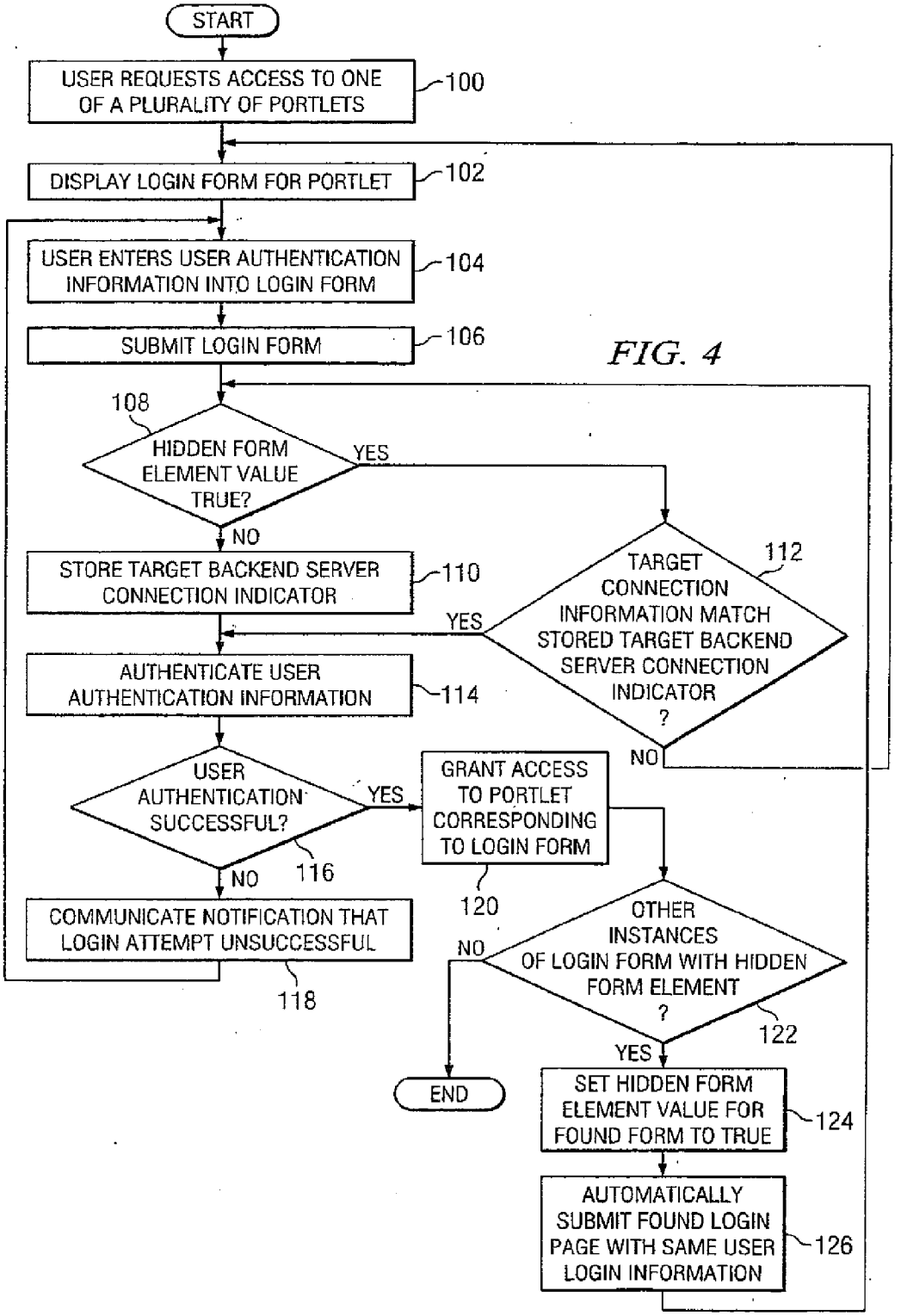

START
USER REQUESTS ACCESS TO ONE OF A PLURALITY OF PORTLETS
100
DISPLAY LOGIN FORM FOR PORTLET
102
USER ENTERS USER AUTHENTICATION INFORMATION INTO LOGIN FORM
104
SUBMIT LOGIN FORM
106
108
HIDDEN FORM ELEMENT VALUE TRUE?
YES
NO
STORE TARGET BACKEND SERVER CONNECTION INDICATOR
110
TARGET CONNECTION INFORMATION MATCH STORED TARGET BACKEND SERVER CONNECTION INDICATOR ?
112
YES
NO
AUTHENTICATE USER AUTHENTICATION INFORMATION
114
USER AUTHENTICATION SUCCESSFUL?
YES
NO
116
GRANT ACCESS TO PORTLET CORRESPONDING TO LOGIN FORM
120
COMMUNICATE NOTIFICATION THAT LOGIN ATTEMPT UNSUCCESSFUL
118
OTHER INSTANCES OF LOGIN FORM WITH HIDDEN FORM ELEMENT ?
122
NO
YES
END
SET HIDDEN FORM ELEMENT VALUE FOR FOUND FORM TO TRUE
124
AUTOMATICALLY SUBMIT FOUND LOGIN PAGE WITH SAME USER LOGIN INFORMATION
126

*FIG. 4*

# SYSTEM AND METHOD FOR SYNCHRONIZING LOGIN PROCESSES

## RELATED APPLICATIONS

**[0001]** This application claims the benefit of U.S. patent application Ser. No. 10/819,012 filed Apr. 6, 2004 entitled "System and Method for Synchronizing Login Processes", and claims the priority under 35 U.S.C. §119 of U.S. Provisional Application No. 60/486,598 filed Jul. 11, 2003, which applications are incorporated herein by reference in their entirety.

## TECHNICAL FIELD

**[0002]** This disclosure relates generally to the field of web communication and more specifically to a system and method for synchronizing login processes.

## BACKGROUND

**[0003]** Users in a web-based or other network environment are often required to enter user authentication information to access certain information, verify the user's identity, access information associated with the user, access user preferences associated with the user, and for other purposes. As an example, a user may be required to login to an access point that may be displayed in a web browser associated with the user. The access point may be one of a plurality of access points in the same or in additional web browsers. For example, a portal environment may include a plurality of portlets each serving as an access point. Each access point may require the user to enter user authentication information to access information associated with the access point.

## SUMMARY

**[0004]** This disclosure provides a system and method for synchronizing login processes.

**[0005]** In certain embodiments, a method for synchronizing login processes in a web environment includes receiving user authentication information for a particular one of a plurality of access points, each access point operable to provide a user system that submitted the user authentication information access to one or more target items. The method includes authenticating the user authentication information to determine whether the user system associated with the user authentication information is authorized to access the one or more target items associated with the particular access point. The method includes initiating a successful login to the particular access point if it is determined that the user system associated with the user authentication information is authorized to access the one or more target items and automatically propagating the successful login to the particular access point to one or more of the other access points based at least on the successful login to the particular access point.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0006]** For a more complete understanding of the present disclosure and its advantages, reference is now made to the following descriptions, taken in conjunction with the accompanying drawings, in which.

**[0007]** FIG. **1** illustrates an example system for synchronizing login processes;

**[0008]** FIG. **2** illustrates another representation of an example system for synchronizing login processes;

**[0009]** FIGS. **3**A through **3**C are exemplary block diagrams illustrating an example display that may be used to provide synchronization of login processes according to certain embodiments of this disclosure; and

**[0010]** FIG. **4** illustrates an example method for synchronizing login processes.

## DESCRIPTION OF EXAMPLE EMBODIMENTS

**[0011]** FIG. **1** illustrates an example system **10** for synchronizing login processes. In certain embodiments, system **10** includes one or more user systems **12**, an application server system **14**, and a backend server system **16**. Although a particular implementation of system **10** is illustrated and described, the present disclosure contemplates system **10** including any suitable configuration, according to particular needs or desires. In general, system **10** enables a user system **12** to login to multiple access points such as one or more portlets in a portal environment by logging into at least one access point. In certain embodiments, the present disclosure may provide the ability to handle multiple instances of portlets having a same login form, such as a Java Server Page (JSP) running on application server system **14**, to log into backend server system **16**. In this example embodiment, a synchronization mechanism automatically logs into backend server system **16** and brings up the next available web page for one or more other portlets when a first portlet has a valid login process to connect to backend server system **16**.

**[0012]** The term "automatically" as used herein generally means that the appropriate processing is substantially performed by system **10**. It should be understood, however, that "automatically" further contemplates any suitable user interaction with system **10**. Additionally, the term "each" as used throughout this disclosure means every one of at least a subset. Furthermore, the term "synchronized" or "synchronization" as used throughout the present disclosure should not be interpreted to require exact synchronization for all embodiments. As just one example, certain processing delays may be associated with the synchronization of login processes.

**[0013]** In certain embodiments, this synchronization mechanism may operate for any generic web browser such as, for example, Microsoft Internet Explorer, Netscape browser, or any other suitable web browser according to particular needs. While the present disclosure discusses portals and portlets, the present disclosure contemplates user system **12** logging into multiple access points of any suitable type by logging onto at least one other access point.

**[0014]** User systems **12** may access target items **18** associated with backend server system **16** via application server system **14**. Although a single user system **12** is illustrated, the present disclosure contemplates system **10** including any suitable number of user systems **12**, according to particular needs. Each user system **12** may include input devices, output devices, mass storage media, processors, memory, interfaces, communication ports, or other appropriate components for interacting with application server system **14** and/or backend server system **16**. As used in this disclosure, user system **12** is intended to encompass a personal computer, workstation, network computer, kiosk, wireless data port, personal digital assistant (PDA), one or more processors within these or other devices, or any other suitable processing device. For example, user system **12** may include a computer that includes an input device, such as keypad, touch screen, mouse, or other device that can accept information, and an output device that conveys information associated with the operation of user system **12**,

application server system **14**, and backend server system **16**, including digital data, visual information, or other suitable information. Both the input device and output device may include fixed or removable storage media such as a magnetic computer disk, CD-ROM, or other suitable media to both receive input from and provide output to users of user systems **12** through a portion of a web interface. In certain embodiments, user systems **12** include HyperText Markup Language (HTML) pages and applets running in browsers, Java applications, and other applications that interoperate with Java. Moreover, "user system **12**" and "user of user system **12**" may be used interchangeably without departing from the scope of this disclosure.

**[0015]** Each user system **12** may include one or more browsers **22**, such as Microsoft Internet Explorer, Netscape Navigator, or any other suitable browser. In certain embodiments, browser **22** need not be an Internet browser but may include any suitable network browser. In addition, the term "web" as used throughout the present disclosure contemplates any suitable network environment. Using a browser **22**, user system **12** may access target items **18** associated with backend server **16** using a workspace window **24**. In certain embodiments, workspace window **24** is a portal **24**, which may be described as a portal container. Throughout the remainder of this disclosure, workspace window **24** will be referred to as a portal **24**; however, it should be understood that the present disclosure contemplates any suitable workspace window according to particular needs. In certain embodiments, portal **24** includes a single web-based access point for delivery of applications, services, and content, such as target items **18**, to user system **12**. Portal **24** may provide user system **12** with a common interface to view, implement, report on, analyze, monitor, and automate system functions for many different system technologies (e.g., storage, security, network control, etc.), and across different platforms. Portal **24** may be displayed within browser **22**, as a separate window (e.g., a workplace window), or in any other suitable manner according to particular needs.

**[0016]** Portal **24** may include a plurality of access points **26** such as portlets **26** for providing a user access to target items **18** associated with backend server system **16**. Throughout the remainder of this disclosure, access points **26** will be referred to as portlets **26**; however, it should be understood that the present disclosure contemplates any suitable access points **26** according to particular needs. While portlets **26** are described primarily as being included in portal **24**, the present disclosure contemplates portlets **26** being independent of a portal **24**. Portlets **26** may be displayed as one or more windows within portal **24**, as separate windows not bound by a single exterior portal **24**, or in any other suitable manner according to particular needs. Portlets **26** may be associated with application server system **14**, backend server system **16**, or any other suitable server system according to particular needs. In certain embodiments, portlets **26** may be servlet-based portlets **26**. In one example embodiment, portlets **26** include Cabinets, Inbox, MyDocuments, MyFolder, MySubscriptions, MyWorkarea, MyWorkflows, Search, or any other suitable portlets **26** and provide enterprise content management services to user systems **12**. These portlets **26** are provided merely as examples and are not meant in a limiting sense.

**[0017]** To gain access to portlets **26**, a user of user system **12** may be required to enter user authentication information and that user authentication information may be authenticated to determine if the user of user system **12** is authorized to access portlets **26**. User authentication information may include a user ID, a password, a domain name, or any other suitable user authentication information according to particular needs. In certain embodiments, a user of user system **12** may be required to complete a login form **28** (e.g., with the user authentication information) to gain access to portlets **26** and ultimately, to gain access to target data **18** associated with a corresponding portlet **26**. Login form **28** may be associated with a login page **30**, which may be a Java Server Page (JSP) or hypertext markup language (HTML) page running on a different application server such as application server system **14**. In certain embodiments, multiple login forms **28** on user system **12** may be associated with a single login page **30** on application server system **14**.

**[0018]** In certain embodiments, the present disclosure provides a system and method for synchronizing login processes among a plurality of portlets **26**. In certain embodiments, each login form **28** may be associated with a target backend server connection indicator **32**. For example, target backend server connection indicator **32** may include an identification of a backend server **16** that the user is attempting to access via the portlet **26** associated with the login form **28**. In certain embodiments, the user of user system **12** may be able to select target backend server system **16** for each portlet **26** in the plurality of portlets **26**. In this embodiment, the user may select the same backend server **16** for one or more of portlets **26**. In certain embodiments, the login forms **28** associated with a single portal **24** may automatically have the same target backend server connection indicator **32**, which may or may not be altered by a user of user system **12** or other authorized person. In certain embodiments, target backend server connection indicator **32** may include an address, such as a URL for example, of the backend server system **16**.

**[0019]** User system **12** may communicate with application server system **14** using link **20**. Link **20** facilitates wireless or wireline communications between application server system **14** and any other computer such as user systems **12**. Link **20** may communicate, for example, Internet Protocol (IP) packets, Frame Relay frames, Asynchronous Transfer Mode (ATM) cells, voice, video, data, and other suitable information between network addresses. Link **20** may include one or more local area networks (LANs), metropolitan area networks (As), wide area networks (WANs), all or a portion of a global network such as the Internet, or any other communication systems at one or more locations. Link **20** may support HTML communication, hypertext transfer protocol (HTTP) communication, or any other suitable communication according to particular needs.

**[0020]** Application server system **14** may include a web application server. In certain embodiments, application server system **14** includes a portal server system operable to provide a user, who has submitted the proper user authentication information, access to target data **18** via portlets **26**, such as may be associated with backend server system **16**. In certain embodiments, application server system **14** is remote from user system **12**. Application server system **14** and backend server system **16** may be a part of a single server system or different server systems, according to particular needs. Thus, in certain embodiments, reference to application server system **14** may include backend server system **16** and reference to backend server system **16** may include application server system **14**. Each server system (application server system **14** and backend server system **16**) may include one or more application servers, one or more web application serv-

ers, one or more databases or other data storage means, one or more servlets, or any other suitable components. Furthermore, although the present disclosure only describes user systems **12**, application server system **14**, and backend server system **16**, the present disclosure contemplates system **10** including any other suitable intervening servers, according to particular needs.

**[0021]** Application server system **14** may include a login page **30** that corresponds to one or more login forms **28** displayed on browser **22**. Although a single login page **30** is illustrated, the present disclosure contemplates application server system **14** including any suitable number of login pages **30**, each corresponding to any suitable number of login forms **28** on a user system **12**. In certain embodiments, login page **30** includes a JSP or HTML page, although the present disclosure contemplates login page **30** being any suitable format according to particular needs. As the user inputs user authentication information into a login form **28** that corresponds to login page **30**, the user authentication information may also be associated with login page **30**. In certain embodiments, the target backend server connection indicator **32** associated with login form **28** may be stored as cookies for the login page **30**, for example. While the present disclosure describes storing the target backend server connection indicator **32** primarily as cookies for the login page **30**, the present disclosure contemplates storing the target backend server connection indicator **32** in any suitable manner such that it is associated with the login page **30** or the login form **28**.

**[0022]** In certain embodiments, when a user submits a completed login form **28** (i.e. that includes user authentication information), by clicking a "submit" or other suitable button for example, the login page **30** associated with the login form **28** is submitted to an action form **34**. In certain embodiments, action form **34** includes a JSP or HTML page, although the present disclosure contemplates action form **34** being any suitable format, according to particular needs. Action form **34** may include an action form for authenticating the user authentication information. While the present disclosure describes a particular method for authenticating the user authentication information, the present disclosure contemplates authenticating the user authentication information in any suitable manner according to particular needs. As examples, user authentication information is authenticated using an WINDOWS NT LanMan (NTLM) authentication scheme, an eTrust Single Sign-on authentication scheme developed by COMPUTER ASSOCIATES INTERNATIONAL, INC., or any other suitable scheme according to particular needs.

**[0023]** In certain embodiments, the user authentication information of login page **30** is submitted to an action form **34**. Action form **34** may also include an authentication page, and action form **34** may be used to verify the user authentication information. Action form **34** or another suitable component of application server system **14** determines whether the authentication of the user authentication information was successful. In certain embodiments, application server system **14** uses action form **34** and the user authentication information submitted to action form **34** to determine the identity of the user and, if applicable to verify the user's identity through the use of a password or other suitable information.

**[0024]** Although the present disclosure primarily describes the use of a user ID and password to authenticate the identity of the user, the user's identity may be authenticated in any suitable manner, according to particular needs. Furthermore, although authentication of user authentication information is described primarily as being performed on application server system **14**, the present disclosure contemplates authentication of user authentication information being performed on any suitable component of system **10** (e.g., on backend server system **16**), according to particular needs. For example, authentication of user authentication information may include communicating the user authentication information from application server system **14** to backend server system **16** for authentication. However, in certain embodiments, passing user authentication information from application server system **14** to backend server system **16** may compromise the security of system **10** and may be undesirable.

**[0025]** If the authentication of the user authentication information is determined to be unsuccessful, action form **34** or another suitable component of application server system **14** may initiate communication of a notification to the user system **12** that the login attempt failed. For example, action form **34** may initiate a refresh of the portlet **26** on browser **22** of user system **12** such that the portlet **26** contains a login form **28** that does not include any user-entered user authentication information. If the authentication of the user authentication information is determined to be successful, action form **34** or another suitable component of application server system **14** may initiate propagation of the successful login to other login forms **28**. For example, action form **34** may initiate propagation of the successful login to one or more other login forms **28** on user system **12**.

**[0026]** Although a particular method for performing the propagation of the successful login is described below, the present disclosure contemplates propagating the successful login in any suitable manner, according to particular needs. In certain embodiments, one or more of the login forms **28** displayed on user system **12** may include a hidden form element **36** or other suitable flag. The present disclosure contemplates storing hidden form element **36** in any suitable manner such that it is associated with the login form **28** and/or login page **30**. Hidden form element **36** indicates whether a successful login has occurred for either the portlet **26** associated with the login form **28** being processed or for one or more other portlets **26** associated with other instances of login form **28**. As an example, hidden form element **36** may initially be set to FALSE or some other suitable value indicating that a successful login attempt has not been performed for a login form **28** associated with the hidden form element **36**. After a successful login has occurred for a login form **28** associated with the login page **30**, the hidden form element **36** may be set to TRUE.

**[0027]** Action form **34** may determine whether the value of hidden form element **36** is set to TRUE or FALSE. For example, action form **34** may determine whether the value of hidden form element **36** is set to TRUE or FALSE before authenticating the user authentication information. While certain operations are described as being performed by action form **34**, the present disclosure contemplates these operations being performed by any suitable component of system **10**, including one or more processors associated with application server system **14**. In certain embodiments, a value for hidden form element **36** of FALSE may indicate that user authentication information has not been successfully authenticated for that login form **28**, and a value for hidden form element **36** of TRUE may indicate that user authentication information has been successfully authenticated for the at least one login form **28** associated with the login page **30**. Although the

values "TRUE" and "FALSE" are described, the present disclosure contemplates the use of any suitable values, such as "1" and "0" for example.

**[0028]** If action form **34** determines that the value of hidden form element **36** of the login form **28** is FALSE, then action form **34** may initiate storage of target backend server connection indicator **32** for the login form **28**. For example, the target backend server connection indicator **32** may include an identification of the target backend server **16** with which the portlet **26** is associated. In certain embodiments, the target backend server connection indicator **32** is stored as cookies for login page **30** associated with the login form **28**. The document cookies may be stored on user system **12**, application server system **14**, or in any other suitable location according to particular needs. The cookies may be set by user system **12**, by application server system **14**, or in any other suitable manner and may be passed between user system **12** and application server system **14**, as HTTP headers for example.

**[0029]** In certain embodiments, if action form **34** or another suitable component of application server system **14** determines that the value of hidden form element **36** is TRUE, then action form **34** may determine whether the target backend server connection indicator **32** for the login form **28** being processed matches the target backend server connection indicator **32** previously stored as cookies for the login page **30**. In certain embodiments, it may be desirable to make this determination because user system **12** may attempt to access a number of portlets **26** (e.g., within a portal **24**). Each portlet **26** may be associated with a different backend server **16**, and each backend server **16** may be associated with its own set of users who have the appropriate permissions for accessing portlets **26** associated with the backend server system **16**. Thus, a successful login to one backend server system **16** may not necessarily mean that a user has privileges to access a portlet **26** associated with another backend server **16**.

**[0030]** If action form **34** or another suitable component of application server system **14** determines that the target backend server connection indicator **32** for the login form **28** being processed does not match the target backend server connection indicator **32** for the login page **30**, then action form **34** may look for other instances of login forms **28** on user system **12** having the hidden form element **36**. If action form **34** or another suitable component of application server system **14** determines that the target backend server connection indicator **32** for the login form **28** being processed matches the target backend server connection indicator **32** for the login page **30**, then action form **34** or another suitable component of system **10** may authenticate the user authentication information associated with the login form **28** being processed as described above.

**[0031]** If authentication of the user authentication information is determined to be successful, then the application server system **14** may grant the user access to the target data **18** associated with the portlet **26** for which the user submitted the user authentication information. For example, application server system **14** may display a next page for the portlet **26**. Action form **34** or another suitable component of application server system **14** may determine whether there is another instance of the login form **28** associated with the login page **30** that has the hidden form element **36**. For example, action form **34** may search within a portal **24** associated with the portlet **26** to which the user was granted access for another portlet **26** associated with the login page **30** that has a login form **28** having the hidden form element **36**. If action form **34** finds such a login form **28**, then action form **34** sets the hidden form element **36** of the found login form **28** to TRUE. Action form **34** may automatically submit the found login form **28** along with the same user authentication information that the user submitted for the portlet **26** to which the user was granted access. Action form **34** may then process the found login form **28** in a similar manner as described above. In certain embodiments, action form **34** repeats the above-described process until all found login forms **28** on user system. **12** have been processed.

**[0032]** In certain embodiments, application server system **14** maintains a runtime cookie hash table or other suitable structure. The runtime cookie hash table may be used to synchronize portlets **26** having the same user authentication information. In certain embodiments, the runtime cookie has table is operable to store user authentication information as user cookies. For example, after a first connection is established, the user cookies may be cached in the hash table that is used for any following connections to other portlets **26**. In certain embodiments, a user ID may be used as an index to fetch user authentication information from the hash table.

**[0033]** Application server system **14** may include or be coupled to a memory **38**. In certain embodiments, memory **38** may be used to store the target backend server connection indicator **32** associated with the login form **30** of a portlet **26** for which a successful login occurs. Memory **38** may store any other suitable information according to particular needs. Memory **38** may include any suitable type of memory according to particular needs. In certain embodiments, memory **38** includes a cache.

**[0034]** Backend server system **16** may include one or more target items **18** or any other suitable data to which user system **12** is attempting to gain access. In certain embodiments, backend server system **16** provides the one or more portlets **26**. In certain embodiments, application server system **14** and backend server system **16** may each be a part of the same server system or may be a single server. Furthermore, although a single backend server system **16** is illustrated, the present disclosure contemplates system **10** including any suitable number of backend server systems according to particular needs. In certain embodiments, backend server system **16** includes or is coupled to a database **40** or other suitable memory. Database **40** may include one or more target items **18** or any other suitable data to which user system **12** is attempting to gain access. Although described as a database, database **40** may be more broadly referred to as an information server, which includes database **40** or other suitable information components such as spreadsheets or flat files.

**[0035]** Reference to "database **40**" is meant to include "information server," and reference to "databases **40**" is meant to include other suitable information components. Although only one database **40** is shown, system **10** may include any suitable number and types of databases **40**, according to particular needs. Database **40** may store and facilitate retrieval of information used by applications user systems **12** or backend server **16**. Database **40** may include any hardware, software, firmware, or combination thereof operable to store and facilitate retrieval of information. Also, database **40** may use any of a variety of data structures, arrangements, and compilations to store and facilitate retrieval of information. Target items **18** may include services **18***a*, applications **18***b*, information **18***c*, user preferences **18***d*, or any other suitable items.

**[0036]** The one or more user systems **12**, application server system **14**, and backend server system **16** may each include one or more computers at one or more locations and may share data storage, communications, or other resources according to particular needs. For example, functionality described in connection with user system **12**, application server system **14**, and backend server system **16** may be provided using a single computer system, which in a particular embodiment might include a conventional desktop or laptop computer. Furthermore, functionality described in connection with user system **12**, application server system **14**, and backend server system **16** may be provided using any suitable software components. The one or more user systems **12** may interact with application server system **14** and backend server system **16** according to suitable input from any number of associated users.

**[0037]** In operation of an example embodiment of system **10**, a user of user system **12** may request access to one of a plurality of portlets **26**. A login form **28** may be displayed to the user, requesting that the user enter user authentication information to access the portlet **26**, and, in certain embodiments, the backend server system **16** associated with the portlet **26**. For example, the login form **28** may include one or more requests for the user to enter user authentication information to verify the user's identity, such as a user name, password, domain name, or any other suitable information according to particular needs. In the example in which the user accesses a portal **24** and a portal container is displayed in the user's browser **22**, the portal container including the plurality of portlets **26**, each portlet **26** may be displayed with a login form **28**. In another embodiment, only a single login form **28** is displayed on user system **12**. Because this is the first of the plurality of portlets **26** for which user system **12** has attempted a login, the hidden form element **36** associated with the login form **28** may initially be set to FALSE or some other suitable value indicating that a successful login attempt has not been performed. In certain embodiments, login form **28** includes a target backend server connection indicator **32** identifying the backend server system **16** associated with the portlet **26**.

**[0038]** The user of user system **12** may enter user authentication information into login form **28**. The user may submit login page **30** corresponding to login form **28** to an action form **34** on application server system **14**, by clicking on a "submit" or similar button on login form **28** for example. Action form **34** or another suitable component of application server system **14** may determine whether the value of the hidden form element **36** for the login form **28** is set to TRUE. If the value of the hidden form element of the login form **28** is determined to be FALSE, then action form **34** or another suitable component of application server system **14** may initiate storage of a target backend server connection indicator **32** for the login form **28**. In certain embodiments, the target backend server connection indicator **32** is stored as cookies for login page **30**. The document cookies may be stored on user system **12**, application server system **14**, or in any other suitable location according to particular needs.

**[0039]** If action form **34** determines that the value of the hidden form element **36** is TRUE, then action form **34** may determine whether the target backend server connection indicator **32** for the login form **28** being processed matches the target backend server connection indicator **32** for Login page **30**. If application server system **14** determines that the target backend server connection indicator **32** for the login form **28** being processed does not match the target backend server connection indicator **32** for login page **30**, then action form **34** may look for other instances of login forms **28** on user system **12** having a hidden form element **36** or may simply maintain the display of the login form **28**. If action form **34** determines that the target backend server connection indicator **32** for the login form **28** being processed matches the target backend server connection indicator **32** for login page **30**, then action form **34** authenticates the user login information using action form **34**. In certain embodiments, the user authentication information of login page **32** is submitted to action form **34**, which, in certain embodiments, includes a JSP or HTML page. Action form **34** authenticates the user authentication information and determines whether the authentication of the user authentication information was successful.

**[0040]** If authentication of the user authentication information is determined to be unsuccessful, then action form **34** or another suitable component of application server system **14** may initiate communication of a notification to the user system **12** that attempted the login that the login attempt was unsuccessful. If authentication of the user authentication information is determined to be successful, then action form **34** or another suitable component of application server system **14** may grant the user access to the target data **18** associated with the portlet **26** for which the user submitted the user authentication information. For example, application server system **14** may display a next page for the portlet **26**. If the authentication of the user authentication information is determined to be successful, action form **34** or another suitable component of application server system **14** may automatically initiate propagation of the successful login to other login forms **28** displayed on user system **12**. For example, action form **34** may initiate propagation of the successful login to one or more other login forms **28** on user system **12**.

**[0041]** In certain embodiments, to perform the propagation of the successful login attempt, action form **34** may determine whether there is another instance of login form **28** associated with login page **30** that has the hidden form element **36**. For example, action form **34** may search within a portal **24** associated with the portlet **26** to which the user was granted access for another portlet **26** associated with login page **30** that has a login form **28** having the hidden form element **36**. If action form **34** finds such a login form **28**, then action form **34** sets the hidden form element **36** of the found login form **28** to TRUE. In certain embodiments, action form **34** automatically submits the found login form **28** along with the same user authentication information that the user submitted for the portlet **26** to which the user was granted access. In other embodiments, action form **34** automatically grants the user associated with the found login form **28** access to the access point **26** associated with the found login form **28** rather than re-authenticating the user authentication information. In certain embodiments, action form **34** repeats the above-described process until all found login forms **28** on user system **12** have been processed.

**[0042]** In certain embodiments, the present disclosure may reduce or eliminate the need to reenter user authentication information (i.e., to login) for each of a plurality of portlets **26** or other web-based access points **26**. For example, the present disclosure may reduce or eliminate the need for a user of a user system to login to each portlet **26** individually. This may ease the burden on the user when accessing and navigating the portlets **26**. Although described as synchronizing login processes, in certain embodiments, the present disclosure does

not require all logins to occur at exactly the same time. As just one example, certain processing delays may be associated with automatically propagating a successful login to one or more other portlets **26**.

**[0043]** FIG. **2** illustrates another representation of an example system **10** for synchronizing login processes. In certain embodiments, certain components of system **10** illustrated in FIG. **2** may be substantially similar to corresponding components described above with reference to FIG. **1**. In the example embodiment illustrated in FIG. **2**, login forms **28***a*, **28***b*, **28***c*, **28***d*, and **28***e* on user system **12** correspond to a login page **30** on application server system **14**. Although a particular number of login forms **28** are illustrated, the present disclosure contemplates any suitable number of login forms **28**.

**[0044]** As can be seen in the example embodiment illustrated in FIG. **2**, a user may enter user authentication information into login form **28***a* and submit the user authentication information using, by clicking on a "submit" or other suitable button for example, as shown on submit path **40***a*. This submit action may also cause login page **30** to be submitted to an action form **34** as shown by path **42***a*. Assuming action form **34** successfully authenticates the user authentication information submitted for login form **28***a*, action form **34** may grant user system **12** access to the portlet **26** corresponding to login form **28***a*, as shown by paths **42***b* and **44***a*. Action form **34** may then automatically propagate the successful login associated with login form **28***a* to other suitable login forms **28** (i.e. login forms **28***b*, **28***c*, **28***d*, and **28***e*) on user system **12** as described above with reference to FIG. **1**. Paths **40***b* and **44***b* illustrate the automatic submission and grant of access for login form **28***b*, paths **40***c* and **44***c* illustrate the automatic submission and grant of access for login form **28***c*, paths **40***d* and **44***d* illustrate the automatic submission and grant of access for login form **28***d*, and paths **40***e* and **44***e* illustrate the automatic submission and grant of access for login form **28***e*.

**[0045]** FIGS. **3**A through **3**C are exemplary block diagrams illustrating an example display that may be used to provide synchronization of login processes according to certain embodiments of this disclosure. In particular, FIGS. **3**A through **3**C illustrate example web pages displayed by a web browser. The web pages illustrated in FIGS. **3**A through **3**C could, for example, be generated by application server system **14** and displayed by browser **22** of user system **12**. The web pages in FIGS. **3**A through **3**C are for illustration only. Other web pages could be used in system **10**. Also, while the web pages may be described as being generated by and used in system **10** of FIG. **1**, the web pages could be generated and used by any other suitable system.

**[0046]** As illustrate in FIG. **3**A, a window **50** (e.g., a portal **24**) may include a panel **52**, which may be a web page or in any other suitable format. Panel **52** may include a hierarchical list, which may include a list of one or more portlet identifiers **54**, each identifying a portlet **26** for example. A user (of user system **12** for example) may select a portlet identifier **54** (e.g., Cabinet), which may correspond to a particular portlet **26** (e.g., the Cabinet portlet **26**). In response, a login screen may be displayed in a panel **56** of window **50**, requesting the user to enter user authentication information **58** to gain access to the portlet **26** corresponding to the portlet identifier **54**. Panel **56** may be a web page or in any other suitable format. The user may enter user authentication information **58** and select a submit button **60**. In certain embodiments, the user may select an "already logged in" button **62**, to inform the appropriate server (e.g., application server system **14**) that the user has already logged in successfully.

**[0047]** As illustrated in FIG. **3**B, assuming a user has entered the appropriate user authentication information **58** and selected the submit button **60**, and that the user authentication information **58** submitted by the user was appropriately processed to determine that the user is authorized to access the Cabinet portlet **26**, the user may be granted access to the Cabinets portlet **26**. For example, the Cabinets portlet **26***a* may be displayed in panel **56** of window **50**.

**[0048]** As illustrated in FIG. **3**C, according to the present invention, once a user has successfully entered user authentication information **58** for one of the portlets **26** (e.g., the Cabinet portlet **26***a*) associated with a portlet identifier **54**, the successful login is propagated to one or more of the other portlets **26** associated with the other portlet identifiers **54** without being required to reenter user authentication information **58** for each of the other portlets **26**. Thus, as illustrated in FIG. **3**C, for example, the user may be able to select a portlet identifier **54** (e.g., Inbox) corresponding to another portlet **26** (e.g.) the Inbox portlet **26***b*), and the Inbox portlet **26***b* may be displayed in panel **56** of window **50** without the user being required to reenter user authentication information **58**. In certain embodiments, a user may be able to access those other portlets **26** that are associated with the same target backend server **16** as the portlet **26** for which the user authentication information was entered and successfully authenticated.

**[0049]** Although FIGS. **3**A through **3**C illustrate example embodiments of a display used in system **10**, various changes may be made to FIGS. **3**A through **3**C. For example, the web page shown in FIGS. **3**A through **3**C is for illustration only. Other web pages or displays having other contents and arrangements may be used. Also, the web pages displayed to the user could include other or additional features and are not limited to the content shown in FIGS. **3**A through **3**C.

**[0050]** FIG. **4** illustrates an example method for synchronizing login processes. At step **100**, a user of user system **12** requests access to one of a plurality of portlets **26**. In certain embodiments, portlets **26** may be a part of a larger portal **24**, such as may be displayed in a portal container on a browser of user system **12**. For example, the user may access the portal **24**, and a portal container may be displayed in the user's browser **22**, the portal container including the plurality of portlets **26**. The portlet **26** may be associated with a predetermined backend server **16** or the user may specify a particular backend server **16** with which the portlet **26** is to be associated. While described as a user of user system **12** requesting access, it should be understood that a user system **12** may automatically perform various steps of the method.

**[0051]** At step **102**, a login form **28** may be displayed to the user, requesting that the user enter user authentication information to access the portlet **26**, and thus the backend server system **16** associated with the portlet **26**. For example, the login form **28** may include one or more requests for the user to enter user authentication information to verify the user's identity, such as a user name, password, domain name, or any other suitable information according to particular needs. In the example in which the user accesses a portal **24** and a portal container is displayed in the user's browser **22**, the portal container including the plurality of portlets **26**, each portlet **26** may be displayed with a login form **28**. For example, the user may request access to portal **24** and login forms **28** for each portlet **26** may be automatically displayed to the user.

**[0052]** Each login form **28** may be associated with a login page **30** on application server system **14**. In certain embodiments, login page **30** includes a JSP or HTML page on application server system **14**. Each login form **28** may be associated with a hidden form element **36** or other suitable flag that indicates whether a successful login has occurred for the portlet **26** associated with the login form **28**. Because this is the first of the plurality of portlets **26** for which user system **12** has attempted a login, the hidden form element **36** may initially be set to FALSE or some other suitable value indicating that a successful login attempt has not been performed In certain embodiments, login form **28** may include a target backend server connection indicator **32** identifying the backend server system **16** associated with the portlet **26**. In certain embodiments, the user of user system **12** may be able to select target backend server system **16** for each portlet **26** in the plurality of portlets **26**. In this embodiment, the user may select the same backend server **16** for one or more of portlets **26**. The target backend server connection indicator **32** may also be stored as cookies for login page **30**, for example. In certain embodiments, the target backend server connection indicator **32** may includes an address, such as a Up for example, of the backend server system **16**.

**[0053]** At step **104**, the user of user system **12** may enter user authentication information into login form **28**. In certain embodiments, user system **12** enters the user authentication information automatically without requiring user action. At step **106**, the user may submit login page **30** corresponding to login form **28** to an action form **34** on application server system **14**, by clicking on a "submit" or similar button on login form **28** for example. In certain embodiments, action form **34** is an authentication page, which may be a JSP document, an HTML page, or any other suitable data format on application server system **14**. At step **108**, action form **34** or another suitable component of application server system **14** automatically determines whether the hidden form element **36** value for the login form **28** is set to TRUE. For example, this may help determine whether other instances of login forms **28** have experienced a successful authentication for this login session. If the hidden form element **36** value of the login form **28** is determined to be FALSE at step **109**, then application server system **108** may automatically initiate storage of target backend server connection indicator **32** for the login page **30** at step **110**. For example, the connection information may include the target backend server connection indicator **32** of the target backend server **16** with which the portlet **26** is associated. In certain embodiments, the target backend server connection indicator **32** is stored as cookies for the login page **30**. The document cookies may be stored on user system **12**, application server system **14**, or in any other suitable location according to particular needs. The cookies may be set by user system **12**, by application server system **14**, or in any other suitable manner and may be passed between user system **12** and application server system **14**, as HTTP headers for example. The method then proceeds to step **112** described below.

**[0054]** Returning to step **108**, if application server system **14** determines that the hidden form element **36** value is TRUE, then application server system **14** automatically determines at step **112** whether the target backend server connection indicator **32** for the login form **28** being processed matches the target backend server connection indicator **32** for login page **30**. If application server system **14** determines at step **112** that the target backend server connection indicator **32** for the login form **28** being processed does not match the target backend server connection indicator **32** for login page **30**, then the method returns to step **102** to display the login form **28**. If application server system **14** determines at step **112** that the target backend server connection indicator **32** for the login form **28** being processed matches the target backend server connection indicator **32** for login page **30** then in certain embodiments, the method proceeds to step **114**. In other embodiments, the method proceeds directly to step **120** if it is determined at step **112** that the target backend server connection indicator **32** for the login form **28** being processed matches the target backend server indicator **32** for login page **30**.

**[0055]** At step **114**, application server system **14** automatically authenticates the user login information using action form **34**. In certain embodiments, the user authentication information of login page **32** is submitted to action form **34**, which, in certain embodiments, includes a JSP or HTML page. Action form **34** may be used to verify the user authentication information. At step **116**, application server system **14** automatically determines whether the authentication of the user authentication information was successful. In certain embodiments, application server system **14** uses action form **34** and the user authentication information submitted to action form **34** to automatically determine the identity of the user and, if applicable to verify the user's identity through the use of a password.

**[0056]** Although the present disclosure primarily describes the use of a user ID and password to authenticate the identity of the user, the user's identity may be authenticated in any suitable manner, according to particular needs. Furthermore, although authentication of user authentication information is described primarily as being performed on application server system **14**, the present disclosure contemplates authentication of user authentication information being performed on any suitable component of system **10** (e.g., on backend server system **16**), according to particular needs, on backend server **16**. For example, authentication of user authentication information may include communicating the user authentication information from application server system **14** to backend server system **16** for authentication. However, in certain embodiments, passing user authentication information from application server system **14** to backend server system **16** may compromise the security of system **10**.

**[0057]** Application server system **14** may determine whether the user has the appropriate privileges to access the requested information on backend server **16** via the corresponding portlet **26**. In certain embodiments, authentication of the user may include determining one or more user preferences based on the user's identity. Authentication of user authentication information may include determining whether the user authentication information is correct (e.g., the correct password is given for a valid user ID), whether the user associated with the user authentication information has the proper credentials to access the portal **26** and/or the target backend server system **16** associated with the portal **26**, or any other suitable verifications according to particular needs.

**[0058]** If authentication of the user authentication information is determined to be unsuccessful at step **116**, then at step **118**, application server system **14** automatically communicates a notification to the user system **12** that attempted the login that the login attempt was unsuccessful. For example, application server system **14** may automatically redirect the user system **12** that attempted the login to the login form **28**,

using a refresh display operation for example. The method then returns to step **104** to wait for the user to enter new login information or to terminate the login attempts. If authentication of the user authentication information is determined to be successful at step **116**, then the application server system **14** may automatically grant the user access to the target data **18** associated with the portlet **26** for which the user submitted the user authentication information. For example, application server system **14** may automatically display a next page for the portlet **26**.

**[0059]** At step **122**, action form **34** automatically determines whether there is another instance of login form **28** associated with login page **30** that has the hidden form element **36**. For example, action form **34** may search within a portal **24** associated with the portlet **26** to which the user was granted access at step **120** for another portlet **26** associated with login page **30** that has a login form **28** having the hidden form element **36**. If action form **34** does not find any such login forms **28** at step **122**, then the method ends. If action form **34** finds such a login form **28** at step **122**, then action form **34** automatically sets the hidden form element **36** of the found login form **28** to TRUE at step **124**. At step **126**, action form **34** automatically submits the found login form **28** along with the same user authentication information that the user submitted for the portlet **26** to which the user was granted access at step **120**. In certain embodiments, method then returns to step **108**. In other embodiments, the method may return directly to step **112** rather than determining whether the hidden form element value is set to TRUE, and in these embodiments if it is determined at step **112** that the target backend server connection indicator **32** of the found login form **28** is the same as the target backend server connection indicator **32** for login page **30**, then the user authentication steps (e.g., steps **114** and **116**) may be skipped, the user automatically being granted access at step **120**.

**[0060]** In certain embodiments, step **122** and the steps that follow step **122** may be automatically repeated until the user is logged into all login forms **28** associated with login page **30** that have the hidden form element **36**. In certain embodiments, steps **122-126** may be referred to as automatically propagating the successful login to other login forms **28** having the hidden form element **36**, although propagating the successful login may include other steps. In certain embodiments, this may allow the user to be logged into all portlets **26** that have a substantially similar login form **28** and that have the same target backend server **16**. Furthermore, although this method has been described for propagating a successful login to other login forms **28**, the present disclosure contemplates performing this synchronization in any suitable manner according to particular needs or desires.

**[0061]** Although a particular method for synchronizing login processes has been described with reference to FIG. **4**, the present disclosure contemplates any suitable method for synchronizing login processes in accordance with the present disclosure. Thus, certain of the steps described with reference to FIG. **4** may take place simultaneously and/or in different orders than as shown. As just one example, step **120** may be performed for all of the successful logins in substantially one step. Moreover, system **10** may use methods with additional steps, fewer steps, and/or different steps, so long as the methods remain appropriate.

**[0062]** Although this disclosure has been described in terms of certain embodiments and generally associated methods, alterations and permutations of these embodiments and methods will be apparent to those skilled in the art. Accordingly, the above description of example embodiments does not define or constrain this disclosure. Other changes, substitutions, and alterations are also possible without departing from the spirit and scope of this disclosure.

What is claimed is:

**1**. A computer-implemented method of providing login forms for synchronizing login processes in a web environment, comprising:

generating, by one or more processors of an application server, a first login form that includes one or more first input areas that receives user authentication information to authenticate a user to access a first access point and includes a first hidden form element that indicates whether the user was authenticated to access a second access point;

generating, by the one or more processors of the application server, a second login form that includes one or more second input areas to receive the user authentication information to authenticate the user to access a second access point and includes a second hidden form element that indicates whether the user was authenticated to access the first access point; and

providing, by the one or more processors of the application server, the first login form and the second login form to be displayed on a user system that accesses the first access point and the second access point,

wherein when a first authentication that the user is authenticated to access the first access point using the first login form, the second hidden form element is updated to indicate the first authentication such that the first authentication is propagated to the second login form through the user system and hidden from the user, and wherein when a second authentication that the user is authenticated to access the second access point using the second login form, the first hidden form element is updated to indicate the second authentication such that the first authentication is propagated to the second login form through the user system and hidden from the user.

**2**. The method of claim **1**, wherein the first login form and the second login form are generated using a login page associated the application server.

**3**. The method of claim **2**, wherein the login page comprises at least one of an embedded script document and an HTML page running on the application server.

**4**. The method of claim **1**, wherein the first hidden form element is initially set to indicate that the first authentication has not occurred.

**5**. The method of claim **1**, further comprising:

providing, by the one or more processors of the application server, a first target backend server connection indicator that identifies a first target backend server associated with the first access point.

**6**. The method of claim **5**, wherein the first target backend server connection indicator is stored as one or more first cookies for the login page associated with the first login form.

**7**. The method of claim **1**, wherein the first access point comprises a portlet.

**8**. A computer readable medium storing computer executable instructions for providing login forms for synchronizing login processes in a web environment the instructions when executed on one or more processors configuring the one or more processors to:

generate a first login form that includes one or more first input areas that receives user authentication information to authenticate a user to access a first access point and includes a first hidden form element that indicates whether the user was authenticated to access a second access point;

generate a second login form that includes one or more second input areas to receive the user authentication information to authenticate the user to access a second access point and includes a second hidden form element that indicates whether the user was authenticated to access the first access point; and

provide the first login form and the second login form to be displayed on a user system that accesses the first access point and the second access point,

wherein when a first authentication that the user is authenticated to access the first access point using the first login form, the second hidden form element is updated to indicate the first authentication such that the first authentication is propagated to the second login form through the user system and hidden from the user, and wherein when a second authentication that the user is authenticated to access the second access point using the second login form, the first hidden form element is updated to indicate the second authentication such that the first authentication is propagated to the second login form through the user system and hidden from the user.

**9**. The computer readable medium of claim **8**, wherein the first login form and the second login form are generated using a login page associated the application server.

**10**. The computer readable medium of claim **9**, wherein the login page comprises at least one of an embedded script document and an HTML page running on the application server.

**11**. The computer readable medium of claim **8**, wherein the first hidden form element is initially set to indicate that the first authentication has not occurred.

**12**. The computer readable medium of claim **8**, the instructions when executed further configuring the one or more processors to:

provide a first target backend server connection indicator that identifies a first target backend server associated with the first access point.

**13**. The computer readable medium of claim **12**, wherein the first target backend server connection indicator is stored as one or more first cookies for the login page associated with the first login form.

**14**. The method of claim **8**, wherein the first access point comprises a portlet.

**15**. A system for providing login forms for synchronizing login processes in a web environment, comprising:

an application server comprising one or more processors configured to:

generate a first login form that includes one or more first input areas that receives user authentication information to authenticate a user to access a first access point and includes a first hidden form element that indicates whether the user was authenticated to access a second access point;

generate a second login form that includes one or more second input areas to receive the user authentication information to authenticate the user to access a second access point and includes a second hidden form element that indicates whether the user was authenticated to access the first access point; and

provide the first login form and the second login form to be displayed on a user system that accesses the first access point and the second access point,

wherein when a first authentication that the user is authenticated to access the first access point using the first login form, the second hidden form element is updated to indicate the first authentication such that the first authentication is propagated to the second login form through the user system and hidden from the user, and wherein when a second authentication that the user is authenticated to access the second access point using the second login form, the first hidden form element is updated to indicate the second authentication such that the first authentication is propagated to the second login form through the user system and hidden from the user.

**16**. The system of claim **15**, wherein the first login form and the second login form are generated using a login page associated the application server.

**17**. The computer readable medium of claim **16**, wherein the login page comprises at least one of an embedded script document and an HTML page running on the application server.

**18**. The computer readable medium of claim **15**, wherein the first hidden form element is initially set to indicate that the first authentication has not occurred.

**19**. The computer readable medium of claim **15**, the one or more processors of the application server further configured to:

provide a first target backend server connection indicator that identifies a first target backend server associated with the first access point.

**20**. The system of claim **19**, wherein the first target backend server connection indicator is stored as one or more first cookies for the login page associated with the first login form.

**21**. The method of claim **15**, wherein the first access point comprises a portlet.

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