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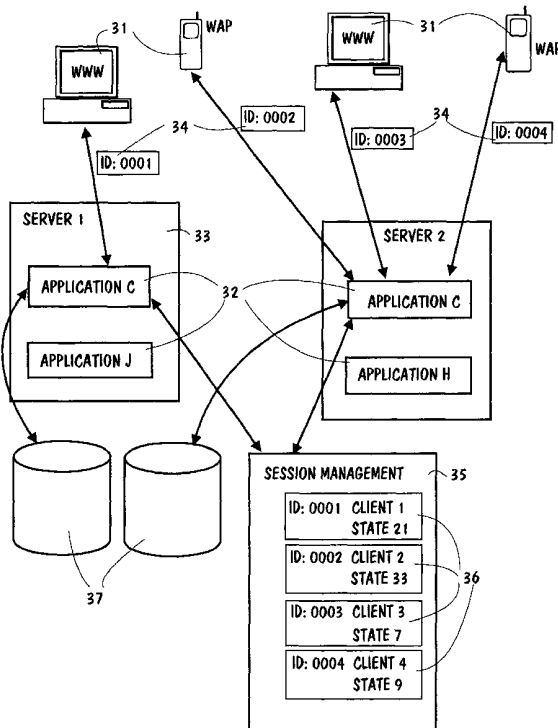
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[Continued on next page]

(54) Title: CENTRALIZED SESSION MANAGEMENT



(57) Abstract: This invention relates to the handling of sessions between clients and services. The invention is to use a centralized element for keeping and managing information of the sessions. Each session (client) is identified by a session-specific ID. The application in the server to which the client is connected checks the session's, i.e. the client's, ID from a centralized element, called session management, by sending the ID to the session management. The session management checks that the ID is correct. If it is, the session management sends the session information of the client to the application. When the session information changes from the act of the client and/or the application, the application updates the changes to the session management.



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Centralized Session Management

Field of the Invention

This invention relates to the handling of sessions between clients
5 and services. In particular, the invention relates to the telecommunications
field where there can be thousands of clients using the same service simul-
taneously. There can also be thousands of different services that are offered
to the customers.

10 Background of the Invention

A session is conceived to be the time period between the login
and the logout of a service in a datacommunications network, or the dialing of
the phone number and the hanging up of the phone in a telecommunications
network. The present evolution goes towards a common network structure,
15 which is capable of transmitting data, voice and audio, i.e. towards a network
comprising features of a datacommunications and telecommunications net-
work.

Each session contains session-specific information, such as the
phone number, the name of the client, the rights of use, and the state of the
20 session. FIG. 1 shows an example of a known solution to handle the ses-
sions and the session-specific information. Each client **1** has its own process
(a copy of the application in use) **2** in a server **3** for offering the service to the
client. The client-specific process handles the session information. For ex-
ample, if the service (application) is a spreadsheet, each client has his own
25 application copy of the sheet and the state of the sheet. The drawback of this
solution is that the server must process several copies of the same applica-
tion.

FIG. 2 shows another example of a known solution to handle the
sessions and the session-specific information. In the Web, cookies are the
30 normal way to handle session management. A cookie **21** is a code for identi-
fying the browser **22** so that the process (the web-page application) **23** can
identify each browser that is using the application. The server **24** containing
the application sends client-specific cookies, which contain client-specific
state information. Typically, the size of a cookie is about 2 kbytes. The
35 browser can keep the cookie information in the cache only during the ses-
sion, or the cookie is saved in the memory of the client for a certain period.

The use of URLs (Uniform Resource Locator) corresponds to the use of cookies. URL is a string that gives the location of a piece of information (such as a web-page). Furthermore, URL may contain session-specific information. However, the capacity of URL is less than the capacity of a
5 cookie to carry session information. Drawbacks of the cookie or URL are that they have a low capacity to carry information, and the communication traffic between the client and the server will grow. Furthermore, the client must have the ability to use cookies. In addition, session management is dependent on a client terminal.

10 When the client wants to change something in the web-page (i.e. use the service page), the desired changes are delivered to the application using URL (or a query string technique). Also the cookie is sent back to the server containing the session information. The application is adapted for the client according to the desired changes. In turn, the application updates the
15 cookie, and sends it back to the client. In this way, the session-specific information is sent back and forth between the client and the server, the browsers keeping the session-specific information in their memories.

The aim of the invention is to reduce the drawbacks of the known solutions and to offer a more efficient way to handle session management.
20 These are achieved in a way described in the claims.

Summary of the Invention

The idea of the invention is to use a centralized element for keeping and managing information of the sessions. Each session (client) is identified by a session-specific ID. In the case of a phone the ID can preferably be
25 the phone number. The application in the server to which the client is connected checks the session's, i.e. the client's, ID from a centralized element, called session management, by sending the ID to the session management. The session management checks that the ID is correct. If it is, the session
30 management sends the session information of the client to the application.

When the session information changes from the act of the client and/or the application, the application updates the changes to the session management. Due to the centralization, it is easy to monitor and manage sessions. Furthermore, the clients are independent of the technology used in
35 an application.

Brief Description of the Drawings

In the following the invention is described in more detail by means of FIGs 1 - 5 in the attached drawings where.

5

FIG. 1 illustrates an example of the traditional way to handle session information,

FIG. 2 illustrates an example of the prior way to handle session information in a Web-based network,

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FIG. 3 illustrates an example of the way according to the invention to handle session information,

FIG. 4 illustrates an example of where the client uses the services of the application according to the invention,

15

FIG. 5 shows an example of a flow chart that describes the method according to the invention.

Detailed Description of the Invention

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FIG. 3 shows an example of an arrangement according to the invention. When a client **31** wants to use some service **32**, he calls the service number (or address). The client terminal is preferably a PC or a WAP phone. The client terminal can also be an SMS terminal, a normal phone, or any other type of device. The service, i.e. the application can be in any server **33** in the network. Actually, it is preferable that a sufficient number of the servers contain their own copy of the application. In this way, the service can be offered to very many clients in a large geographical area.

25

At the beginning of the session, when the client is logging in for using the application **32**, the session ID does not exist. Thus the client does not send a cookie or URL containing the session ID which is noticed by the application. Noticing that the session is new, the application asks the session management **35** to create a data storage and session ID for session information. The session management sends the session ID to the application, which is now ready to create, use and update the session information storage in the session management. The application sends the created session ID, **34** to the client (in cookie or URL).

35

When using the service the client sends the session ID to the application. The application checks that the client is ok, by using the session ID

34 (or the phone number) of the client. The checking is done by using the session management **35**. The application asks the session information that is identified by using the session ID from the session management, which checks the validity of the ID, i.e. that the data storage that corresponds to the
5 ID exists. If the ID is correct, the session management sends the session information **36** of the client to the application. The session information comprises the client-specific information, such as the client's name, address, phone numbers, state information of the application, and the rights of use. The client's session information of the application is created at the first ses-
10 sion in the application, when the session information needed is saved in the session management.

It is worth noting that the client can actually use several applica-
tions during one session. For example, the client can use another application
for a while, and then go back to use the originally used application. The ses-
15 sion information keeps state information of both applications (or all applica-
tions used in the session) until the client logs out of the session when the
session information is deleted in the session management.

The application can use databases **37** in the network for getting
necessary information for accomplishing the required service. The state of
20 the application (the session) changes when it is performing its tasks. The
changes are saved in the application state information (in the session infor-
mation). So, the session information needed is sent between the application
and the centralized session management. Since the transmission path be-
tween the application and the session management is preferably in the net-
25 work part with high capacity, there is no strict limit on the amount of session
information. Usually, the path between the application and the session man-
agement is also safer than the path between the client and the application.
When the session is terminated, the session information is deleted. So, the
next time, when the client wants to use the application, a new client-specific
30 session ID and a data storage in the session management must be created.

FIG. 4 shows an example of a calendar service. The client **41**
wants to look at his calendar information, so he calls to the calendar service
42. The calendar service has been distributed all over the network, several
servers **43** containing the calendar application **42**. Preferably the nearest ap-
35 plication handles the call. At the beginning of the session, the client-specific
session ID **44** (in this case the WAP phone number) and a session informa-

tion data storage **46** are created in the session management **45**. The session management keeps a data storage for the session information of the clients. The session ID is sent to the application, which forwards it to the client. When the client uses the calendar, the changes are updated in the session management. The calendar application uses the session ID for requesting and updating the session information. If the ID is valid (the session-specific storage exists), the session management sends the client-specific session information **45**, such as the name, time, and date, to the application.

In this case, the application uses a special calendar database **47** for keeping the actual calendar information, such as meetings, holidays, and short memos. The application loads the calendar information from the database, and uses the date information of the session information for creating the calendar service for the client. The client can make necessary changes to the calendar, and the application handles the updating of the changes for the calendar database and for the session management. The application also sends the desired service information to the client.

Client-specific session information must be created in the centralized session management. This is done when the client logs into the service as mentioned before. In the session information configuration, the client gets a session ID, which is used when the client uses the application, for identifying the client and the client-specific information. Further, in the configuration, the session management saves the session information needed for successful running of the application. FIG. 5 shows an example of a flow chart according to the invention, illustrating the method in a running time, assuming that the session information configuration has been done earlier. First, the session ID must be checked **51**. As described above, the checking is handled by the cooperation of the application and the session management. The application sends the session ID to the session management, and if the ID is ok, i.e. the session-specific information storage exists, the session management sends the session information to the application, i.e. the session information is requested **52** by the application. As the session information changes, it must be updated **53** in the session management. The application sends the update information to the session management. The aim is that the application does not keep the session information in its own cache, but instead, the session management does, as it has enough capacity to handle session information of several (thousands) clients. Due to this, the requesting

and the updating steps must be repeated **54** as many times as needed during the session.

5 Session information is application state-specific and client-specific information for each application and client. Thus, the session management may contain a number of session information storages for each client, each storage containing the information that the application or applications need during the session.

10 As mentioned before, clients are independent of the technology used in the applications. Since the clients do not need to receive or keep session information, such as cookies or URLs, they do not need complicated features. Applications use, for example, HTTP-protocol, and the applications have been created using different techniques. For example, an application is a CGI (Common Gateway Interface) application having a connection for client terminals. Other possible application technologies are NSAPI (Netscape
15 Application Program Interface), ISAPI (Internet Service Application Program Interface), and JavaServlet.

20 Since the session management information is sent in the trunk network with high capacity, it is possible to efficiently use the central session management as a database. The trend seems to be towards services, which need more session management information. The prior art solutions do not offer an efficient way to handle the growth of such services. Further, it is worth noting that the path between the application and the session management usually is safer than the path between the application and the client. For example, CORBA (Common Object Request Broker Architecture) can
25 work as a technological base (interface) for the interworking between the application and the session management.

30 The invention is not restricted to the examples above. For example, the invention can comprise several session management elements, each of them handling a part of the network. It is worth noting, that in this case the session management elements have to update session information among themselves so that each element has the latest session information. It is evident that the invention can also be used in other solutions, in the scope of the inventive idea.

Claims

1. An arrangement for handling client-specific session information in a network that comprises at least one client terminal and at least one server, the server comprising at least one service application, whereby said
5 session information is for a session established between a client terminal used by a client and a service application, and whereby the session is the period the client uses the service, characterized in that the arrangement further comprises a centralized element for keeping and managing the session information.
- 10 2. An arrangement according to claim 1, characterized in that the arrangement further comprises a session identifier for each session, for identifying the session information, specific for each client.
3. An arrangement according to claim 2, characterized in that the arrangement further comprises at least one connection between the
15 central element and the service applications for transmitting the session information.
4. An arrangement according to claim 3, characterized in that the arrangement further comprises at least one connection between the client terminals and the service applications for transmitting services of the
20 service applications to the client.
5. An arrangement according to claim 4, characterized in that the arrangement further comprises means in the client terminal for sending the session identifier to the application.
6. An arrangement according to claim 2, characterized in
25 that the session identifier is the phone number of the client terminal, the terminal being a phone.
7. An arrangement according to claim 1, 2, 3, 4, 5, or 6, characterized in that the arrangement comprises several central elements.
8. A method for handling client-specific session information in a
30 communication network, the session being between a client and a service application in a network, characterized in that the method comprises the step of using a centralized element for creating, keeping, and managing session information of several clients.
9. A method according to claim 8, characterized by creating
35 a session information data storage and a session ID for the session at the beginning of the session.

10. A method according to claim 8 or 9, characterized in that the method comprises for each session the steps of
- checking that the client-specific session information exists using the ID of the session for identifying the session information,
 - 5 - requesting the client-specific session information from the centralized element that keeps and manages the session information, for the use of the application,
 - updating the client-specific session information in the central element, when needed, and
 - 10 - repeating the requesting step as many times as needed during the session
 - repeating the updating step as many times as needed during the session.
11. A method according to claim 10, characterized in that
- 15 the checking step comprises the steps of
- sending the session ID from the client to the application,
 - sending the session ID from the application to the central element.
12. A method according to claim 8, 9 or 10, characterized
- 20 in that the method further comprises the step of updating the session specific information among several central elements.

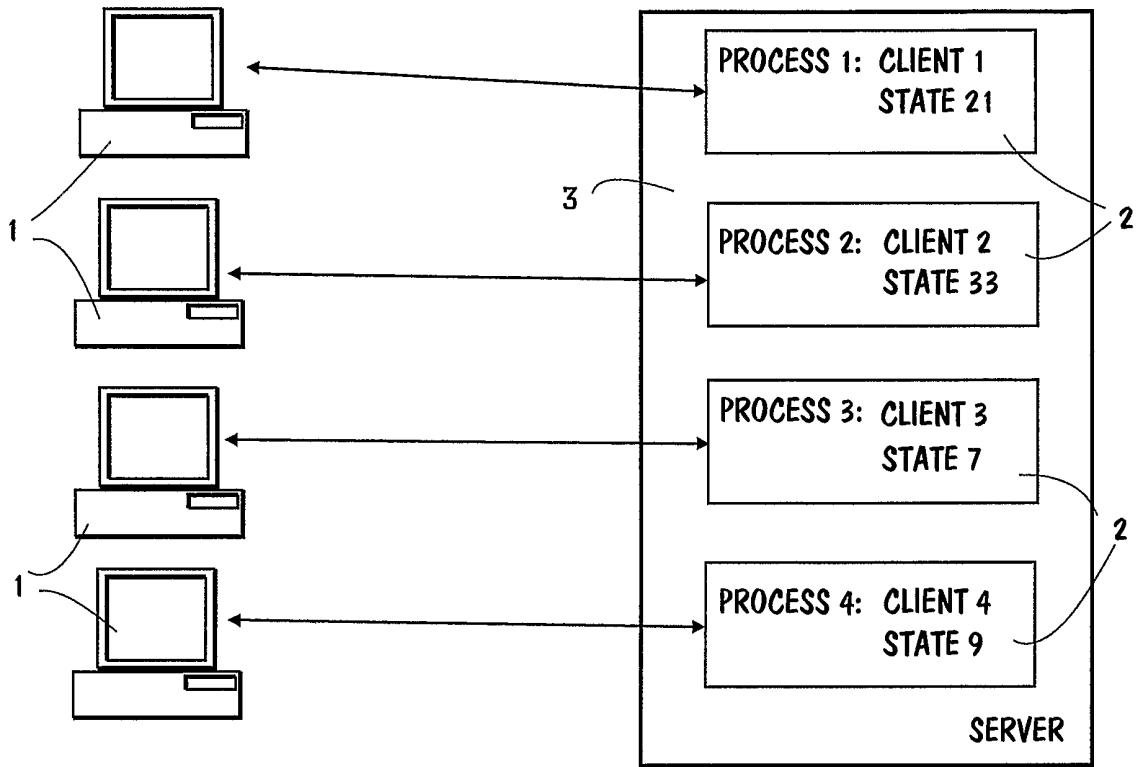


FIG. 1

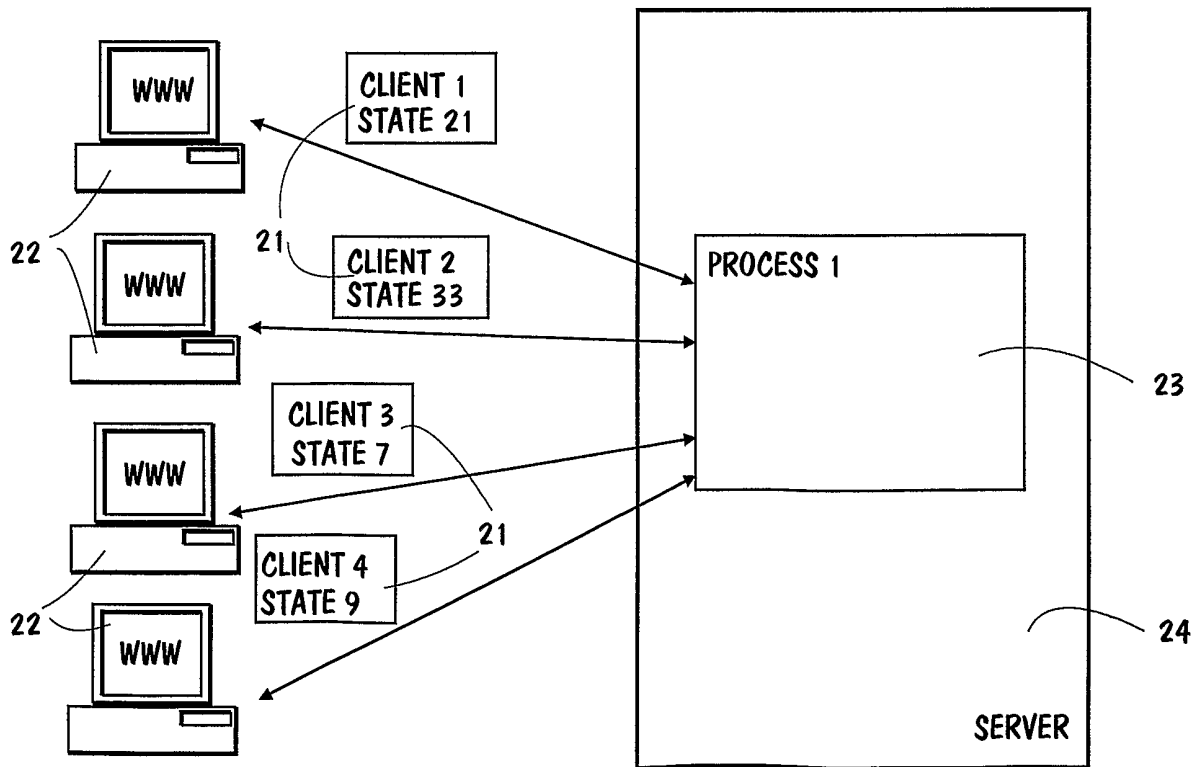


FIG. 2

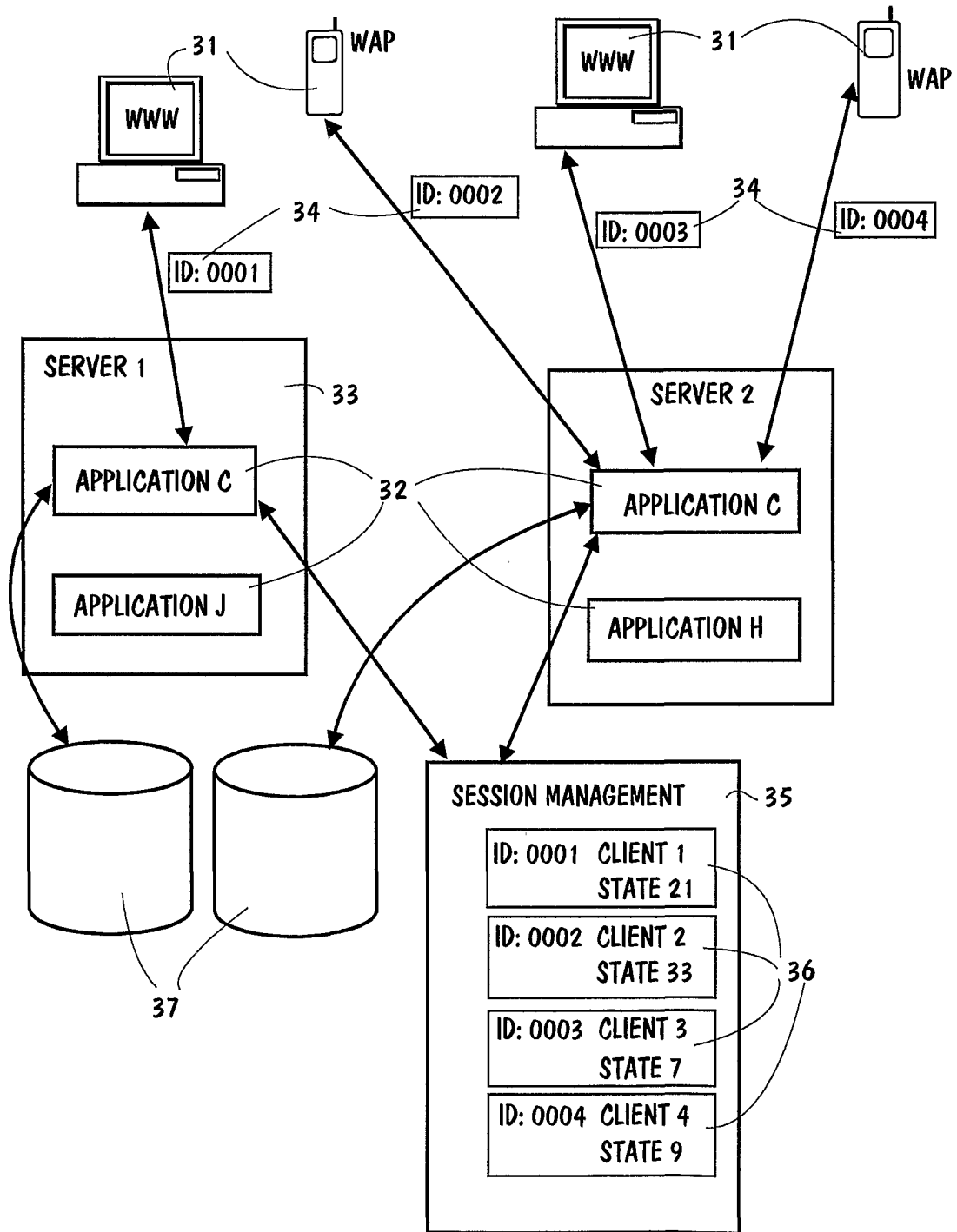


FIG. 3

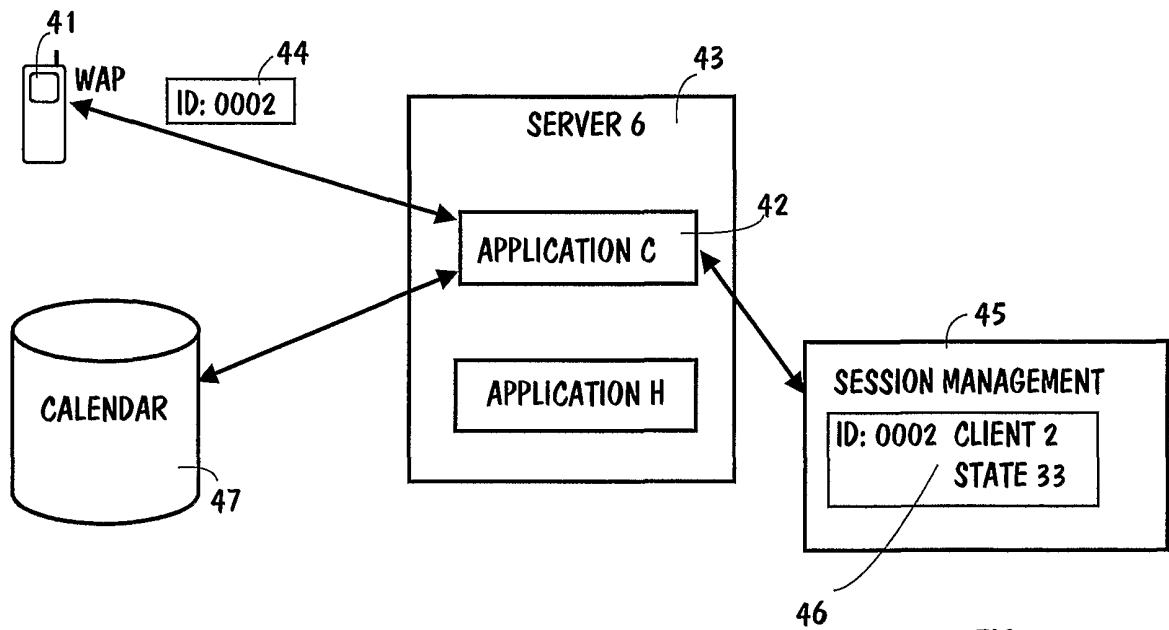


FIG. 4

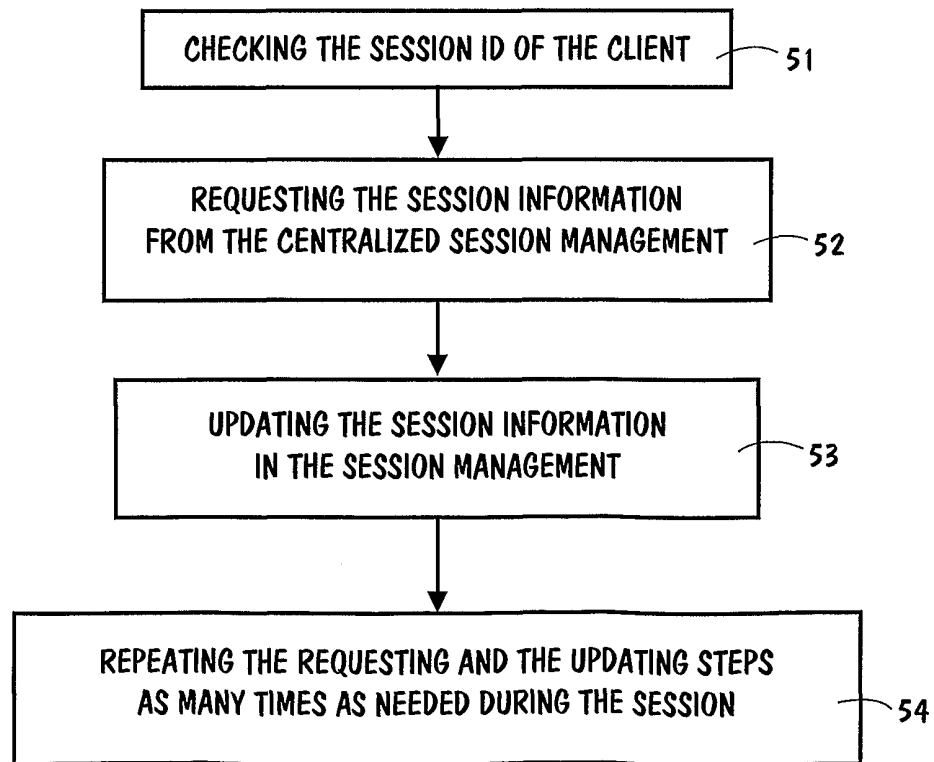


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 01/01119

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04Q 7/22, H04L 29/06, G06F 17/30
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G06F, H04L, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5835724 A (SMITH), 10 November 1998 (10.11.98), column 1, line 45 - column 2, line 26; column 4, line 8 - line 33 --	1-10
X	US 6076108 A (COURTS ET AL), 13 June 2000 (13.06.00), column 1, line 40 - column 2, line 10; column 7, line 28 - column 9, line 11; column 8, line 32, abstract --	1-10
P,A	US 6289333 B1 (JAWAHAR ET AL), 11 Sept 2001 (11.09.01), column 2, line 6 - line 41, abstract -- -----	1-10

 Further documents are listed in the continuation of Box C.

 See patent family annex.

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"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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INTERNATIONAL SEARCH REPORT
Information on patent family members

28/01/02

International application No.

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US 6076108 A	13/06/00	US 6085220 A	04/07/00
US 6289333 B1	11/09/01	US 6256620 B	03/07/01
		US 6298356 B	02/10/01