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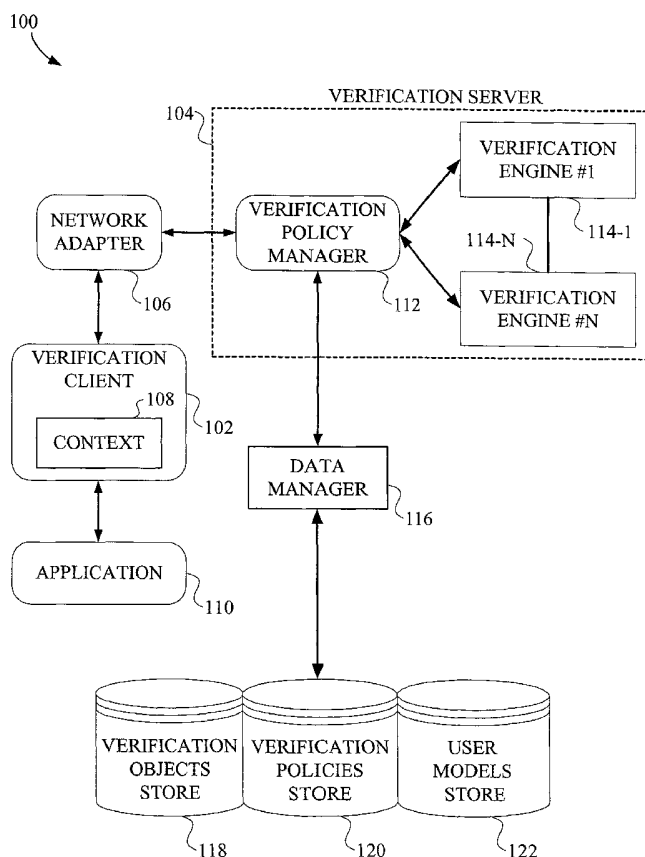
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[Continued on next page]

(54) Title: METHODS AND APPARATUS FOR DYNAMIC USER AUTHENTICATION



(57) Abstract: An authentication framework is provided which enables dynamic user authentication that combines multiple authentication objects using a shared context and that permits customizable interaction design to suit varying user preferences and transaction/application requirements. Such a framework provides a high degree of flexibility, accuracy, convenience and robustness. In one illustrative aspect of the invention, an automated technique for user authentication comprises the following steps/operations. First, user input is obtained. At least a portion of the user input is associated with two or more verification objects. Then, the user is verified based on the two or more verification objects in accordance with at least one verification policy operating on a context shared across the two or more verification objects. The user authentication technique of the invention may preferably be implemented in a flexible, distributed architecture comprising at least one client device coupled to at least one verification server. The client device and the verification server may operate together to perform the user authentication techniques of the invention.



ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,  
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# INTERNATIONAL SEARCH REPORT

national Application No  
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**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 G06F1/00

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)  
IPC 7 G06F G05F H04L

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

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

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 176 489 A (DEW ENGINEERING AND DEV LTD) 30 January 2002 (2002-01-30) page 4, line 7 - line 27 page 5, line 43 - line 53 page 6, line 35 - line 54 page 7, line 51 - line 54	1-66
X	GB 2 342 744 A (TOKYO SHIBAURA ELECTRIC CO) 19 April 2000 (2000-04-19) page 4, line 26 - page 6, line 5 page 16, line 18 - page 18, line 1 page 32, line 7 - page 33, line 5 ----- -/--	1-66

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/087894 A1 (FOLEY JAMES M ET AL) 4 July 2002 (2002-07-04)	1,20, 49-51, . 55,62-66
A	column 2, paragraph 10 column 3, paragraph 25 - column 4, paragraph 31	2-19, 21-48, 52-54, 56-61
A	----- WO 01/90859 A (ROSKIND JIM ; WARD RORY (US); NETSCAPE COMM CORP (US)) 29 November 2001 (2001-11-29) page 2, line 12 - page 3, line 3 page 4, line 1 - page 5, line 16 -----	1-66

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1176489	A	30-01-2002	CA 2317259 A1	25-01-2002
			EP 1176489 A2	30-01-2002
			TW 539981 B	01-07-2003
GB 2342744	A	19-04-2000	JP 2000122975 A	28-04-2000
US 2002087894	A1	04-07-2002	NONE	
WO 0190859	A	29-11-2001	WO 0190859 A1	29-11-2001
			AU 5148500 A	03-12-2001
			EP 1285317 A1	26-02-2003
			JP 2004510215 T	02-04-2004