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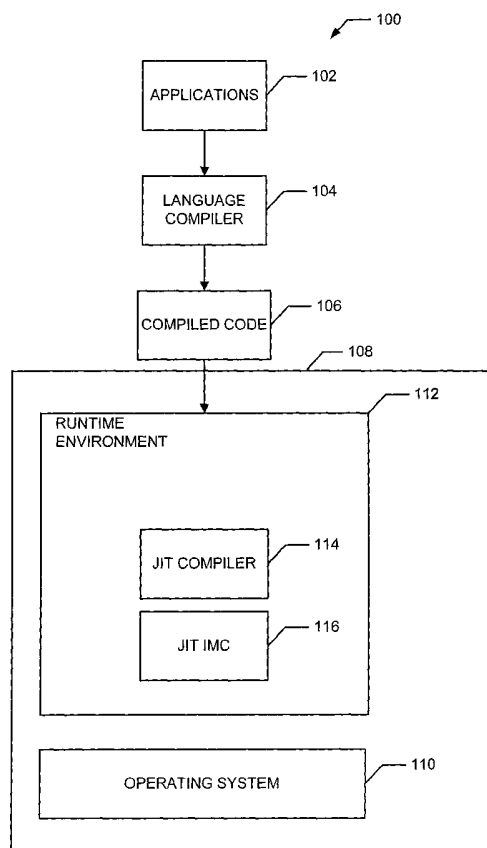
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[Continued on next page]

(54) Title: APPARATUS AND METHODS FOR DESYNCHRONIZING OBJECT-ORIENTED SOFTWARE APPLICATIONS IN MANAGED RUNTIME ENVIRONMENTS



(57) Abstract: Apparatus and methods for desynchronizing object-oriented software applications in managed runtime environments are disclosed. Apparatus and methods for desynchronizing synchronized program code determine a type of the program code during just-in-time compilation of the program code and modify the program code during just-in-time compilation of the program code based on the type of the program code to desynchronize the program code.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G06F9/46

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)
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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, INSPEC, WPI Data, IBM-TDB, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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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	RUF E: "Effective synchronization removal for Java" SIGPLAN NOTICES ACM USA, vol. 35, no. 5, May 2000 (2000-05), pages 208-218, XP002301519 ISSN: 0362-1340 abstract page 208, left-hand column, line 1 - line 3 page 208, right-hand column, line 31 - line 32 page 209, right-hand column, line 32 - line 34 page 210, left-hand column, line 3 - line 8 page 212 - page 213 page 217, right-hand column, line 13 - line 19 page 208	1,2, 4-10,18, 19, 21-27, 35-39
Y		3,11,12, 20,28, 29,40,41
X	----- BOGDA J ET AL: "Removing unnecessary synchronization in Java" SIGPLAN NOTICES ACM USA, vol. 34, no. 10, October 1999 (1999-10), pages 35-46, XP002301518 ISSN: 0362-1340 abstract page 37, left-hand column, line 32 - line 54	1,2, 4-10,18, 19, 21-27, 35-39
Y	page 39, right-hand column, line 4 - page 40, right-hand column, line 27	3,11,12, 20,28, 29,40,41
A	----- US 6 141 794 A (VANDETTE ROBERT G ET AL) 31 October 2000 (2000-10-31) the whole document	1-46
A	----- WO 02/41143 A (BOTTOMLEY MARK ; ZUCOTTO WIRELESS INC (US)) 23 May 2002 (2002-05-23) the whole document	1-46
A	----- US 6 330 714 B1 (HICKS DANIEL RODMAN ET AL) 11 December 2001 (2001-12-11) the whole document	1-46
A	----- US 5 617 569 A (O'RIORDAN MARTIN ET AL) 1 April 1997 (1997-04-01) the whole document	1-46
A	----- US 5 920 720 A (TOUTONGHI MICHAEL J ET AL) 6 July 1999 (1999-07-06) the whole document -----	1-46

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US2004/008588

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 6141794	A	31-10-2000	AU	6429999 A	08-05-2000
			WO	0023892 A1	27-04-2000
<hr/>					
WO 0241143	A	23-05-2002	US	2004015912 A1	22-01-2004
			AU	2039502 A	27-05-2002
			AU	3044502 A	03-06-2002
			AU	3047302 A	03-06-2002
			AU	4150502 A	11-06-2002
			AU	4150702 A	24-06-2002
			AU	7832901 A	27-05-2002
			WO	0241145 A2	23-05-2002
			WO	0241143 A2	23-05-2002
			WO	0242898 A2	30-05-2002
			WO	0245385 A2	06-06-2002
			WO	0248864 A2	20-06-2002
			WO	02071211 A2	12-09-2002
			WO	0242911 A2	30-05-2002
<hr/>					
US 6330714	B1	11-12-2001	NONE		
<hr/>					
US 5617569	A	01-04-1997	US	5432936 A	11-07-1995
<hr/>					
US 5920720	A	06-07-1999	NONE		
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