



(51) International Patent Classification:
G06F 12/02 (2006.01)

(21) International Application Number:
PCT/IB2011/000597

(22) International Filing Date:
28 February 2011 (28.02.2011)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
12/716,391 3 March 2010 (03.03.2010) US

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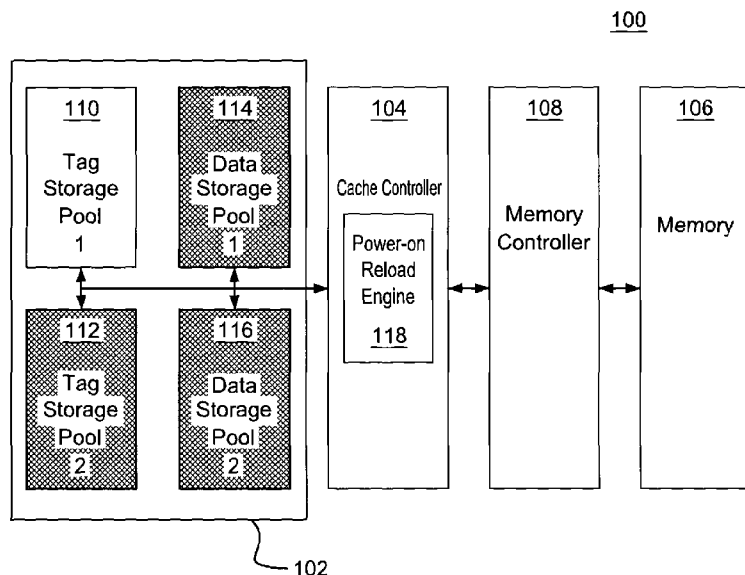
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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,

[Continued on next page]

(54) Title: **CACHE WITH RELOAD CAPABILITY AFTER POWER RESTORATION**



(57) Abstract: A method and apparatus for repopulating a cache are disclosed. At least a portion of the contents of the cache are stored in a location separate from the cache. Power is removed from the cache and is restored some time later. After power has been restored to the cache, it is repopulated with the portion of the contents of the cache that were stored separately from the cache.

FIG. 1



EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,
LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,
SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

(88) Date of publication of the international search report:

17 November 2011

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2011/000597

A. CLASSIFICATION OF SUBJECT MATTER IPC: G06F 12/02 (2006.01) 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: ALL (2006.01)		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used) Databases: Canadian Patent Database, TotalPatent, Google, IEEEExplore; Keywords: cache, line, decay, off, shut, high, level, power, recover, restore, populate, primary, secondary, internal, tlb, backup, 11, 12, tag, address, resume, prefetch, refetch, return, archive		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 7,647,452B1 (Moll et al.) 12 January 2010 (12-01-2010) (abstract, col. 5, 17, 18, 19, 21, 23, 26, 28, 29; Figures 1A-1C, 2; claims 1, 9-12)	1-12, 14, 16-27
A	US 6,795,896B1 (Hart et al.) 21 September 2004 (21-09-2004) (claim 1, [0010], [0014])	
A	US 5,708,768A (Horiuchi et al.) 13 January 1998 (13-01-1998) (col. 2 lines 14-35; col. 4 lines 1-27; col. 5 lines 5-10)	
A	US 5,632,038A (Fuller) 20 May 1997 (20-05-1997) (Background, Summary of Invention)	
A	EP 1202287A2 (Kaxiras et al.) 02 May 2002 (02-05-2002) ([0012], [0050])	
A	US2003145241A1 (Hu et al.) 31 July 2003 (31-07-2003) ([0008], [0020], [0035])	
☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents :	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	
"E" earlier application or patent but published on or after the international filing date	"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	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family	
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search	Date of mailing of the international search report	
24 August 2011 (08-24-2011)	25 August 2011 (25-08-2011)	
Name and mailing address of the ISA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001-819-953-2476	Authorized officer Simon Chau (819) 994-7514	

INTERNATIONAL SEARCH REPORTInternational application No.
PCT/IB2011/000597

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Kaxiras et al., "Cache Decay: Exploiting Generational Behavior to Reduce Cache Leakage Power", Computer Architecture, 2001. Proceedings. 28th Annual International Symposium, 2001. (section 5.1, Figures 13 and 14)	

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/IB2011/000597

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
US7647452B1	12 January 2010 (12-01-2010)	CN101356510A CN101356511A EP1958070A2 EP1958071A2 US2007130382A1 US7412570B2 US7443759B1 US2007113015A1 US7516274B2 US7533242B1 US7663961B1 US7873788B1 US2009132764A1 US7899990B2 US2007214323A1 US7904659B2 US7934054B1 US2007186057A1 US7958312B2 WO2007059085A2 WO2007059085A3 WO2007097791A2 WO2007097791A3	28 January 2009 (28-01-2009) 28 January 2009 (28-01-2009) 20 August 2008 (20-08-2008) 20 August 2008 (20-08-2008) 07 June 2007 (07-06-2007) 12 August 2008 (12-08-2008) 28 October 2008 (28-10-2008) 17 May 2007 (17-05-2007) 07 April 2009 (07-04-2009) 12 May 2009 (12-05-2009) 16 February 2010 (16-02-2010) 18 January 2011 (18-01-2011) 21 May 2009 (21-05-2009) 01 March 2011 (01-03-2011) 13 September 2007 (13-09-2007) 08 March 2011 (08-03-2011) 26 April 2011 (26-04-2011) 09 August 2007 (09-08-2007) 07 June 2011 (07-06-2011) 24 May 2007 (24-05-2007) 09 August 2007 (09-08-2007) 30 August 2007 (30-08-2007) 10 April 2008 (10-04-2008)
US6795896B1	21 September 2004 (21-09-2004)	None	
US5708768A	13 January 1998 (13-01-1998)	EP0354024A2 EP0354024A3 IT8921451D0 JP2045173A JP7047335B	07 February 1990 (07-02-1990) 25 September 1991 (25-09-1991) 04 August 1989 (04-08-1989) 15 February 1990 (15-02-1990) 24 May 1995 (24-05-1995)
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INTERNATIONAL SEARCH REPORTInternational application No.
PCT/IB2011/000597**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of the first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons :

1. ☐ Claim Nos. :
because they relate to subject matter not required to be searched by this Authority, namely :
2. ☐ Claim Nos. :
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically :
3. ☐ Claim Nos. :
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows :

Group A: 1-13 and 16-27 are directed to copying backup cache contents to a cache after a cache power restore;

Group B: 14-15 are directed to issuing a prefetch command to load data into a cache after a cache power restore;

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claim Nos. :
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim Nos. :

Remark on Protest ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
☐ No protest accompanied the payment of additional search fees.