

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
25 November 2004 (25.11.2004)

PCT

(10) International Publication Number  
WO 2004/102392 A3

- (51) International Patent Classification:  
G06F 9/38 (2006.01) G06F 9/45 (2006.01)
- (21) International Application Number:  
PCT/JP2004/005777
- (22) International Filing Date: 22 April 2004 (22.04.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
2003-136387 14 May 2003 (14.05.2003) JP
- (71) Applicant: SONY COMPUTER ENTERTAINMENT INC. [JP/JP]; 2-6-21, Minami-Aoyama, Minato-ku, Tokyo 107-0062 (JP).
- (72) Inventor: OHBA, Akio; c/o SONY COMPUTER ENTERTAINMENT INC., 2-6-21, Minami-Aoyama, Minato-ku, Tokyo 107-0062 (JP).
- (74) Agent: MORISHITA, Sakaki; 2-11-12, Ebisu-Nishi, Shibuya-ku, Tokyo 150-0021 (JP).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

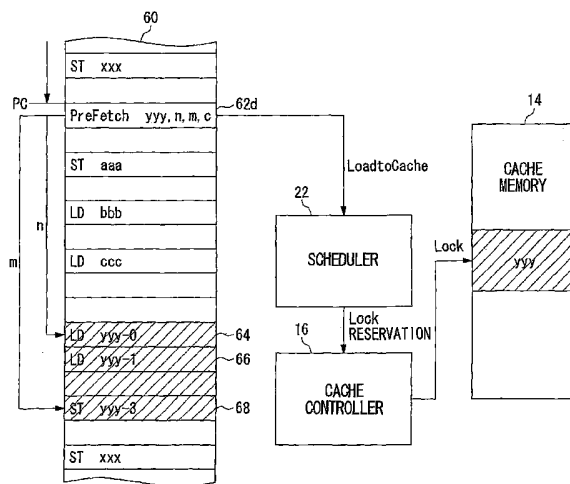
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:  
— with international search report  
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:  
23 March 2006

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CONTROL OF PREFETCH COMMAND FOR DATA EXTENDED WITH SPECIFICATION OF THE UTILIZATION TIME OF THE DATA



(57) Abstract: A prefetch command control apparatus is provided. A protocol slot generation unit, when receiving from a CPU a prefetch command in which a utilization time of data to be prefetched is specified, generates a protocol slot based on the utilization time and registers it in a schedule list storage unit. When receiving a regular access command, the protocol slot generation unit registers a protocol slot in a regular protocol queue storage unit. A cost evaluation unit evaluates an issuance cost of the prefetch command based on a cache retention time of data to be prefetched and evaluates an issuance cost of the regular access command based on a resource occupation cost. A protocol issuance unit decides which command shall be issued, the prefetch command or regular access command, based on the evaluation result of these issuance costs.

WO 2004/102392 A3

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/JP2004/005777

| <b>A. CLASSIFICATION OF SUBJECT MATTER</b><br>G06F9/38      G06F9/45  |   |                       |
|---|---|-----------------------|
| According to International Patent Classification (IPC) or to both national classification and IPC   |   |                       |
| <b>B. FIELDS SEARCHED</b>   |   |                       |
| Minimum documentation searched (classification system followed by classification symbols)<br>G06F   |   |                       |
| 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)<br>EPO-Internal  |   |                       |
| <b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>   |   |                       |
| Category *  | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
| Y   | US 2003/088864 A1 (TIRUMALAI PARTHA P ET AL) 8 May 2003 (2003-05-08)<br>paragraph '0008! - paragraph '0018!<br>paragraph '0040! - paragraph '0066!                      | 1,15-17               |
| A   | -----   | 2-14                  |
| Y   | WO 02/08893 A (THEIS, JEAN-PAUL; ANTEVISTA GMBH) 31 January 2002 (2002-01-31)<br>page 4, line 1 - page 8, line 5  | 1,15-17               |
| A   | -----   | 6,10,11               |
| A   | US 6 381 679 B1 (MATSUBARA KENJI ET AL)<br>30 April 2002 (2002-04-30)<br>column 4, line 60 - column 5, line 52<br>column 6, line 26 - column 9, line 8<br>-----<br>-/-- | 1,6,10,<br>15-17      |
| <input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.   |   |                       |
| * Special categories of cited documents :<br>*A* document defining the general state of the art which is not considered to be of particular relevance<br>*E* earlier document but published on or after the international filing date<br>*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)<br>*O* document referring to an oral disclosure, use, exhibition or other means<br>*P* document published prior to the international filing date but later than the priority date claimed<br>*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<br>*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<br>*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.<br>*&* document member of the same patent family |   |                       |
| Date of the actual completion of the international search   | Date of mailing of the international search report  |                       |
| 26 January 2006   | 03/02/2006  |                       |
| Name and mailing address of the ISA<br>European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,<br>Fax: (+31-70) 340-3016  | Authorized officer<br><br>Kusnierczak, P  |                       |

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/JP2004/005777

| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT |   |                       |
|--|---|-----------------------|
| Category *   | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
| A  | US 5 835 745 A (SAGER ET AL)<br>10 November 1998 (1998-11-10)<br>column 2, line 48 - column 3, line 36<br>column 4, line 26 - column 10, line 29<br>column 27, line 6 - column 37, line 13<br>----- | 1-14                  |
| A  | EP 1 096 371 A (HEWLETT-PACKARD COMPANY, A<br>DELAWARE CORPORATION; HEWLETT-PACKARD<br>COMPA) 2 May 2001 (2001-05-02)<br>paragraph '0024! - paragraph '0043!<br>-----                               | 1,6,10,<br>15-17      |

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP2004/005777

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date   |
|--|------------------|-------------------------|--|
| US 2003088864                          | A1               | 08-05-2003              | NONE   |
| WO 0208893                             | A                | 31-01-2002              | WO 0208894 A1 31-01-2002<br>US 2003135712 A1 17-07-2003  |
| US 6381679                             | B1               | 30-04-2002              | NONE   |
| US 5835745                             | A                | 10-11-1998              | NONE   |
| EP 1096371                             | A                | 02-05-2001              | DE 60014005 D1 28-10-2004<br>DE 60014005 T2 17-11-2005<br>JP 2001134440 A 18-05-2001<br>US 6799263 B1 28-09-2004 |