



- (51) **International Patent Classification:**  
G06F 9/06 (2006.01) G06F 9/44 (2006.01)
- (21) **International Application Number:**  
PCT/US2012/054041
- (22) **International Filing Date:**  
7 September 2012 (07.09.2012)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**  
13/229,342 9 September 2011 (09.09.2011) US
- (71) **Applicant (for all designated States except US):** MICROSOFT CORPORATION [US/US]; One Microsoft Way, Redmond, Washington 98052-6399 (US).
- (72) **Inventors:** SCHNEIDER, Gerhard; c/o Microsoft Corporation, LCA - International Patents, One Microsoft Way, Redmond, Washington 98052-6399 (US). JORDAN, Bede; c/o Microsoft Corporation, LCA - International Patents, One Microsoft Way, Redmond, Washington 98052-6399 (US). MICHAIL, Ashraf; c/o Microsoft Corporation, LCA - International Patents, One Microsoft Way, Redmond, Washington 98052-6399 (US). CLARK, Brendan J.; c/o Microsoft Corporation, LCA - International Patents, One Microsoft Way, Redmond, Washington 98052-6399 (US). OLSZTA, Pawel Wiktor; c/o Microsoft Corporation, LCA - International Patents, One Microsoft Way, Redmond, Washington 98052-6399 (US).
- (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, BN, 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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, 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, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, 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).

**Declarations under Rule 4.17:**

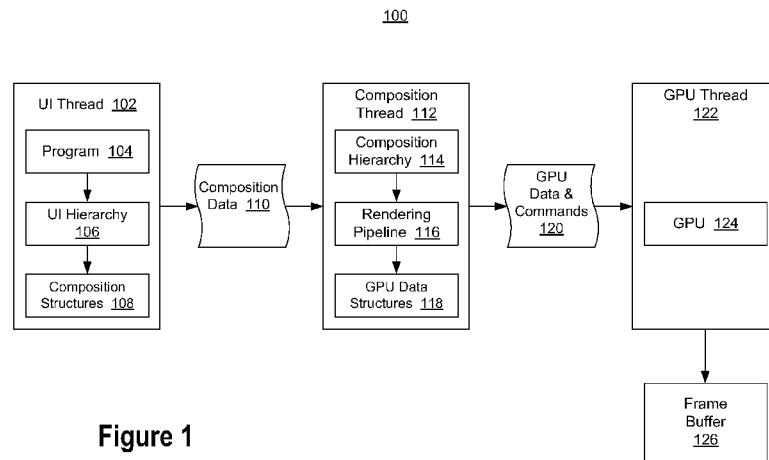
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

**Published:**

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

[Continued on next page]

(54) **Title:** PRIMITIVE COMPOSITION



**Figure 1**

(57) **Abstract:** Performing primitive composition within a user interface thread, enhancing the ability to scale a user interface framework to computing devices having limited resources. In one or more embodiments, a user interface thread walks a user interface hierarchy that describes elements of a program's user interface and directly generates static Graphics Processing Unit (GPU) data structures representing at least a portion of the user interface hierarchy. The user interface thread passes the static GPU data structures to a composition thread, which uses these static GPU data structures during generation of a plurality of video frames. This includes the composition thread, based on the static GPU data structures, sending GPU data and GPU commands for the plurality of video frames to a GPU for rendering.

WO 2013/036700 A3

**(88) Date of publication of the international search report:**  
2 May 2013

## INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/US2012/054041****A. CLASSIFICATION OF SUBJECT MATTER****G06F 9/06(2006.01)i, G06F 9/44(2006.01)i**

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)

G06F 9/06; G06F 15/00; G06T 15/50; G09G 5/00

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) &amp; Keywords: rendering, UI thread, GPU data structures, composition thread, video frames and similar terms.

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 2009-0225079 A1 (GREG D. SCHECHTER et al.) 10 September 2009 See paragraphs [0003], [0021]-[0028], [0032]-[0035], [0041]-[0043], claims 1, 13, 18 and figures 3, 4, 13.	1-5, 7, 10-11, 13-14 6, 8-9, 12, 15
A	US20100026700 A1 (MICHAIL ASHRAF et al.) 04 February 2010 See paragraphs [0018]-[0019], [0021], [0034]-[0039], claim 1 and figures 1, 4, 5.	1-15
A	US20100013854 A1 (MICHAIL ASHRAF) 21 January 2010 See paragraphs [0020]-[0027], [0032]-[0035], claim 1 and figures 1, 4, 5, 6.	1-15
A	US6091422 A (OUAKNINE; ALAIN et al.) 18 July 2000 See column 6, line 7 - column 7, line 21, column 19, line 22 - column 20, line 23, claim 1 and figure 6.	1-15

 Further documents are listed in the continuation of Box C. See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"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

"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

"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

"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

"&amp;" document member of the same patent family

Date of the actual completion of the international search

20 FEBRUARY 2013 (20.02.2013)

Date of mailing of the international search report

**20 FEBRUARY 2013 (20.02.2013)**

Name and mailing address of the ISA/KR



Facsimile No. 82-42-472-7140

Authorized officer

PARK, Je Hyun

Telephone No. 82-42-481-5776



## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

**PCT/US2012/054041**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US20090225079 A1	10.09.2009	EP 2260465 A1	15.12.2010
		JP 2011-517803 A	16.06.2011
		KR 10-2010-0123853 A	25.11.2010
		MX 2010009741 A	28.09.2010
		US 8345045 B2	01.01.2013
		WO 2009-111119 A1	11.09.2009
US20100026700 A1	04.02.2010	CN 102113303 A	29.06.2011
		EP 2308224 A2	13.04.2011
		JP 2011-530136 A	15.12.2011
		KR 10-2011-0050630 A	16.05.2011
		US 8274516 B2	25.09.2012
		WO 2010-017113 A2	11.02.2010
		WO 2010-017113 A3	11.02.2010
WO 2010-017113 A3	06.05.2010		
US20100013854 A1	21.01.2010	CN 102099832 A	15.06.2011
		EP 2300984 A2	30.03.2011
		IL209404D0	31.01.2011
		JP 2011-528823 A	24.11.2011
		WO 2010-009338 A2	21.01.2010
		WO 2010-009338 A3	15.04.2010
WO 2010-009338 A3	21.01.2010		
US6091422 A	18.07.2000	AU 1999-23600 A1	14.10.1999
		CA 2267591 A1	03.10.1999
		EP 0947960 A2	06.10.1999
		EP 0947960 A3	12.04.2006
		JP 11-345349 A	14.12.1999