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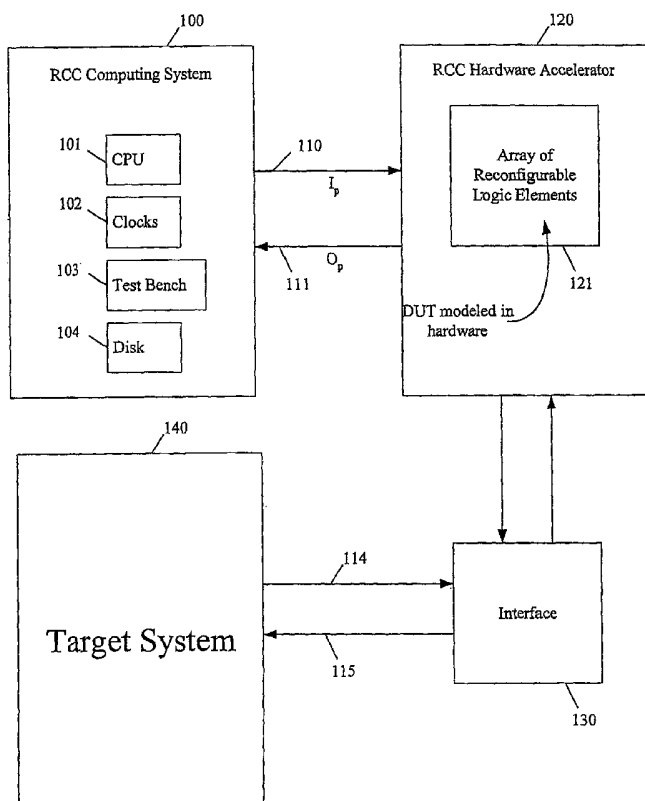
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(54) Title: MULTI-USER SERVER SYSTEM AND METHOD FOR SIMULATION

RCC System



(57) Abstract: The multi-user server technology allows multiple host stations to configure, load, and execute multiple jobs in a reconfigurable hardware unit for emulation purposes, simulation acceleration purposes, and a combination of emulation and simulation in a concurrent manner. The reconfigurable hardware unit includes a plurality of hardware resources (e.g., FPGA chips on slot module boards) for modeling at least a portion of one or more user designed. The server includes a bus arbiter for deciding which one of the host stations will be coupled to the hardware resources via the bus multiplexer. The plurality of hardware resources includes slot modules, which includes one or more boards of FPGA chips. An arbitration decision is made to assign a particular slot(s) to a particular host. A host and its respective assigned slot(s) can communicate with each other while other hosts and their respective assigned slot(s) communicate with each other.

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Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations 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, JP, 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, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE,

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 134 516 A (LIN SHARON SHEAU-PYNG ET AL) 17 October 2000 (2000-10-17) abstract; figure 46 column 14, line 32 - column 15, line 2 ----- -/--	1-34

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.
A	<p>EL-GHAZAWI TAREK, ALEXANDRIDIS NIKITAS, ET AL: "Productive Use of Distributed Reconfigurable Computing Resources" LUCITE TECHNICAL TASK ORDER, 'Online! 21 November 2000 (2000-11-21), pages 1-32, XP002307170</p> <p>GEORGE MASON UNIVERSITY, FAIRFAX, VA, USA ET AL</p> <p>Retrieved from the Internet: URL: http://web.archive.org/web/20020223033328/http://ece.gmu.edu/lucite/reports/proposal.PDF > 'retrieved on 2004-11-24! figure p.5 page 7, paragraph 1 page 16, paragraphs 3,4</p>	1-34
A	<p>WIGLEY G ET AL: "The first real operating system for reconfigurable computers" PROCEEDINGS 6TH AUSTRALASIAN COMPUTER SYSTEMS ARCHITECTURE CONFERENCE. ACSAC 2001, 29 January 2001 (2001-01-29), pages 130-137, XP010531916</p> <p>abstract page 131, column 2, paragraph 2 page 133, column 1, paragraph 5 page 137, column 2, paragraph 3</p>	1-34
A	<p>LI Z ET AL: "Configuration caching management techniques for reconfigurable computing" FIELD-PROGRAMMABLE CUSTOM COMPUTING MACHINES, 2000 IEEE SYMPOSIUM ON NAPA VALLEY, CA, USA 17-19 APRIL 2000, LOS ALAMITOS, CA, USA, IEEE COMPUT. SOC, US, 17 April 2000 (2000-04-17), pages 22-36, XP010531922</p> <p>ISBN: 0-7695-0871-5</p> <p>abstract page 24, paragraph 2; figure 2</p>	1-34
A	<p>COMPTON K HAUCK: "Reconfigurable computing: A survey of systems and software" ACM COMPUTING SURVEYS, ACM, NEW YORK, US, US, vol. 34, no. 2, June 2002 (2002-06), page 171AND210, XP002957662</p> <p>ISSN: 0360-0300</p> <p>abstract page 201, paragraphs 2,3</p>	1-34
A	<p>US 6 009 256 A (LIN SHARON SHEAU-PYNG ET AL) 28 December 1999 (1999-12-28) cited in the application abstract</p>	1-34

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INTERNATIONAL SEARCH REPORT

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PCT/US2004/015868

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 6 094 715 A (KOGGE PETER MICHAEL ET AL) 25 July 2000 (2000-07-25) cited in the application abstract -----	1-34

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US2004/015868

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6134516	A	17-10-2000	US 6009256 A 28-12-1999
			WO 03017148 A1 27-02-2003
			US 6026230 A 15-02-2000
			US 6421251 B1 16-07-2002
			US 6389379 B1 14-05-2002
			US 6321366 B1 20-11-2001
			US 6651225 B1 18-11-2003
			US 6785873 B1 31-08-2004
US 6009256	A	28-12-1999	WO 03017148 A1 27-02-2003
			US 6026230 A 15-02-2000
			US 6421251 B1 16-07-2002
			US 6134516 A 17-10-2000
			US 6389379 B1 14-05-2002
			US 6321366 B1 20-11-2001
			US 6651225 B1 18-11-2003
			US 6785873 B1 31-08-2004
US 6094715	A	25-07-2000	US 5765011 A 09-06-1998
			US 5752067 A 12-05-1998
			US 5717944 A 10-02-1998
			US 5878241 A 02-03-1999
			US 5713037 A 27-01-1998
			US 5754871 A 19-05-1998
			US 5708836 A 13-01-1998
			US 5761523 A 02-06-1998
			US 5870619 A 09-02-1999
			JP 2557175 B2 27-11-1996
			JP 6052125 A 25-02-1994
			US 5966528 A 12-10-1999
			AT 177547 T 15-03-1999
			CA 2073516 A1 28-05-1993
			CN 1072788 A , B 02-06-1993
			DE 69228586 D1 15-04-1999
			DE 69228586 T2 14-10-1999
			EP 0544127 A2 02-06-1993
			JP 2647315 B2 27-08-1997
			JP 5233569 A 10-09-1993
			KR 9708529 B1 24-05-1997
			MX 9206864 A1 01-05-1993
			US 5794059 A 11-08-1998
			US 5765012 A 09-06-1998
			US 5475856 A 12-12-1995
			US 5617577 A 01-04-1997
			US 5963745 A 05-10-1999
			US 5630162 A 13-05-1997
			US 5765015 A 09-06-1998
			US 5625836 A 29-04-1997
			US 5809292 A 15-09-1998
			US 5717943 A 10-02-1998
US 5710935 A 20-01-1998			
US 5842031 A 24-11-1998			
US 5963746 A 05-10-1999			
US 5828894 A 27-10-1998			
US 5734921 A 31-03-1998			
US 5815723 A 29-09-1998			
US 5590345 A 31-12-1996			
AT 180586 T 15-06-1999			

INTERNATIONAL SEARCH REPORT

Information on patent family members

In International Application No PCT/US2004/015868

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6094715	A	BR 9104603 A	23-06-1992
		CA 2050166 A1	14-05-1992
		CN 1061482 A ,B	27-05-1992
		CZ 9103440 A3	17-05-1995
		DE 69131272 D1	01-07-1999
		DE 69131272 T2	09-12-1999
		EP 0485690 A2	20-05-1992
		HU 59496 A2	28-05-1992
		JP 4267466 A	24-09-1992
		KR 9616880 B1	26-12-1996
