



US007155525B2

(12) **United States Patent**
Glasco et al.

(10) **Patent No.:** **US 7,155,525 B2**
(45) **Date of Patent:** **Dec. 26, 2006**

- (54) **TRANSACTION MANAGEMENT IN SYSTEMS HAVING MULTIPLE MULTI-PROCESSOR CLUSTERS** 5,682,512 A 10/1997 Tetrick 711/202
5,692,123 A 11/1997 Logghe
5,781,187 A 7/1998 Gephardt et al.
5,796,605 A 8/1998 Hagersten
5,805,839 A 9/1998 Singhal
5,819,075 A 10/1998 Forsmo
5,822,531 A 10/1998 Gorczyca et al.
5,931,938 A 8/1999 Drogichen et al. 712/15
6,003,075 A 12/1999 Arendt et al.
6,038,651 A 3/2000 VanHuben et al.
6,047,332 A * 4/2000 Viswanathan et al. 709/245
6,085,295 A 7/2000 Ekanadham et al.
6,097,707 A 8/2000 Hodzic et al. 370/321
- (75) Inventors: **David Brian Glasco**, Austin, TX (US);
Carl Zeitler, Tomball, TX (US);
Rajesh Kota, Austin, TX (US); **Guru Prasadh**, Austin, TX (US); **Richard R. Oehler**, Somers, NY (US)
- (73) Assignee: **Newisys, Inc.**, Austin, TX (US)
- (*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 739 days.

(Continued)

(21) Appl. No.: **10/157,384**

FOREIGN PATENT DOCUMENTS

(22) Filed: **May 28, 2002**

EP 0978781 2/2000

(65) **Prior Publication Data**

US 2003/0233388 A1 Dec. 18, 2003

(Continued)

(51) **Int. Cl.**

G06F 15/16 (2006.01)
G06F 15/167 (2006.01)

OTHER PUBLICATIONS

International Search Report dated Jul. 30, 2004, from corresponding PCT Application No. PCT/US2003/034687 (9 pages).

(52) **U.S. Cl.** **709/229**; 709/212; 709/216; 709/228

(Continued)

(58) **Field of Classification Search** 709/201, 709/212-216, 227, 228, 229; 714/100
See application file for complete search history.

Primary Examiner—Ario Etienne
Assistant Examiner—Sargon Nano
(74) *Attorney, Agent, or Firm*—Beyer Weaver & Thomas LLP

(56) **References Cited**

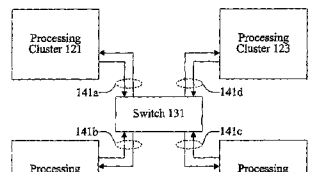
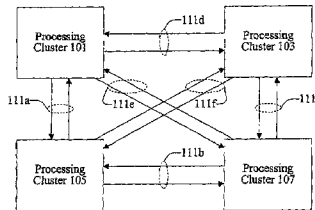
(57) **ABSTRACT**

U.S. PATENT DOCUMENTS

- 4,667,287 A 5/1987 Allen et al. 709/234
4,783,687 A 11/1988 Rees
5,125,081 A 6/1992 Chiba
5,166,674 A 11/1992 Baum et al. 714/752
5,191,651 A 3/1993 Halim et al. 709/250
5,197,130 A 3/1993 Chen et al. 712/3
5,301,311 A * 4/1994 Fushimi et al. 714/23
5,371,852 A 12/1994 Attanasio et al. 709/245
5,561,768 A 10/1996 Smith 712/13
5,623,644 A * 4/1997 Self et al. 713/503

A multi-processor computer system is described in which address mapping, routing, and transaction identification mechanisms are provided which enable the interconnection of a plurality of multi-processor clusters, wherein the number of processors interconnected exceeds limited address, node identification, and transaction tag spaces associated with each of the individual clusters.

30 Claims, 9 Drawing Sheets



U.S. PATENT DOCUMENTS

6,151,663	A	11/2000	Pawlowski et al.	
6,167,492	A	12/2000	Keller et al.	711/154
6,209,065	B1	3/2001	Van Doren et al.	
6,219,775	B1	4/2001	Wade et al.	712/11
6,226,671	B1*	5/2001	Hagersten et al.	709/215
6,256,671	B1	7/2001	Strentzsch et al.	709/227
6,259,701	B1	7/2001	Shur et al.	370/401
6,331,983	B1	12/2001	Haggerty et al.	370/400
6,338,122	B1	1/2002	Baumgartner et al.	711/141
6,349,091	B1	2/2002	Li	370/238
6,370,585	B1	4/2002	Hagersten et al.	709/238
6,377,640	B1	4/2002	Trans	
6,385,174	B1	5/2002	Li	370/252
6,385,705	B1	5/2002	Keller et al.	711/154
6,397,255	B1	5/2002	Nurenberg et al.	709/228
6,463,529	B1	10/2002	Miller et al.	
6,467,007	B1	10/2002	Armstrong et al.	
6,490,661	B1	12/2002	Keller et al.	711/150
6,553,439	B1	4/2003	Greger et al.	
6,578,071	B1*	6/2003	Hagersten et al.	709/215
6,598,130	B1	7/2003	Harris et al.	
6,687,751	B1	2/2004	Wils et al.	709/230
6,690,757	B1	2/2004	Bunton et al.	
6,718,552	B1	4/2004	Goode	725/95
6,760,819	B1	7/2004	Dhong et al.	711/146
6,772,226	B1	8/2004	Bommareddy et al.	709/245
6,785,726	B1	8/2004	Freeman et al.	
6,820,174	B1	11/2004	Vanderwiel	
6,826,660	B1*	11/2004	Hagersten et al.	711/153
6,847,993	B1*	1/2005	Novaes et al.	709/221
6,854,069	B1	2/2005	Kampe et al.	
6,856,621	B1	2/2005	Artes	370/390
6,920,519	B1*	7/2005	Beukema et al.	710/306
6,977,908	B1	12/2005	De Azevedo et al.	

7,010,617	B1	3/2006	Kampe et al.	
7,043,569	B1	5/2006	Chou et al.	
2001/0014097	A1	8/2001	Beck et al.	370/401
2001/0037435	A1	11/2001	Van Doren	
2002/0004915	A1	1/2002	Fung	713/320
2002/0007463	A1	1/2002	Fung et al.	
2002/0156888	A1	10/2002	Lee et al.	709/224
2002/0157035	A1	10/2002	Wong et al.	
2002/0174168	A1	11/2002	Beukema et al.	
2003/0225909	A1	12/2003	Glasco et al.	709/245
2003/0225938	A1	12/2003	Glasco et al.	713/375
2004/0098475	A1	5/2004	Zeitler et al.	709/223

FOREIGN PATENT DOCUMENTS

WO	WO 02/39242	5/2002	
----	-------------	--------	--

OTHER PUBLICATIONS

D. E. Culler, J. P. Singh, A. Gupta, "Parallel Computer Architecture", 1999 Morgan Kaufmann, San Francisco, CA USA XP002277658.

Andrew Tanenbaum, "Computer Networks", Computer Networks, London: Prentice Hall International, GB, 1996, pp. 345-403, XP002155220.

HyperTransport™ I/O Link Specification Revision 1.03, HyperTransport™ Consortium, Oct. 10, 2001, Copyright © HyperTransport Technology Consortium.

U.S. Appl. No. 10/356,393, filed Jan. 30, 2003, Office Action mailed Apr. 18, 2006.

European Search Report, Application No. 03 778 027.7-2211, Mailed Mar. 29, 2006.

Office Action mailed Jul. 6, 2006 in U.S. Appl. No. 10/156,893, filed May 28, 2002.

* cited by examiner

Fig. 1A

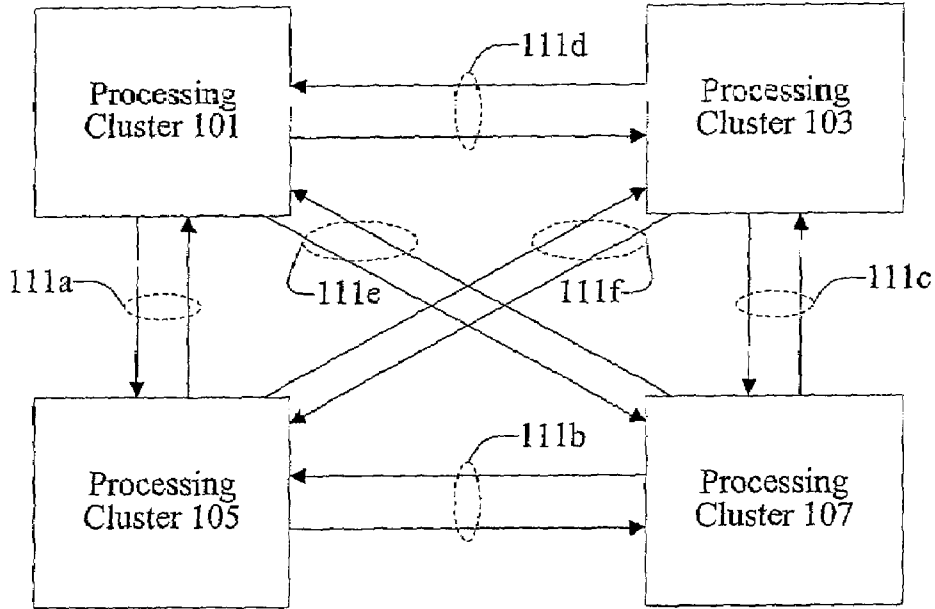


Fig. 1B

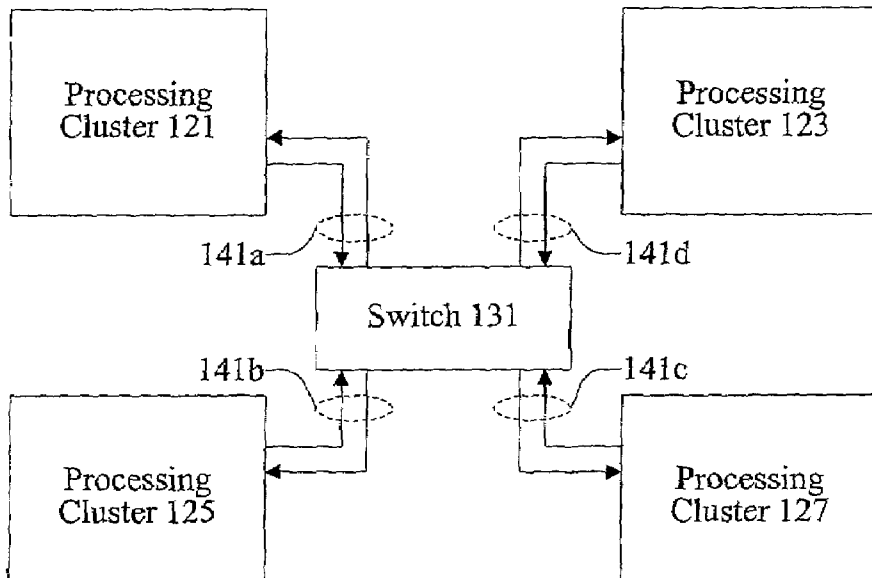


Fig. 2

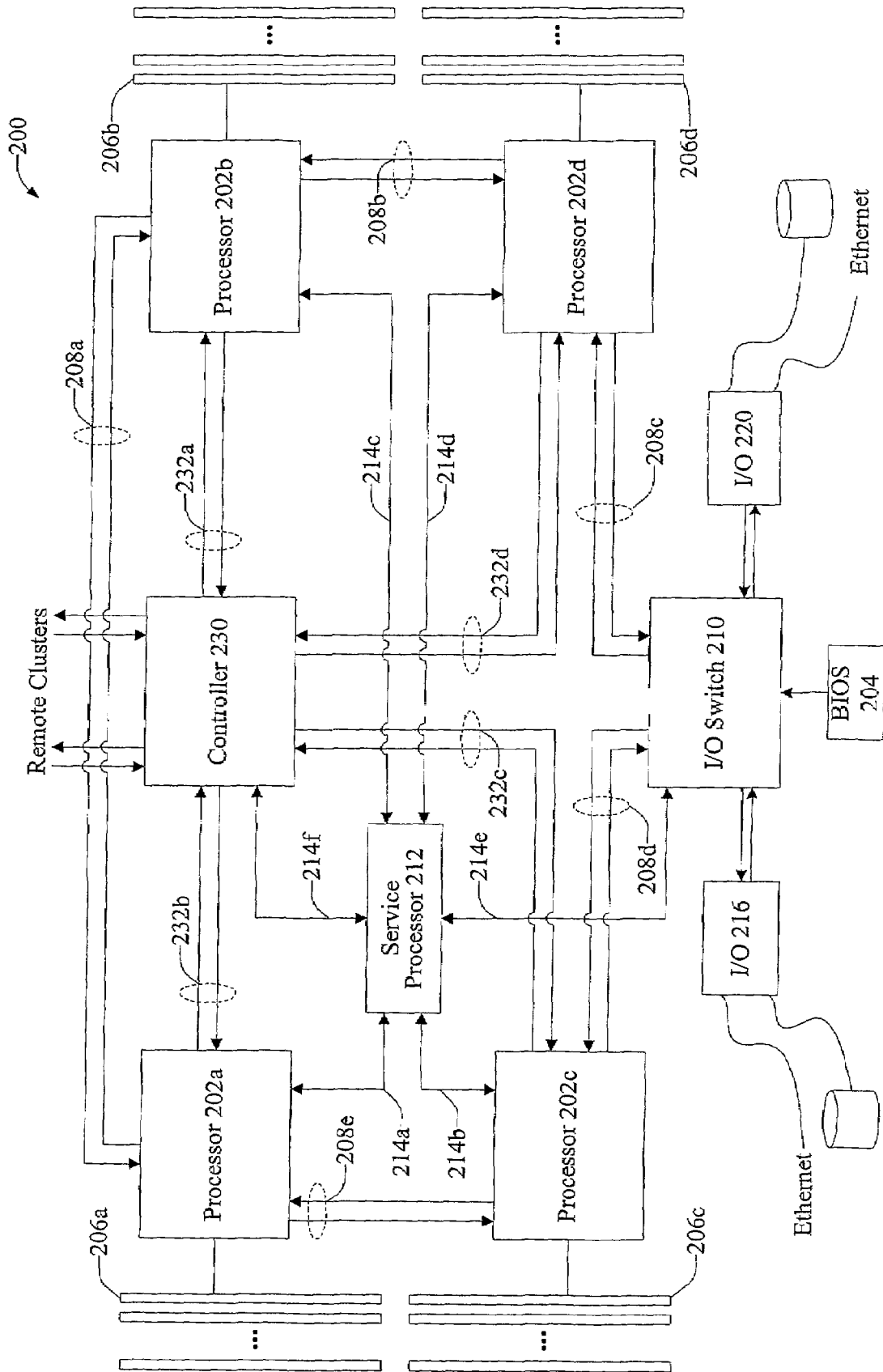
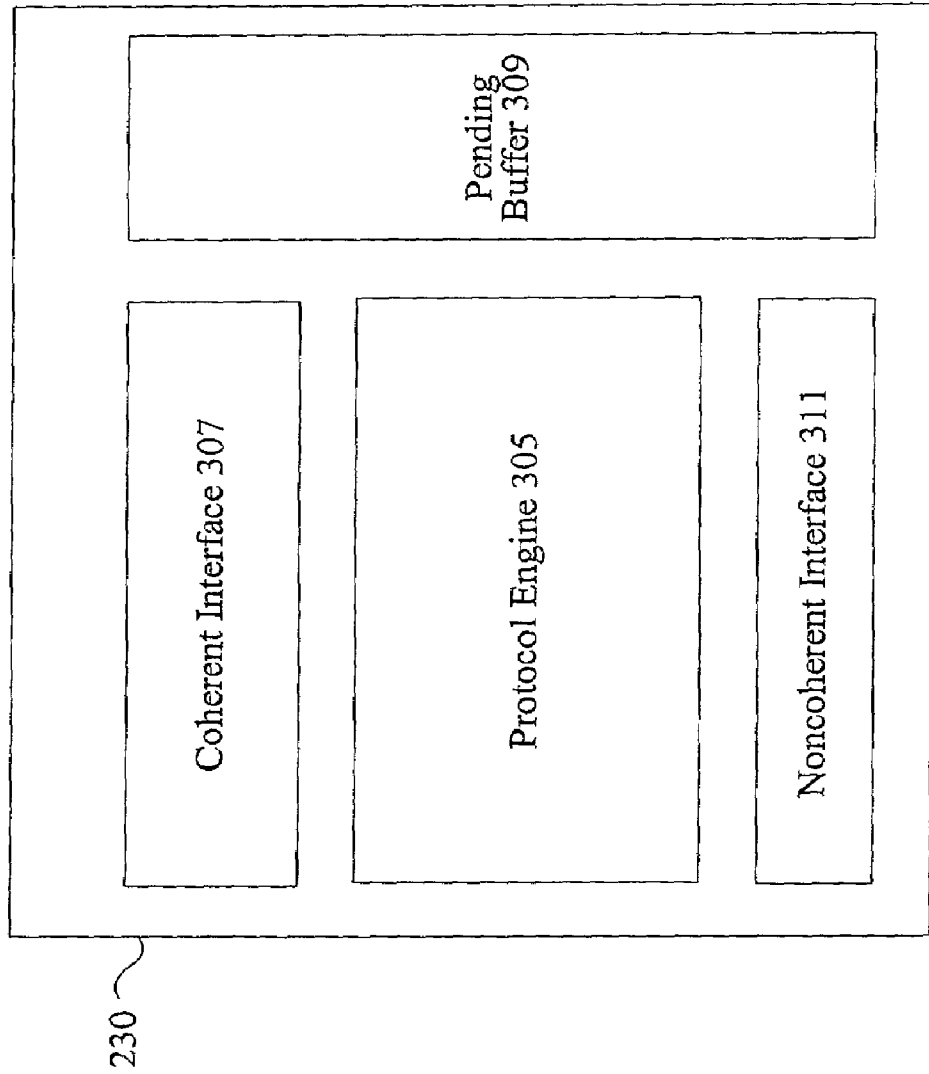


Fig. 3



Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.