

21/08/03
2003046190

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



162162

(43) International Publication Date
6 September 2002 (06.09.2002)

PCT

(10) International Publication Number
WO 02/069550 A1

(51) International Patent Classification⁷: **H04L 1/18,**
H04J 3/02

(21) International Application Number: PCT/US02/05573

(22) International Filing Date: 25 February 2002 (25.02.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/271,124 24 February 2001 (24.02.2001) US

(71) Applicants and

(72) Inventors: **BHANOT, Gyan, V.** [US/US]; 347 Dodds Lane, Princeton, NJ 08540 (US). **BLUMRICH, Matthias, A.** [US/US]; 76 Florida Hill Road, Ridgefield, CT 06877 (US). **CHEN, Dong** [CN/US]; 15 Scenic Drive, Apt. K, Croton-On-Hudson, NY 10520 (US). **COTEUS, Paul, W.** [US/US]; 2742 Quinlan Street, Yorktown Heights, NY 10598 (US). **GARA, ALAN, G.** [US/US]; 38 Marion Avenue, Mount Kisco, NY 10549 (US). **GIAMPAPA, Mark, E.** [US/US]; 140 North Broadway, Apt. GT-14,

Irvington, NY 10533 (US). **HEIDELBERGER, Philip** [US/US]; 24 Lakeview Avenue West, Cortlandt Manor, NY 10567 (US). **STEINMACHER-BUROW, Burkhard, D.** [CA/US]; 28 Manchester Drive, Mount Kisco, NY 10549 (US). **TAKKEN, Todd, E.** [US/US]; 118 Foxwood Circle, Mount Kisco, NY 10549 (US). **VRANAS, Pavlos, M.** [GR/US]; 30-A Bedford Avenue, Bedford Hills, NY 10507 (US).

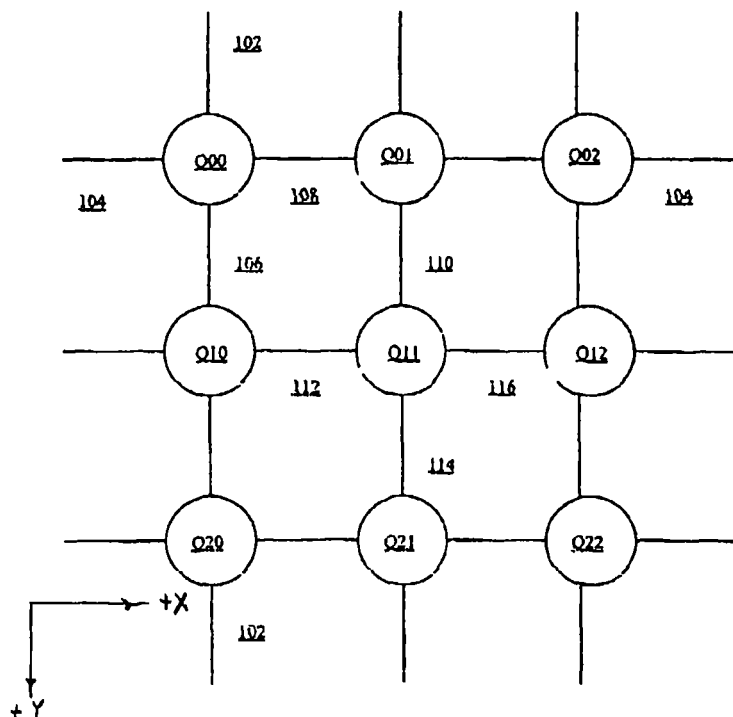
(74) Agents: **GROLZ, Edward, W.** et al.; Scully, Scott, Murphy & Presser, 400 Garden City Plaza, Garden City, NY 11530 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, 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, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),

[Continued on next page]

54) Title: CLASS NETWORK ROUTING



(57) Abstract: Class network routing is implemented in a network such as a computer network comprising a plurality of parallel compute processors at nodes (Q00-Q22) thereof. Class network routing allows a compute processor to broadcast a message to a range (one or more) of other compute processors in the computer network, such as processors in a column or a row. Normally this type of operation requires a separate message to be sent to each processor. With class network routing pursuant to the invention, a single message is sufficient, which generally reduces the total number of messages in the network as well as the latency to do a broadcast. Class network routing is also applied to dense matrix inversion algorithms on distributed memory parallel supercomputers (Fig. 1) with hardware class function (multicast) capability. This is achieved by exploiting the fact that the communication patterns of dense matrix inversion can be served by hardware classe functions, which results in faster execution times.

WO 02/069550 A1



ACTION

Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM).
European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR,
GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,
NE, SN, TD, TG).

— *before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments*

Published:

— *with international search report*

*For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.*