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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
02 October 2025 (02.10.2025)

WIPO | PCT

(10) International Publication Number
WO 2025/207901 A1

(51) International Patent Classification:
G06F 15/80 (2006.01) *G06F 30/347* (2020.01)
G06F 9/30 (2018.01)

(21) International Application Number:
PCT/US2025/021779

(22) International Filing Date:
27 March 2025 (27.03.2025)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
63/570,822 28 March 2024 (28.03.2024) US
18/749,599 20 June 2024 (20.06.2024) US

(71) Applicant: **TENSTORRENT USA, INC.** [US/US]; 7717 Southwest Pkwy, Building #3, Suite 200, Austin, Texas 78735 (US).

(72) Inventors: **XIE, Dongjie**; 7717 Southwest Pkwy, Building #3, Suite 200, Austin, Texas 78735 (US). **RUCKER, Alexander C.**; 7717 Southwest Pkwy, Building #3, Suite 200, Austin, Texas 78735 (US).

(74) Agent: **SCHEUERLEIN, Eric**; 3790 El Camino Real, Unit #531, Palo Alto, California 94306 (US).

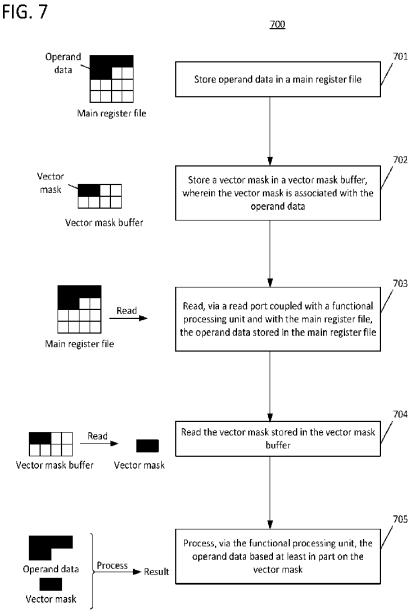
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UY, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, 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, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report (Art. 21(3))*

(54) Title: VECTOR MASK BUFFERS IN A VECTOR INSTRUCTION EXECUTION PIPELINE

FIG. 7



(57) Abstract: Systems and methods related to vector mask buffers in a vector instruction execution pipeline are disclosed herein. The vector instruction execution pipeline may include several lanes. Each lane may include a vector register file, a vector mask buffer, and a functional processing unit. The vector register file may store operand data and the vector mask buffer may store a vector mask associated with the operand data. In a lane, the operand data may be read from the register file into a functional processing unit, and the vector mask may be read from the vector mask buffer to the functional processing unit. The functional processing unit may process the operand data based on the vector mask. The lane-specific vector mask buffers improve the efficiency of the vector instruction execution pipeline by storing the vector masks proximate to where the vector masks will be used.

WO 2025/207901 A1