



(51) International Patent Classification:
G06F 17/30 (2006.01)

(21) International Application Number:
PCT/US2013/071720

(22) International Filing Date:
25 November 2013 (25.11.2013)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/730,024 26 November 2012 (26.11.2012) US
13/792,643 11 March 2013 (11.03.2013) US
13/792,914 11 March 2013 (11.03.2013) US
13/792,671 11 March 2013 (11.03.2013) US

(71) Applicant: AMAZON TECHNOLOGIES, INC.
[US/US]; P.O. Box 8102, Reno, Nevada 89507 (US).

(72) Inventors: GUPTA, Anurag Windlass; 410 Terry Avenue North, Seattle, Washington 98109-5210 (US). KULESZA, Jakub; 410 Terry Avenue North, Seattle, Washington 98109-5210 (US). AGARWAL, Deepak; 410 Terry Avenue North, Seattle, Washington 98109-5210 (US). SURNA, Aleksandras; 410 Terry Avenue North, Seattle, Washing-

ton 98109-5210 (US). JAIN, Tushar; 410 Terry Avenue North, Seattle, Washington 98109-5210 (US). FONG, Zelanie; 410 Terry Avenue North, Seattle, Washington 98109-5210 (US). STEFANI, Stefano; 410 Terry Avenue North, Seattle, Washington 98109-5210 (US).

(74) Agent: KOWERT, Robert C.; Meyertons, Hood, Kivlin, Kowert & Goetzel, P.C., P.O. Box 398, Austin, Texas 78767-0398 (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, IR, IS, JP, KE, KG, 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, SA, 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,

[Continued on next page]

(54) Title: STREAMING RESTORE OF A DATABASE FROM A BACKUP SYSTEM

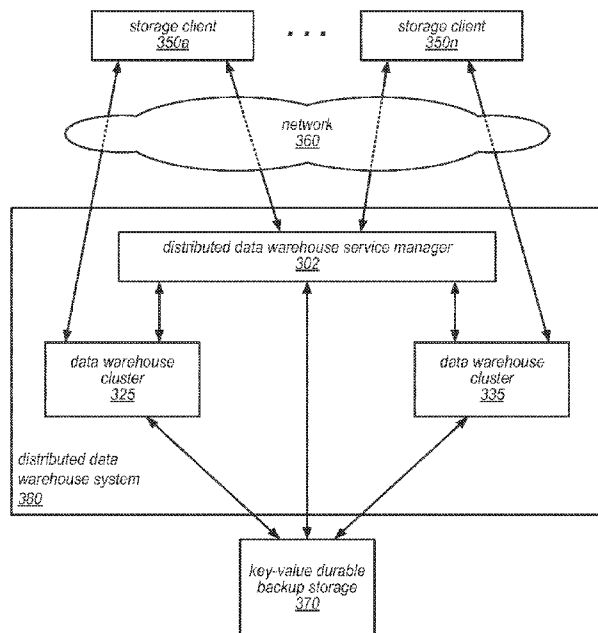


FIG. 3

(57) Abstract: A distributed data warehouse system may maintain data blocks on behalf of clients in multiple clusters in a data store. Each cluster may include a single leader node and multiple compute nodes, each including multiple disks storing data. The warehouse system may store primary and secondary copies of each data block on different disks or nodes in a cluster. Each node may include a data structure that maintains metadata about each data block stored on the node, including its unique identifier. The warehouse system may back up data blocks in a remote key-value backup storage system with high durability. A streaming restore operation may be used to retrieve data blocks from backup storage using their unique identifiers as keys. The warehouse system may service incoming queries (and may satisfy some queries by retrieving data from backup storage on an as-needed basis) prior to completion of the restore operation.



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, KM, ML, MR, NE, SN, TD, TG).

Published:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*