



(51) International Patent Classification:
G06Q 10/087 (2023.01) *G06Q 20/02* (2012.01)
H04L 9/00 (2022.01)

(21) International Application Number:
PCT/EP2023/057563

(22) International Filing Date:
23 March 2023 (23.03.2023)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2204293.1 25 March 2022 (25.03.2022) GB
2206682.3 06 May 2022 (06.05.2022) GB

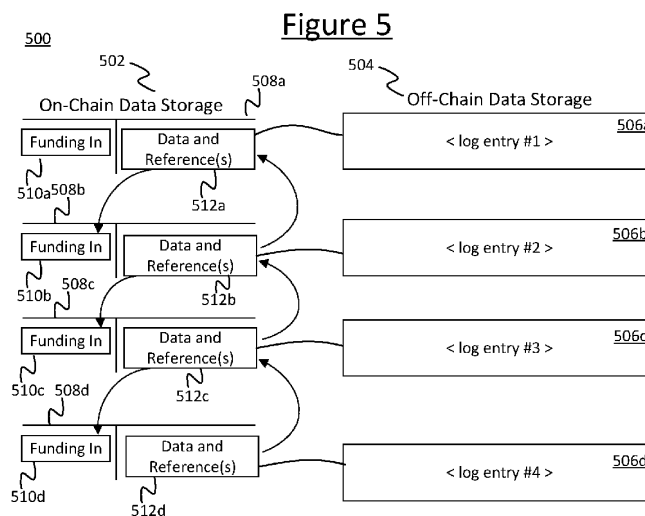
(71) Applicant: NCHAIN LICENSING AG [CH/CH]; Grafenauweg 6, 6300 Zug (CH).

(72) Inventors: **RAND, Ricky Charles**; C/o Murgitroyd & Company, Murgitroyd House, 165-169 Scotland Street, Glasgow G5 8PL (GB). **CLARK, Paul**; C/o Murgitroyd & Company, Murgitroyd House, 165-169 Scotland Street, Glasgow G5 8PL (GB). **WOODS, Alex**; C/o Murgitroyd & Company, Murgitroyd House, 165-169 Scotland Street, Glasgow G5 8PL (GB). **DAVIES, Jack Owen**; C/o Murgitroyd & Company, Murgitroyd House, 165-169 Scotland Street, Glasgow G5 8PL (GB). **ZHANG, Wei**; C/o Murgitroyd & Company, Murgitroyd House, 165-169 Scotland Street, Glasgow G5 8PL (GB).

(74) Agent: **MURGITROYD & COMPANY**; Murgitroyd House, 165-169 Scotland Street, Glasgow G5 8PL (GB).

(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,

(54) Title: SELECTIVE PROOF OF EXISTENCE USING ORDERED, APPEND-ONLY DATA STORAGE



(57) Abstract: There is provided a computer implemented method. The method provides a generation of a proof of existence data structures. The method comprising: (i) receiving a request comprising a data reveal path, the data reveal path referencing a node of interest within an input hierarchical data structure (ii) obtaining the input hierarchical data structure comprising an input root node and a plurality of input nodes, wherein each of the input nodes within the input hierarchical data structure have an associated value, and (iii) generating an output hierarchical data structure based on the data reveal path and the input hierarchical data structure, wherein the output hierarchical data structure comprises a plurality of output nodes. There is also provided a method for verification of the proof of existence.

[Continued on next page]

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, 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))