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(71) Applicant: CLUMIO, INC. [US/US]; 4555 Great America Parkway, Suite 101, Santa Clara, California 95054 (US).

(72) Inventors: CHANG, Lawrence Jaemyung; 4555 Great America Parkway, Suite 101, Santa Clara, California 95054 (US). JUNG, Woon Ho; 4555 Great America Parkway, Suite 101, Santa Clara, California 95054 (US). KUMAR, Poojan; 4555 Great America Parkway, Suite 101, Santa Clara, California 95054 (US). PALEKAR, Amber; 4555 Great America Parkway, Suite 101, Santa Clara, California 95054 (US). PANG, Hung Hing Anthony; 4555 Great America Parkway, Suite 101, Santa Clara, California 95054 (US). PATIL, Kaustubh Sambhaji; 4555 Great Amer-

ica Parkway, Suite 101, Santa Clara, California 95054 (US). SHARMA, Rishabh; 4555 Great America Parkway, Suite 101, Santa Clara, California 95054 (US). STEWART, John; 4555 Great America Parkway, Suite 101, Santa Clara, California 95054 (US).

(74) Agent: MERKEL, Lawrence J.; Kowert, Hood, Munyon, Rankin & Goetzel, P.O. Box 398, Austin, Texas 78767-0398 (US).

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(54) Title: CLOUD-BASED DATA PROTECTION SERVICE

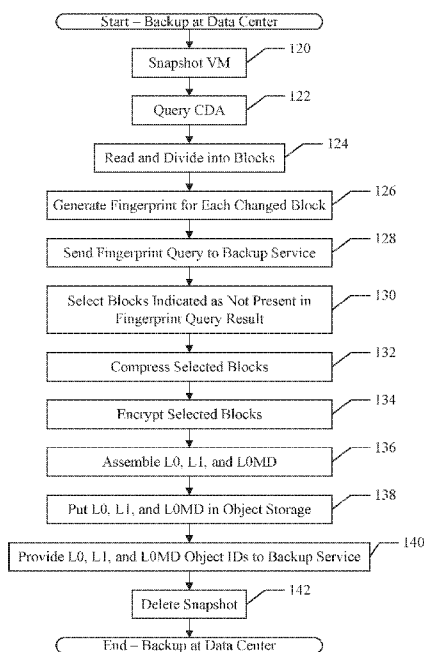


FIG. 7

(57) Abstract: A cloud-based data protection service is disclosed. In an embodiment, the data protection service may support backup of data sets from one or more sites associated with one or more organizations. In an embodiment, deduplication of backup data across multiple sites of an organization and/or multiple sites associated with different organizations may be supported. In an embodiment, backup data may be post-processed in the cloud to insert fingerprints corresponding to data blocks that did not change since a previous backup was performed, to scan the backup for security threats such as viruses, other malware, personally identifiable information, etc. In an embodiment, restore may be supported from the cloud, where restore blocks may be larger than backup data blocks. In another embodiment, restore may be based on blocks that have changed since the most recent backup (or a user-selected backup).

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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).

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- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

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10 December 2020 (10.12.2020)

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. G06F11/14
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 8 825 972 B1 (TSAUR YNN-PYNG "ANKER" [US]) 2 September 2014 (2014-09-02) abstract column 5, line 1 - line 25 column 8, line 16 - column 9, line 20 column 10, line 66 - column 11, line 15 -----	1-3,12, 13,17,18
A	WO 2016/191152 A1 (GOOGLE INC [US]) 1 December 2016 (2016-12-01) the whole document -----	1-3,12, 13,17,18

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

20 August 2020

Date of mailing of the international search report

29/10/2020

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Leuridan, Koen

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2020/029492

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-3, 12, 13, 17, 18

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-3, 12, 13, 17, 18

Performing an incremental backup

2. claim: 4

Saving backup storage space by compressing backup data

3. claims: 5-8, 14-16, 19, 20

Ensuring confidentiality of backup data by means of encryption

4. claims: 9-11

Managing the backup image by creating a data descriptor containing the location of the backup blocks.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2020/029492

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 8825972	B1	02-09-2014	NONE
WO 2016191152	A1	01-12-2016	CN 107667351 A 06-02-2018
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