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time limit referred to in Article 21(2)(a)

(54) Title: LOG-STRUCTURED STORAGE SYSTEMS

(57) **Abstract:** Disclosed herein are methods, systems, and apparatus, including computer programs encoded on computer storage devices, for data processing and storage. One of the method includes: maintaining a plurality of tiers of storage devices and one or more tiers of caches by a storage system for storing blockchain data, the plurality of tiers of storage devices including at least a higher-tier storage device and a lower-tier storage device; determining that a blockchain data object in a data log file stored in a lower-tier storage device is an active data object, wherein the blockchain data object is block data, transaction data, or state data; and writing the data object into a cache of the one or more tiers of caches.

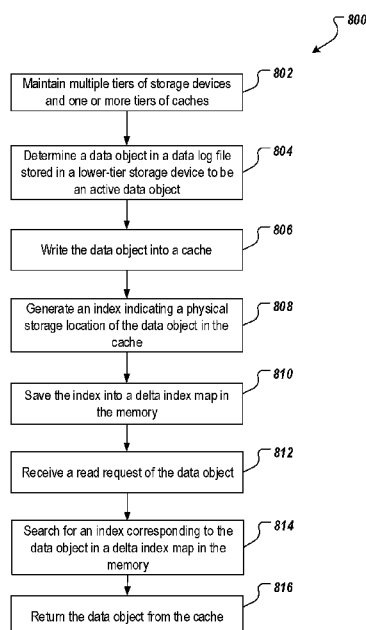


FIG. 8

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INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

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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)

CNPAT, WPI, EPODOC, CNKI, IEEE: storage, cache, blockchain, block, chain, higher, lower, tier, log, transaction, state, write, access, threshold, time window, index, map, active

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 108519862 A (BAIDU ONLINE NETWORK TECHNOLOGY BEIJING CO., LTD.) 11 September 2018 (2018-09-11) claims 1-12, description, paragraphs 44-46, 92 and figure 5	1-4, 8-10
A	CN 109086388 A (BAIDU ONLINE NETWORK TECHNOLOGY BEIJING CO., LTD.) 25 December 2018 (2018-12-25) the whole document	1-10
A	CN 109144414 A (ALIBABA GROUP HOLDING LTD.) 04 January 2019 (2019-01-04) the whole document	1-10
A	CN 109766312 A (SHENZHEN UNIVERSITY) 17 May 2019 (2019-05-17) the whole document	1-10
A	WO 2019028130 A1 (SALESFORCE. COM, INC.) 07 February 2019 (2019-02-07) the whole document	1-10



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“&” document member of the same patent family

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Information on patent family members

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Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	108519862	A	11 September 2018	None			
CN	109086388	A	25 December 2018	None			
CN	109144414	A	04 January 2019	US	2020034311	A1	30 January 2020
				WO	2020023843	A1	30 January 2020
CN	109766312	A	17 May 2019	None			
WO	2019028130	A1	07 February 2019	US	2019042638	A1	07 February 2019
				CN	110998557	A	10 April 2020