

CLAIMS

1. — A computer-implemented method (800) for indexing blockchain data for storage, the method ~~comprising:~~

~~generating, being performed~~ by a first blockchain node of a ~~blockchain network, a~~ plurality of blockchain nodes, the method comprising:

generating (802) one or more encoded blocks based on performing error correction coding ~~(, ECC),~~ on ~~a plurality of one or more~~ blocks of a blockchain;

~~—for each encoded block of the~~ plurality of one or more encoded blocks:

~~—dividing, by the blockchain node, (804)~~ the encoded block into a plurality of datasets based on a data storage scheme associated with the ~~plurality of one or more~~ blocks, wherein the data storage scheme provides assignments of the plurality of datasets to ~~at the~~ plurality of blockchain nodes; ~~and~~

~~—storing, by the blockchain node, (806)~~ at least one of the plurality of datasets based on the assignments provided in the data storage scheme; ~~and, wherein one or more other datasets of the plurality of datasets are not stored at the first blockchain node;~~

~~—storing, by the blockchain node, providing (808)~~ an index that indexes each of the plurality of datasets to each of the plurality of ~~the~~ blockchain nodes at which a respective dataset is stored; wherein the index provides a correspondence between a dataset identifier, ID, of a dataset and a node ID of a blockchain node at which the dataset is stored;

hashing a remainder of the plurality of datasets other than the at least one of the plurality of datasets to generate hash values corresponding to the remainder of the plurality of datasets;

storing the hash values;

deleting the one or more blocks;

receiving, by the blockchain node, a request for blockchain data from a computing device;

determining, by the blockchain node, that the blockchain data is included in ~~a block of the blockchain;~~ one or more blocks; and

identifying, by the blockchain node sending, based on the index, ~~one or more other~~ hash values to a remainder of the blockchain nodes ~~in of at the~~ blockchain network to

~~retrieve the remainder of the plurality of datasets, that store other datasets other than the at least one of the plurality of datasets stored by the blockchain node;~~

~~sending, by the blockchain node to the one or more other blockchain nodes, requests for the other datasets;~~

~~receiving, by the blockchain node from the one or more other blockchain nodes, the other datasets;~~

~~combining the at least one of the plurality of datasets with the other datasets to form, as a formed encoded block, the encoded block; and~~

~~decoding the formed encoded block, to generate the block of the blockchain.~~

~~2. — The method of claim 1, wherein the index provides a correspondence between a dataset identifier (ID) of a dataset and a node ID of a blockchain node at which the dataset is stored.~~

~~23. The method (800) of any previous claim 1, wherein the index provides a plurality of block IDs corresponding to the plurality of blocks that the data storage scheme is associated with.~~

~~4. — The method of any previous claim, further comprising:~~

~~hashing the other datasets to generate hash values corresponding to the other datasets;~~

~~and~~

~~storing the hash values.~~

~~5. — The method of claim 4, further comprising:~~

~~— sending, based on the index, hash values to the one or more other blockchain nodes to retrieve the other datasets.~~

~~36. — The method (800) of any one of claims 1 or 52, further comprising:~~

~~— receiving at least one dataset from each of the one or more other remainder of the blockchain nodes;~~

~~—~~

~~hashing the at least one dataset to generate at least one hash value corresponding to each of the one or more other remainder of the blockchain nodes; and~~

~~— determining whether the at least one hash value is stored in the blockchain node.~~

~~7.~~4. The method (800) of claim ~~63~~, further comprising:

- in response to determining that the at least one hash value is not stored in the blockchain node, determining a blockchain node that the at least one dataset corresponding to the at least one hash value is received from; and
- reporting the blockchain node as a faulty node.

5. The method (800) of claim 3, further comprising:

in response to determining that the at least one hash value corresponding to each of the remainder of the blockchain nodes is stored in the blockchain node, decoding the one or more blocks based on the at least one of the plurality of datasets stored in the blockchain node and the at least one dataset received from each of the remainder of the blockchain nodes.

~~8.~~6. The method (800) of any previous claim, wherein the ~~plurality of one or more~~ blocks are historical blocks that have been created for a predetermined amount of time.

~~9.~~7. The method (800) of any previous claim, wherein the ECC is performed when utilization rate of computational resource of the blockchain node is less than or equal to a predetermined value or usage of storage space of the blockchain node is greater than or equal to a predetermined percentage.

~~10.~~8. The method (800) of any previous claim, wherein the ECC is erasure coding performed by adding redundant bits to the plurality of blocks.

~~11.~~9. The method (800) of any previous claim, wherein the plurality of blocks are infrequently accessed blocks that are appended to the blockchain for a predetermined amount of time.

~~120.~~ —A system communicating shared blockchain data, comprising:

- one or more processors; and
- one or more computer-readable memories coupled to the one or more processors and having instructions stored thereon that are executable by the one or more processors to perform the method (800) of any of claims 1 to ~~119~~.

~~131~~.—An apparatus for communicating shared blockchain data, the apparatus comprising a plurality of modules for performing the method (800) of any of claims 1 to ~~944~~.