

CLAIMS

1. A method for updating databases that store blockchain data, the method comprising:
receiving a transaction associated with a blockchain network;
determining, after the transaction is performed, an updated account state of a blockchain account involved in the transaction;
adding, to a history state object database and after a current block is appended to a blockchain associated with the blockchain network based on performing a consensus algorithm, the updated account state, a hash value of the updated account state, an account identifier (ID) of the blockchain account, and a block ID of the current block; and
updating, based on the hash value of the account state, the account ID, and the block ID, a state tree stored in a history state database.
2. The method of claim 1, wherein the history state object database stores a mapping between an account ID, a block ID, a hash value of an account state, and an account state of each blockchain account of the blockchain network and an account state of the corresponding blockchain account.
3. The method of claim 1, wherein the consensus algorithm is based on one of proof of work (PoW), proof of stake (PoS), and practical Byzantine fault tolerance (PBFT).
4. The method of any previous claim, wherein the state tree is a content-addressed state tree.
5. The method of claim 4, wherein the content-addressed state tree is a history state tree of a fixed-depth Merkle tree (FDMT), a sparse Merkle Tree (SMT), or a Merkle Patricia tree (MPT).
6. The method of any previous claim, wherein updating the state tree includes adding one or more branch nodes and a leaf node under a state root associated with the current block and store the hash value of the updated account state, the account ID in the leaf node.

7. The method of claim 6, wherein the leaf node stores hash values of account states and account IDs corresponding to a plurality of blockchain accounts of the blockchain network.

8. The method of claim 7, wherein the account IDs identify relative locations of corresponding hash values of account states of the plurality of blockchain accounts stored in the leaf node.

9. The method of claim 7 or 8, wherein an address of the leaf node is a hash value generated based on the account states corresponding to the plurality of blockchain nodes.

10. The method of any previous claim, wherein the consensus algorithm is performed after one or more of existence, validity, and authenticity of the transaction are verified.

11. A computer-implemented system for updating databases that store 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 of any of claims 1 to 10.

12. An apparatus for updating databases that store blockchain data, the apparatus comprising a plurality of modules for performing the method of any of claims 1 to 10.