

CLAIMS

1. A computer-implemented method for blockchain-based data storage performed by a blockchain node, the method comprising:

receiving data for storage from a service platform, wherein the data includes mutable data, immutable data, and index data identified by the service platform;

storing the mutable data in a cache storage, wherein the mutable data is to be executed by a smart contract;

initiating, a consensus algorithm to record the immutable data on a blockchain;

in response to successfully performing the consensus algorithm, recording, based on invoking the smart contract, the immutable data on the blockchain, wherein the blockchain is stored in a database that has lower storage cost than the cache storage; and

linking, based on invoking the smart contract, the mutable data and the immutable data based on the index data.

2. The computer-implemented method of claim 1, wherein the data is custom clearance data associated with a purchase order and includes one or more of order data, logistics data, and payment data.

3. The computer-implemented method of any previous claim, wherein the mutable data is associated with a document for custom clearance, and the mutable data includes one or more of a document type of the document, a document status of the document, association information of the document with one or more other documents for custom clearance.

4. The computer-implemented method of claim 3, wherein the immutable data is associated with the document and includes an encrypted version of at least a portion of content of the document encrypted by an encryption key associated with an owner of the document.

5. The computer-implemented method of claim 4, wherein the index data is associated with the document and includes one or more of an identifier of the document and hash values of a plurality of blockchain transactions associated with the document.

6. The computer-implemented method of claim 4, wherein the encryption key is derived based on a linear secret sharing scheme through negotiations among at least two of (i) a custom clearance agent platform managed by at least one custom clearance agent or broker who represents importers in preparing and submitting information related to custom clearance to the customs authority, (ii) the service platform, or (iii) the customs authority.

7. The computer-implemented method of any previous claim, wherein the consensus algorithm is one of proof of work (PoW), proof of stake (PoS), or practical Byzantine fault tolerance (PBFT).

8. The computer-implemented method of any previous claim, wherein linking the mutable data and the immutable data based on the index data includes storing the index data and the mutable data under a first data structure in the cache storage and recording the index data and the immutable data under a second data structure on the blockchain.

9. The computer-implemented method of any previous claim, wherein linking the mutable data and the immutable data based on the index data comprises enabling a user to obtain the mutable data and the immutable data by searching for the index data in the first data structure and the second data structure.

10. The computer-implemented method of any previous claim, comprising: at the service platform, providing an application programming interface to enable the customs authority to search for the index data to retrieve the mutable data and the immutable data linked based on the index data.

11. The computer-implemented method of any previous claim, wherein an address of the smart contract is stored on the blockchain in the database storage.

12. The computer-implemented method of any previous claim, wherein the immutable data is stored in a data structure of a state Merkle tree.

13. A system for custom clearance data storage, 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 12.

14. An apparatus for custom clearance data storage, the apparatus comprising a plurality of modules for performing the method of any of claims 1 to 12.