CLAIMS

1. A computer-implemented method for managing a blockchain-based centralized ledger system, the method comprising:

transmitting a timestamp request for a to-be-timestamped block in a blockchain to a trust time server by a computing device in the blockchain-based centralized ledger system that stores data in the blockchain, the trust time server being associated with a trust time authority and independent from the blockchain-based centralized ledger system, the blockchain including a plurality of blocks storing transaction data;

receiving a timestamp and associated signature for the to-be-timestamped block from the trust time server by the computing device; and

storing information of the timestamp and the associated signature for the to-be-timestamped block in a corresponding timestamped block in the blockchain by the computing device, wherein a block body of the corresponding timestamped block in the blockchain comprises no other transaction data except the information of the timestamp and the associated signature for the to-be-timestamped block.

2. The method of claim 1, wherein storing information of the respective timestamp and the associated signature for the to-be-timestamped block in the blockchain comprises:

storing at least one of the timestamp and the associated signature or a hash of the timestamp and the associated signature in a second block immediately subsequent to the to-be-timestamped block in the blockchain,

wherein the second block stores a hash of the to-be-timestamped block.

3. The method of claim 2, wherein a block body of the second block comprises no other transaction data except the at least one of the timestamp and associated signature or the hash of the timestamp and the associated signature.

4. The method of any preceding claim, wherein the to-be-timestamped block is a most recent block generated in the blockchain when the timestamp request is transmitted.

5. The method of any preceding claim, wherein the timestamp request comprises a hash of the to-be-timestamped block.

6. The method of any preceding claim, further comprising:

periodically transmit timestamp requests for to-be-timestamped blocks in the blockchain to the trust time server with a predetermined triggering time period by the computing device.

7. The method of claim 6, wherein the predetermined triggering time period is associated with a corresponding cost for a timestamp service of the centralized ledger system.

8. The method of claim 6 or 7, wherein the predetermined triggering time period is predetermined by a client associated with the centralized ledger system.

9. The method of any one of claims 6 to 8, wherein the computing device is configured to periodically generate the plurality of blocks in the blockchain with a predetermined time period of block generation, and

wherein the predetermined time period of block generation is shorter than the predetermined triggering time period.

10. The method of any one of claims 6 to 9, further comprising:

receiving respective timestamps and associated signatures for the to-be-timestamped blocks from the trust time server by the computing device; and

storing information of the respective timestamps and associated signatures for the to-be-timestamped blocks in timestamped blocks in the blockchain by the computing device.

11. The method of claim 10, wherein the timestamped blocks comprise:

a first timestamped block storing information of a first respective timestamp and associated signature for a first to-be-timestamped block that is immediately before the first timestamped block in the blockchain, and

a second timestamped block storing information of a second respective timestamp and associated signature for a second to-be-timestamped block that is immediately before the second timestamped block in the blockchain,

wherein the second respective timestamp and associated signature is immediately subsequent to the first respective timestamp and associated signature among the respective timestamps and associated signatures for the to-be-timestamped blocks, and

wherein the second timestamped block is immediately subsequent to the first timestamped block among the timestamped blocks in the blockchain.

12. The method of claim 11, wherein each of the plurality of blocks is associated with a respective block identifier, and the plurality of blocks are stored in order in the blockchain according to the respective block identifiers, and

wherein a first block identifier of the first timestamped block is separated from a second block identifier of the second timestamped block by other block identifiers of other blocks between the first timestamped block and the second timestamped block in the blockchain, the other blocks storing no trust timestamp information from the trust time server.

13. A system for managing a blockchain-based centralized ledger system, 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 one of claims 1 to 12.

14. An apparatus for managing a blockchain-based centralized ledger system, the apparatus comprising a plurality of modules for performing the method of any one of claims 1 to 12.