CLAIMS

1. A blockchain middleware operable by one or more processors according to instructions stored in at least one tangible, non-transitory, computer-readable storage medium coupled with the one or more processors, the middleware being configured to perform a method comprising:

establishing connections with at least a first software component and a second software component over a network;

in response to an initiation of a transaction between the first software component and the second software component, the transaction involving a file originating from the first software component, generating a root hash based on a plurality of identifiers, each of the plurality of identifiers being tagged to a partial copy of the file;

generating a block based on the root hash and a hash of a prior block in a blockchain, wherein the prior block is part of a ledger accessible by the second software component;

obtaining a first plurality of segments, wherein each of the first plurality of segments corresponds to a part of the file, and wherein the first plurality of segments collectively corresponds to one complete copy of the file;

encrypting the file to obtain an encrypted file;

splitting the encrypted file into multiple parts to obtain the first plurality of segments;

at least a step of making a predetermined number of replicates of each of the first plurality of segments to obtain a second plurality of segments, wherein each of the plurality of identifiers is tagged to one of the second plurality of segments;

forming a first generation of hashes based on hashing the plurality of identifiers; and

iteratively forming subsequent generations of hashes, each subsequent generation of one or more hashes being based on hashing one or more groups of hashes of a preceding generation, and wherein a last subsequent generation generates the root hash,

wherein each subsequent generation generates fewer hashes than the preceding generation,

and wherein the method includes generating more than one root hash for the file, each of the more than one root hash being based on a group of identifiers randomly selected from the plurality of identifiers.

2. The blockchain middleware according to claim 1, the method further comprising: appending the more than one root hash to more than one blockchain.

3. A method executable by the blockchain middleware according to claim 1 or claim 2, the method comprising:

in response to instructions to store the file, applying an encryption algorithm to the file to obtain an encrypted file;

splitting the encrypted file into a first plurality of fragments;

making a predetermined number of replicates of each of the first plurality of fragments to obtain a second set of fragments, the second set of fragments having a second plurality of fragments;

configuring the second set of fragments as a randomly ordered sequence; and

distributing the second set of fragments among multiple storage nodes for blockchain storage such that respective parts of the randomly ordered sequence are stored in different storage nodes.

4. The method according to claim 3, further comprising:

forming a first generation of hashes based hashing the plurality of identifiers, wherein each of the first and/or second plurality of fragments is tagged by one of the plurality of identifiers; and

iteratively forming subsequent generations of hashes, wherein each subsequent generation of one or more hashes is based on hashing one or more groups of hashes of a preceding generation, wherein a last subsequent generation generates the root hash.

5. The method according to claim 4, wherein each subsequent generation generates fewer hashes than the preceding generation.

6. The method according to claim 5, the method further comprising:

generating more than one root hash for the file, wherein each of the more than one root hash is based on a group of identifiers randomly selected from the plurality of identifiers.

7. The method according to claim 6, the method further comprising: appending the more than one root hash to more than one blockchain.

8. The method of claim 7, further comprising:

enabling user selection of at least one node cluster for the blockchain storage.

9. The method of claim 8, further comprising: enabling user configuration of the predetermined number of replicates.

10. The method of claim 9, further comprising: enabling user configuration of respective locations of at least some of the multiple storage nodes, wherein the at least some of the multiple storage nodes are provided on at least one private server.

11. The method of claim 10, wherein the at least one node cluster further comprises at least one third party-operated storage provided as a cloud-based storage-as-a-service.

12. The method of claim 11, wherein the distributing comprises distributing different parts of the randomly ordered sequence to the at least one private server and the at least one third party-operated storage respectively for the blockchain storage, wherein each of the at least one private server corresponds to at least one of the node clusters, and wherein each of the at least one third party-operated storage corresponds to one of the node clusters.

13. The method of claim 12, wherein the at least one private server comprises at least one local server and at least one remote server, such that the at least one local server and the at least one remote server are each configured for the blockchain storage.