

CLAIMS

1. A computer-implemented method for blockchain-based data synchronization, comprising:

obtaining, from one or more blockchain nodes associated with a blockchain, data associated with a plurality of blockchain transactions recorded in one or more blocks of the blockchain;

storing the obtained data in one or more data stores, wherein the storing comprises organizing the obtained data according to one or more schemas, at least one of the one or more schemas being different from a data structure of the blockchain; and the organizing the obtained data comprises:

obtaining interface definitions associated with one or more blockchain contracts invoked by a blockchain transaction, wherein one or more blockchain contracts each comprise instructions executable by a virtual machine associated with the blockchain and the interface definitions specify one or more input types and one or more output types associated with the one or more blockchain contracts;

resolving the blockchain transaction based on the obtained interface definitions associated with the one or more blockchain contracts to obtain one or more inputs and one or more return values; and

storing the one or more inputs and the one or more return values in association with the data associated with the blockchain transaction;

receiving, from a client device, a data query based on one of the one or more schemas; executing the data query on the data in the one or more data stores to obtain a result;

and

sending, to the client device, a response comprising the obtained result.

2. The method of claim 1, wherein the organizing the obtained data according to the one or more schemas comprises:

ordering the data associated with the blockchain transactions based on a height of a block in the blockchain that records each of the blockchain transactions.

3. The method of claim 1, wherein one or more of the blockchain transactions each invokes one or more blockchain contracts associated with the blockchain, and wherein the organizing the obtained data according to the one or more schemas comprises:

categorizing data associated with the one or more blockchain transactions based on the one or more blockchain contracts.

~~4. The method of claim 3, wherein the organizing the obtained data according to the one or more schemas further comprises, for each blockchain transaction of the one or more blockchain transactions:~~

~~obtaining interface definitions associated with the one or more blockchain contracts invoked by the blockchain transaction;~~

~~resolving the blockchain transaction based on the obtained interface definitions to obtain one or more inputs and one or more return values; and~~

~~storing the one or more inputs and one or more return values in association with the data associated with the blockchain transaction.~~

54. The method of claim 1, wherein one or more of the blockchain transactions each comprises one or more identifiers respectively associated with one or more blockchain accounts associated with the blockchain, and wherein the organizing the obtained data according to the one or more schemas comprises:

categorizing the data associated with the one or more blockchain transactions based on the one or more identifiers in each of the blockchain transactions.

65. The method of claim 1, wherein the organizing the obtained data according to the one or more schemas comprises:

categorizing the data associated with the blockchain transactions based on a type of each of the blockchain transactions.

76. The method of any one of the claims 1-65, further comprising:

determining that a block is newly added to the blockchain;

obtaining data associated with a plurality of blockchain transactions recorded in the newly-added block; and

updating the one or more data stores based on the blockchain transactions recorded in the newly-added block.

87. The method of any one of the claims 1-76, wherein the storing the obtained data in one or more data stores comprises:

storing the obtained data redundantly according to a hierarchical structure.

98. The method of claim 87, wherein the storing the obtained data redundantly comprises:

storing the obtained data according to a first schema of the one or more schemas; and
storing the obtained data according to a second schema of the one or more schemas.

109. The method of any one of the claims 1-98, wherein the organizing the obtained data according to the one or more schemas comprises:

generating one or more indices respectively associated with the one or more schemas;
and
storing the one or more indices in the one or more data stores.

110. The method of any one of the claims 1-109, further comprising, before receiving the data query based on the one of the one or more schemas:

receiving, from the client system, a request for the one of the one or more schemas;
and
sending, to the client system, a specification of the one of the one or more schemas.

111. The method of any one of the claims 1-110, wherein the executing the data query on the data in the one or more data stores to obtain the result comprises:

identifying a subset of the data in the one or more data stores based on the data query;
performing one or more data operations on the identified subset of the data; and
determining the result based on the one or more data operations.

112. The method of any one of the claims 1-111, wherein the one or more data stores comprise one or more distributed data storage systems.

113. A system for blockchain-based data synchronization, 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 1-112.

~~15~~14. A non-transitory computer-readable storage medium configured with instructions executable by one or more processors to cause the one or more processors to perform the method of any one of the claims 1-~~13~~12.

~~16~~15. An apparatus for blockchain-based data synchronization comprising a plurality of modules for performing the method of any one of the claims 1-~~13~~12.