

CLAIMS

1. A computer-implemented method for discovering and correcting missing or erroneous information in modifiable off-chain transaction records using unmodifiable blockchain transaction records, the method comprising:

obtaining, by a blockchain member, a blockchain transaction record that is selected from a blockchain ledger associated with a blockchain and satisfies a specified condition, wherein the blockchain member is associated with a corresponding blockchain node in the blockchain, wherein the blockchain ledger is maintained on the corresponding blockchain node in the blockchain, and wherein the blockchain transaction record includes first information describing a transaction;

comparing, by the blockchain member, the blockchain transaction record with an off-chain transaction record maintained by the blockchain member, wherein the off-chain transaction record includes second information describing the transaction and is stored, by the blockchain member, separate from the blockchain and using different description fields than the first information;

determining, by the blockchain member and based on the comparing, that the second information of the off-chain transaction record is inconsistent with the first information of the blockchain transaction record based on the second information (i) being modified after the off-chain transaction record was created or (ii) including an incomplete description of the transaction relative to the blockchain transaction record;

in response to the determining that the second information of the off-chain transaction record is inconsistent with the first information of the blockchain transaction record,

performing, by the blockchain member, a reconciliation operation on the off-chain transaction record based on the blockchain transaction record to make the second information of the off-chain transaction record consistent with the first information of the blockchain transaction record, the reconciliation operation including making at least one change to the second information of the off-chain transaction record; and

recording, by the blockchain member, reconciliation-data into the blockchain ledger maintained in the blockchain, wherein the reconciliation-data comprises an identification of the blockchain member that performed the reconciliation operation and the at least one change made by the blockchain member to the off-chain transaction record.

2. The computer-implemented method of claim 1, wherein the blockchain ledger includes

a plurality of blockchain transaction records that record information associated with asset transfer operations occurring on the blockchain.

3. The computer-implemented method of claim 1, wherein the blockchain includes a reconciliation service provider that provides a transaction record query service for the blockchain member.

4. The computer-implemented method of claim 3, wherein obtaining the blockchain transaction record comprises:

 sending the specified condition to the reconciliation service provider of the blockchain; and

 receiving the blockchain transaction record returned by the reconciliation service provider.

5. The computer-implemented method of claim 1, wherein the specified condition comprises at least one of a time duration at which the blockchain transaction record is created, a blockchain member that participates in a blockchain transaction corresponding to the blockchain transaction record, a condition indicating that the blockchain transaction record is a normal transaction record, or a condition indicating that the blockchain transaction is a refund transaction record.

6. The computer-implemented method of claim 1, wherein comparing the blockchain transaction record with the off-chain transaction record comprises:

 exporting the blockchain transaction record by using a bridge module that is configured between the blockchain member and the blockchain; and

 comparing the blockchain transaction record with the off-chain transaction record off the blockchain, wherein the bridge module is respectively connected to a first data interface provided by the blockchain member and a second data interface provided by the blockchain.

7. A non-transitory, computer-readable medium storing one or more instructions executable by a computer system to perform operations for discovering and correcting missing or erroneous information in modifiable off-chain transaction records using unmodifiable blockchain transaction records, the operations comprising:

obtaining, by a blockchain member, a blockchain transaction record that is selected from a blockchain ledger associated with a blockchain and satisfies a specified condition, wherein the blockchain member is associated with a corresponding blockchain node in the blockchain, wherein the blockchain ledger is maintained on the corresponding blockchain node in the blockchain, and wherein the blockchain transaction record includes first information describing a transaction;

comparing, by the blockchain member, the blockchain transaction record with an off-chain transaction record maintained by the blockchain member, wherein the off-chain transaction record includes second information describing the transaction and is stored, by the blockchain member, separate from the blockchain and using different description fields than the first information;

determining, by the blockchain member and based on the comparing, that the second information of the off-chain transaction record is inconsistent with the first information of the blockchain transaction record based on the second information (i) being modified after the off-chain transaction record was created or (ii) including an incomplete description of the transaction relative to the blockchain transaction record;

in response to the determining that the second information of the off-chain transaction record is inconsistent with the first information of the blockchain transaction record,

performing, by the blockchain member, a reconciliation operation on the off-chain transaction record based on the blockchain transaction record to make the second information of the off-chain transaction record consistent with the first information of the blockchain transaction record, the reconciliation operation including making at least one change to the second information of the off-chain transaction record; and

recording, by the blockchain member, reconciliation-data into the blockchain ledger maintained in the blockchain, wherein the reconciliation-data comprises an identification of the blockchain member that performed the reconciliation operation and the at least one change made by the blockchain member to the off-chain transaction record.

8. The non-transitory, computer-readable medium of claim 7, wherein the blockchain ledger includes a plurality of blockchain transaction records that record information associated with asset transfer operations occurring on the blockchain.

9. The non-transitory, computer-readable medium of claim 7, wherein the blockchain includes a reconciliation service provider that provides a transaction record query service for

the blockchain member.

10. The non-transitory, computer-readable medium of claim 9, wherein obtaining the blockchain transaction record comprises:

 sending the specified condition to the reconciliation service provider of the blockchain; and

 receiving the blockchain transaction record returned by the reconciliation service provider.

11. The non-transitory, computer-readable medium of claim 7, wherein the specified condition comprises at least one of a time duration at which the blockchain transaction record is created, a blockchain member that participates in a blockchain transaction corresponding to the blockchain transaction record, a condition indicating that the blockchain transaction record is a normal transaction record, or a condition indicating that the blockchain transaction is a refund transaction record.

12. The non-transitory, computer-readable medium of claim 7, wherein comparing the blockchain transaction record with the off-chain transaction record comprises:

 exporting the blockchain transaction record by using a bridge module that is configured between the blockchain member and the blockchain; and

 comparing the blockchain transaction record with the off-chain transaction record off the blockchain, wherein the bridge module is respectively connected to a first data interface provided by the blockchain member and a second data interface provided by the blockchain.

13. A computer-implemented system for discovering and correcting missing or erroneous information in modifiable off-chain transaction records using unmodifiable blockchain transaction records, comprising:

 one or more computers; and

 one or more computer memory devices interoperably coupled with the one or more computers and having tangible, non-transitory, machine-readable media storing one or more instructions that, when executed by the one or more computers, perform one or more operations comprising:

 obtaining, by a blockchain member, a blockchain transaction record that is selected from a blockchain ledger associated with a blockchain and satisfies a specified

condition, wherein the blockchain member is associated with a corresponding blockchain node in the blockchain, wherein the blockchain ledger is maintained on the corresponding blockchain node in the blockchain, and wherein the blockchain transaction record includes first information describing a transaction;

comparing, by the blockchain member, the blockchain transaction record with an off-chain transaction record maintained by the blockchain member, wherein the off-chain transaction record includes second information describing the transaction and is stored, by the blockchain member, separate from the blockchain and using different description fields than the first information;

determining, by the blockchain member and based on the comparing, that the second information of the off-chain transaction record is inconsistent with the first information of the blockchain transaction record based on the the second information (i) being modified after the off-chain transaction record was created or (ii) including an incomplete description of the transaction relative to the blockchain transaction record;

in response to the determining that the second information of the off-chain transaction record is inconsistent with the first information of the blockchain transaction record,

performing, by the blockchain member, a reconciliation operation on the off-chain transaction record based on the blockchain transaction record to make the second information of the off-chain transaction record consistent with the first information of the blockchain transaction record, the reconciliation operation including making at least one change to the second information of the off-chain transaction record; and

recording, by the blockchain member, reconciliation-data into the blockchain ledger maintained in the blockchain, wherein the reconciliation-data comprises an identification of the blockchain member that performed the reconciliation operation and the at least one change made by the blockchain member to the off-chain transaction record.

14. The computer-implemented system of claim 13, wherein the blockchain ledger includes a plurality of blockchain transaction records that record information associated with asset transfer operations occurring on the blockchain.

15. The computer-implemented system of claim 13, wherein the blockchain includes a reconciliation service provider that provides a transaction record query service for the blockchain member.

16. The computer-implemented system of claim 15, wherein obtaining the blockchain transaction record comprises:

 sending the specified condition to the reconciliation service provider of the blockchain; and

 receiving the blockchain transaction record returned by the reconciliation service provider.

17. The computer-implemented system of claim 13, wherein the specified condition comprises at least one of a time duration at which the blockchain transaction record is created, a blockchain member that participates in a blockchain transaction corresponding to the blockchain transaction record, a condition indicating that the blockchain transaction record is a normal transaction record, or a condition indicating that the blockchain transaction is a refund transaction record.

18. The computer-implemented system of claim 13, wherein comparing the blockchain transaction record with the off-chain transaction record comprises:

 exporting the blockchain transaction record by using a bridge module that is configured between the blockchain member and the blockchain; and

 comparing the blockchain transaction record with the off-chain transaction record off the blockchain, wherein the bridge module is respectively connected to a first data interface provided by the blockchain member and a second data interface provided by the blockchain.