BLOCKCHAIN DATA STORAGE SYSTEM AND METHOD

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to Chinese Patent Application No. 2017101392691, entitled "Blockchain Data Storage System and Method" filed March 9, 2017, the content of which is expressly incorporated by reference herein in its entirety.

TECHNICAL FIELD

[0002] The present disclosure relates to a field of Internet technologies, particularly to a system for storing blockchain data and a method for storing blockchain data.

BACKGROUND

[0003] Blockchain is generally understood as a distributed book, which is also essentially a distributed computing and storage system. The blockchain has a plurality of nodes, and different nodes reach consensus through certain calculation rules, and store a transaction execution result after consensus in the database in the form of blocks, and the blocks form a blockchain. Since the different nodes have different calculation speeds, data between the nodes may be inconsistent, and the data corresponding to the nodes need to be read in the database for synchronization operation. The transaction execution result and the data corresponding to the nodes stored in the database may be collectively referred to as blockchain data. Since the blockchain data has a very high reading and writing frequency, the blockchain data increases with an increase of a transaction volume. Performance of the blockchain will be affected if the blockchain data has a lower reading and writing efficiency. Accordingly, how to effectively improve the reading and writing efficiency of the blockchain data becomes a technical problem that needs to be solved at present.

SUMMARY

[0004] According to various embodiments of the present disclosure, a system for

storing blockchain data and a method for storing blockchain data are provided.

[0005] A system for storing blockchain data is provided, including a memory database and a magnetic disk database, in which

[0006] the memory database and the magnetic disk database respectively receive blockchain data written by a blockchain node, and store the blockchain data; and

[0007] when a node reads the blockchain data, the node first reads the blockchain data from the memory database, and if the reading fails, the node reads the blockchain data from the magnetic disk database, and synchronizes the read blockchain data to the memory database.

[0008] A method for storing blockchain data is provided, including:

[0009] acquiring blockchain data;

[0010] writing the blockchain data into a memory database and a magnetic disk database for storage, respectively; and

[0011] reading the blockchain data first from the memory database during reading of the blockchain data, and reading the blockchain data from the magnetic disk database if the reading fails, and synchronizing the read blockchain data to the memory database .

[0012] A blockchain data storage device is provided, including:

[0013] an acquisition module configured to acquire blockchain data;

[0014] a storage module configured to write the blockchain data into a memory database and a magnetic disk database for storage, respectively;

[0015] an access module configured to first read the blockchain data from the memory database during reading of the blockchain data, and if the reading fails, to read the blockchain data from the magnetic disk database and synchronize the read blockchain data to the memory database.

[0016] A blockchain node is provided, including a memory and one or more processors, the memory having computer-readable instructions stored therein which, when executed by the processor, causing the one or more processors to perform the steps of:

[0017] acquiring blockchain data;

[0018] writing the blockchain data into a memory database and a magnetic disk database for storage, respectively; and

[0019] reading the blockchain data first from the memory database during reading of the blockchain data, and reading the blockchain data from the magnetic disk database if the reading fails, and synchronizing the read blockchain data to the memory database .

[0020] One or more non-transitory computer-readable storage medium is provided having computer-readable instructions stored thereon which, when executed by one or more processors, causing the one or more processors to perform:

[0021] acquiring blockchain data;

[0022] writing the blockchain data into a memory database and a magnetic disk database for storage, respectively; and

[0023] reading the blockchain data first from the memory database during reading of the blockchain data, and reading the blockchain data from the magnetic disk database if the reading fails, and synchronizing the read blockchain data to the memory database .

[0024] The details of one or more embodiments of the present disclosure will be presented with reference to the following drawings and description. Other characteristic and advantages of the present disclosure will be more apparent from the specification, drawings and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] To illustrate the technical schemes according to the embodiments of the present disclosure more clearly, the accompanying drawings for describing the embodiments or the prior art are introduced briefly in the following. Apparently, the accompanying drawings in the following description are only some embodiments of the present disclosure, and those skilled in the art can derive other drawings from the accompanying drawings without creative efforts.

[0026] FIG. 1 is a block diagram of a system for storing blockchain data according to one or more embodiments.

[0027] FIG. 2 is a schematic diagram of connections of a system for storing blockchain data according to one or more embodiments.

[0028] FIG. 3 is a flowchart of a method for storing blockchain data according to one or more embodiments.

[0029] FIG. 4 is a block diagram of a blockchain node according to one or more embodiments.

[0030] FIG. 5 is a block diagram of a blockchain data storage device according to one or more embodiments.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0031] The present disclosure will be further described below with reference to the accompanying drawings for more clearly and fully discussing the technical solutions of the present disclosure. It should be appreciated that specific embodiments described herein are merely illustrative of the present disclosure and are not intended to limit the present disclosure.

[0032] In an embodiment, as shown in FIG. 1, a system for storing blockchain data is provided, including a memory database and a magnetic disk database, in which:

[0033] the memory database and the magnetic disk database respectively receive blockchain data written by a blockchain node, and store the blockchain data.

[0034] When a node reads the blockchain data, the node first reads the blockchain data from the memory database, and if the reading fails, the node reads the blockchain data from the magnetic disk database, and synchronizes the read blockchain data to the memory database.

[0035] The blockchain data includes a transaction execution result and a transaction log. After calculating and obtaining the transaction execution result, the blockchain node stores the transaction execution result and the transaction log. In a conventional way, the node stores the transaction execution result and the transaction log in the disk database. However, since there may be a delay in writing to the disk database, the performance of the blockchain would be affected when writing to the disk database at a high frequency.

[0036] In the present embodiment, the database corresponding to the blockchain node includes the memory database and magnetic disk database. A plurality of blockchain nodes may be provided, and the nodes may be authorized terminals or authorized servers. The database corresponding to the node may be a database respectively deployed for each node.

[0037] The node writes the blockchain data into the memory database through a memory database interface layer, and the memory database stores the blockchain data written by the node. The node writes the blockchain data into the magnetic disk database through a magnetic disk database interface, a data routing, a sharding middleware, etc., and the magnetic disk database stores the blockchain data written by the node. Since a writing speed of the memory database is much higher than that of the magnetic disk database, storing the blockchain data in the memory database can effectively improve the storing efficiency. Performance of the blockchain will not be affected when the blockchain data is written into the memory database at a high frequency. However, since the memory database has a relatively limited volume, the magnetic disk database is required to provide permanent storage for the blockchain data.

[0038] When the node needs to read the blockchain data in the database, the node first reads from the memory database. A reading speed of the memory database is higher than that of the magnetic disk database, so that reading the blockchain data from the memory database can effectively improve the reading efficiency. If the reading fails, the node reads from the magnetic disk database and synchronizes the read blockchain data to the memory database after the reading succeeds, so that a subsequent reading may be performed directly in the memory database, so as to improve the reading speed. If the required blockchain data is still not read from the disk database, a message informing that the reading has failed is returned to the node.

[0039] In the present embodiment, the node writes the blockchain data into the memory database and the magnetic disk database for storage, respectively. During reading of the blockchain data, the node first reads from the memory database, and if the reading fails, the node reads from the magnetic disk database and synchronizes

the read blockchain data to the memory database. Due to the high reading and writing performance of the memory database, the storage of the blockchain data can be effectively improved. Since the memory database has a limited volume, permanent storage for the blockchain data of the node is provided through the magnetic disk database. When the node fails to read the blockchain data from the memory database, the node can read through the magnetic disk database. In addition, the read blockchain data is synchronized to the memory database, so that the reading may be performed directly in the memory database next time, which effectively improves the reading speed.

[0040] In an embodiment, the system further includes a first memory mapping file, and when writing of the blockchain data into the memory database fails, the node acquires the first memory mapping file and writes the blockchain data to the first memory mapping file; after the memory database is restored, the node writes the blockchain data into the memory database through the first memory mapping file.

[0041] There is a possibility that the node fails to write the blockchain data into the memory database. Although the possibility of such a writing failure is relatively low, the high-frequency storage of the blockchain data would be affected once the writing failure occurs.

[0042] In the present embodiment, the memory database has a corresponding first memory mapping file. When writing of the blockchain data into the memory database fails, the node acquires the first memory mapping file corresponding to the memory database, and writes the blockchain data into the first memory mapping file. The blockchain data is cached through the first memory mapping file. Therefore, in case of a storage failure of the memory database, it is possible to effectively prevent a reduction of the storing efficiency of the blockchain data. The first memory mapping file is pre-memory mapped. After the memory database is restored, the node writes the blockchain data stored in the first memory mapping file to the memory database, thereby ensuring that the cached data can be accurately stored in the memory database, and data loss is effectively prevented.

[0043] After that the node writes the blockchain data stored in the first memory

mapping file into the memory database after the memory database is restored, the node may also delete the cached blockchain data in the first memory mapping file, so as to effectively improve the utilization of the first memory mapping file.

[0044] In an embodiment, the system further includes a second memory mapping file, and when writing of the blockchain data into the magnetic disk database fails, the node acquires the second memory mapping file and writes the blockchain data into the second memory mapping file; after the magnetic disk database is restored, the node writes the blockchain data into the magnetic disk database through the second memory mapping file.

[0045] There is a possibility that the node fails to write the blockchain data into the magnetic disk database. Although the possibility of such a writing failure is relatively low, the storage of the blockchain data would be affected once the writing failure occurs.

[0046] In the present embodiment, the magnetic disk database has a corresponding second memory mapping file. When writing of the blockchain data into the magnetic disk database fails, the node acquires the second memory mapping file corresponding to the magnetic disk database, and writes the blockchain data into the second memory mapping file. The blockchain data is cached through the second memory mapping file. Therefore, in case of a storage failure of the magnetic disk database, it is possible to effectively prevent a reduction of the storing efficiency of the blockchain data. The second memory mapping file is pre-memory mapped. After the magnetic disk database is restored, the node writes the blockchain data stored in the second memory mapping file to the magnetic disk database, thereby ensuring that the cached data can be accurately stored in the magnetic disk database, and data loss is effectively prevented.

[0047] After that the node writes the blockchain data stored in the second memory mapping file into the magnetic disk database after the magnetic disk database is restored, the node may also delete the cached blockchain data in the second memory mapping file, so as to effectively improve the utilization of the second memory mapping file.

[0048] In an embodiment, the magnetic disk database includes a primary magnetic disk database and a secondary magnetic disk database. The blockchain data is written into the primary magnetic disk database for storage, and synchronization of the blockchain data between the primary magnetic disk database and the secondary magnetic disk database is maintained. When the node reads the blockchain data, the blockchain data is read from the secondary magnetic disk database.

[0049] The magnetic disk database provides permanent storage for the blockchain data, and the magnetic disk database is divided into a primary magnetic disk database and a secondary magnetic disk database in order to effectively improve the reading and writing performance of the magnetic disk database. The primary magnetic disk database is configured to receive the blockchain data written by the node to store the blockchain data, and may further be configured for the node to read the blockchain data. The secondary magnetic disk database is configured for the node to read the blockchain data. When the node reads data from the magnetic disk database, the node may read from the secondary magnetic disk database. If reading from the secondary magnetic disk database fails, the reading may be performed in the primary magnetic disk database. By separating the reading and writing functions of the primary magnetic disk database and the secondary magnetic disk database, the storing efficiency of the magnetic disk database can be effectively improved.

[0050] Further, a plurality of primary magnetic disk databases are provided, and a plurality of secondary magnetic disk databases are provided. The node performs reading and writing in the plurality of primary magnetic disk databases through a magnetic disk database interface layer, a data routing, a sharding middleware and a primary database connection pool. The node performs reading in the plurality of primary magnetic disk databases through a magnetic disk database interface layer, a data routing, a sharding middleware and a secondary database connection pool.

[0051] In one of the embodiments, a schematic diagram of the connections of a node to a memory database and a magnetic disk database is shown in FIG. 2. The node connects with the memory database through a database interface layer and a memory database interface layer to perform reading and writing in the memory

database. The node connects with a plurality of primary magnetic disk databases through the database interface layer, the magnetic disk database interface layer, the data routing, the sharding middleware and the primary database connection pool. The node connects with a plurality of secondary magnetic disk databases through the database interface layer, the magnetic disk database interface layer, the data routing, the sharding middleware and the secondary database connection pool.

[0052] The primary magnetic disk database may be divided into a plurality of primary magnetic disk databases through the sharding middleware. Specifically, the primary magnetic disk database may be divided into a plurality of primary magnetic disk databases according to the types of the blockchain data. Thus, the blockchain data may be respectively stored in different primary magnetic disk databases according to the types of blockchain data, so that classified storage of the blockchain data may be implemented.

[0053] The secondary magnetic disk database may be divided into a plurality of secondary magnetic disk databases through the sharding middleware. Specifically, the primary magnetic disk database may be divided into a plurality of primary magnetic disk databases according to the types of the blockchain data. Synchronization between the primary magnetic disk databases and the secondary magnetic disk databases is maintained through a database log. A classified storage can be performed to the blockchain data in the primary magnetic disk databases, such that the classified storage can also be implemented to the blockchain data in the secondary magnetic disk databases. When the node reads the blockchain data, the corresponding blockchain data may be acquired from the secondary magnetic disk database according to the type of blockchain data, so as to effectively improve the reading speed.

[0054] In an embodiment, after the node is restarted, the node first reads the blockchain data from the magnetic disk database and loads the read blockchain data into the memory database, and synchronization between the magnetic disk database and the memory database is performed at a predetermined frequency.

[0055] In the present embodiment, after the blockchain node is powered off, the

blockchain data in the memory database is lost or invalid. After the node is restarted, the node first reads the blockchain data from the magnetic disk database and loads the read blockchain data into the memory database. After the node is started, synchronization between the magnetic disk database and the memory database corresponding to the node is performed at a predetermined frequency, so as to ensure that the node may first read from the memory database when reading data, and the reading speed is effectively improved.

[0056] In an embodiment, as shown in FIG. 3, a method for storing blockchain data is provided, which is described in an example that the method is applied to a blockchain node, the method includes the steps of:

[0057] At step 302, blockchain data is acquired.

[0058] At step 304, the blockchain data is written into a memory database and a magnetic disk database for storage, respectively.

[0059] At step 306, the blockchain data is first read from the memory database during reading of the blockchain data, and if the reading fails, the blockchain data is read from the magnetic disk database and the read blockchain data is synchronized to the memory database.

[0060] In the present embodiment, the node reads the blockchain data including a transaction execution result and a transaction log. The database corresponding to the blockchain node includes the magnetic disk database and the memory database. The node writes the blockchain data into the memory database through a memory database interface layer, and the memory database stores the blockchain data written by the node. The node writes the blockchain data into the magnetic disk database through a magnetic disk database interface, a data routing, a sharding middleware, etc., and the magnetic disk database stores the blockchain data written by the node. Since a writing speed of the memory database is much higher than that of the magnetic disk database, storing the blockchain data in the memory database can effectively improve the storing efficiency. Performance of the blockchain will not be affected when the blockchain data is written into the memory database at a high frequency. However, since the memory database has a relatively limited volume, the

magnetic disk database is required to provide permanent storage for the blockchain data.

[0061] When the node needs to read the blockchain data in the database, the node first reads from the memory database. A reading speed of the memory database is higher than that of the magnetic disk database, so that reading the blockchain data from the memory database can effectively improve the reading efficiency. If the reading fails, the node reads from the magnetic disk database, and synchronizes the read blockchain data to the memory database after the reading succeeds, so that a subsequent reading may be performed directly in the memory database, so as to improve the reading speed. If the required blockchain data is still not read from the disk database, a message informing that the reading has failed is returned to the node.

[0062] In the present embodiment, due to the high reading and writing performance of the memory database, the node writes the blockchain data into the memory database respectively, which enables to effectively improve the storage of blockchain data. Since the memory database has a limited volume, permanent storage for the blockchain data of the node is provided through the magnetic disk database. When the node fails to read the blockchain data from the memory database, the node can read through the magnetic disk database. In addition, the read blockchain data is synchronized to the memory database, so that the reading may be performed directly in the memory database next time, which effectively improves the reading speed.

[0063] It should be appreciated that although the various steps in the flowcharts of FIG. 3 are shown sequentially as indicated by the arrows, these steps are not necessarily performed sequentially in the order indicated by the arrows. The performance of these steps is not critical to the order in which they are performed unless explicitly stated herein, and the steps may be performed in other orders. Moreover, at least a part of the steps in FIG. 3 may include a plurality of sub-steps or stages, which are not necessarily performed at the same time, but may be performed at different times, and the order in which the sub-steps or stages are performed is not necessarily performed sequentially, but may be performed in turns or alternatively with other steps or at least a part of sub-steps or stages of other steps.

[0064] In an embodiment, the memory database includes a first memory mapping file; and the method further includes: when writing of the blockchain data into the memory database fails, the first memory mapping file is acquired and the blockchain data is written into the first memory mapping file; after the memory database is restored, the blockchain data is written into the memory database through the first memory mapping file.

[0065] In the present embodiment, the memory database has a corresponding first memory mapping file. When writing of the blockchain data into the memory database fails, the node acquires the first memory mapping file corresponding to the memory database, and writes the blockchain data into the first memory mapping file. The blockchain data is cached through the first memory mapping file. Therefore, in case of a storage failure of the memory database, it is possible to effectively prevent a reduction of the storing efficiency of the blockchain data. The first memory mapping file is pre-memory mapped. After the memory database is restored, the node writes the blockchain data stored in the first memory mapping file to the memory database, thereby ensuring that the cached data can be accurately stored in the memory database, and data loss is effectively prevented.

[0066] In an embodiment, the magnetic disk database includes a second memory mapping file; and the method further includes: when writing of the blockchain data into the magnetic disk database fails, the second memory mapping file is acquired and the blockchain data is written into the second memory mapping file; after the magnetic disk database is restored, the blockchain data is written into the magnetic disk database through the second memory mapping file.

[0067] In the present embodiment, the magnetic disk database has a corresponding second memory mapping file. When writing of the blockchain data into the magnetic disk database fails, the node acquires the second memory mapping file corresponding to the magnetic disk database, and writes the blockchain data into the second memory mapping file. The blockchain data is cached through the second memory mapping file. Therefore, in case of a storage failure of the magnetic disk database, it is possible to effectively prevent a reduction of the storing efficiency of the blockchain data. The

second memory mapping file is pre-memory mapped. After the magnetic disk database is restored, the node writes the blockchain data stored in the second memory mapping file to the magnetic disk database, thereby ensuring that the cached data can be accurately stored in the magnetic disk database, and data loss is effectively prevented.

[0068] In an embodiment, the magnetic disk database includes a primary magnetic disk database and a secondary magnetic disk database; and the method further includes: the blockchain data is written into the primary magnetic disk database for storage; and synchronization of the blockchain data between the primary magnetic disk database and the secondary magnetic disk database is maintained; the blockchain data is read from the secondary magnetic disk database during reading of the blockchain data.

[0069] In the present embodiment, the magnetic disk database is divided into a primary magnetic disk database and a secondary magnetic disk database in order to effectively improve the reading and writing performance of the magnetic disk database. The primary magnetic disk database is configured to receive the blockchain data written by the node to store the blockchain data, and may be further configured for the node to read the blockchain data. The secondary magnetic disk database is configured for the node to read the blockchain data. When the node reads data from the magnetic disk database, the node may read from the secondary magnetic disk database. If reading from the secondary magnetic disk database fails, the reading may be performed in the primary magnetic disk database. By separating the reading and writing functions of the primary magnetic disk database and the secondary magnetic disk database, the storing efficiency of the magnetic disk database can be effectively improved.

[0070] In an embodiment, the blockchain node may be a terminal or a server. As an example, the blockchain node is a terminal, and an internal structure thereof may be as shown in FIG. 4. The terminal includes a processor, a memory, a non-transitory storage medium network interface connected through a system bus. The non-transitory storage medium stores an operating system and computer-readable

instructions. The non-transitory storage medium is a computer-readable non-transitory storage medium. The processor of the terminal is configured to provide calculation and control capabilities and is configured to execute a method for storing blockchain data. The memory of the terminal provides an environment for the operation of the computer-readable instructions in the non-transitory storage medium. The computer-readable instructions are executed by the processor to implement the method for storing blockchain data. The network interface of the computer device is configured to communicate with an external terminal through a network connection. Such as receiving a transaction request uploaded by a client terminal and sending event message flow to the client terminal, etc. Those skilled in the art will appreciate that the structure shown in FIG. 4 is merely a block diagram of a portion of the structure associated with the solution of the present disclosure, and does not constitute a limitation on the computer device to which the solution of the present disclosure is applied, a particular computer device may include more or less components, or combine certain components, or with a different arrangement of components.

[0071] In an embodiment, as shown in FIG. 5, a blockchain data storage device is provided, including: an acquisition module 502, a storage module 504 and an access module 506, in which

[0072] the acquisition module 502 is configured to acquire blockchain data.

[0073] the storage module 204 is configured to write the blockchain data into a memory database and a magnetic disk database for storage, respectively.

[0074] the access module 506 is configured to first read the blockchain data from the memory database during reading of the blockchain data, and if the reading fails, to read the blockchain data from the magnetic disk database and synchronize the read blockchain data to the memory database.

[0075] In an embodiment, the memory database includes a corresponding first memory mapping file; and the storage module 504 is further configured to acquire the first memory mapping file when writing of the blockchain data into the memory database fails, and write the blockchain data into the first memory mapping file; and

to write the blockchain data into the memory database through the first memory mapping file after the memory database is restored.

[0076] In an embodiment, the magnetic disk database includes a corresponding second memory mapping file; and the storage module 504 is further configured to acquire the second memory mapping file when writing of the blockchain data into the magnetic disk database fails, and write the blockchain data into the second memory mapping file; and to write the blockchain data into the magnetic disk database through the second memory mapping file after the magnetic disk database is restored.

[0077] In an embodiment, the magnetic disk database includes a primary magnetic disk database and a secondary magnetic disk database; and the storage module 504 is further configured to write the blockchain data into the primary magnetic disk database for storage; and to maintain synchronization of the blockchain data between the primary magnetic disk database and the secondary magnetic disk database; and the access module 506 is further configured to read the blockchain data from the secondary magnetic disk database during reading of the blockchain data.

[0078] In an embodiment, a blockchain node is provided comprising a memory and one or more processors, and the memory has computer-readable instructions stored therein which, when executed by the processor, cause the one or more processors to implement the steps of embodiments of the methods as described.

[0079] In an embodiment, one or more non-transitory storage mediums are provided having computer-readable instructions stored therein which, when executed by the processor, cause the one or more processors to implement the steps of embodiments of the methods as described.

[0080] Persons of ordinary skill in the art understand that all or part of the processes in the methods of the foregoing embodiments may be implemented by a computer program instructing relevant hardware. The computer program may be stored in a non-transitory computer-readable storage medium. When the computer program is executed, flows of embodiments of the methods as described above may be included. Any references to memory, storage, databases, or other media used in the various embodiments provided herein may include non-transitory and/or transitory

memory. The non-transitory memory may include a read only memory (ROM), a programmable ROM (PROM), an electrically programmable ROM (EPROM), an electrically erasable programmable ROM (EEPROM), or a flash memory. The transitory memory may include a random access memory (RAM) or an external cache memory. By way of illustration and not limitation, RAM is available in a variety of forms such as static RAM (SRAM), dynamic RAM (DRAM), synchronous DRAM (SDRAM), double data rate SDRAM (DDRSDRAM), enhanced SDRAM (ESDRAM), Synchlink DRAM (SLDRAM), Memory Bus (Rambus) Direct RAM (RDRAM), Direct Memory Bus Dynamic RAM (DRDRAM), Memory Bus Dynamic RAM (RDRAM) etc.

[0081] The foregoing respective technical features involved in the respective embodiments can be combined arbitrarily, for brevity, not all possible combinations of the respective technical features in the foregoing embodiments are described, however, to the extent they have no collision with each other, the combination of the respective technical features shall be considered to be within the scope of the description.

[0082] The foregoing implementations are merely specific embodiments of the present disclosure, and are not intended to limit the protection scope of the present disclosure. It should be noted that any variation or replacement readily figured out by persons skilled in the art within the technical scope disclosed in the present disclosure shall all fall into the protection scope of the present disclosure. Therefore, the protection scope of the present disclosure shall be subject to the protection scope of the claims.

What is claimed is:

1. A system for storing blockchain data, comprising a memory database and a magnetic disk database, wherein

the memory database and the magnetic disk database respectively receive blockchain data written by a blockchain node, and store the blockchain data; and

when a node reads the blockchain data, the node first reads the blockchain data from the memory database, and if the reading fails, the node reads the blockchain data from the magnetic disk database, and synchronizes the read blockchain data to the memory database.

2. The system according to claim 1, further comprising a first memory mapping file, wherein when writing of the blockchain data into the memory database fails, the node acquires the first memory mapping file and writes the blockchain data into the first memory mapping file; and after the memory database is restored, the node writes the blockchain data into the memory database through the first memory mapping file.

3. The system according to claim 1, further comprising a second memory mapping file, and when writing of the blockchain data into the magnetic disk database fails, the node acquires the second memory mapping file and writes the blockchain data into the second memory mapping file; and after the magnetic disk database is restored, the node writes the blockchain data into the magnetic disk database through the second memory mapping file.

4. The system according to claim 1, wherein the magnetic disk database comprises a primary magnetic disk database and a secondary magnetic disk database; the blockchain data is written into the primary magnetic disk database for storage, and synchronization of the blockchain data between the primary magnetic disk database and the secondary magnetic disk database is maintained; and when the node reads the blockchain data, the blockchain data is read from the secondary magnetic disk database.

5. The system according to claim 4, wherein a plurality of primary magnetic disk databases are provided, and the node performs reading and writing in the plurality of primary magnetic disk databases through a magnetic disk database interface layer, a data routing, a sharding middleware and a primary database connection pool.

6. The system according to claim 4 or 5, wherein a plurality of secondary magnetic disk databases are provided, and the node performs reading in the plurality of primary magnetic disk databases through a magnetic disk database interface layer, a data routing, a sharding middleware and a secondary database connection pool.

7. The system according to claim 1, wherein after the node is restarted, the node first reads the blockchain data from the magnetic disk database and loads the read blockchain data into the memory database, and synchronization between the magnetic disk database and the memory database is performed at a predetermined frequency.

8. A method for storing blockchain data, comprising:
acquiring blockchain data;
writing the blockchain data into a memory database and a magnetic disk database for storage, respectively; and
reading the blockchain data first from the memory database during reading of the blockchain data, and reading the blockchain data from the magnetic disk database if the reading fails, and synchronizing the read blockchain data to the memory database.

9. The method according to claim 8, wherein the memory database has a corresponding first memory mapping file; the method further comprises:
acquiring the first memory mapping file when writing of the blockchain data into the memory database fails, and writing the blockchain data into the first memory mapping file; and
writing the blockchain data to the memory database through the first memory

mapping file after the memory database is restored.

10. The method according to claim 8, wherein the magnetic disk database has a corresponding second memory mapping file, the method further comprises:
acquiring the second memory mapping file when writing of the blockchain data into the magnetic disk database fails, and writing the blockchain data into the second memory mapping file; and
writing the blockchain data to the magnetic disk database through the second memory mapping file after the magnetic disk database is restored.

11. The method according to any one of claims 8 to 10, wherein the magnetic disk database comprises a primary magnetic disk database and a secondary magnetic disk database; the method further comprises:
writing the blockchain data into the primary magnetic disk database for storage;
maintaining synchronization of the blockchain data between the primary magnetic disk database and the secondary magnetic disk database; and
reading the blockchain data from the secondary magnetic disk database during reading of the blockchain data.

12. A blockchain data storage device, comprising
an acquisition module configured to acquire blockchain data;
a storage module configured to write the blockchain data into a memory database and a magnetic disk database for storage, respectively;
an access module configured to first read the blockchain data from the memory database during reading of the blockchain data, and if the reading fails, to read the blockchain data from the magnetic disk database and synchronize the read blockchain data to the memory database.

13. A blockchain node, comprising a memory and one or more processors, the memory having computer-readable instructions stored therein which, when executed

by the processor, causing the one or more processors to perform the steps of:
acquiring blockchain data;
writing the blockchain data into a memory database and a magnetic disk database for storage, respectively; and
reading the blockchain data first from the memory database during reading of the blockchain data, and reading the blockchain data from the magnetic disk database if the reading fails, and synchronizing the read blockchain data to the memory database.

14. The blockchain node according to claim 13, wherein the memory database has a corresponding first memory mapping file; and the computer-readable instructions, when executed by the processor, cause the one or more processors to further perform the steps of:
acquiring the first memory mapping file when writing of the blockchain data into the memory database fails, and writing the blockchain data into the first memory mapping file; and
writing the blockchain data to the memory database through the first memory mapping file after the memory database is restored.

15. The blockchain node according to claim 14, wherein the magnetic disk database has a corresponding second memory mapping file; and the computer-readable instructions, when executed by the processor, cause the one or more processors to further perform the steps of:
acquiring the second memory mapping file when writing of the blockchain data into the magnetic disk database fails, and writing the blockchain data into the second memory mapping file; and
writing the blockchain data to the magnetic disk database through the second memory mapping file after the magnetic disk database is restored.

16. The blockchain node according to any one of claims 13 to 15, wherein the magnetic disk database comprises a primary magnetic disk database and a secondary

magnetic disk database; and the computer-readable instructions, when executed by the processor, cause the one or more processors to further perform the steps of:
writing the blockchain data into the primary magnetic disk database for storage;
maintaining synchronization of the blockchain data between the primary magnetic disk database and the secondary magnetic disk database; and
reading the blockchain data from the secondary magnetic disk database during reading of the blockchain data.

17. One or more non-transitory computer-readable storage medium having computer-readable instructions stored thereon which, when executed by one or more processors, causing the one or more processors to perform:
acquiring blockchain data;
writing the blockchain data into a memory database and a magnetic disk database for storage, respectively; and
reading the blockchain data first from the memory database during reading of the blockchain data, and reading the blockchain data from the magnetic disk database if the reading fails, and synchronizing the read blockchain data to the memory database.

18. The storage medium according to claim 17, wherein the memory database has a corresponding first memory mapping file; and the computer-readable instructions, when executed by the processor, cause the one or more processors to further perform the steps of:
acquiring the first memory mapping file when writing of the blockchain data into the memory database fails, and writing the blockchain data into the first memory mapping file; and
writing the blockchain data to the memory database through the first memory mapping file after the memory database is restored.

19. The storage medium according to claim 17, wherein the magnetic disk database has a corresponding second memory mapping file; and the computer-readable

instructions, when executed by the processor, cause the one or more processors to further perform the steps of:

acquiring the second memory mapping file when writing of the blockchain data into the magnetic disk database fails, and writing the blockchain data into the second memory mapping file; and

writing the blockchain data to the magnetic disk database through the second memory mapping file after the magnetic disk database is restored.

20. The storage medium according to any one of claims 17to 19, wherein the magnetic disk database comprises a primary magnetic disk database and a secondary magnetic disk database; and the computer-readable instructions, when executed by the processor, cause the one or more processors to further perform the steps of:

writing the blockchain data into the primary magnetic disk database for storage;

maintaining synchronization of the blockchain data between the primary magnetic disk database and the secondary magnetic disk database; and

reading the blockchain data from the secondary magnetic disk database during reading of the blockchain data.