(54) **BLOCKCHAIN SERVER COMPUTING CAPABILITY ALLOCATION METHOD AND SYSTEM**

VERFAHREN UND SYSTEM ZUR ZUWEISUNG VON BLOCKKETTEN-SERVER-RECHENKAPAZITÄTEN

PROCÉDÉ ET SYSTÈME D'ALLOCATION DES CAPACITÉS DE CALCUL DE SERVEUR DE CHAÎNE DE BLOCS

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• CHARLIE HOU ET AL: "SquirRL: Automating Attack Discovery on Blockchain Incentive Mechanisms with Deep Reinforcement Learning", ARXIV.ORG, CORNELL UNIVERSITY LIBRARY, 201 OLIN LIBRARY CORNELL UNIVERSITY ITHACA, NY 14853, 4 December 2019 (2019-12-04), XP081544893
• FANG MINGHONG ET AL: "Toward Low-Cost and Stable Blockchain Networks", ICC 2020 - 2020 IEEE INTERNATIONAL CONFERENCE ON COMMUNICATIONS (ICC), IEEE, 7 June 2020 (2020-06-07), pages 1 - 6, XP033797633, DOI: 10.1109/ICC40277.2020.9148615

Description

Technical Field

[0001] The present invention relates to the technical field of blockchain server computing capability allocation, in particular to a blockchain server computing capability allocation method and system.

Background

[0002] Blockchain consensus computing refers to a process of collecting unconfirmed transactions into a data block using a CPU or other dedicated hardware computing devices, and calculating an SHA-256 hash value of the data block after attaching a random adjustment number, repeatedly attempting the previous step until a random adjustment number which makes the generated hash value lower than a specific target is found, and obtaining corresponding rewards. The tool used in the blockchain consensus computing process is a blockchain server. A blockchain server computing capability represents computing capability of the blockchain server, which specifically represents the number of overall hash algorithm operation times of the blockchain server per second.

[0003] At present, each of the blockchain servers is configured with a sub-account, if the blockchain server is to provide computing capability to other sub-accounts, the blockchain server needs to be configured with sub-accounts, such that related art have the problems of cumbersome computing capability allocation process and inaccurate computing capability allocation of blockchain servers. In addition, in related art, one sub-account is configured with a plurality of blockchain servers, and when a blockchain server fails, the computing capability of the sub-account will be affected.

[0004] It should be noted that the sub-account is an account used by a blockchain computing distribution center to distribute money, and there may be a plurality of sub-accounts, each corresponding to a different user.

[0005] Publication from Jiao Yutao et al. "Social Welfare Maximization Auction in Edge Computing Resource Allocation for Mobile Blockchain", 2018 IEEE INTERNATIONAL CONFERENCE ON COMMUNICATIONS (ICC), IEEE, 20 May 2018 (2018-05-20), pages 1-6, XP033378617, DOI: 10.1109/ICC.2018.8422632, considers deploying edge computing service to support the mobile blockchain. The publication proposes an auction-based edge computing resource allocation mechanism for the edge computing service provider.

[0006] Publication from Charlie Hou et al. "SquirRL: Automating Attack Discovery on Blockchain Incentive Mechanisms with Deep Reinforcement Learning", ARXIV.ORG, CORNELL UNIVERSITY LIBRARY, 201 OLIN LIBRARY CORNELL UNIVERSITY ITHACA, NY 14853, 4 December 2019 (2019-12-04), XP081544893, proposes SquirRL, a framework for using deep reinforcement learning to identify attack strategies on blockchain incentive mechanisms. With minimal setup, SquirRL replicates known theoretical results on the Bitcoin protocol. In more complex and realistic settings, as when mining power varies over time, it identifies attack strategies superior to those known in the literature. Finally, SquirRL yields results suggesting that classical selfish mining attacks against Bitcoin lose effectiveness in the presence of multiple attackers. These results shed light on why selfish mining, which is unobserved to date in the wild, may be a poor attack strategy.

[0007] Publication from Fang Minghong et al. "Toward Low-Cost and Stable Blockchain Networks", ICC 2020 - 2020 IEEE INTERNATIONAL CONFERENCE ON COMMUNICATIONS (ICC), IEEE, 7 June 2020 (2020-06-07), pages 1-6, XP033797633, DOI: 10.1109/ICC40277.2020.9148615, proposes a blockchain mining resources allocation algorithm to reduce the mining cost in PoW-based (proof-of-work-based) blockchain networks. First, an analytical queuing model for general blockchain networks is proposed. Then the Lyapunov optimization techniques are leveraged to propose a dynamic mining resources allocation algorithm (DMRA), which is parametrized by a tuning parameter $K > 0$.

Summary

[0008] In view of this, provided is a blockchain server computing capability allocation method and system, so as to solve the problems of inaccurate allocation results of the computing capability of a blockchain server and unstable computing capability of a sub-account in the related art.

[0009] The present invention adopts the following technical solution:
According to a first aspect, the present invention provides a blockchain server computing capability allocation method as recited in claim 1.

[0010] Preferably, the step of determining an up-to-standard result of the computing capability of the first sub-account by the blockchain computing distribution module includes:

determining the computing capability according to the task result by the blockchain computing distribution module;
adding, by the blockchain computing distribution module, the computing capability corresponding to the task result and an accumulated computing capability of the first sub-account to obtain a target computing capability of the first sub-account, wherein the accumulated computing capability of the first sub-account is computed according to a computing result of the blockchain server corresponding to the first sub-account received by the blockchain computing distribution module; and
determining the up-to-standard result according to

the target computing capability of the first sub-account and computing capability standard corresponding to the first sub-account by the blockchain computing distribution module.

Preferably, the first sub-account information further includes a blockchain computing distribution center address corresponding to the first sub-account;

the step of acquiring, by the computing scheduling module, the first sub-account information sent by the blockchain computing distribution module includes:

acquiring, by the computing scheduling module, the first sub-account information sent by the blockchain computing distribution module and the blockchain computing distribution center address corresponding to the first sub-account;

sending, by the computing scheduling module, authentication information to the blockchain computing distribution module according to the first sub-account and the blockchain computing distribution center address corresponding to the first sub-account;

feeding back an authentication result to the computing scheduling module according to the authentication information by the blockchain computing distribution module;

connecting to the blockchain computing distribution center corresponding to the first sub-account according to the authentication result by the computing scheduling module when the authentication result is successful;

sending, by the blockchain computing distribution module, a blockchain consensus computing task corresponding to the first sub-account to the computing scheduling module; and

receiving, by the computing scheduling module, the blockchain consensus computing task corresponding to the first sub-account sent by the blockchain computing distribution module.

[0011] Preferably, the blockchain server computing capability allocation method of the present invention further includes: scheduling a standby blockchain server to provide the computing capability for the sub-account when the computing scheduling module determines that the blockchain server fails or the computing capability of the blockchain server is not up to standard.

[0012] According to a second aspect, the present invention further provides a blockchain server computing capability allocation system as recited in claim 5.

[0013] Preferably, the blockchain server computing capability allocation system of the present invention further includes: a blockchain computing distribution module;

wherein the blockchain computing distribution module is configured to send sub-account information to the computing scheduling module, determine an up-to-standard result of the computing capability of the

sub-account according to a scheduling result of the computing scheduling module, and feeding back the up-to-standard result to the computing scheduling module; and

the computing scheduling module is further configured to determine a computing capability allocation result of the blockchain server according to the scheduling result.

[0014] The present invention adopts the above technical solution. A blockchain server computing capability allocation method includes: acquiring, by a computing scheduling module, first sub-account information sent by a blockchain computing distribution module, wherein the blockchain computing distribution module includes a plurality of sub-accounts; scheduling, by the computing scheduling module, the blockchain server to provide computing capability for a first sub-account according to the first sub-account information; determining an up-to-standard result of the computing capability of the first sub-account, and feeding back the up-to-standard result to the computing scheduling module by the blockchain computing distribution module; scheduling the blockchain server to provide computing capability for a second sub-account when the computing scheduling module determines that the computing capability of the first sub-account is up to standard according to the up-to-standard result; scheduling the blockchain server to continue to provide the computing capability for the first sub-account by the computing scheduling module when the computing scheduling module determines that the computing capability of the first sub-account is not up to standard according to the up-to-standard result; and repeating the above steps until the computing capability of all sub-accounts is up to standard. Based on this, it is possible in the present invention to divide and distribute the computing capability of one blockchain server to the sub-accounts without modifying the configuration of the blockchain server, thereby realizing the purpose of accurately dividing the computing capability of the blockchain server. In addition, with the technical solution of switching to another sub-account only when the computing capability of one sub-account is up to standard, and providing the computing capability for the other sub-account in the present invention, the stability of computing capability of each sub-account is ensured.

Brief Description of the Drawings

[0015] To more clearly illustrate embodiments of the present invention or technical solutions in prior art, the following will briefly introduce the drawings that are desired to be used in the description of the embodiments or prior art. Obviously, the drawings in the following description are merely some embodiments of the present invention, and other drawings may also be obtained according to these drawings without exerting inventive effort by those ordinarily skilled in the art.

FIG. 1 is a flow diagram of a blockchain server computing capability allocation method provided by an embodiment of the present invention; and
FIG. 2 is a structural schematic diagram of a blockchain server computing capability allocation system provided by the embodiment of the present invention.

Description of the Embodiments

[0016] To make the objects, technical solutions and advantages of the present invention clearer, the technical solutions of the present invention will be described in detail below. Obviously, the described embodiments are only a part of the embodiments of the present invention, without covering all embodiments. All other embodiments that those of ordinary skill in the art obtain without creative efforts based on the embodiments of the present invention also fall within the scope of the present invention.

[0017] FIG. 1 is a flow diagram of a blockchain server computing capability allocation method provided by an embodiment of the present invention. As shown in FIG. 1, the blockchain server computing capability allocation method of this embodiment includes:
At S 101, a computing scheduling module acquirers first sub-account information sent by a blockchain computing distribution module, wherein the blockchain computing distribution module includes a plurality of sub-accounts.

[0018] Specifically, the first sub-account information includes a first sub-account, a blockchain computing distribution center address corresponding to the first sub-account and a blockchain consensus computing task corresponding to the first sub-account.

[0019] The computing scheduling module acquires the first sub-account information sent by the blockchain computing distribution module, including:

the computing scheduling module acquires the first sub-account information sent by the blockchain computing distribution module and the blockchain computing distribution center address corresponding to the first sub-account;
the computing scheduling module sends authentication information to the blockchain computing distribution module according to the first sub-account and the blockchain computing distribution center address corresponding to the first sub-account;
the blockchain computing distribution module feeds back an authentication result to the computing scheduling module according to the authentication information;
the computing scheduling module is connected to the blockchain computing distribution center corresponding to the first sub-account according to the authentication result when the authentication result is successful;
the blockchain computing distribution module sends

a blockchain consensus computing task corresponding to the first sub-account to the computing scheduling module; and
the computing scheduling module receives the blockchain consensus computing task corresponding to the first sub-account sent by the blockchain computing distribution module.

[0020] More specifically, one sub-account corresponds to one user, and the blockchain computing distribution center corresponding to each of the sub-accounts can be the same or different. After being started, the computing scheduling module receives the sub-accounts of different users and the blockchain computing distribution center address corresponding to each of the sub-accounts. After connecting to the blockchain computing distribution center address corresponding to one of the sub-accounts, the computing scheduling module sends the authentication information corresponding to the sub-account to the blockchain computing distribution module. After the authentication is successful, the blockchain computing distribution module sends the blockchain consensus computing task of the authenticated sub-account to the computing scheduling module. Similarly, the computing scheduling module is connected to the blockchain computing distribution center corresponding to other sub-accounts, and receives the blockchain consensus computing tasks of other sub-accounts.

[0021] At S 102, the computing scheduling module schedules the blockchain server to provide computing capability for a first sub-account according to the first sub-account information.

[0022] In detail, firstly, the computing scheduling module sends the blockchain consensus computing task corresponding to the first sub-account to the blockchain server; then, the blockchain server computes a task result according to the blockchain consensus computing task corresponding to the first sub-account, and feeds back the task result to the computing scheduling module; and finally, the computing scheduling module sends the task result to the blockchain computing distribution module.

[0023] At S103, the blockchain computing distribution module determines an up-to-standard result of the computing capability of the first sub-account, and feeds back the up-to-standard result to the computing scheduling module.

[0024] Specifically, at first, the blockchain computing distribution module determines the computing capability according to the task result; then, the blockchain computing distribution module adds the computing capability corresponding to the task result and an accumulated computing capability of the first sub-account to obtain a target computing capability of the first sub-account; wherein the accumulated computing capability of the first sub-account is computed according to a computing result of the blockchain server corresponding to the first sub-account received by the blockchain computing distribu-

tion module; and the accumulated computing capability of the first sub-account may be 0 or not, the accumulated computing capability of the first sub-account is 0 when the blockchain computing distribution module receives the computing result of the blockchain server corresponding to the first sub-account, otherwise, it is not 0. Finally, the blockchain computing distribution module determines the up-to-standard result according to the target computing capability of the first sub-account and computing capability standard corresponding to the first sub-account, that is, the blockchain computing distribution module determines whether the target computing capability of the first sub-account meets the computing capability requirement of the first sub-account, and the computing capability standard corresponding to the first sub-account is present in the blockchain computing distribution module in advance.

[0025]   At S 104, the computing scheduling module schedules the blockchain server to provide computing capability for a second sub-account when determining that the computing capability of the first sub-account is up to standard according to the up-to-standard result; and the computing scheduling module schedules the blockchain server to continue to provide the computing capability for the first sub-account when determining that the computing capability of the first sub-account is not up to standard according to the up-to-standard result.

[0026]   Specifically, first, the computing scheduling module analyzes the up-to-standard result; when determining that the computing capability of the first sub-account is up to standard according to the up-to-standard result, the computing scheduling module switches to the second sub-account, connects to the blockchain computing distribution center corresponding to the second sub-account, receives the blockchain consensus computing task of the second sub-account issued by the blockchain computing distribution module, and schedules the blockchain server to provide computing capability for the second sub-account; and when determining that the computing capability of the first sub-account is not up to standard according to the up-to-standard result, the computing scheduling module continues to receive the blockchain consensus computing task of the first sub-account issued by the blockchain computing distribution module, and schedules the blockchain server to continue to provide the computing capability for the first sub-account.

[0027]   At S 105, the above steps are repeated until the computing capability of all sub-accounts is up to standard.

[0028]   Specifically, the above steps realize allocating the computing capability of the blockchain server to the first sub-account so that the computing capability of the first sub-account meets the requirements of the sub-account, when the computing capability of the first sub-account meets the requirements of the sub-account, and the computing scheduling module allocates the computing capability of the blockchain server to the second sub-account so that the computing capability of the second sub-account meets the requirements of the sub-account. Similarly, when the computing capability of the second sub-account meets the requirements of the sub-account, the computing scheduling module allocates the computing capability of the blockchain server to other sub-accounts, so that the computing capability of each of the sub-accounts is up to standard, thereby dividing and distributing the computing capability of one blockchain server is to a plurality of sub-accounts and providing the computing capability for a plurality of sub-accounts.

[0029]   This embodiment adopts the above technical solution. A blockchain server computing capability allocation method, includes: acquiring, by a computing scheduling module, first sub-account information sent by a blockchain computing distribution module, wherein the blockchain computing distribution module includes a plurality of sub-accounts; scheduling, by the computing scheduling module, the blockchain server to provide computing capability for a first sub-account according to the first sub-account information; determining an up-to-standard result of the computing capability of the first sub-account, and feeding back the up-to-standard result to the computing scheduling module by the blockchain computing distribution module; scheduling the blockchain server to provide computing capability for a second sub-account when the computing scheduling module determines that the computing capability of the first sub-account is up to standard according to the up-to-standard result; scheduling, by the computing scheduling module, the blockchain server to continue to provide the computing capability for the first sub-account when the computing scheduling module determines that the computing capability of the first sub-account is not up to standard according to the up-to-standard result; and repeating the above steps until the computing capability of all sub-accounts is up to standard. Based on this, it is possible in this embodiment to divide and distribute the computing capability of one blockchain server to the sub-accounts without modifying the configuration of the blockchain server, thereby realizing the purpose of accurately dividing the computing capability of the blockchain server. In addition, with the technical solution of switching to another sub-account only when the computing capability of one sub-account is up to standard, and providing the computing capability for the other sub-account in this embodiment, the stability of computing capability of each sub-account is ensured.

[0030]   Preferably, the blockchain server computing capability allocation method of this embodiment further includes: scheduling a standby blockchain server to provide the computing capability for the sub-account when the computing scheduling module determines that the blockchain server fails or the computing capability of the blockchain server is not up to standard.

[0031]   Specifically, the computing scheduling module can determine a situation that the blockchain server fails or the computing capability of the blockchain server is

not up to standard according to instructions of the user, and can also determine the situation that the blockchain server fails or the computing capability of the blockchain server is not up to standard according to other methods capable of implementing the present application in the prior art. When the computing scheduling module determines that the blockchain server fails or the computing capability of the blockchain server is not up to standard, the computing scheduling module is connected to other blockchain servers that do not fail and the computing capability thereof is up to standard, and schedules the blockchain server to provide the computing capability for the sub-account. In this way, the stability of the computing capability of the sub-account is further ensured.

[0032]   Based on a general inventive concept, the present invention further provides a blockchain server computing capability allocation system. The blockchain server computing capability allocation system of this embodiment includes: a blockchain server and a computing scheduling module;

    wherein the computing scheduling module is configured to acquire sub-account information sent by an external blockchain computing distribution module and schedule the blockchain server to provide computing capability for the sub-account according to the sub-account information; the blockchain computing distribution module includes a plurality of sub-accounts; and
    the blockchain server is configured to provide the computing capability for the sub-account according to a scheduling instruction of the computing scheduling module.

[0033]   The present invention further provides another blockchain server computing capability allocation system. FIG. 2 is a structural schematic diagram of a blockchain server computing capability allocation system provided by the embodiment of the present invention. The blockchain server computing capability allocation system of this embodiment is used for implementing the blockchain server computing capability allocation method of the above-mentioned embodiment. As shown in FIG. 2, the blockchain server computing capability allocation system of this embodiment includes: a blockchain server 21, a computing scheduling module 22, and a blockchain computing distribution module 23.

[0034]   The computing scheduling module 22 is configured to acquire sub-account information sent by an external blockchain computing distribution module and schedule the blockchain server to provide computing capability for the sub-account according to the sub-account information; the blockchain computing distribution module includes a plurality of sub-accounts; and the blockchain server 21 is configured to provide the computing capability for the sub-account according to a scheduling instruction of the computing scheduling module. The blockchain computing distribution module 23 is config-

ured to send sub-account information to the computing scheduling module, and determine an up-to-standard result of the computing capability of the sub-account according to a scheduling result of the computing scheduling module, and feed back the up-to-standard result to the computing scheduling module; and the computing scheduling module 22 is further configured to determine computing capability allocation result of the blockchain server according to the scheduling result.

[0035]   Preferably, the computation scheduling module 22 is specifically configured to implement the following method:

    acquiring first sub-account information sent by the blockchain computing distribution module;
    scheduling the blockchain server to provide computing capability for a first sub-account according to the first sub-account information;
    receiving the up-to-standard result of the computing capability of the first sub-account fed back by the blockchain computing distribution module;
    wherein the computing scheduling module schedules the blockchain server to provide the computing capability for a second sub-account when determining that the computing capability of the first sub-account is up to standard according to the up-to-standard result of the computing capability of the first sub-account; and the computing scheduling module schedules the blockchain server to continue to provide the computing capability for the first sub-account when determining that the computing capability of the first sub-account is not up to standard according to the up-to-standard result of the computing capability of the first sub-account.

[0036]   Preferably, the computing scheduling module 22 is further configured to schedule a standby blockchain server to provide the computing capability for the sub-account when determining that the blockchain server fails or the computing capability of the blockchain server is not up to standard.

[0037]   It should be noted that the blockchain server computing capability allocation system of this embodiment and the blockchain server computing capability allocation method of the above-mentioned embodiments are based on a general inventive concept and share the same or corresponding execution process and beneficial effects, which will not be repeatedly described here.

[0038]   It will be understood that the same or similar parts of the above embodiments may refer to each other, and contents not described in detail in some embodiments may refer to the same or similar contents in other embodiments.

[0039]   It should be noted that in the description of the present invention, the terms "first", "second" and the like are used for descriptive purposes only and cannot be understood as indicating or implying relative importance. Furthermore, in the description of the present invention,

"a plurality" means at least two unless otherwise stated.

[0040] Any process or method description in the flow diagram or otherwise described herein may be understood as, a module, fragment, or part of code representing one or more executable instructions for implementing steps of a particular logical function or process, and the scope of the preferred embodiments of the present invention encompasses additional implementations in which functions may be executed not in an order shown or discussed, including in a substantially simultaneous manner or in reverse order depending on the functions involved, as will be understood by those skilled in the art to which embodiments of the present invention pertain.

[0041] It should be understood that each of the parts of the present invention may be implemented by hardware, software, firmware, or a combination thereof.

[0042] In the above embodiments, multiple steps or methods may be realized by software or firmware that is stored in the memory and executed by an appropriate instruction executing system. For example, if it is realized by hardware, it may be realized by any one of the following technologies known in the art or a combination thereof as in another embodiment: a discrete logic circuit(s) having logic gates for implementing logic functions upon data signals, an application specific integrated circuit having appropriate logic gates, a programmable gate array(s) (PGA), a field programmable gate array (FPGA), etc.

[0043] It can be understood by those skilled in the art that all or part of the steps in the embodiments can be completed by the means that relevant hardware is instructed by a program, the program can be stored in a computer readable storage medium, and the program includes any one or combination of the steps of the method embodiments when being executed.

[0044] In addition, each functional unit in each embodiment of the present disclosure may be integrated in a processing module, or be physically independent, or two or more units are integrated in a module. The integrated module above may be implemented by hardware or by a software functional module. The integrated module implemented by the software functional module and sold or used as an independent product may be stored in a computer readable storage medium also.

[0045] The aforementioned storage medium may be a Read Only Memory (ROM), a magnetic disk or a Compact Disk-Read Only Memory (CD-ROM).

[0046] In the context of the description, descriptions of the reference terms "one embodiment", "some embodiments", "example", "specific example" or "some examples" etc. mean that specific features, structures, materials, or characteristics described in connection with the embodiment or example are included in at least one embodiment or example of the present invention.

[0047] In the description, schematic expressions of the above terms do not necessarily refer to the same embodiments or examples.

[0048] Further, the specific features, structures, materials or characteristics described may be combined in any one or more embodiments or examples in a suitable manner.

[0049] Although the embodiments of the present invention have been shown and described above, it is to be understood that the above-described embodiments are exemplary and cannot be construed as limiting of the present invention and that changes, modifications, substitutions and variations may be made to the above embodiments within the scope of the present invention by those of ordinary skill in the art.

Claims

1. A blockchain server computing capability allocation method comprising:

   acquiring, by a computing scheduling module, first sub-account information sent by a blockchain computing distribution module, wherein the blockchain computing distribution module comprises a plurality of sub-accounts;
   scheduling, by the computing scheduling module, the blockchain server to provide computing capability for a first sub-account according to the first sub-account information;
   determining, by the blockchain computing distribution module, an up-to-standard result of the computing capability of the first sub-account, and feeding back the up-to-standard result to the computing scheduling module;
   scheduling the blockchain server to provide computing capability for a second sub-account when the computing scheduling module determines that the computing capability of the first sub-account is up to standard according to the up-to-standard result; scheduling the blockchain server to continue to provide the computing capability for the first sub-account by the computing scheduling module when the computing scheduling module determines that the computing capability of the first sub-account is not up to standard according to the up-to-standard result; and
   repeating the above steps until the computing capability of all sub-accounts is up to standard;
   the first sub-account information comprises the first sub-account and a blockchain consensus computing task corresponding to the first sub-account, blockchain consensus computing referring to a process of collecting unconfirmed transactions into a data block and repeatedly calculating a hash value of the data block after attaching a random adjustment number until the calculated hash value is lower than a specific target; and
   the step of scheduling, by the computing scheduling module, the blockchain server to provide

computing capability for a first sub-account according to the first sub-account information comprises:

> sending the blockchain consensus computing task corresponding to the first sub-account to the blockchain server by the computing scheduling module;
> computing a task result according to the blockchain consensus computing task corresponding to the first sub-account by the blockchain server;
> feeding back the task result to the computing scheduling module by the blockchain server; and
> sending the task result to the blockchain computing distribution module by the computing scheduling module.

2. The blockchain server computing capability allocation method of claim 1, wherein the step of determining an up-to-standard result of the computing capability of the first sub-account by the blockchain computing distribution module comprises:

> determining the computing capability according to the task result by the blockchain computing distribution module;
> adding, by the blockchain computing distribution module, the computing capability corresponding to the task result and an accumulated computing capability of the first sub-account to obtain a target computing capability of the first sub-account, wherein the accumulated computing capability of the first sub-account is computed according to a computing result of the blockchain server corresponding to the first sub-account received by the blockchain computing distribution module; and
> determining the up-to-standard result according to the target computing capability of the first sub-account and computing capability standard corresponding to the first sub-account by the blockchain computing distribution module.

3. The blockchain server computing capability allocation method of claim 1, wherein the first sub-account information further comprises a blockchain computing distribution center address corresponding to the first sub-account; and
the step of acquiring, by the computing scheduling module, the first sub-account information sent by the blockchain computing distribution module comprises:

> acquiring, by the computing scheduling module, the first sub-account information sent by the blockchain computing distribution module and

the blockchain computing distribution center address corresponding to the first sub-account;
sending, by the computing scheduling module, authentication information to the blockchain computing distribution module according to the first sub-account and the blockchain computing distribution center address corresponding to the first sub-account;
feeding back an authentication result to the computing scheduling module according to the authentication information by the blockchain computing distribution module;
connecting to the blockchain computing distribution center corresponding to the first sub-account according to the authentication result by the computing scheduling module when the authentication result is successful;
sending, by the blockchain computing distribution module, a blockchain consensus computing task corresponding to the first sub-account to the computing scheduling module; and
receiving, by the computing scheduling module, the blockchain consensus computing task corresponding to the first sub-account sent by the blockchain computing distribution module.

4. The blockchain server computing capability allocation method of claim 1, further comprising: scheduling a standby blockchain server to provide the computing capability for the sub-account when the computing scheduling module determines that the blockchain server fails or the computing capability of the blockchain server is not up to standard.

5. A blockchain server computing capability allocation system comprising: a blockchain server and a computing scheduling module;

> wherein the computing scheduling module is configured to acquire sub-account information sent by an external blockchain computing distribution module and schedule the blockchain server to provide computing capability for the sub-account according to the sub-account information; the blockchain computing distribution module comprises a plurality of sub-accounts; and
> the blockchain server is configured to provide the computing capability for the sub-account according to a scheduling instruction of the computing scheduling module; the computing scheduling module being specifically configured to:

> > acquire first sub-account information sent by the blockchain computing distribution module, wherein the first sub-account information comprises a first sub-account and a

blockchain consensus computing task corresponding to the first sub-account, blockchain consensus computing referring to a process of collecting unconfirmed transactions into a data block and repeatedly calculating a hash value of the data block after attaching a random adjustment number until the calculated hash value is lower than a specific target; schedule the blockchain server to provide computing capability for the first sub-account according to the first sub-account information; the system further **characterized in that** the computing scheduling module is further configured to receive an up-to-standard result of the computing capability of the first sub-account fed back by the blockchain computing distribution module, wherein the computing scheduling module schedules the blockchain server to provide the computing capability for a second sub-account when determining that the computing capability of the first sub-account is up to standard according to the up-to-standard result of the computing capability of the first sub-account; and the computing scheduling module schedules the blockchain server to continue to provide the computing capability for the first sub-account when determining that the computing capability of the first sub-account is not up to standard according to the up-to-standard result of the computing capability of the first sub-account.

6. The blockchain server computing capability allocation system of claim 5, further comprising: a blockchain computing distribution module;

wherein the blockchain computing distribution module is configured to send sub-account information to the computing scheduling module, and determine an up-to-standard result of the computing capability of the sub-account according to a scheduling result of the computing scheduling module, and feed back the up-to-standard result to the computing scheduling module; and
the computing scheduling module is further configured to determine computing capability allocation result of the blockchain server according to the scheduling result.

Patentansprüche

1. Verfahren zur Zuweisung der Rechenleistung eines Blockchain-Servers, umfassend:

Erfassen von ersten Unterkonteninformationen, die von einem Blockchain-Rechenverteilungsmodul gesendet werden, durch ein Rechenplanungsmodul, wobei das Blockchain-Rechenverteilungsmodul eine Vielzahl von Unterkonten umfasst;
Planen des Blockchain-Servers durch das Rechenplanungsmodul, um die Rechenleistung eines ersten Unterkontos gemäß den ersten Unterkontoinformationen bereitzustellen;
Bestimmen eines normgerechten Ergebnisses der Rechenleistung des ersten Unterkontos durch das Blockchain-Rechenverteilungsmodul und Rückmelden des normgerechten Ergebnisses an das Rechenplanungsmodul;
Planen des Blockchain-Servers, um die Rechenleistung des zweiten Unterkontos bereitzustellen, wenn das Rechenplanungsmodul gemäß dem normgerechten Ergebnis feststellt, dass die Rechenleistung des ersten Unterkontos dem Standard entspricht; Planen des Blockchain-Servers, um die Rechenleistung des ersten Unterkontos weiterhin durch das Rechenplanungsmodul bereitzustellen, wenn das Rechenplanungsmodul gemäß dem normgerechten Ergebnis feststellt, dass die Rechenleistung des ersten Unterkontos nicht dem Standard entspricht; und
Wiederholen der oben genannten Schritte, bis die Rechenleistung aller Unterkonten dem Standard entspricht;
wobei die ersten Unterkontoinformationen das erste Unterkonto und eine dem ersten Unterkonto entsprechende Blockchain-Konsensberechnungsaufgabe umfassen, wobei sich die Blockchain-Konsensberechnung auf einen Prozess des Sammelns unbestätigter Transaktionen in einem Datenblock und des wiederholten Berechnens eines Hashwerts des Datenblocks nach dem Anhängen einer zufälligen Anpassungszahl bezieht, bis der berechnete Hashwert niedriger als ein spezifisches Ziel ist; und
wobei der Schritt des Planens des Blockchain-Servers durch das Rechenplanungsmodul, um die Rechenleistung eines ersten Unterkontos gemäß den ersten Unterkontoinformationen bereitzustellen, umfasst:

Senden der Blockchain-Konsensberechnungsaufgabe, die dem ersten Unterkonto entspricht, an den Blockchain-Server durch das Rechenplanungsmodul;
Berechnen eines Aufgabenergebnisses gemäß der Blockchain-Konsensberechnungsaufgabe, die dem ersten Unterkonto entspricht, durch den Blockchain-Server;
Rückmelden des Aufgabenergebnisses an das Rechenplanungsmodul durch den

Blockchain-Server; und
Senden des Aufgabenergebnisses an das
Blockchain-Rechenverteilungsmodul
durch das Rechenplanungsmodul.

2. Verfahren zur Zuweisung der Rechenleistung eines
Blockchain-Servers nach Anspruch 1, wobei der
Schritt des Bestimmens eines normgerechten Er-
gebnisses der Rechenleistung des ersten Unterkon-
tos durch das Blockchain-Rechenverteilungsmodul
umfasst:

Bestimmen der Rechenleitung gemäß dem Auf-
gabenergebnis durch das Blockchain-Rechen-
verteilungsmodul;
Addieren der dem Aufgabenergebnis entspre-
chenden Rechenleistung und einer akkumulier-
ten Rechenleistung des ersten Unterkontos
durch das Blockchain-Rechenverteilungsmo-
dul, um eine Zielrechenleistung des ersten Un-
terkontos zu erhalten, wobei die akkumulierte
Rechenleistung des ersten Unterkontos gemäß
einem Rechenergebnis des Blockchain-Ser-
vers, das dem ersten Unterkonto entspricht, das
von dem Blockchain-Rechenverteilungsmodul
empfangen wurde, berechnet wird; und
Bestimmen des normgerechten Ergebnisses
gemäß der Zielrechenleistung des ersten Unter-
kontos und dem Rechenleistungsstandard, der
dem ersten Unterkonto entspricht, durch das
Blockchain-Rechnerverteilungsmodul.

3. Verfahren zur Zuweisung der Rechenleistung eines
Blockchain-Servers nach Anspruch 1, wobei die ers-
ten Unterkontoinformationen außerdem eine Adres-
se des Blockchain-Rechenverteilungszentrums um-
fassen, die dem ersten Unterkonto entspricht; und
der Schritt des Erfassens der ersten Unterkontoin-
formationen, die von dem Blockchain-Rechenvertei-
lungsmodul gesendet werden, durch das Rechen-
planungsmodul umfasst:

Erfassen der ersten Unterkonteninformationen,
die vom Blockchain-Rechenverteilungsmodul
gesendet werden, und der Adresse des Block-
chain-Rechenverteilungszentrums, die dem
ersten Unterkonto entspricht, durch ein Rechen-
planungsmodul;
Senden von Authentifizierungsinformationen an
das Blockchain-Rechenverteilungsmodul durch
das Rechenplanungsmodul gemäß dem ersten
Unterkonto und der Adresse des Blockchain-
Rechenverteilungszentrums, die dem ersten
Unterkonto entspricht;
Rückmelden eines Authentifizierungsergebnis-
ses an das Rechenplanungsmodul gemäß den
Authentifizierungsinformationen durch das
Blockchain-Rechenverteilungsmodul,

Verbinden mit dem Blockchain-Rechenvertei-
lungsmodul, das dem ersten Unterkonto ent-
spricht, gemäß dem Authentifizierungsergebnis
durch das Rechenplanungsmodul, wenn das
Authentifizierungsergebnis erfolgreich ist;
Senden, durch das Blockchain-Rechenvertei-
lungsmodul, einer Blockchain-Konsensberech-
nungsaufgabe, die dem ersten Unterkonto ent-
spricht, an das Rechenplanungsmodul; und
Empfangen der Blockchain-Konsensberech-
nungsaufgabe, die dem ersten Unterkonto ent-
spricht, das von dem Blockchain-Rechenvertei-
lungsmodul gesendet wurde, durch das Re-
chenplanungsmodul.

4. Verfahren zur Zuweisung der Rechenleistung eines
Blockchain-Servers nach Anspruch 1, weiter umfas-
send: Planen eines Standby-Blockchain-Servers,
um die Rechenleistung des Unterkontos bereitzu-
stellen, wenn das Rechenplanungsmodul feststellt,
dass der Blockchain-Server ausfällt oder die Re-
chenleistung des Blockchain-Servers nicht dem
Standard entspricht.

5. System zur Zuweisung der Rechenleistung eines
Blockchain-Servers, umfassend einen Blockchain-
Server und ein Rechenplanungsmodul,

wobei das Rechenplanungsmodul so konfigu-
riert ist, dass es Unterkontoinformationen er-
fasst, die von einem externen Blockchain-Re-
chenverteilungsmodul gesendet werden, und
den Blockchain-Server so plant, dass er Re-
chenleistung des Unterkontos gemäß den Un-
terkontoinformationen bereitstellt; wobei das
Blockchain-Rechenverteilungsmodul eine Viel-
zahl von Unterkonten umfasst; und
wobei der Blockchain-Server so konfiguriert ist,
dass er die Rechenleistung des Unterkontos ge-
mäß einer Planungsanweisung des Rechenpla-
nungsmoduls bereitstellt;
wobei das Rechenplanungsmodul speziell für
Folgendes konfiguriert ist:

Erfassen erster Unterkontoinformationen,
die von dem Blockchain-Rechenvertei-
lungsmodul gesendet werden, wobei die
ersten Unterkontoinformationen ein erstes
Konto und eine dem ersten Unterkonto ent-
sprechende Blockchain-Konsensberech-
nungsaufgabe umfassen, wobei sich die
Blockchain-Konsensberechnung auf einen
Prozess des Sammelns unbestätigter
Transaktionen in einem Datenblock und
des wiederholten Berechnens eines Hash-
werts des Datenblocks nach dem Anhän-
gen einer zufälligen Anpassungszahl be-
zieht, bis der berechnete Hashwert niedri-

ger als ein spezifisches Ziel ist; und
Planen des Blockchain-Servers, um die Rechenleistung des ersten Unterkontos gemäß den ersten Unterkontoinformationen bereitzustellen; **dadurch gekennzeichnet ist, dass** das Rechenplanungsmodul ferner so konfiguriert ist, dass es ein normgerechtes Ergebnis der Rechenleistung des ersten Unterkontos empfängt, das von dem Blockchain-Rechenverteilungsmodul rückgemeldet wird,
wobei das Rechenplanungsmodul den Blockchain-Server so einplant, dass er die Rechenleistung des zweiten Unterkontos bereitstellt, wenn er feststellt, dass die Rechenleistung des ersten Unterkontos dem Standard gemäß dem normgerechten Ergebnis Rechenleistung des ersten Unterkontos entspricht; wobei das Rechenplanungsmodul den Blockchain-Server so einplant, dass er die Rechenleistung des zweiten Unterkontos bereitstellt, wenn er feststellt, dass die Rechenleistung des ersten Unterkontos dem Standard gemäß dem normgerechten Ergebnis Rechenleistung des ersten Unterkontos entspricht.

6. System zur Zuweisung der Rechenleistung eines Blockchain-Servers nach Anspruch 5, ferner umfassend ein Blockchain-Rechenverteilungsmodul;

   wobei das Blockchain-Rechenverteilungsmodul so konfiguriert ist, dass es Unterkontoinformationen an das Rechenplanungsmodul sendet und ein normgerechtes Ergebnis der Rechenleistung des Unterkontos gemäß einem Planungsergebnis des Rechenplanungsmoduls bestimmt und das normgerechte Ergebnis an das Rechenplanungsmodul rückgemeldet; und
   wobei das Rechenplanungsmodul ferner so konfiguriert ist, dass es das Ergebnis der Zuweisung der Rechenleistung des Blockchain-Servers gemäß dem Planungsergebnis bestimmt.

Revendications

1. Procédé de distribution de la capacité de calcul d'un serveur de chaîne à blocs, comprenant :

   acquérir, par un module de planification de calcul, une première information de sous-compte envoyée par un module de distribution de calcul de chaîne à blocs, dans lequel le module de distribution de calcul de chaîne à blocs comprend une pluralité de sous-comptes ;
   planifier, par le module de planification de calcul, le serveur de chaîne à blocs à fournir une capa-

cité de calcul à un premier sous-compte en fonction de la première information de sous-compte ;
déterminer, par le module de distribution de calcul de chaîne à blocs, un résultat de conformité à la norme de la capacité de calcul du premier sous-compte, et renvoyer le résultat de conformité à la norme vers le module de planification de calcul ;
planifier le serveur de chaîne à blocs à fournir une capacité de calcul à un deuxième sous-compte lorsque le module de planification de calcul détermine que la capacité de calcul du premier sous-compte est conforme à la norme en fonction du résultat de conformité à la norme ;
planifier le serveur de chaîne à blocs à continuer à fournir la capacité de calcul au premier sous-compte par le module de planification de calcul lorsque le module de planification de calcul détermine que la capacité de calcul du premier sous-compte n'est pas conforme à la norme en fonction du résultat de conformité à la norme ; et
répéter les étapes ci-dessus jusqu'à ce que la capacité de calcul de tous les sous-comptes soit conforme à la norme ;
la première information de sous-compte comprend le premier sous-compte et une tâche de calcul de consensus de chaîne à blocs correspondant au premier sous-compte, le calcul de consensus de chaîne à blocs se référant à un processus de collecter des transactions non confirmées dans un bloc de données et de calculer de manière répétitive une valeur hachage du bloc de données après avoir attaché un nombre d'ajustement aléatoire jusqu'à ce que la valeur hachage calculée soit inférieure à une cible spécifique ; et
l'étape de planifier, par le module de planification de calcul, le serveur de chaîne à blocs à fournir une capacité de calcul à un premier sous-compte en fonction de la première information de sous-compte comprend :

   envoyer la tâche de calcul de consensus de chaîne à blocs correspondant au premier sous-compte vers le serveur de chaîne à blocs par le module de planification de calcul ;
   calculer un résultat de tâche en fonction de la tâche de calcul de consensus de chaîne à blocs correspondant au premier sous-compte par le serveur de chaîne à blocs ;
   renvoyer le résultat de tâche vers le module de planification de calcul par le serveur de chaîne à blocs ; et
   envoyer le résultat de tâche vers le module de distribution de calcul de chaîne à blocs par le module de planification de calcul.

2. Procédé de distribution de la capacité de calcul d'un serveur de chaîne à blocs selon la revendication 1, dans lequel l'étape de déterminer un résultat de conformité à la norme de la capacité de calcul du premier sous-compte par le module de distribution de calcul de chaîne à blocs comprend :

déterminer la capacité de calcul en fonction du résultat de tâche par le module de distribution de calcul de chaîne à blocs ;
additionner, par le module de distribution de calcul de chaîne à blocs, la capacité de calcul correspondant au résultat de tâche et une capacité cumulée de calcul du premier sous-compte pour obtenir une capacité de calcul cible du premier sous-compte, dans lequel la capacité accumulée de calcul du premier sous-compte est calculée en fonction d'un résultat de calcul du serveur de chaîne à blocs correspondant au premier sous-compte reçu par le module de distribution de calcul de chaîne à blocs ; et
déterminer le résultat de conformité à la norme en fonction de la capacité de calcul cible du premier sous-compte et de la norme de capacité de calcul correspondant au premier sous-compte par le module de distribution de calcul de chaîne à blocs.

3. Procédé de distribution de la capacité de calcul d'un serveur de chaîne à blocs selon la revendication 1, dans lequel la première information de sous-compte comprend en outre une adresse de centre de distribution de calcul de chaîne à blocs correspondant au premier sous-compte ; et

l'étape d'acquérir, par un module de planification de calcul, la première information de sous-compte envoyée par le module de distribution de calcul de chaîne à blocs comprend :

acquérir, par le module de planification de calcul, la première information de sous-compte envoyée par un module de distribution de calcul de chaîne à blocs et l'adresse de centre de distribution de calcul de chaîne à blocs correspondant au premier sous-compte ;
envoyer, par le module de planification de calcul, une information d'authentification vers le module de distribution de calcul de chaîne à blocs en fonction du premier sous-compte et l'adresse de centre de distribution de calcul de chaîne à blocs correspondant au premier sous-compte ;
renvoyer un résultat d'authentification vers le module de planification de calcul en fonction de l'information d'authentification par le module de distribution de calcul de chaîne à blocs ;
connecter au centre de distribution de calcul de chaîne à blocs correspondant au premier sous-compte en fonction du résultat d'authentification

par le module de planification de calcul lorsque le résultat d'authentification est réussi ;
envoyer, par le module de distribution de calcul de chaîne à blocs, une tâche de calcul de consensus de chaîne à blocs correspondant au premier sous-compte vers le module de planification de calcul ; et
recevoir, par le module de planification de calcul, la tâche de calcul de consensus de chaîne à blocs correspondant au premier sous-compte envoyé par le module de distribution de calcul de chaîne à blocs.

4. Procédé de distribution de la capacité de calcul d'un serveur de chaîne à blocs selon la revendication 1, comprenant en outre : planifier un serveur de chaîne à blocs de secours à fournir la capacité de calcul au sous-compte lorsque le module de planification de calcul détermine que le serveur de chaîne à blocs tombe en panne ou que la capacité de calcul du serveur de chaîne à blocs n'est pas conforme à la norme.

5. Système de distribution de la capacité de calcul d'un serveur de chaîne à blocs, comprenant : un serveur de chaîne à blocs et un module de planification de calcul ;

dans lequel module de planification de calcul est configuré pour acquérir une première information de sous-compte envoyée par un module de distribution de calcul de chaîne à blocs externe et planifier le serveur de chaîne à blocs à fournir une capacité de calcul à un premier sous-compte en fonction de la première information de sous-compte ; le module de distribution de calcul de chaîne à blocs comprend une pluralité de sous-comptes ; et
le serveur de chaîne à blocs est configuré pour fournir la capacité de calcul au sous-compte en fonction d'une instruction de planification du module de planification de calcul ;
le module de planification de calcul est configuré en particulier pour :

acquérir une première information de sous-compte envoyée par le module de distribution de calcul de chaîne à blocs, dans lequel la première information de sous-compte comprend un premier sous-compte et une tâche de calcul de consensus de chaîne à blocs correspondant au premier sous-compte, le calcul de consensus de chaîne à blocs se référant à un processus de collecter des transactions non confirmées dans un bloc de données et de calculer de manière répétitive une valeur hachage du bloc de données après avoir attaché un

nombre d'ajustement aléatoire jusqu'à ce que la valeur hachage calculée soit inférieure à une cible spécifique ;

planifier le serveur de chaîne à blocs à fournir une capacité de calcul au premier sous-compte en fonction de la première information de sous-compte ; le système est également **caractérisé en ce que** le module de planification de calcul est configuré en outre pour recevoir un résultat de conformité à la norme de la capacité de calcul du premier sous-compte renvoyé par le module de distribution de calcul de chaîne à blocs,

dans lequel le module de planification de calcul planifie le serveur de chaîne à blocs à fournir la capacité de calcul à un deuxième sous-compte lorsqu'il détermine que la capacité de calcul du premier sous-compte est conforme à la norme en fonction du résultat de conformité à la norme de la capacité de calcul du premier sous-compte ; le module de planification de calcul planifie le serveur de chaîne à blocs à continuer à fournir la capacité de calcul au premier sous-compte lorsqu'il détermine que la capacité de calcul du premier sous-compte n'est pas conforme à la norme en fonction du résultat de conformité à la norme de la capacité de calcul du premier sous-compte.

6. Système de distribution de la capacité de calcul d'un serveur de chaîne à blocs selon la revendication 5, comprenant en outre un module de distribution de calcul de chaîne à blocs ;

dans lequel le module de distribution de calcul de chaîne à blocs est configuré pour envoyer une information de sous-compte vers le module de planification de calcul, déterminer un résultat de conformité à la norme de la capacité de calcul du sous-compte en fonction d'un résultat de planification du module de planification de calcul, et renvoyer le résultat de conformité à la norme vers le module de planification de calcul ; et le module de planification de calcul est configuré en outre pour déterminer un résultat de distribution de la capacité de calcul du serveur de chaîne à blocs en fonction du résultat de planification.

acquiring, by a computing scheduling module, first sub-account information sent by a blockchain computing distribution module ⟋ S101

↓

Scheduling , by the computing scheduling module , the blockchain server to provide computing capability for a first sub-account according to the first sub-account information ⟋ S102

↓

determining an up-to-standard result of the computing capability of the first sub-account , and feeding back the up-to-standard result to the computing scheduling module by the blockchain computing distribution module ⟋ S103

↓

scheduling the blockchain server to provide computing capability for a second sub-account when the computing scheduling module determines that the computing capability of the first sub-account is up to standard according to the up-to-standard result : and scheduling , by the computing scheduling module , the blockchain server to continue to provide the computing capability for the first sub-account when the computing scheduling module determines that the computing capability of the first sub-account is not up to standard according to the up-to-standard result ⟋ S104

↓

repeating the above steps until the computing capability of all sub-accounts is up to standard ⟋ S105

FIG. 1

23

Blockchain
Computing
Distribution
Module

Sub-account a

21

Blockchain
Consensus
Computing Task

22

Blockchain
Consensus
Computing Task

Sub-account b

Blockchain
Server

Computing
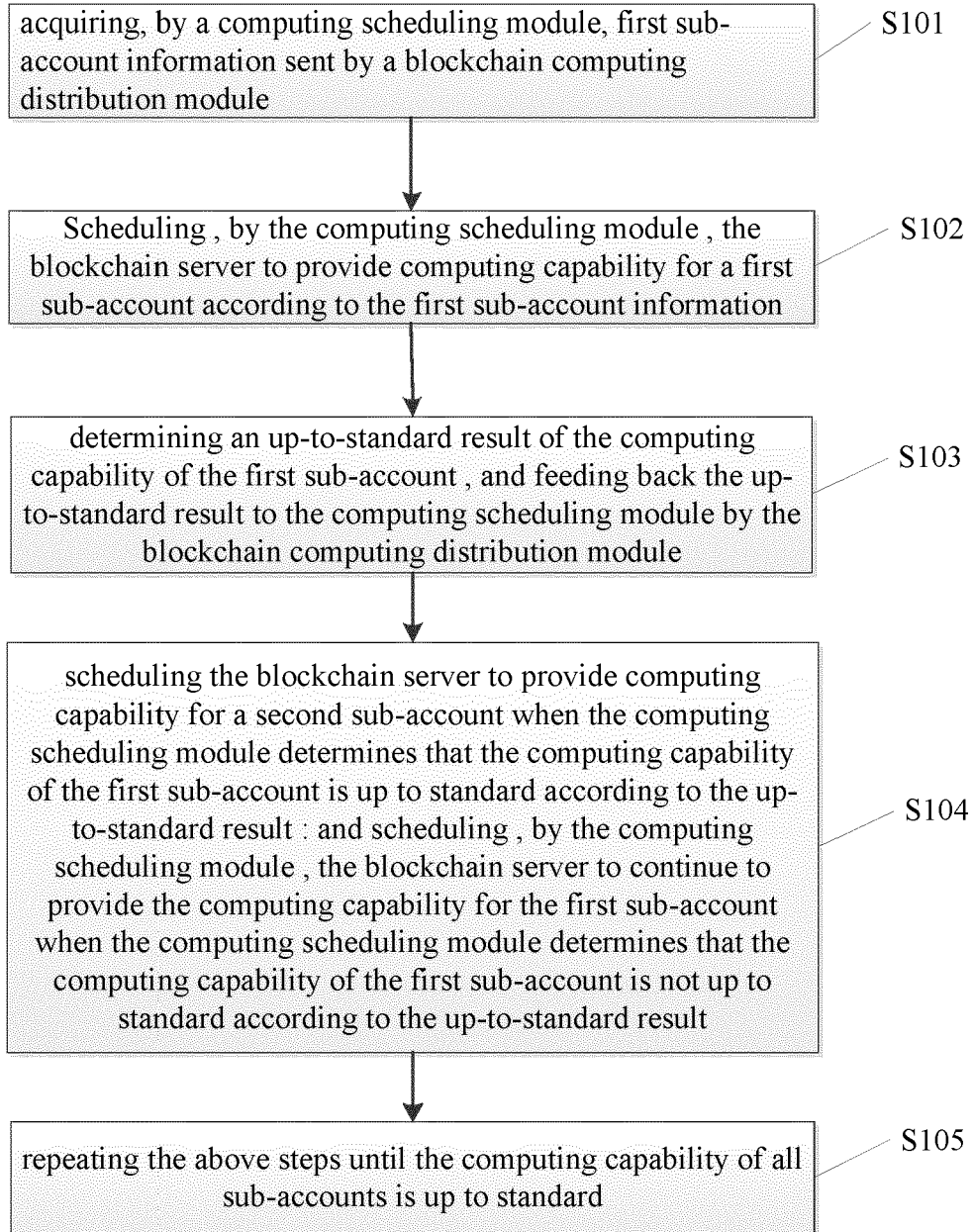Scheduling
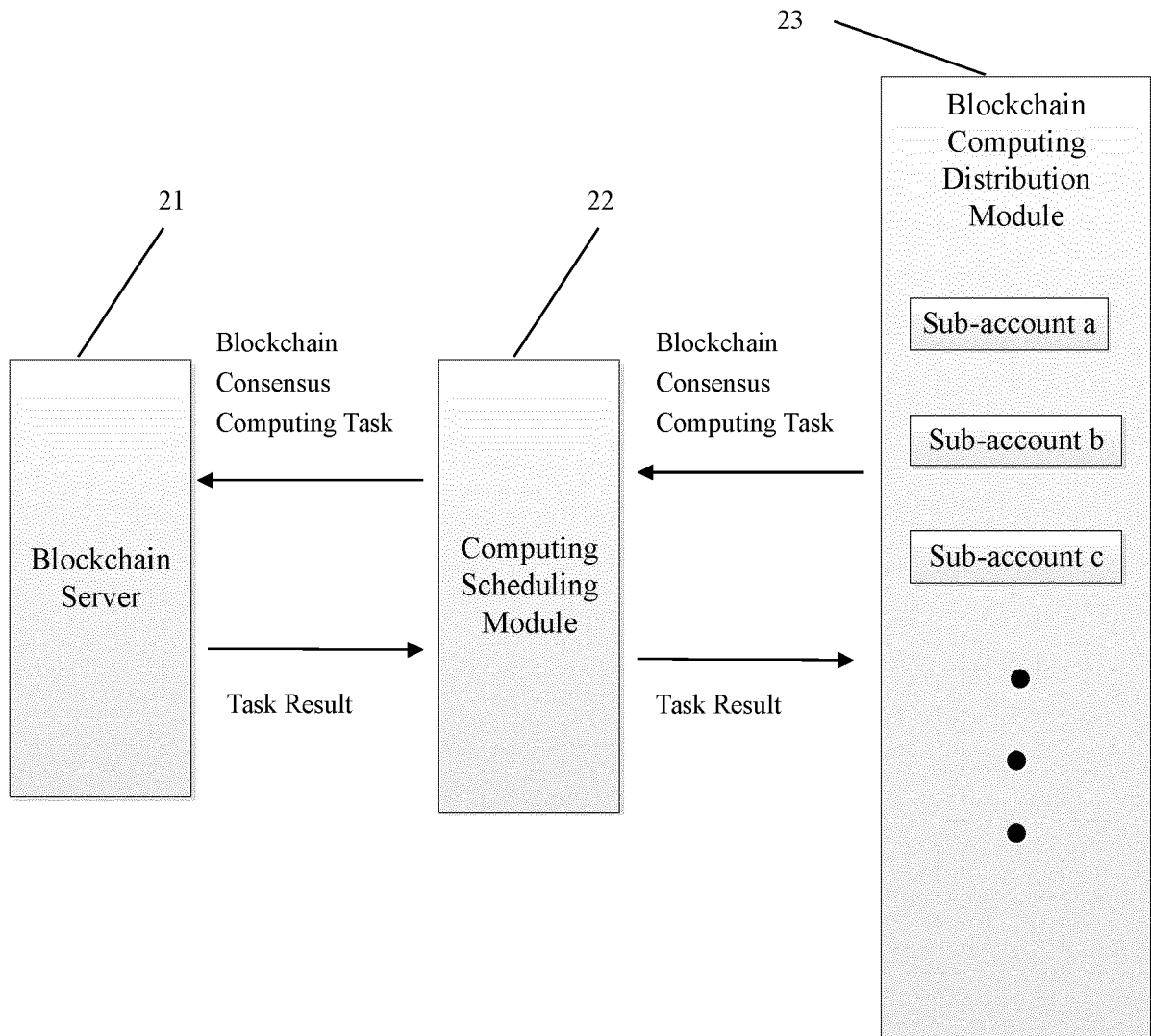Module

Sub-account c

Task Result

Task Result

FIG. 2

REFERENCES CITED IN THE DESCRIPTION

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