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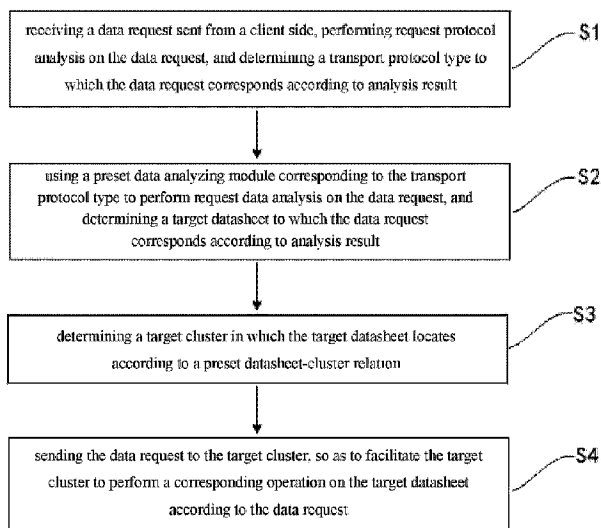
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(57) **Abrégé/Abstract:**

The present invention makes public a data request processing method, a data request processing device, a computer equipment and a storage medium. The method comprises: receiving a data request sent from a client side, performing request protocol analysis on the data request, determining a transport protocol type to which the data request corresponds according to analysis result, using a preset data analyzing module corresponding to the transport protocol type to perform request data analysis on the data request, determining a target datasheet to which the data request corresponds according to analysis result, determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation, and sending the data request to the target cluster, so as to facilitate the target cluster to perform a corresponding operation on the target datasheet according to the data request.



Abstract

The present invention makes public a data request processing method, a data request processing device, a computer equipment and a storage medium. The method comprises: receiving a data request sent from a client side, performing request protocol analysis on the data request, determining a transport protocol type to which the data request corresponds according to analysis result, using a preset data analyzing module corresponding to the transport protocol type to perform request data analysis on the data request, determining a target datasheet to which the data request corresponds according to analysis result, determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation, and sending the data request to the target cluster, so as to facilitate the target cluster to perform a corresponding operation on the target datasheet according to the data request.

DATA PROCESSING METHOD, DEVICE, COMPUTER EQUIPMENT AND STORAGE MEDIUM

BACKGROUND OF THE INVENTION

Technical Field

[0001] The present invention relates to the field of multi-cluster management, and more particularly to a data processing method, a data processing device, a computer equipment and a storage medium.

Description of Related Art

[0002] There are currently two methods for storage type multi-cluster management. One method is to directly connect read/write requests of the client side to storage clusters, and to manage plural clusters through one service administration layer, for example to set up cluster parameters, to create and delete tables/sheets, etc. Another method is to create a multi-cluster gateway layer, through which requests of the client side are forwarded to corresponding clusters.

[0003] On the one hand, the method of directly connecting requests of the client side to storage type clusters simplifies the complexity of multi-cluster management, and is relatively convenient in use in the case there are not too many clusters. However, the deficiency of this method rests in the fact that different users can all be directly connected to corresponding clusters, there is no unified flow control and safety control, and it is impossible to shield deviations of different cluster versions from user requests. With the development of businesses, when the clusters become increasingly larger in number, the difficulty with which this method performs cluster management is instead gradually increased.

[0004] On the other hand, a gateway layer is used to receive user requests and to forward the

requests to corresponding clusters. Although this method solves the deviations of different cluster versions with respect to users and achieves unified flow control, it fails to achieve multi-protocol compatibility, as it can only process requests of identically-typed protocols, and protocol types that can be forwarded are not widely ranging. In addition, this method further lacks safety control on read/write requests of users, whereby even write requests of large data size also pass through the gateway layer, so that the method tends to cause interference between read/write requests, and even to engender such problems as gateway overload.

[0005] Accordingly, a novel data processing method is proposed to address the aforementioned problems.

SUMMARY OF THE INVENTION

[0006] In order to solve the problems pending in the state of the art, embodiments of the present invention provide a data request processing method, a data request processing device, a computer equipment and a storage medium, so as to address such problems existent in prior-art technology as that direct connection of user requests to clusters makes it impossible to perform unified control of requests of plural clusters, that forwarding of user requests through a gateway layer makes it impossible to achieve multi-protocol compatibility, as it is possible only to process requests of identically-typed protocols, and that protocol types as forwarded are not widely ranging.

[0007] In order to solve one or more of the aforementioned technical problems, the present invention employs the following technical solutions:

[0008] According to the first aspect, there is provided a data request processing method, which comprises the following steps:

[0009] receiving a data request sent from a client side, performing request protocol analysis on the data request, and determining a transport protocol type to which the data request

- corresponds according to analysis result;
- [0010] using a preset data analyzing module corresponding to the transport protocol type to perform request data analysis on the data request, and determining a target datasheet to which the data request corresponds according to analysis result;
- [0011] determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation; and
- [0012] sending the data request to the target cluster, so as to facilitate the target cluster to perform a corresponding operation on the target datasheet according to the data request.
- [0013] Further, the step of determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation includes:
- [0014] enquiring whether the target datasheet exists in cluster metadata, if yes, determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation.
- [0015] Further, the data request includes user information, and the step of sending the data request to the target cluster includes:
- [0016] extracting user information from the data request, enquiring a preset permission relation table according to the user information, determining whether the user has operation permission of the target datasheet, if yes, sending the data request to the target cluster.
- [0017] Further, the data request includes version information of the client side, and the step of sending the data request to the target cluster includes:
- [0018] extracting version information of the client side from the data request;
- [0019] determining whether a version of the client side is adapted to a version of the target cluster according to the version information of the client side and a preset mapping relation table between client side versions and cluster versions, if yes, directly sending the data request to the target cluster; and
- [0020] if not, adjusting parameters in the data request according to the version of the target

cluster, and sending the data request with adjusted parameters to the target cluster.

[0021] Further, the method further comprises:

[0022] receiving real-time and/or offline data via a data integrating module, and writing the real-time and/or offline data in a corresponding datasheet in the cluster according to a preset index relation.

[0023] Further, the method further comprises:

[0024] monitoring the cluster metadata, and updating the locally cached cluster metadata if update is monitored in the cluster metadata.

[0025] Further, the corresponding operation includes at least one of read operation and write operation.

[0026] According to the second aspect, there is provided a data request processing device, which comprises:

[0027] a first analyzing module, for receiving a data request sent from a client side, performing request protocol analysis on the data request, and determining a transport protocol type to which the data request corresponds according to analysis result;

[0028] a second analyzing module, for using a preset data analyzing module corresponding to the transport protocol type to perform request data analysis on the data request, and determining a target datasheet to which the data request corresponds according to analysis result;

[0029] a cluster determining module, for determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation; and

[0030] a request forwarding module, for sending the data request to the target cluster, so as to facilitate the target cluster to perform a corresponding operation on the target datasheet according to the data request.

[0031] According to the third aspect, there is provided a computer equipment that comprises a memory, a processor and a computer program stored on the memory and executable on the processor, and the following steps are realized when the processor executes the computer program:

[0032] receiving a data request sent from a client side, performing request protocol analysis on the data request, and determining a transport protocol type to which the data request corresponds according to analysis result;

[0033] using a preset data analyzing module corresponding to the transport protocol type to perform request data analysis on the data request, and determining a target datasheet to which the data request corresponds according to analysis result;

[0034] determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation; and

[0035] sending the data request to the target cluster, so as to facilitate the target cluster to perform a corresponding operation on the target datasheet according to the data request.

[0036] According to the fourth aspect, there is provided a computer-readable storage medium storing a computer program thereon, and the following steps are realized when the computer program is executed by a processor:

[0037] receiving a data request sent from a client side, performing request protocol analysis on the data request, and determining a transport protocol type to which the data request corresponds according to analysis result;

[0038] using a preset data analyzing module corresponding to the transport protocol type to perform request data analysis on the data request, and determining a target datasheet to which the data request corresponds according to analysis result;

[0039] determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation; and

[0040] sending the data request to the target cluster, so as to facilitate the target cluster to perform a corresponding operation on the target datasheet according to the data request.

[0041] Technical solutions provided by the embodiments of the present invention bring about the following advantageous effects:

[0042] In the data request processing method, data request processing device, computer equipment and storage medium provided by the embodiments of the present invention, by receiving a data request sent from a client side, performing request protocol analysis on the data request, determining a transport protocol type to which the data request corresponds according to analysis result, using a preset data analyzing module corresponding to the transport protocol type to perform request data analysis on the data request, determining a target datasheet to which the data request corresponds according to analysis result, determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation, and sending the data request to the target cluster, so as to facilitate the target cluster to perform a corresponding operation on the target datasheet according to the data request, and by configuring analyzing modules of different protocols at the gateway layer, the present invention achieves multi-protocol compatibility, enables to process differently typed protocol requests, and solves the problem in which protocol types as forwarded are not widely ranging.

[0043] Besides, in the data request processing method, data request processing device, computer equipment and storage medium provided by the embodiments of the present invention, by extracting user information from the data request, enquiring a preset permission relation table according to the user information, determining whether the user has operation permission of the target datasheet, if yes, sending the data request to the target cluster, control of data requests forwarded to the clusters is achieved, and cluster pressure is reduced.

[0044] Moreover, in the data request processing method, data request processing device, computer equipment and storage medium provided by the embodiments of the present invention, by receiving real-time and/or offline data via a data integrating module, and

writing the real-time and/or offline data in a corresponding datasheet in the cluster according to a preset index relation, the pressure of write requests with large data size onto the gateway layer is separated via the data integrating module, the problem of gateway overload is prevented, and interference of read/write requests is avoided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0045] In order to more clearly describe the technical solutions in the embodiments of the present invention, drawings needed to illustrate the embodiments will be briefly introduced below. Apparently, the drawings introduced below are merely directed to some embodiments of the present invention, and persons ordinarily skilled in the art may base on these drawings to further acquire other drawings without spending creative effort in the process.

[0046] Fig. 1 is a view illustrating the framework of a multi-cluster managing system according to an exemplary embodiment;

[0047] Fig. 2 is a flowchart illustrating a process of processing a client side data request through a gateway layer of the multi-cluster managing system according to an exemplary embodiment;

[0048] Fig. 3 is a flowchart illustrating a data request processing method according to an exemplary embodiment;

[0049] Fig. 4 is a view schematically illustrating a flow of service discovery through a gateway layer of the multi-cluster managing system according to an exemplary embodiment;

[0050] Fig. 5 is a view schematically illustrating the structure of a data request processing device according to an exemplary embodiment; and

[0051] Fig. 6 is a view schematically illustrating the internal structure of a computer equipment according to an exemplary embodiment.

DETAILED DESCRIPTION OF THE INVENTION

[0052] To make clearer the objectives, technical solutions and advantages of the present invention, technical solutions in the embodiments of the present invention will be described more clearly and comprehensively below with reference to the drawings accompanying the embodiments of the present invention. Apparently, the embodiments as described here are merely partial, rather than the entire, embodiments of the present invention. All other embodiments obtainable by persons ordinarily skilled in the art on the basis of the embodiments in the present invention without spending creative effort shall all fall within the protection scope of the present invention.

[0053] As noted in the *Description of Related Art*, in the methods for storage type multi-cluster management in the state of the art, if the mode of directly connecting user requests to clusters is employed, there lacks unified flow control and safety control, and it is impossible to shield deviations of different cluster versions from user requests; if the mode of receiving user requests through a gateway layer is employed, there will be the problem that it is impossible to achieve multi-protocol compatibility, as it can only process requests of identically-typed protocols, i.e., the problem that protocol types that can be forwarded are not widely ranging.

[0054] To solve these problems, a data request processing method is creatively proposed in the embodiments of the present invention, and this method separates from cluster management a service discovery module, a gateway layer module and a cluster service administration module, and respectively strengthens the different modules. The gateway layer module supports service consistency discovery, multi-cluster gateway, multi-protocol versions

adapting and flow control, etc., and the pressure of write requests with large data size onto the gateway layer is separated via the data integrating module.

Embodiment 1

[0055] As shown in Fig. 1, the present application provides a multi-cluster managing system, and the system at least comprises a cluster service administration module, a service discovery module, a gateway layer module, a data integrating module, and clusters. In the embodiments of the present invention, the cluster service administration module is responsible for the work of multi-cluster management and multi-cluster metadata operation, issues the metadata in the service discovery module, specifically provides initiation, implementation and status tracking of the cluster metadata changing operation, after the metadata changing operation has been successfully implemented, updates the metadata to the service discovery module, and is responsible for version maintenance, software management, resources management, configuration management of the clusters. The service discovery module can be developed and realized by using an etcd service discovery framework, where etcd leader obtains multi-cluster metadata status update of the service administration module. The gateway layer module includes, but is not limited to, gateway. The gateway layer serves as a gateway layer of all cluster services, and is responsible for such works as request analysis, cluster service discovery, versions adapting, and flow statistics and control, etc.

[0056] In the embodiments of the present invention, load balance is further provided; load balance is firstly used to perform flow access load balancing, responsible for forwarding requests to the gateway layer, so as to enhance the total throughput capacity. As a preferred embodiment, load balance can be embodied as the DR mode, whereby the request response is directly returned to the client side, server flow of load balance is markedly reduced, a local least connection algorithm is employed to sense the running state of the backend server, and realizes dynamic expansion and contraction of gateway capacity. The gateway

layer serves as a gateway layer of all cluster services, and is mainly responsible for such works as request analysis, cluster service discovery, versions adapting, and flow statistics and control, etc.

[0057] Specifically, with reference to Fig. 2, the process of processing a client side data request through the gateway layer of the multi-cluster managing system is described below:

[0058] Step 1 - receiving a data request sent from a client side, performing request protocol analysis on the data request, and determining a transport protocol type of the data request.

[0059] Specifically, currently available cluster managing systems that receive user data requests through gateway layers usually cannot achieve multi-protocol compatibility, as it is possible only to process requests of identically-typed protocols, that is to say, protocol types that can be forwarded are not widely ranging. In order to solve the above problem of protocol types as forwarded being not widely ranging, adapting of at least two protocols, including but not limited to http and tcp, is realized at the gateway layer. As a preferred example, in the embodiments of the present invention, adapting of the two protocols http and tcp is realized at the gateway layer. After a data request sent by a user via the client side has been received, request protocol analysis is firstly processed on the data request, and a transport protocol type of the data request is determined. During specific implementation, it is possible to analyze the protocol identification (hereinafter referred to as "ID") carried with the data request, and to determine the transport protocol type to which the data request corresponds via the ID. As should be additionally noted, in the embodiments of the present invention, the data request sent by the user via the client side includes, but is not limited to, data read request, data write request, etc.

[0060] Step 2 – transmitting the data request to a corresponding data analyzing module to be performed with data analysis.

[0061] Specifically, in the embodiments of the present invention, data analyzing modules corresponding to the adapted protocols are likewise preconfigured at the gateway layer. Taking the two protocols http and tcp for example, in the embodiments of the present invention, an httpRequest analyzing module and a tcp (transportAction) analyzing module are likewise configured at the gateway layer. If it is analyzed at the above step that the data request is an http request, it is forwarded to the httpRequest analyzing module for data analysis; if it is analyzed at the above step that the data request is a tcp request, it is forwarded to the transportAction analyzing module for response analysis; if it is analyzed that the transport protocol type to which the data request corresponds is unidentifiable at the gateway layer, an identification result is directly fed back to the client side as unidentifiable.

[0062] Step 3 – using the data analyzing module to analyze and obtain from the data request such information as a corresponding target datasheet.

[0063] Specifically, a corresponding data analyzing module is used to perform data analysis on the data request to analyze and obtain from the data request (namely a request body) a target datasheet to which the data request corresponds. In addition thereto, the analysis result may further contain such information as cluster index, to which no restriction is made.

[0064] After the target datasheet to which the data request corresponds has been determined, it is further required to enquire whether the target datasheet exists in the metadata. If the target datasheet exists in the metadata, the cluster to which the target datasheet pertains is further obtained; if the target datasheet does not exist in the metadata, information specifying that the datasheet does not exist is directly returned to the client side, by which time the request ends. During specific implementation, it is possible to preset a datasheet-cluster relation that at least includes the pertaining relations of datasheets to clusters, and then base on the datasheet-cluster relation to determine the target cluster in which the target datasheet locates.

[0065] Step 4 – performing permission check on the target datasheet.

[0066] Specifically, after the datasheet to which the data request corresponds and the target cluster to which the target datasheet pertains have been determined, it is further required to perform permission check on the request of the datasheet. The permission used in this context means whether the user of the current data request has operation permission of the target datasheet, and the permission includes, but is not limited to, read permission, write permission, etc. If there is operation permission of the target datasheet, the process continues to the next step; if there is no operation permission of the target datasheet, information specifying that the permission does not pass is directly returned to the client side, by which time the request ends.

[0067] Step 5 – performing version adapting verification on the data request.

[0068] Specifically, in order to ensure that the target cluster can process the data request, before the data request is sent to the target cluster, it is further required to perform version adapting verification on the data request. During specific implementation, as a preferred example, it is possible to preset a mapping relation table between client side versions and cluster versions; when the user sends a data request via the client side, the data request will carry therewith version information of the client side; when version adapting verification is being performed, the version information of the client side carried with the data request is firstly analyzed, and it is subsequently determined according to the version information of the client side and the mapping relation table between client side versions and cluster versions whether the version of the client side is adapted to the version of the target cluster. If the version of the client side is not adapted to the version of the target cluster, it is required to base on the version of the target cluster to compose the data request in a request protocol that is compatible with the target cluster, namely to base on the version of the target cluster to adjust the parameters in the data request, so that the request parameters are adjusted to

be consistent with the version of the target cluster.

[0069] Step 6 – sending the data request to the target cluster.

[0070] Specifically, if the version of the client side is adapted to the version of the target cluster, the data request can be directly sent to the target cluster, otherwise the version of the target cluster should be based on to adjust the parameters in the data request, so that the request parameters are adjusted to be consistent with the version of the target cluster, and the data request with adjusted parameters is thereafter sent to the target cluster.

Embodiment 2

[0071] Fig. 3 is a flowchart illustrating a data request processing method according to an exemplary embodiment, with reference to Fig. 3, the method comprises the following steps.

[0072] S1 - receiving a data request sent from a client side, performing request protocol analysis on the data request, and determining a transport protocol type to which the data request corresponds according to analysis result.

[0073] Specifically, the multi-cluster managing system in the embodiments of the present invention receives the data request sent by a user via the client side, and forwards the request to a corresponding cluster. The gateway layer supports the processing of at least two transport protocols, including, but not limited to, http and tcp. When the data request sent from the client side is received, request protocol analysis is firstly performed on the data request to obtain analysis result, and the analysis result includes, but is not limited to, such information as the protocol ID (such as request header), through which is determined the transport protocol type to which the data request corresponds.

[0074] S2 - using a preset data analyzing module corresponding to the transport protocol type

to perform request data analysis on the data request, and determining a target datasheet to which the data request corresponds according to analysis result.

[0075] Specifically, the multi-cluster managing system in the embodiments of the present invention receives the data request sent by a user via the client side, and forwards the request to a corresponding cluster. The gateway layer supports the processing of at least two transport protocols, including, but not limited to, http and tcp. When the data request sent from the client side is received, request protocol analysis is firstly performed on the data request to obtain analysis result, and the analysis result includes, but is not limited to, such information as the protocol ID (such as request header), through which is determined the transport protocol type to which the data request corresponds.

[0076] S3 - determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation.

[0077] Specifically, after the target datasheet to which the data request corresponds has been determined, it is further required to determine the target cluster in which the target datasheet locates. During specific implementation, it is possible to preset a datasheet-cluster relation in which are recorded clusters in which the various datasheets locate, by enquiring the datasheet-cluster relation, the target cluster in which the target datasheet locates is determined.

[0078] S4 - sending the data request to the target cluster, so as to facilitate the target cluster to perform a corresponding operation on the target datasheet according to the data request.

[0079] Specifically, in the embodiments of the present invention, the corresponding operation includes, but is not limited to, read operation and write operation, etc.

[0080] As a preferred mode of execution, in the embodiments of the present invention, the step

of determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation includes:

[0081] enquiring whether the target datasheet exists in cluster metadata, if yes, determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation.

[0082] Specifically, as an example, when the target cluster in which the target datasheet locates is being determined, it is possible to enquire whether the target datasheet exists in the cluster metadata; if the target datasheet exists in the cluster metadata, the cluster to which the target datasheet pertains is further obtained; if the target datasheet does not exist in the cluster metadata, the process directly returns, and the request ends.

[0083] As a preferred mode of execution, in the embodiments of the present invention, the data request includes user information, and the step of sending the data request to the target cluster includes:

[0084] extracting user information from the data request, enquiring a preset permission relation table according to the user information, determining whether the user has operation permission of the target datasheet, if yes, sending the data request to the target cluster.

[0085] As a preferred mode of execution, in the embodiments of the present invention, the data request includes version information of the client side, and the step of sending the data request to the target cluster includes:

[0086] extracting version information of the client side from the data request;

[0087] determining whether a version of the client side is adapted to a version of the target cluster according to the version information of the client side and a preset mapping relation table between client side versions and cluster versions, if yes, directly sending the data request to the target cluster; and

[0088] if not, adjusting parameters in the data request according to the version of the target cluster, and sending the data request with adjusted parameters to the target cluster.

[0089] As a preferred mode of execution, in the embodiments of the present invention, the method further comprises:

[0090] receiving real-time and/or offline data via a data integrating module, and writing the real-time and/or offline data in a corresponding datasheet in the cluster according to a preset index relation.

[0091] Specifically, in order to reduce the pressure of the gateway layer due to write requests of large data size, the multi-cluster managing system provided by the present invention is equipped with a data integrating module, through which is realized the writing of corresponding data into a corresponding cluster, so that the pressure of the gateway layer due to write requests of large data size is separated. With further reference to Fig. 1, during specific implementation, the data integrating module preconfigures a data write-in task, and requests the cluster service administration module for an index relation of the clusters while configuring the data write-in task. The data write-in task is periodically executed, real-time and/or offline data is received as sent via such data tools as kafka, Hive, etc., and the real-time and/or offline data is subsequently written in a corresponding datasheet in the cluster according to a preset index relation.

[0092] As a preferred mode of execution, in the embodiments of the present invention, the method further comprises:

[0093] monitoring the cluster metadata, and updating the locally cached cluster metadata if update is monitored in the cluster metadata.

[0094] Specifically, with further reference to Fig. 1, the multi-cluster managing system provided by the present invention is further equipped with a service discovery module, which can be developed and realized by using an etcd service discovery framework, where etcd leader obtains multi-cluster metadata status update of the service administration module.

[0095] Fig. 4 is a view schematically illustrating a flow of service discovery through a gateway layer of the multi-cluster managing system according to an exemplary embodiment. With reference to Fig. 4, the service discovery module makes use of the etcd service discovery service, monitors the status of the cluster service administration metadata, and realizes the change and issuance of cluster and sheet data. During specific implementation, the cluster service administration module is responsible for obtaining expansion and contraction of node capacity of the various clusters and change of metadata at the sheet level, and updates the changed metadata to the service discovery module; the gateway layer is connected with the service discovery module, and monitors whether there is change in the cluster metadata, if there is, the latest metadata will be cached in service discovery of the gateway layer. As a preferred example, while updating the metadata, the gateway layer makes use of the distributed lock during the caching process to ensure consistency of the metadata of each gateway layer instance.

[0096] As a preferred mode of execution, in the embodiments of the present invention, the corresponding operation includes at least one of read operation and write operation.

[0097] Fig. 5 is a view schematically illustrating the structure of a data request processing device according to an exemplary embodiment, and the device comprises:

[0098] a first analyzing module, for receiving a data request sent from a client side, performing request protocol analysis on the data request, and determining a transport protocol type to which the data request corresponds according to analysis result;

[0099] a second analyzing module, for using a preset data analyzing module corresponding to the transport protocol type to perform request data analysis on the data request, and determining a target datasheet to which the data request corresponds according to analysis result;

[0100] a cluster determining module, for determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation; and

[0101] a request forwarding module, for sending the data request to the target cluster, so as to facilitate the target cluster to perform a corresponding operation on the target datasheet according to the data request.

[0102] As a preferred mode of execution, in the embodiments of the present invention, the cluster determining module is specifically employed for:

[0103] enquiring whether the target datasheet exists in cluster metadata, if yes, determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation.

[0104] As a preferred mode of execution, in the embodiments of the present invention, the request forwarding module is specifically employed for:

[0105] extracting user information from the data request, enquiring a preset permission relation table according to the user information, determining whether the user has operation permission of the target datasheet, if yes, sending the data request to the target cluster.

[0106] As a preferred mode of execution, in the embodiments of the present invention, the request forwarding module is further employed for:

[0107] extracting version information of the client side from the data request;

[0108] determining whether a version of the client side is adapted to a version of the target cluster according to the version information of the client side and a preset mapping relation table between client side versions and cluster versions, if yes, directly sending the data request to the target cluster; and

[0109] if not, adjusting parameters in the data request according to the version of the target cluster, and sending the data request with adjusted parameters to the target cluster.

[0110] As a preferred mode of execution, in the embodiments of the present invention, the device further comprises:

[0111] a data writing-in module, for receiving real-time and/or offline data via a data integrating

module, and writing the real-time and/or offline data in a corresponding datasheet in the cluster according to a preset index relation.

[0112] As a preferred mode of execution, in the embodiments of the present invention, the device further comprises:

[0113] a service discovery module, for monitoring the cluster metadata, and updating the locally cached cluster metadata if update is monitored in the cluster metadata.

[0114] As a preferred mode of execution, in the embodiments of the present invention, the corresponding operation includes at least one of read operation and write operation.

[0115] Fig. 6 is a view schematically illustrating the internal structure of a computer equipment according to an exemplary embodiment. With reference to Fig. 6, the computer equipment comprises a processor, a memory, and a network interface connected to each other via a system bus. The processor of the computer equipment is employed to provide computing and controlling capabilities. The memory of the computer equipment includes a nonvolatile storage medium, and an internal memory. The nonvolatile storage medium stores therein an operating system, a computer program and a database. The internal memory provides environment for the running of the operating system and the computer program in the nonvolatile storage medium. The network interface of the computer equipment is employed to connect to an external terminal via network for communication. The computer program realizes a method of optimizing an execution plan when it is executed by a processor.

[0116] As understandable to persons skilled in the art, the structure illustrated in Fig. 6 is merely a block diagram of partial structure relevant to the solution of the present invention, and does not constitute any restriction to the computer equipment on which the solution of the present invention is applied, as the specific computer equipment may comprise component parts that are more than or less than those illustrated in Fig. 6, or may combine certain component parts, or may have different layout of component parts.

[0117] As a preferred mode of execution, in the embodiments of the present invention, there is provided a computer equipment that comprises a memory, a processor and a computer program stored on the memory and operable on the processor, and the following steps are realized when the processor executes the computer program:

[0118] receiving a data request sent from a client side, performing request protocol analysis on the data request, and determining a transport protocol type to which the data request corresponds according to analysis result;

[0119] using a preset data analyzing module corresponding to the transport protocol type to perform request data analysis on the data request, and determining a target datasheet to which the data request corresponds according to analysis result;

[0120] determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation; and

[0121] sending the data request to the target cluster, so as to facilitate the target cluster to perform a corresponding operation on the target datasheet according to the data request.

[0122] As a preferred mode of execution, in the embodiments of the present invention, when the processor executes the computer program, the following step is further realized:

[0123] enquiring whether the target datasheet exists in cluster metadata, if yes, determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation.

[0124] As a preferred mode of execution, in the embodiments of the present invention, when the processor executes the computer program, the following steps are further realized:

[0125] extracting user information from the data request, enquiring a preset permission relation table according to the user information, determining whether the user has operation permission of the target datasheet, if yes, sending the data request to the target cluster.

[0126] As a preferred mode of execution, in the embodiments of the present invention, when

- the processor executes the computer program, the following steps are further realized:
- [0127] extracting version information of the client side from the data request;
 - [0128] determining whether a version of the client side is adapted to a version of the target cluster according to the version information of the client side and a preset mapping relation table between client side versions and cluster versions, if yes, directly sending the data request to the target cluster; and
 - [0129] if not, adjusting parameters in the data request according to the version of the target cluster, and sending the data request with adjusted parameters to the target cluster.
- [0130] As a preferred mode of execution, in the embodiments of the present invention, when the processor executes the computer program, the following steps are further realized:
- [0131] receiving real-time and/or offline data via a data integrating module, and writing the real-time and/or offline data in a corresponding datasheet in the cluster according to a preset index relation.
- [0132] As a preferred mode of execution, in the embodiments of the present invention, when the processor executes the computer program, the following steps are further realized:
- [0133] monitoring the cluster metadata, and updating the locally cached cluster metadata if update is monitored in the cluster metadata.
- [0134] In the embodiments of the present invention, there is further provided a computer-readable storage medium storing thereon a computer program, and the following steps are realized when the computer program is executed by a processor:
- [0135] receiving a data request sent from a client side, performing request protocol analysis on the data request, and determining a transport protocol type to which the data request corresponds according to analysis result;
 - [0136] using a preset data analyzing module corresponding to the transport protocol type to perform request data analysis on the data request, and determining a target datasheet to which the data request corresponds according to analysis result;

[0137] determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation; and

[0138] sending the data request to the target cluster, so as to facilitate the target cluster to perform a corresponding operation on the target datasheet according to the data request.

[0139] As a preferred mode of execution, in the embodiments of the present invention, when the computer program is executed by a processor, the following step is further realized:

[0140] enquiring whether the target datasheet exists in cluster metadata, if yes, determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation.

[0141] As a preferred mode of execution, in the embodiments of the present invention, when the computer program is executed by a processor, the following steps are further realized:

[0142] extracting user information from the data request, enquiring a preset permission relation table according to the user information, determining whether the user has operation permission of the target datasheet, if yes, sending the data request to the target cluster.

[0143] As a preferred mode of execution, in the embodiments of the present invention, when the computer program is executed by a processor, the following steps are further realized:

[0144] extracting version information of the client side from the data request;

[0145] determining whether a version of the client side is adapted to a version of the target cluster according to the version information of the client side and a preset mapping relation table between client side versions and cluster versions, if yes, directly sending the data request to the target cluster; and

[0146] if not, adjusting parameters in the data request according to the version of the target cluster, and sending the data request with adjusted parameters to the target cluster.

[0147] As a preferred mode of execution, in the embodiments of the present invention, when the computer program is executed by a processor, the following steps are further realized:

[0148] receiving real-time and/or offline data via a data integrating module, and writing the real-time and/or offline data in a corresponding datasheet in the cluster according to a preset index relation.

[0149] As a preferred mode of execution, in the embodiments of the present invention, when the computer program is executed by a processor, the following steps are further realized:

[0150] monitoring the cluster metadata, and updating the locally cached cluster metadata if update is monitored in the cluster metadata.

[0151] In summary, technical solutions provided by the embodiments of the present invention bring about the following advantageous effects.

[0152] In the data request processing method, data request processing device, computer equipment and storage medium provided by the embodiments of the present invention, by receiving a data request sent from a client side, performing request protocol analysis on the data request, determining a transport protocol type to which the data request corresponds according to analysis result, using a preset data analyzing module corresponding to the transport protocol type to perform request data analysis on the data request, determining a target datasheet to which the data request corresponds according to analysis result, determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation, and sending the data request to the target cluster, so as to facilitate the target cluster to perform a corresponding operation on the target datasheet according to the data request, and by configuring analyzing modules of different protocols at the gateway layer, the present invention achieves multi-protocol compatibility, enables to process differently typed protocol requests, and solves the problem in which protocol types as forwarded are not widely ranging.

[0153] Besides, in the data request processing method, data request processing device, computer equipment and storage medium provided by the embodiments of the present

invention, by extracting user information from the data request, enquiring a preset permission relation table according to the user information, determining whether the user has operation permission of the target datasheet, if yes, sending the data request to the target cluster, control of data requests forwarded to the clusters is achieved, and cluster pressure is reduced.

[0154] Moreover, in the data request processing method, data request processing device, computer equipment and storage medium provided by the embodiments of the present invention, by receiving real-time and/or offline data via a data integrating module, and writing the real-time and/or offline data in a corresponding datasheet in the cluster according to a preset index relation, the pressure of write requests with large data size onto the gateway layer is separated via the data integrating module, the problem of gateway overload is prevented, and interference of read/write requests is avoided.

[0155] As should be noted, when the data request processing device provided by the aforementioned embodiments triggers the data processing business, it is only exemplarily described with the division into the aforementioned various functional modules, while in practical application, it is possible to assign the functions to different functional modules to be completed thereby according to requirements, that is to say, to divide the internal structure of the device into different functional modules to complete the entire or partial functions described above. In addition, the data request processing device provided by the aforementioned embodiments pertains to the same conception as the data request processing method, that is to say, the device is based on the data request processing method – details for its specific realization process can be inferred from the method embodiments, while no repetition would be made in this context.

[0156] As comprehensible to persons ordinarily skilled in the art, the entire or partial steps of the aforementioned embodiments can be completed via hardware, or via a program instructing relevant hardware, the program can be stored in a computer-readable storage

medium, and the storage medium can be a read-only memory, a magnetic disk, or an optical disk.

[0157] What is described above is merely directed to preferred embodiments of the present invention, and is not meant to restrict the present invention. Any amendment, equivalent replacement and improvement makeable within the spirit and scope of the present invention shall all be covered within the protection scope of the present invention.

CLAIMS

1. A data request processing method, characterized in comprising the following steps:

receiving a data request sent from a client side, performing request protocol analysis on the data request, and determining a transport protocol type to which the data request corresponds according to analysis result;

using a preset data analyzing module corresponding to the transport protocol type to perform request data analysis on the data request, and determining a target datasheet to which the data request corresponds according to analysis result;

determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation; and

sending the data request to the target cluster, so as to facilitate the target cluster to perform a corresponding operation on the target datasheet according to the data request.

2. The data request processing method according to Claim 1, characterized in that the step of determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation includes:

enquiring whether the target datasheet exists in cluster metadata, if yes, determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation.

3. The data request processing method according to Claim 1 or 2, characterized in that the data request includes user information, and that the step of sending the data request to the target cluster includes:

extracting user information from the data request, enquiring a preset permission relation table according to the user information, determining whether the user has operation permission of the target datasheet, if yes, sending the data request to the target cluster.

4. The data request processing method according to Claim 1 or 2, characterized in that the data request includes version information of the client side, and that the step of sending the data request to the target cluster includes:

extracting version information of the client side from the data request;

determining whether a version of the client side is adapted to a version of the target cluster according to the version information of the client side and a preset mapping relation table between client side versions and cluster versions, if yes, directly sending the data request to the target cluster; and

if not, adjusting parameters in the data request according to the version of the target cluster, and sending the data request with adjusted parameters to the target cluster.

5. The data request processing method according to Claim 1 or 2, characterized in further comprising:

receiving real-time and/or offline data via a data integrating module, and writing the real-time and/or offline data in a corresponding datasheet in the cluster according to a preset index relation.

6. The data request processing method according to Claim 2, characterized in further comprising: monitoring the cluster metadata, and updating the locally cached cluster metadata if update is monitored in the cluster metadata.

7. The data request processing method according to Claim 1 or 2, characterized in that the corresponding operation includes at least one of read operation and write operation.
8. A data request processing device, characterized in comprising:

a first analyzing module, for receiving a data request sent from a client side, performing request protocol analysis on the data request, and determining a transport protocol type to which the data request corresponds according to analysis result;

a second analyzing module, for using a preset data analyzing module corresponding to the transport protocol type to perform request data analysis on the data request, and determining a target datasheet to which the data request corresponds according to analysis result;

a cluster determining module, for determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation; and

a request forwarding module, for sending the data request to the target cluster, so as to facilitate the target cluster to perform a corresponding operation on the target datasheet according to the data request.
9. A computer equipment, comprising a memory, a processor and a computer program stored on the memory and executable on the processor, characterized in that the method steps according to anyone of Claims 1 to 7 are realized when the processor executes the computer program.
10. A computer-readable storage medium, storing a computer program thereon, characterized in that the method steps according to anyone of Claims 1 to 7 are realized when the computer program is executed by a processor.

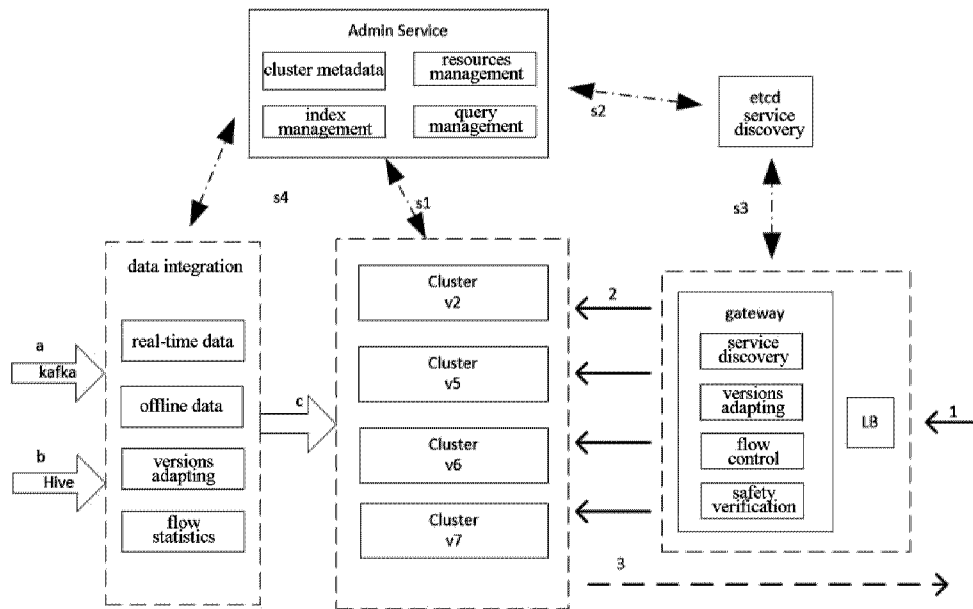


Fig. 1

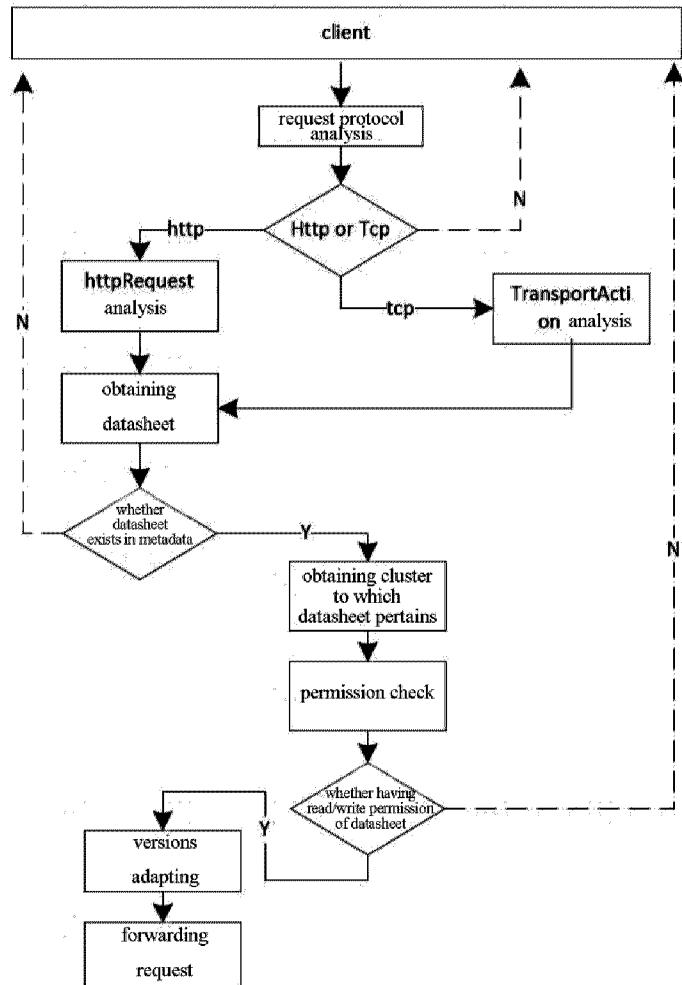


Fig. 2

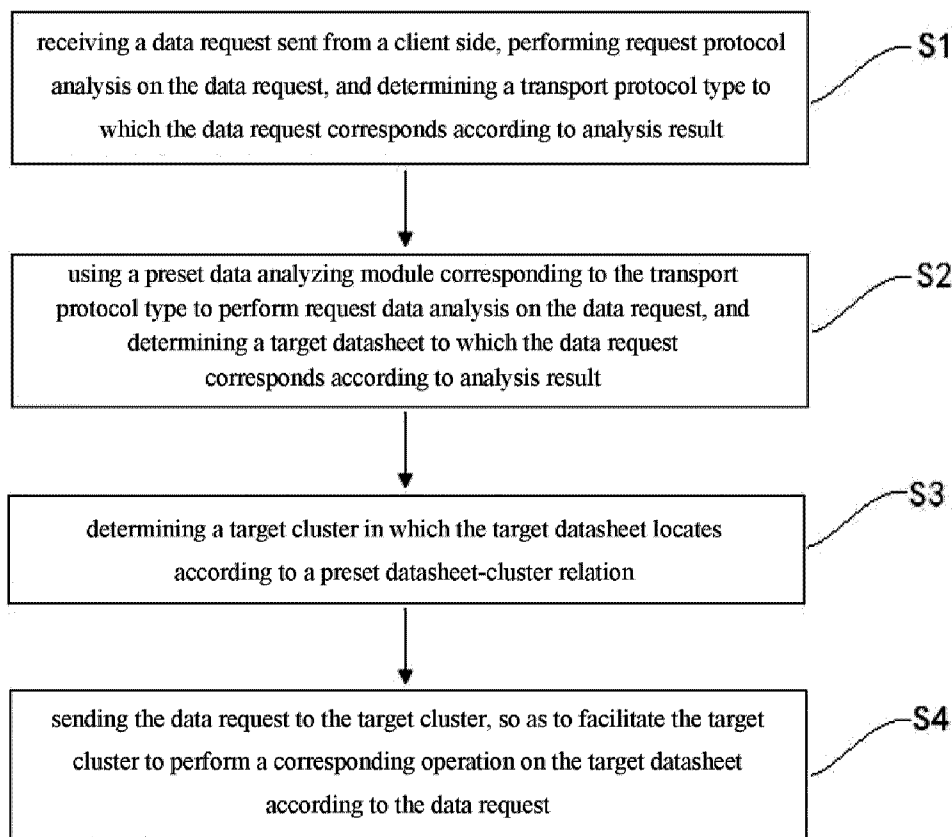


Fig. 3

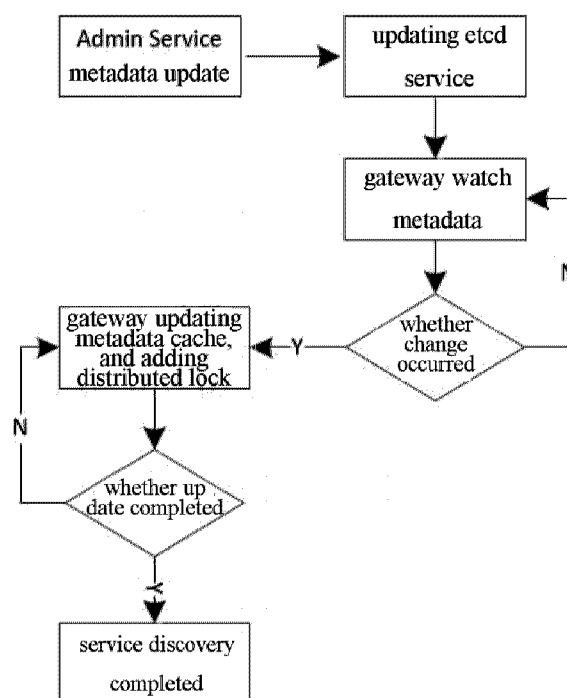


Fig. 4

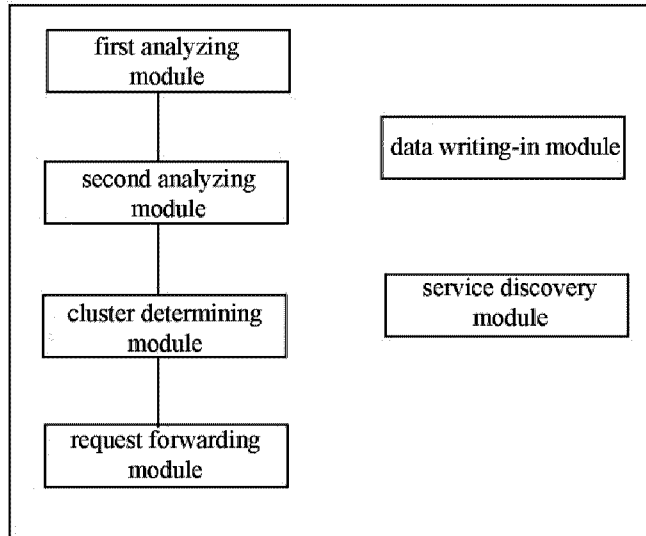


Fig. 5

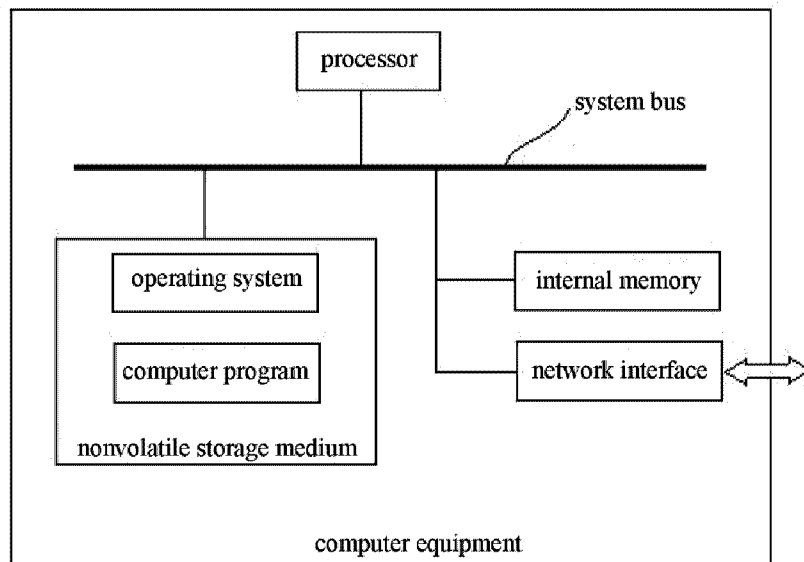


Fig. 6

receiving a data request sent from a client side, performing request protocol analysis on the data request, and determining a transport protocol type to which the data request corresponds according to analysis result

S1

using a preset data analyzing module corresponding to the transport protocol type to perform request data analysis on the data request, and determining a target datasheet to which the data request corresponds according to analysis result

S2

determining a target cluster in which the target datasheet locates according to a preset datasheet-cluster relation

S3

sending the data request to the target cluster, so as to facilitate the target cluster to perform a corresponding operation on the target datasheet according to the data request

S4