



(11) **EP 3 747 727 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
26.06.2024 Bulletin 2024/26

(51) International Patent Classification (IPC):
B61L 27/00 ^(2022.01) **G06F 17/00** ^(2019.01)
B61L 15/00 ^(2006.01)

(21) Application number: **19811381.3**

(52) Cooperative Patent Classification (CPC):
B61L 27/40

(22) Date of filing: **29.05.2019**

(86) International application number:
PCT/CN2019/089017

(87) International publication number:
WO 2019/228400 (05.12.2019 Gazette 2019/49)

(54) **DATA PROCESSING SYSTEM AND METHOD**

DATENVERARBEITUNGSSYSTEM UND -VERFAHREN

SYSTÈME ET PROCÉDÉ DE TRAITEMENT DE DONNÉES

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

(30) Priority: **31.05.2018 CN 201810571943**

(43) Date of publication of application:
09.12.2020 Bulletin 2020/50

(73) Proprietor: **CRSC Research & Design Institute
Group Co., Ltd.
Beijing 100070 (CN)**

(72) Inventors:

- **LIU, Jun
Beijing 100070 (CN)**
- **WEI, Feng
Beijing 100070 (CN)**
- **WANG, Lijun
Beijing 100070 (CN)**

- **LIN, Feng
Beijing 100070 (CN)**
- **CHEN, Jianxin
Beijing 100070 (CN)**
- **LIU, Kenan
Beijing 100070 (CN)**
- **ZHAO, Guimin
Beijing 100070 (CN)**
- **LI, Hanbing
Beijing 100070 (CN)**

(74) Representative: **Huang, Liwei
Cäcilienstraße 12
40597 Düsseldorf (DE)**

(56) References cited:
CN-A- 101 602 372 CN-A- 103 338 261
CN-A- 103 338 261 CN-A- 108 860 223
KR-B1- 101 434 303 US-A- 5 659 779

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] The present disclosure claims priority to Chinese patent application with the application No. of 201810571943.8 and the invention title of "data processing system and method" filed on May 31, 2018 in China.

TECHNICAL FIELD

[0002] The present disclosure relates to the field of data application management technology, and more particularly, to a data processing system and a data processing method.

BACKGROUND

[0003] TDCS (Train Dispatching Command System) is a modern information system that implements various levels of railway transportation dispatching and realizes transparent command, real-time adjustment, and centralized control over train operation, it is composed of railway headquarter dispatching center system, railways bureau dispatching center systems and station systems, it is a modern railway transportation dispatching command and control system covering all roads. TDCS utilizes modern scientific and technological means such as information technology, network technology, control technology, adopts and combines modern information technology such as advanced communication, signal, computer network, data transmission, and multimedia technology, and achieves close integration, interconnection and information sharing with the related system under the premise of ensuring network security.

[0004] CTC (Centralized Traffic Control) means that the traffic dispatcher centrally, remotely controls the signals and turnouts of each station in the section in the dispatching station, and handles the routes for receiving and departing. At present, the modernization of railway transportation dispatching and commanding is a key project of railway development, the modernized dispatching and commanding management system for the nation's railways should be built with the TDCS as the platform, the centralized control CTC as the core, and the automation of traffic control as the goal.

[0005] However, the existing CTC, as a dispatching command system, does not include the functions related to traffic management positions into the system scope, and cannot realize the relevant functions of traffic management, for example, it cannot realize the traffic management including operation process management, construction registration and deregistration, regulation and data maintenance. In addition, the existing CTC has not fulfilled a series of new functional requirements of the station, including station plan and station traffic indication board. The existing CTC system cannot well solve the functional requirements of station-level traffic command, station-level data processing, and centralized storage of traffic data of stations within a jurisdiction. Due to the

scattered data and the shortage of centralized storage, the stored data cannot be shared among different user terminals.

[0006] Therefore, a technology is needed to achieve centralized processing of data.

[0007] Some prior arts regarding a data processing system for railway stations can be found in CN 103338261A and KR 101434303B1.

SUMMARY

[0008] The present disclosure provides a data processing system and method to solve the problem of how to centrally process train operation data.

[0009] The invention is set out in the appended set of claims.

[0010] The data processing system and method provided by the technical solutions of the present disclosure are used for collecting data of every station among a plurality of stations in a dispatcher area and implementing centralized processing of the collected data, the system comprising: a plurality of data collection units, each data collection unit being positioned at a corresponding station among the plurality of stations, and being used for collecting data associated with the corresponding station, each data collection unit being capable of establishing a communication link with a CTC device at the station in order to acquire data recorded by the CTC device; a data storage unit used to acquire the collected data from each of the data collection units among the plurality of data collection units, implement grouped storage of the collected data on the basis of an identifier of each data collection unit, and establish a category index for the collected data on the basis of the type of the collected data. Through the data storage unit, the data recorded by the CTC device collected by the plurality of data collection units are centrally stored. To facilitate query or invoking of the data, the technical solutions of the present disclosure implement grouped storage of the collected data according to the identifier of each data collection unit, and establish a category index for the collected data according to the type of the collected data, which is convenient for different users to search and invoke the data. The data processing system of the technical solutions of the present disclosure further comprises: an interface unit used to receive a query request of a user terminal, implement data search on the basis of a query type and keywords to which the query request relates, and send the query results acquired through data search to the user terminal, wherein the query type includes a group query and a category query. Through the interface unit, different users can realize group query or category query of the centralized storage data. The technical solutions of the present disclosure solve the functional requirements of station-level traffic command, station-level data processing and centralized storage of traffic data of stations within a jurisdiction.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] In order to more clearly illustrate the technical solutions in the embodiments of the present disclosure or in the prior art, the drawings necessary for description of the embodiments or the prior art will be briefly introduced below, obviously, the drawings in the following description are some embodiments of the present disclosure, other drawings can be obtained by a person of ordinary skill in the art based on these drawings without paying creative efforts.

Figure 1 is a schematic structural diagram of a data processing system according to embodiments of the present disclosure; and

Figure 2 is a flowchart of a data processing method according to embodiments of the present disclosure.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0012] Exemplary embodiments of the present disclosure will now be described with reference to the accompanying drawings, however, the present disclosure can be implemented in many different forms and is not limited to the embodiments described herein, these embodiments are provided to disclose the present disclosure in detail and completely, and to fully convey the scope of the present disclosure to a person skilled in the art. The terms in the exemplary embodiments shown in the drawings are not intended to limit the present disclosure. In the drawings, the same reference signs are used for the same units/elements.

[0013] Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by a person of ordinary skill in the art to which present disclosure belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having the meaning that is consistent with their meaning in the context of the relevant art and will not be interpreted in an idealized or overly formal sense.

[0014] Figure 1 is a schematic structural diagram of a data processing system according to embodiments of the present invention. The data processing system 100 provided by the embodiments of the present invention are used for collecting data of every station among a plurality of stations in a dispatcher area and implementing centralized processing of the collected data, the system 100 comprises: a plurality of data collection units 101, each data collection unit being positioned at a corresponding station among the plurality of stations, and being used for collecting data associated with the corresponding station, each data collection unit being capable of establishing a communication link with a CTC device at the station in order to acquire data recorded by the CTC device; a data storage unit 102 used to acquire the collected data from each of the data collection units among the plurality of data collection units, implement

grouped storage of the collected data on the basis of an identifier of each data collection unit, and establish a category index for the collected data on the basis of the type of the collected data. Alternatively, a category index is established for the collected data according to the type of a terminal to which the collected data belongs. The type of the collected data is determined by the type of a terminal associated with the collected data, or the type of the collected data is determined by the type of a terminal from which the collected data is sourced. Through the data storage unit 102, the data recorded by the CTC device collected by the plurality of data collection units are centrally stored. To facilitate query or invoking of the data, the embodiments of the present disclosure implement grouped storage of the collected data according to the identifier of each data collection unit among the plurality of data collection units 101, and establish a category index for the collected data according to the type of the collected data, which is convenient for different users to search and invoke the data. Alternatively, a category index is established for the collected data according to the type of a terminal from which the collected data is sourced. The data processing system of the embodiments of the present invention further comprises: an interface unit 103 used to receive a query request of a user terminal, implement data search on the basis of a query type and keywords to which the query request relates, and send the query results acquired through data search to the user terminal, wherein the query type includes a group query and a category query. Through the interface unit 103, different users can realize group query or category query of the centralized storage data. A data processing system 100, used for collecting data of every station among a plurality of stations in a dispatcher area and implementing centralized processing of the collected data, is shown in Figure 1, the system comprises: a plurality of data collection units 101, each data collection unit being positioned at a corresponding station among the plurality of stations, and being used for collecting data associated with the corresponding station, wherein each data collection unit is capable of establishing a communication link with a CTC device at the station in order to acquire data recorded by the CTC device.

[0015] Preferably, each data collection unit is capable of establishing a communication link with a CTC device at the station in order to acquire data recorded by the CTC device, the data includes: data obtained by the CTC device from a train operation terminal, a maintenance terminal of communication and signaling, and a traffic management terminal.

[0016] Preferably, the data collected by the plurality of data collections units 101 in the system 100 includes: train running plan, shunting operation plan, running log, dispatching command, construction registration and de-registration, travel event alarm log, station operation process management data, regulations and materials.

a data storage unit 102 used to acquire the collected

data from each of the data collection units among the plurality of data collection units, implement grouped storage of the collected data on the basis of an identifier of each data collection unit, and establish a category index for the collected data on the basis of the type of the collected data; alternatively, a category index is established for the collected data according to the type of a terminal to which the collected data belongs; and
 an interface unit 103 used to receive a query request of a user terminal, implement data search on the basis of a query type and keywords to which the query request relates, and send the query results acquired through data search to the user terminal, wherein the query type includes a group query and a category query.

[0017] Preferably, the number of the stations is less than or equal to 15.

[0018] According to the invention, the system 100 is installed on two servers, and the two servers are set as a master running server and a slave running server; the system 100 runs normally on the master running server; when the master running server fails, the system 100 continues to run after the slave running server is upgraded as the master running server.

[0019] In the present disclosure, the main functions of the system 100 include transfer-station-level traffic command, station-level data processing, and centralized storage of the traffic data of stations within a jurisdiction. The traffic data includes train running plan, shunting operation plan, running log, dispatching command, construction registration and deregistration, travel event alarm log, station operation process management data, regulations and materials, etc. The system 100 should adopt hot standby with dual-machine, be equipped with a large-capacity network storage, and be installed in the signal room. A set of data processing system 100 is shared by a plurality of stations in a CTC section directly under a line station or belong to a train depot.

[0020] Station servers generally use general-purpose computing equipment, PC servers with X86 architecture. The embodiments of the present disclosure only exemplify the mainstream configuration, but the embodiments of the present disclosure are not limited to this.

[0021] Logically, the data processing system generally comprises two types of components.

[0022] One type is communication programs, on the one hand, they are responsible for establishing communication connections with other CTC devices, and on the other hand, they are responsible for establishing communication connections with other internal program modules to realize data interaction between the two sides.

[0023] The other type is application programs, which are mainly various data storage and query modules, each module is responsible for the storage of one type of information and response to query requests, wherein information classification includes, for example, train run-

ning plan, shunting operation plan, running log, dispatching command, construction registration and deregistration, travel event alarm log, station operation process management data, regulations and materials.

[0024] The functional realization logic of the data processing system mainly includes two types, one type is storage, relevant information is sent to a corresponding storage query module in the data processing system by applications on various terminals (including the train operation terminal, the maintenance terminal of communication and signaling, the traffic management terminal, etc.). The storage query module returns a receipt to the corresponding terminal application after making a storage in the database. The other type is query, various terminals (including the train operation terminal, the maintenance terminal of communication and signaling, the traffic management terminal, etc.) send query requests for related information to the corresponding storage query module in the data processing system, and the storage query module returns a query result from the database to the corresponding terminal application.

[0025] In the implementations of the present disclosure, as far as the storage function is concerned, the information source of construction registration and deregistration, regulations and materials is the traffic management terminal, and other information sources are the train operation terminal and the maintenance terminal of communication and signaling, and the query function can be deployed on demand.

[0026] The data processing system in the present application adopts dual-computer redundancy, with two servers operating in an active-standby mode. The standby computer will be upgraded as the host computer to continue running when a failure of the host is detected.

[0027] The data processing system of the present disclosure supports a series of new functions of the station, including the realization of station planning and station traffic indication board. And the related functions of the traffic management positions are included in the scope of the system, including operation process management, construction registration and deregistration, regulation and data maintenance. This system upgrades the CTC system, expands the applicability scope, and supports the realization of traffic management functions (mainly including operation process management, construction registration and deregistration, regulation and data maintenance). The data processing system provided by the present disclosure supports a series of new functions of the station which include the realization of functions such as station planning and station traffic indication board. These functions further expand the applicability scope of the CTC system and enhance the station's ability to conduct traffic command.

[0028] Figure 2 is a flowchart of a data processing method according to embodiments of the present invention.

[0029] A data processing method 200 provided by the embodiments of the present invention is used for col-

lecting data of every station among a plurality of stations in a dispatcher area and implementing centralized processing of the collected data, the method 200 comprises: setting a plurality of data collection units, each data collection unit being positioned at a corresponding station among the plurality of stations, and being used for collecting data associated with the corresponding station, each data collection unit being capable of establishing a communication link with a CTC device at the station in order to acquire data recorded by the CTC device; acquiring the collected data from each of the data collection units among the plurality of data collection units, implementing grouped storage of the collected data on the basis of an identifier of each data collection unit, and establishing a category index for the collected data on the basis of the type of the collected data. Alternatively, a category index is established for the collected data according to the type of a terminal to which the collected data belongs, and the data recorded by the CTC device collected by the plurality of data collection units are centrally stored. To facilitate query or invoking of the data, the embodiments of the present disclosure implement grouped storage of the collected data according to the identifier of each data collection unit among the plurality of data collection units, and establish a category index for the collected data according to the type of the collected data, which is convenient for different users to search and invoke the data. Alternatively, a category index is established for the collected data according to the type of a terminal from which the collected data is sourced. The data processing method of the embodiments of the present disclosure further comprises: receiving a query request of a user terminal, implementing data search on the basis of a query type and keywords to which the query request relates, and sending query results acquired through data search to the user terminal, wherein the query type includes a group query and a category query. The query types include group query and category query. Group query or category query on the centralized storage data is achieved. A data processing method 200, used for collecting data of every station among a plurality of stations in a scheduling area and implementing centralized processing of the collected data, is shown in Figure 2, the method 200 starts from step 201.

[0030] According to the invention, in step 201: setting a plurality of data collection units, wherein each data collection unit is positioned at a corresponding station among the plurality of stations, used for collecting data associated with the corresponding station, and each data collection unit is capable of establishing a communication link with a CTC device at the station in order to acquire data recorded by the CTC device.

[0031] Preferably, each data collection unit is capable of establishing a communication link with a CTC device at the station in order to acquire data recorded by the CTC device, the data includes: data obtained by the CTC device from a train operation terminal, a maintenance terminal of communication and signaling, and a traffic

management terminal.

[0032] Preferably, the data includes: train running plan, shunting operation plan, running log, dispatching command, construction registration and deregistration, travel event alarm log, station operation process management data, regulations and materials.

[0033] Preferably, in step 202: acquiring the collected data from each of the data collection units among the plurality of data collection units, implementing grouped storage of the collected data on the basis of an identifier of each data collection unit, and establishing a category index for the collected data on the basis of the type of the collected data. Alternatively, a category index is established for the collected data according to the type of a terminal to which the collected data belongs.

[0034] Preferably, in step S203: receiving a query request of a user terminal, implementing data search on the basis of a query type and keywords to which the query request relates, and sending query results acquired through data search to the user terminal, wherein the query type includes a group query and a category query.

[0035] Preferably, the number of the stations is less than or equal to 15.

[0036] According to the invention, the method is run on two servers in an active-standby manner, the two servers are set as a master running server and a slave running server; the method runs normally on the master running server; when the master running server fails, the method continues to run after the slave running server is upgraded as the master running server.

[0037] The data processing method of the present disclosure supports a series of new functions of the station, including the realization of station planning and station traffic indication board. And the related functions of the traffic management positions are included in the scope of the system, including operation process management, construction registration and deregistration, regulation and data maintenance. This system upgrades the CTC system, expands the applicability scope, and supports the realization of traffic management functions (mainly including operation process management, construction registration and deregistration, regulation and material maintenance). The data processing system provided by the present disclosure supports a series of new functions of the station which include the realization of functions such as station planning and station traffic indication board. These functions further expand the applicability scope of the CTC system and enhance the station's ability to conduct traffic command.

[0038] Generally, all terms used in the claims are interpreted according to their ordinary meanings in the technical field, unless explicitly defined otherwise.

Claims

1. A data processing system (100), for collecting data of every station among a plurality of stations in a

dispatcher area and implementing centralized processing of the collected data, the system comprising:

a plurality of data collection units (101), each data collection unit being positioned at a corresponding station among the plurality of stations, and being configured to collect data associated with the corresponding station, each data collection unit (101) being capable of establishing a communication link with a CTC device at the station in order to acquire data recorded by the CTC device;

a data storage unit (102) configured to acquire the collected data from each of the data collection units (101) among the plurality of data collection units (101), implement grouped storage of the collected data on the basis of an identifier of each data collection unit (101), and establish a category index for the collected data on the basis of a type of the collected data, wherein the type of the collected data is determined by a type of a terminal with which the collected data are associated, or is determined by a type of a terminal from which the collected data are sourced; and

an interface unit (103) configured to receive a query request of a user terminal, implement data search on the basis of a query type and keywords to which the query request relates, and send query results acquired through data search to the user terminal;

characterized in that

the system is installed on two servers, the two servers are set as a master running server and a slave running server; the system runs normally on the master running server; when the master running server fails, the system continues to run after the slave running server is upgraded as the master running server.

2. The system according to claim 1, wherein each data collection unit (101) is capable of establishing a communication link with a CTC device at the station in order to acquire data recorded by the CTC device, the data includes: data obtained by the CTC device from a train operation terminal, a maintenance terminal of communication and signaling, and a traffic management terminal.
3. The system according to claim 1, wherein the number of the stations is less than or equal to 15.
4. The system according to claim 1, wherein the data includes: train running plan, shunting operation plan, running log, dispatching command, construction registration and deregistration, travel event alarm log, station operation process management data, regu-

lations and materials.

5. A data processing method (200), for collecting data of every station among a plurality of stations in a scheduling area and implementing centralized processing of the collected data, the method comprising:

setting a plurality of data collection units, each data collection unit being positioned at a corresponding station among the plurality of stations, and being used for collecting data associated with the corresponding station (201), each data collection unit being capable of establishing a communication link with a CTC device at the station in order to acquire data recorded by the CTC device;

acquiring the collected data from each of the data collection units among the plurality of data collection units, implementing grouped storage of the collected data on the basis of an identifier of each data collection unit (202), and establishing a category index for the collected data on the basis of a type of the collected data, wherein the type of the collected data is determined by a type of a terminal with which the collected data are associated, or is determined by a type of a terminal from which the collected data are sourced; and

receiving a query request of a user terminal, implementing data search on the basis of a query type and keywords to which the query request relates, and sending query results acquired through data search to the user terminal (203), wherein the query type includes a group query and a category query;

characterized in that

the method is run on two servers in an active-standby manner, the two servers are set as a master running server and a slave running server; the method runs normally on the master running server; when the master running server fails, the method continues to run after the slave running server is upgraded as the master running server.

6. The method according to claim 5, wherein each data collection unit is capable of establishing a communication link with a CTC device at the station in order to acquire data recorded by the CTC device, the data includes: data obtained by the CTC device from a train operation terminal, a maintenance terminal of communication and signaling, and a traffic management terminal.
7. The method according to claim 5, wherein the number of the stations is less than or equal to 15.

8. The method according to claim 5, wherein the data includes: train running plan, shunting operation plan, running log, dispatching command, construction registration and deregistration, travel event alarm log, station operation process management data, regulations and materials.

Patentansprüche

1. Datenverarbeitungssystem (100) zum Erfassen von Daten jeder Station aus einer Vielzahl von Stationen in einem Dispatcher-Bereich und zum Umsetzen einer zentralisierten Verarbeitung der erfassten Daten, wobei das System Folgendes umfasst:

eine Vielzahl von Datenerfassungseinheiten (101), wobei jede Datenerfassungseinheit an einer entsprechenden Station aus der Vielzahl von Stationen positioniert ist und dazu konfiguriert ist, der entsprechenden Station zugeordnete Daten zu erfassen, wobei jede Datenerfassungseinheit (101) in der Lage ist, eine Kommunikationsverbindung mit einer CTC-Vorrichtung an der Station herzustellen, um durch die CTC-Vorrichtung aufgezeichnete Daten zu erlangen; eine Datenspeichereinheit (102), die dazu konfiguriert ist, die erfassten Daten von jeder der Datenerfassungseinheiten (101) aus der Vielzahl von Datenerfassungseinheiten (101) zu erlangen, eine gruppierte Speicherung der erfassten Daten auf der Grundlage einer Kennung jeder Datenerfassungseinheit (101) umzusetzen und einen Kategorienindex für die erfassten Daten auf der Grundlage eines Typs der erfassten Daten zu erstellen, wobei der Typ der erfassten Daten durch einen Typ eines Endgeräts bestimmt wird, dem die erfassten Daten zugeordnet sind, oder durch einen Typ eines Endgeräts bestimmt wird, von dem die erfassten Daten stammen; und

eine Schnittstelleneinheit (103), die dazu konfiguriert ist, eine Abfrageanforderung eines Benutzerendgeräts zu empfangen, eine Datensuche auf der Grundlage eines Abfragetyps und von Schlüsselwörtern, auf die sich die Abfrageanforderung bezieht, umzusetzen und durch die Datensuche erlangte Abfrageergebnisse an das Benutzerendgerät zu senden;

dadurch gekennzeichnet, dass

das System auf zwei Servern installiert ist, die zwei Server als ein Master-Server und ein Slave-Server eingerichtet sind; das System normalerweise auf dem Master-Server läuft; wenn der Master-Server ausfällt, das System weiterläuft, nachdem der Slave-Server zum Master-Server hochgestuft wurde.

2. System nach Anspruch 1, wobei jede Datenerfassungseinheit (101) in der Lage ist, eine Kommunikationsverbindung mit einer CTC-Vorrichtung an der Station herzustellen, um durch die CTC-Vorrichtung aufgezeichnete Daten zu erlangen, wobei die Daten Folgendes enthalten: Daten, die durch die CTC-Vorrichtung von einem Zugbetriebsendgerät, einem Wartungsendgerät für Kommunikation und Signalisierung und einem Verkehrsmanagementendgerät erhalten wurden.

3. System nach Anspruch 1, wobei die Anzahl der Stationen kleiner oder gleich 15 ist.

4. System nach Anspruch 1, wobei die Daten Folgendes enthalten: Zuglaufplan, Rangierbetriebsplan, Laufprotokoll, Abfertigungsbefehl, Bauanmeldung und -abmeldung, Fahrereignisalarmprotokoll, Daten zum Stationsbetriebsablaufmanagement, Vorschriften und Materialien.

5. Datenverarbeitungsverfahren (200) zum Erfassen von Daten jeder Station aus einer Vielzahl von Stationen in einem Planungsbereich und zum Umsetzen einer zentralisierten Verarbeitung der erfassten Daten, wobei das Verfahren Folgendes umfasst:

Einrichten einer Vielzahl von Datenerfassungseinheiten, wobei jede Datenerfassungseinheit an einer entsprechenden Station aus der Vielzahl von Stationen positioniert ist und dazu verwendet wird, der entsprechenden Station (201) zugeordnete Daten zu erfassen, wobei jede Datenerfassungseinheit in der Lage ist, eine Kommunikationsverbindung mit einer CTC-Vorrichtung an der Station herzustellen, um durch die CTC-Vorrichtung aufgezeichnete Daten zu erlangen;

Erlangen der erfassten Daten von jeder der Datenerfassungseinheiten aus der Vielzahl von Datenerfassungseinheiten, Umsetzen einer gruppierten Speicherung der erfassten Daten auf der Grundlage einer Kennung jeder Datenerfassungseinheit (202) und Erstellen eines Kategorienindex für die erfassten Daten auf der Grundlage eines Typs der erfassten Daten, wobei der Typ der erfassten Daten durch einen Typ eines Endgeräts bestimmt wird, dem die erfassten Daten zugeordnet sind, oder durch einen Typ eines Endgeräts bestimmt wird, von dem die erfassten Daten stammen; und

Empfangen einer Abfrageanforderung eines Benutzerendgeräts, Umsetzen einer Datensuche auf der Grundlage eines Abfragetyps und von Schlüsselwörtern, auf die sich die Abfrageanforderung bezieht, und Senden von durch die Datensuche erlangten Abfrageergebnissen an das Benutzerendgerät (203), wobei der Ab-

fragetyp eine Gruppenabfrage und eine Kategorienabfrage enthält;

dadurch gekennzeichnet, dass

das Verfahren auf zwei Servern in einem aktiven Bereitschaftsmodus läuft, die zwei Server als ein Master-Server und ein Slave-Server eingerichtet sind; das Verfahren normalerweise auf dem Master-Server läuft, wenn der Master-Server ausfällt, das Verfahren weiterläuft, nachdem der Slave-Server zum Master-Server hochgestuft wurde.

6. Verfahren nach Anspruch 5, wobei jede Datenerfassungseinheit in der Lage ist, eine Kommunikationsverbindung mit einer CTC-Vorrichtung an der Station herzustellen, um durch die CTC-Vorrichtung aufzeichnete Daten zu erlangen, wobei die Daten Folgendes enthalten: Daten, die durch die CTC-Vorrichtung von einem Zugbetriebsendgerät, einem Wartungsendgerät für Kommunikation und Signalisierung und einem Verkehrsmanagementendgerät erhalten wurden.
7. Verfahren nach Anspruch 5, wobei die Anzahl der Stationen kleiner oder gleich 15 ist.
8. Verfahren nach Anspruch 5, wobei die Daten Folgendes enthalten: Zuglaufplan, Rangierbetriebsplan, Laufprotokoll, Abfertigungsbefehl, Bauanmeldung und -abmeldung, Fahrereignisalarmprotokoll, Daten zum Stationsbetriebsablaufmanagement, Vorschriften und Materialien.

Revendications

1. Système de traitement de données (100), destiné à collecter des données de chaque station parmi une pluralité de stations dans une zone de répartiteur et mettre en oeuvre un traitement centralisé des données collectées, le système comprenant :

une pluralité d'unités de collecte de données (101), chaque unité de collecte de données étant positionnée au niveau d'une station correspondante parmi la pluralité de stations, et étant configurée pour collecter des données associées à la station correspondante, chaque unité de collecte de données (101) pouvant établir une liaison de communication avec un dispositif CTC à la station afin d'acquérir des données enregistrées par le dispositif CTC ;
une unité de stockage de données (102) configurée pour acquérir les données collectées à partir de chacune des unités de collecte de données (101) parmi la pluralité d'unités de collecte de données (101), mettre en oeuvre un stockage groupé des données collectées sur la base d'un

identifiant de chaque unité de collecte de données (101), et établir un index de catégories pour les données collectées sur la base du type des données collectées, ledit type des données collectées étant déterminé par le type d'un terminal auquel les données collectées sont associées, ou étant déterminé par le type d'un terminal duquel proviennent les données collectées ; et

une unité d'interface (103) configurée pour recevoir une demande d'interrogation d'un terminal utilisateur, mettre en oeuvre une recherche de données sur la base d'un type d'interrogation et de mots-clés auxquels la demande d'interrogation se rapporte, et envoyer les résultats d'interrogation acquis par une recherche de données au terminal utilisateur ;

caractérisé en ce que

le système est installé sur deux serveurs, les deux serveurs sont définis comme serveur d'exécution maître et serveur d'exécution esclave ; le système fonctionne normalement sur le serveur d'exécution maître ; lorsque le serveur d'exécution maître tombe en panne, le système continue de fonctionner après la mise à niveau du serveur d'exécution esclave en tant que serveur d'exécution maître.

2. Système selon la revendication 1, chaque unité de collecte de données (101) pouvant établir une liaison de communication avec un dispositif CTC à la station afin d'acquérir des données enregistrées par le dispositif CTC, les données comprenant : des données obtenues par le dispositif CTC à partir d'un terminal d'exploitation ferroviaire, d'un terminal de maintenance de communication et de signalisation, et d'un terminal de gestion du trafic.
3. Système selon la revendication 1, le nombre de stations étant inférieur ou égal à 15.
4. Système selon la revendication 1, lesdites données comprenant : un plan de circulation des trains, un plan d'opération de manoeuvre, un journal de circulation, une commande de répartition, un enregistrement et une désinscription de construction, un journal d'alarme d'événement de voyage, des données de gestion de processus d'exploitation de station, des réglementations et des matériaux.
5. Procédé de traitement de données (200), permettant de collecter des données de chaque station parmi une pluralité de stations dans une zone de planification et mettre en oeuvre un traitement centralisé des données collectées, le procédé comprenant :

la définition d'une pluralité d'unités de collecte de données, chaque unité de collecte de don-

nées étant positionnée au niveau d'une station correspondante parmi la pluralité de stations, et étant utilisée pour collecter des données associées à la station correspondante (201), chaque unité de collecte de données pouvant établir une liaison de communication avec un dispositif CTC à la station afin d'acquérir des données enregistrées par le dispositif CTC ;

l'acquisition des données collectées à partir de chacune des unités de collecte de données parmi la pluralité d'unités de collecte de données, la mise en oeuvre d'un stockage groupé des données collectées sur la base d'un identifiant de chaque unité de collecte de données (202), et l'établissement d'un index de catégories pour les données collectées sur la base du type des données collectées, le type des données collectées étant déterminé par le type d'un terminal auquel les données collectées sont associées, ou étant déterminé par le type d'un terminal duquel proviennent les données collectées ; et la réception d'une demande d'interrogation d'un terminal utilisateur, la mise en oeuvre d'une recherche de données sur la base du type d'interrogation et de mots-clés auxquels la demande d'interrogation se rapporte, et l'envoi des résultats d'interrogation acquis par recherche de données au terminal utilisateur (203), ledit type d'interrogation comprenant une interrogation de groupe et une interrogation de catégorie ;

caractérisé en ce que

le procédé est exécuté sur deux serveurs de manière active-veille, les deux serveurs étant définis comme serveur d'exécution maître et serveur d'exécution esclave ; le procédé s'exécute normalement sur le serveur d'exécution maître ; lorsque le serveur d'exécution maître tombe en panne, le procédé continue de s'exécuter après la mise à niveau du serveur d'exécution esclave en tant que serveur d'exécution maître.

une désinscription de construction, un journal d'alarme d'événement de voyage, des données de gestion de processus d'exploitation de station, des réglementations et des matériaux.

6. Procédé selon la revendication 5, chaque unité de collecte de données pouvant établir une liaison de communication avec un dispositif CTC à la station afin d'acquérir des données enregistrées par le dispositif CTC, lesdites données comprenant : des données obtenues par le dispositif CTC à partir d'un terminal d'exploitation de train, un terminal de maintenance de communication et de signalisation, et un terminal de gestion du trafic.
7. Procédé selon la revendication 5, le nombre de stations étant inférieur ou égal à 15.
8. Procédé selon la revendication 5, lesdites données comprenant : un plan de circulation du train, un plan d'opération de manoeuvre, un journal de circulation, une commande de répartition, un enregistrement et

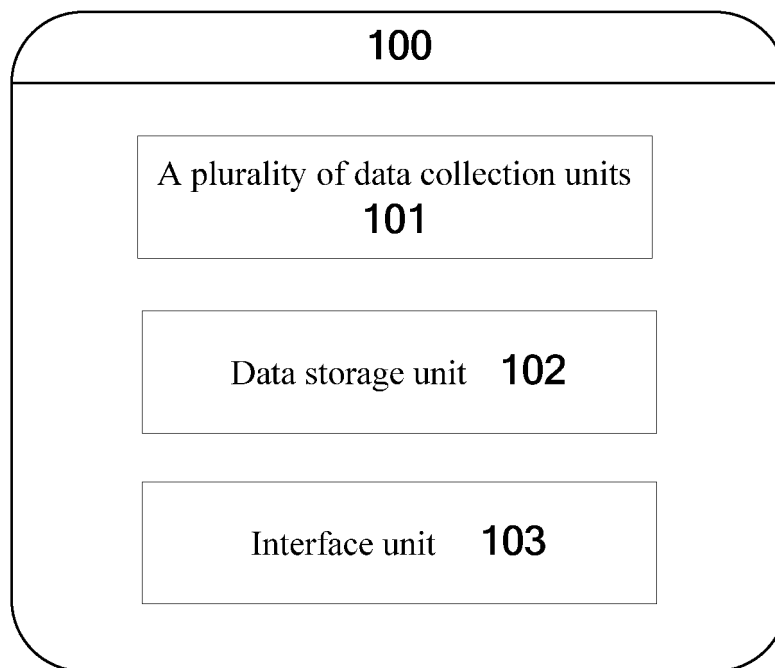


Figure 1

200

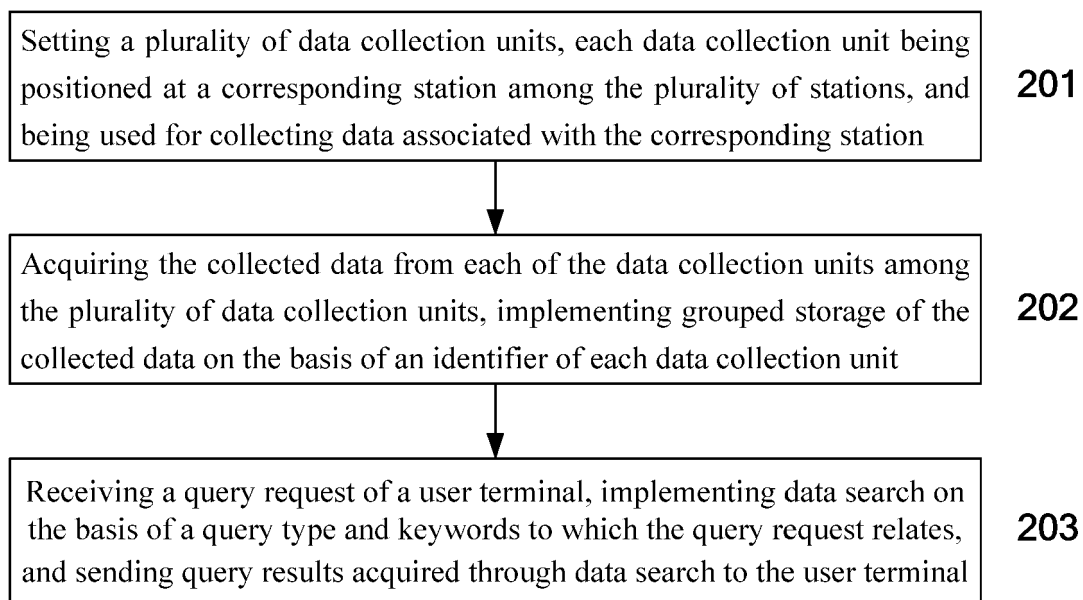


Figure 2

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 201810571943 [0001]
- CN 103338261 A [0007]
- KR 101434303 B1 [0007]