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(54) **METHOD AND SYSTEM FOR PROCESSING CRITICAL LOGIC STATE**

(57) The present application relates to a method for processing key logic states, including: obtaining a plurality of key logic states; updating the key logic states according to changes of the key logic states; and transmitting the updated key logic states to an autonomous machine to achieve synchronization of key logic states. A system for processing key logic states is further provided.

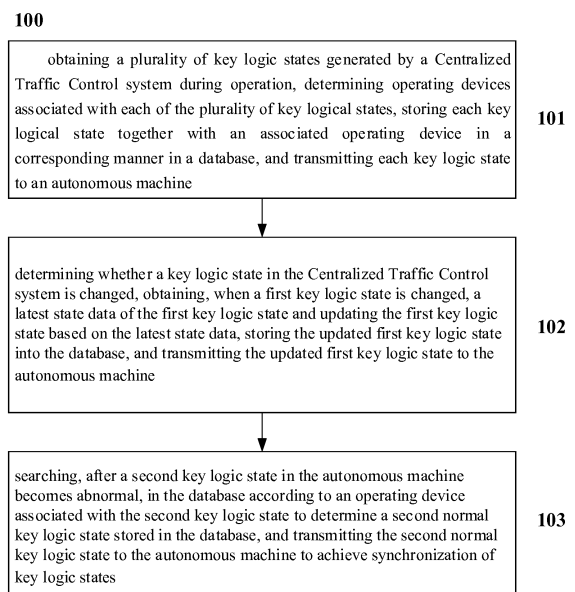


FIG. 1

Description

[0001] The present application claims the priority of Chinese Patent Application No. 201810472241.4, filed on May 17, 2018 and entitled "METHOD AND SYSTEM FOR PROCESSING KEY LOGIC STATES", the content of which is incorporated herein by reference in their entirety.

TECHNICAL FIELD

[0002] The present disclosure relates to a field of information processing technology, and more particularly, to a method and system for processing key logic states.

BACKGROUND

[0003] The Train operation Dispatching Command system, abbreviated as TDCS, mainly completes functions such as recording and analysis of dispatching command information, train number check, automatic reporting on being punctual or late, generation of statistics on late arrival and punctual arrival information, automatic drawing of operation diagram, issuing of dispatching command and plan, automatic generation of logbook, etc. The Centralized Traffic Control system, abbreviated as CTC can further complete automatic train route setting on schedule besides complete all the functions of the TDCS. The manual operation function of the station signal equipment is divided into two modes: decentralized self-discipline control and emergency station control.

[0004] An important function of the CTC is to track and store key states. The stability and security of storage of key states are of great significance to railway dispatching and command. In the prior art, a key state is stored in a data file. When a key state in the system is abnormal, the key state in the system is restored by reading a key state in the data file. Since the key state is real-time, it is necessary to synchronize the key state that has changed. Since the instability of the data file, the data is easily lost, and the file would possibly cannot be restored due to damage.

[0005] Therefore, a technique enabling process of key logic states that change in real time is needed.

SUMMARY

[0006] The present disclosure provides a method and system for processing key logic states to solve a problem of synchronizing and updating, in real time, the key logic states that change in real time.

[0007] In order to solve the above problem, the present disclosure provides a method for processing key logic states, including:

obtaining a plurality of key logic states generated by a Centralized Traffic Control system during operation, determining operating devices associated with

each of the plurality of key logical states, storing each key logical state together with an associated operating device in a corresponding manner into a database, and transmitting each key logic state to an autonomous machine;

determining whether a key logic state in the Centralized Traffic Control system is changed, obtaining, when a first key logic state is changed, a latest state data of the first key logic state and updating the first key logic state based on the latest state data, storing the updated first key logic state into the database, and transmitting the updated first key logic state to the autonomous machine;

searching, after a second key logic state in the autonomous machine becomes abnormal, in the database according to an operating device associated with the second key logic state to determine a second normal key logic state stored in the database, and transmitting the second normal key logic state to the autonomous machine to achieve synchronization of key logic states.

[0008] Preferably, the method further includes setting each of the plurality of key logic states by a user input or a state of a signaling device, transmitting the set key logic states to the autonomous machine for verification processing by the autonomous machine, and storing the key logic states synchronously into the database after the verification processing.

[0009] Preferably, the method further includes deleting any of the plurality of key logic states by a user input.

[0010] Preferably, the key logic states include: states of a traction power contact network of a section, which include: being connected to network, being not connected to network, being powered, and being not powered.

[0011] Preferably, the key logic states include: states of bad shunting of a section, which include: no bad shunting, section occupied for the bad shunting, and section unoccupied for the bad shunting.

[0012] Preferably, the key logic states include: open-close states of a section, which include: closed and open.

[0013] Preferably, each of the key logic states received is buffered by the autonomous machine.

[0014] Preferably, when the updated first key logic state is received by the autonomous machine, the first key logic state in a local buffer is replaced with the updated first key logic state, and the updated first key logic state is stored in the database.

[0015] Preferably, when the second normal key logic state is received by the autonomous machine, the second key logic state which is abnormal is replaced with the second normal key logic state.

[0016] Preferably, when read of a key logic state stored in the database is failed, the key logic state is set to a state that steers safely.

[0017] According to another aspect of the present disclosure, a system for processing a key logic state is provided, including:

an initialization unit, configured to obtain a plurality of key logic states generated by a Centralized Traffic Control system during operation, determine operating devices associated with each of the plurality of key logical states, store each key logical state together with an associated operating device in a corresponding manner into a database, and transmit each key logic state to an autonomous machine; a monitoring unit, configured to determine whether a key logic state in the Centralized Traffic Control system is changed, obtain, when a first key logic state is changed, a latest state data of the first key logic state and update the first key logic state based on the latest state data, store the updated first key logic state into the database, and transmit the updated first key logic state to the autonomous machine; and a synchronization unit, configured to search, after a second key logic state in the autonomous machine becomes abnormal, the database according to an operating device associated with the second key logic state to determine a second normal key logic state stored in the database, and transmit the second normal key logic state to the autonomous machine to achieve synchronization of key logic states.

[0018] Preferably, the initialization unit is further configured to set each of the plurality of key logic states by a user input or a state of a signaling device, transmit the set key logic states to the autonomous machine for verification processing by the autonomous machine, and store the key logic states synchronously into the database after the verification processing.

[0019] Preferably, the system further includes a processing unit configured to delete any of the plurality of key logic states by a user input.

[0020] Preferably, the key logic states include: states of a traction power contact network of a section, which include: being connected to network, being not connected to network, being powered, and being not powered.

[0021] Preferably, the key logic states include: states of bad shunting of a section, which include: no bad shunting, section occupied for the bad shunting, and section unoccupied for the bad shunting.

[0022] Preferably, the key logic states include: open-close states of a section, which include: closed and open.

[0023] Preferably, each of the key logic states received is buffered by the autonomous machine.

[0024] Preferably, when the updated first key logic state is received by the autonomous machine, the first key logic state in a local buffer is replaced with the updated first key logic state, and the updated first key logic state is stored in the database.

[0025] Preferably, when the second normal key logic state is received by the autonomous machine, the second key logic state which is abnormal is replaced with the second normal key logic state.

[0026] Preferably, when read of a key logic state stored

in the database is failed, the key logic state is set to a state that steers safely.

[0027] In the technical solution of the disclosure, the key state is buffered in a memory of the autonomous machine and persistently stored in the database at the same time, and the key logic state stored in the memory of the autonomous machine is directly read during a manual operation process and the shunting route control, thereby improving the performance efficiency. When the key logic state stored in the memory of the autonomous machine is not available and needs to be reinitialized, the persistently stored data is obtained from the database, and the key logic state is reinitialized according to the technical solution of the present disclosure. The technical solution of the disclosure uses the database to synchronize the key logic state, which solves a problem of low efficiency and instability of the backup of the key logic state by the data file in the prior art. The synchronous processing of the key logic state in the technical solution of the present application is convenient, and storing the key logical state in the database is more reliable and efficient.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] Exemplary embodiments of the present disclosure can be more completely understood by reference to the following drawings:

FIG. 1 is a flowchart illustrating a method for processing key logic states according to an embodiment of the present disclosure; and

FIG. 2 is a block diagram illustrating a structure of a system for processing key logic states according to an embodiment of the present disclosure.

DETAILED DESCRIPTION

[0029] The exemplary embodiments of the present disclosure are described with reference to the drawings, however, the present disclosure may be embodied in many different forms and may not be limited to the embodiments described herein. The embodiments are provided to disclose the present disclosure in detail and completely, and to fully convey the scope of the disclosure to those skilled in the art. The terms used in the exemplary embodiments and shown in the drawings are not intended to limit the disclosure. In the drawings, similar reference numerals are used for similar units/elements.

[0030] The terms (including technical terms) used herein are of the ordinary meaning for those skilled in the art, unless otherwise stated. In addition, it is to be understood that terms defined in commonly used dictionaries should be understood as having a meaning consistent with the context in the related art, and should not be interpreted as an idealized meaning or an over-interpreted meaning.

[0031] FIG. 1 is a flowchart illustrating a method for

processing key logic states according to an embodiment of the present disclosure. In an implementation of the present disclosure, when a key logic state is changed, a latest state data of the key logic state is stored in a database. When a key logic state in the CTC becomes abnormal and needs to be restored, the stored key logic state is read from the database. If read of the key logic state is failed, the key logic state is set to a state that steers safely. In an implementation of the present disclosure, the key state is buffered in a memory of the autonomous machine and persistently stored in the database at the same time, and the key logic state stored in the memory of the autonomous machine is directly read during a manual operation process and the shunting route control, thereby improving the performance efficiency. When the key logic state stored in the memory of the autonomous machine is not available and needs to be reinitialized, the persistently stored data is obtained from the database, and the key logic state is reinitialized according to the technical solution of the present disclosure. In the technical solution of the present application, the synchronous processing of the key logic state and storing the key logical state in the database is more reliable and efficient. As shown in FIG. 1, a method 100 for processing key logic states begins at step 101.

[0032] Further, at step 101: obtaining a plurality of key logic states generated by a Centralized Traffic Control system during operation, determining operating devices associated with each of the plurality of key logical states, storing each key logical state together with an associated operating device in a corresponding manner into a database, and transmitting each key logic state to an autonomous machine.

[0033] Further, during the initialization according to the present disclosure, which key states (for example, whether a section is closed or not) each device should have is first determined, and then the database is queried for the current states of these key states (closed or open). Further, the present disclosure includes a process of initializing key logic states, which includes: first determining which key states each device should have, such as, for the device, whether there is a section closed or not, or whether there is a state of bad shunting, etc., and then searching in the database for the current states of these key states.

[0034] Further, the key logic states include states of a traction power contact network of a section, which include: being connected to network, being not connected to network, being powered, and being not powered. Further, the key logic states include states of bad shunting of a section, which include: no bad shunting, section occupied for the bad shunting, and section unoccupied for the bad shunting. Further, the key logic states include: open-close states of a section, which include: closed and open.

[0035] Further, the method further includes setting each of the plurality of key logic states by a user input or a state of a signaling device, transmitting the set key logic

states to the autonomous machine for verification processing by the autonomous machine, and storing the key logic states synchronously into the database after the verification processing. According to the present disclosure, the key logic states are monitored by the system, and manually set by the user, or the key logic states may be changed jointly according to a state of a signaling device. In the present disclosure, the CTC system implements this function by setting and displaying, specifically, the user operates the key logic state at the CTC terminal, and transmits it to the autonomous machine for processing; after the operation is succeeded, the state is returned to the terminal for display, and store in the database synchronously.

[0036] Further, the method further includes deleting any of the plurality of key logic states by a user input.

[0037] Further, at step 102: determining whether the key logic state in the Centralized Traffic Control system is changed, obtaining, when a first key logic state is changed, a latest state data of the first key logic state and updating the first key logic state based on the latest state data, storing the updated first key logic state into the database, and transmitting the updated first key logic state to the autonomous machine.

[0038] Further, at step 103: searching, after a second key logic state in the autonomous machine becomes abnormal, in the database according to an operating device associated with the second key logic state to determine a second normal key logic state stored in the database, and transmitting the second normal key logic state to the autonomous machine to achieve synchronization of key logic states.

[0039] Further, during the abnormality restore according to the present disclosure, which key states (for example, whether a section is closed or not) each device should have is first determined, and then the database is queried for the current states of these key states (closed or open).

[0040] Further, each of the key logic states received is buffered by the autonomous machine.

[0041] Further, when the updated first key logic state is received by the autonomous machine, the first key logic state in a local buffer is replaced with the updated first key logic state, and the updated first key logic state is stored into the database.

[0042] Further, when the second normal key logic state is received by the autonomous machine, the second key logic state which is abnormal is replaced with the second normal key logic state. According to the present disclosure, in a normal state, when the key logic state is changed, the first key logic state in the autonomous machine is first updated, and then the first key logic state is stored into the database synchronously. When the second key logic state in the autonomous machine is failure and needs to be restarted, the last stored second key logic state is loaded from the database to replace the abnormal second key logic state in the autonomous machine.

[0043] Further, when read of the key logic state stored in the database is failed, the key logic state is set to a state that steers safely. According to the present disclosure, when the key logic state is changed, the latest key logic state is synchronously stored into the database in real time. When an abnormality occurs in the system and thus a restoration is needed, the key logic state data is read from the database. If read of the key logic state stored in the database is failed, the key logic state is set to a state that steers safely, to ensure safe driving. According to the present disclosure, during the initialization of the autonomous machine, if read of the key logic states stored in the database is failed, all the device states are set to relatively safe states, such as, states of a traction power contact network of a section (being not connected to network, and being not powered, ensuring that an electric train would not go to a section which is not connected to network and not powered), states of bad shunting of a section (section occupied for the bad shunting, ensuring that a train would not go to a occupied section with the bad shunting), open-close states of a section (closed, ensuring that a train would not go to a closed section), to improve the safety of the system operation.

[0044] For the key logic state of the present disclosure, it is buffered in a memory of the autonomous machine and persistently stored in the database at the same time, and the key logic state stored in the memory of the autonomous machine is directly read during a manual operation process and the shunting route control, thereby improving the performance efficiency. When the key logic state stored in the memory of the autonomous machine is not available and needs to be reinitialized, the persistently stored data may be obtained from the database for the reinitialization. High reliability is achieved by storing the key logic states in the server.

[0045] FIG. 2 is a block diagram illustrating a structure of a system for processing key logic states according to an embodiment of the present disclosure. As shown in FIG. 2, a system 200 for processing key logic states includes: an initialization unit 201, a monitoring unit 202 and a synchronization unit 203.

[0046] The initializing unit 201 is configured to obtain a plurality of key logic states generated by a Centralized Traffic Control system during operation, determine operating devices associated with each of the plurality of key logical states, store each key logical state together with an associated operating device in a corresponding manner into a database, and transmit each key logic state to an autonomous machine.

[0047] Further, the present disclosure includes a process of initializing key logic states, which includes: first determining which key states each device should have, such as, for the device, whether there is a section closed or not, or whether there is a state of bad shunting, etc., and then searching in the database for the current states of these key states.

[0048] Further, the key logic states include: states of a traction power contact network of a section, which in-

clude: being connected to network, being not connected to network, being powered, and being not powered. Further, the key logic states include: states of bad shunting of a section, which include: no bad shunting, section occupied for the bad shunting, and section unoccupied for the bad shunting. Further, the key logic states include: open-close states of a section, which include: closed and open.

[0049] Further, the initializing unit 201 is further configured to set each of the plurality of key logic states by a user input or a state of a signaling device, transmit the set key logic states to the autonomous machine for verification processing by the autonomous machine, and store the key logic states synchronously into the database after the verification processing. According to the present disclosure, the key logic states are monitored by the system, and manually set by the user, or the key logic states may be changed jointly according to a state of a signaling device. In the present disclosure, the CTC system implements this function by setting and displaying, specifically, the user operates the key logic state at the CTC terminal, and transmits it to the autonomous machine for processing; after the operation is succeeded, the state is returned to the terminal for display, and store in the database synchronously.

[0050] Further, system 200 further includes a processing unit configured to delete any of the plurality of key logic states by a user input.

[0051] The monitoring unit 202 is configured to determine whether a key logic state in the Centralized Traffic Control system is changed, obtain, when a first key logic state is changed, a latest state data of the first key logic state and update the first key logic state based on the latest state data, store the updated first key logic state into the database, and transmit the updated first key logic state to the autonomous machine.

[0052] The synchronization unit 203 is configured to search, after a second key logic state in the autonomous machine becomes abnormal, in the database according to an operating device associated with the second key logic state to determine a second normal key logic state stored in the database, and transmit the second normal key logic state to the autonomous machine to achieve synchronization of key logic states.

[0053] Further, each of the key logic states received is buffered by the autonomous machine.

[0054] Further, when the updated first key logic state is received by the autonomous machine, the first key logic state in a local buffer is replaced with the updated first key logic state, and the updated first key logic state is stored into the database.

[0055] Further, when the second normal key logic state is received by the autonomous machine, the second key logic state which is abnormal is replaced with the second normal key logic state. According to the present disclosure, in a normal state, when the key logic state is changed, the first key logic state in the autonomous machine is first updated, and then the first key logic state is

stored into the database synchronously. When the second key logic state in the autonomous machine is failure and needs to be restarted, the last stored second key logic state is loaded from the database to replace the abnormal second key logic state in the autonomous machine.

[0056] Further, when read of the key logic state stored in the database is failed, the key logic state is set to a state that steers safely. According to the present disclosure, when the key logic state is changed, the latest key logic state is synchronously stored into the database in real time. When an abnormality occurs in the system and thus a restoration is needed, the key logic state data is read from the database. If read of the key logic state stored in the database is failed, the key logic state is set to a state that steers safely, to ensure safe driving. According to the present disclosure, during the initialization of the autonomous machine, if read of the key logic states stored in the database is failed, all the device states are set to relatively safe states, such as, states of a traction power contact network of a section (being not connected to network, and being not powered, ensuring that an electric train would not go to a section which is not connected to network and not powered), states of bad shunting of a section (section occupied for the bad shunting, ensuring that a train would not go to an occupied section with the bad shunting), open-close states of a section (closed, ensuring that a train would not go to a closed section), to improve the safety of the system operation.

[0057] The disclosure has been described by reference to a few embodiments. However, those skilled in the art should know that, as defined by the appended claims, other embodiments of the disclosure in addition to the embodiments disclosed above should equally fall within the scope of the present disclosure.

[0058] In general, all terms used in the claims are interpreted according to their ordinary meaning in the art, unless explicitly defined otherwise. All references to "a/an/the device, component, etc." are widely interpreted as at least one instance of the device, component, etc., unless explicitly stated otherwise. The steps of any method disclosed herein are not necessarily performed in the specific order disclosed, unless explicitly stated.

Claims

1. A method for processing key logic states, comprising:

obtaining a plurality of key logic states generated by a Centralized Traffic Control system during operation, determining operating devices associated with each of the plurality of key logical states, storing each key logical state together with an associated operating device in a corresponding manner in a database, and transmitting each key logic state to an autonomous machine;

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determining whether a key logic state in the Centralized Traffic Control system is changed, obtaining, when a first key logic state is changed, a latest state data of the first key logic state and updating the first key logic state based on the latest state data, storing the updated first key logic state into the database, and transmitting the updated first key logic state to the autonomous machine; and

searching, after a second key logic state in the autonomous machine becomes abnormal, in the database according to an operating device associated with the second key logic state to determine a second normal key logic state stored in the database, and transmitting the second normal key logic state to the autonomous machine to achieve synchronization of key logic states.

2. The method of claim 1, further comprising setting each of the plurality of key logic states by a user input or a state of a signaling device, transmitting the set key logic states to the autonomous machine for verification processing by the autonomous machine, and storing the key logic states synchronously into the database after the verification processing.
3. The method of claim 1 further comprising deleting any of the plurality of key logic states by a user input.
4. The method of claim 1, the key logic states comprise: states of a traction power contact network of a section, which comprise: being connected to network, being not connected to network, being powered, and being not powered.
5. The method of claim 1, the key logic states comprise: states of bad shunting of a section, which comprise: no shunt failure, section occupied for the bad shunting, and section unoccupied for the bad shunting.
6. The method of claim 1, the key logic states comprise: open-close states of a section, which comprise: closed and open.
7. The method of claim 1, each of the key logic states received is buffered by the autonomous machine.
8. The method of claim 1, when the updated first key logic state is received by the autonomous machine, the first key logic state in a local buffer is replaced with the updated first key logic state, and the updated first key logic state is stored in the database.
9. The method of claim 1, when the second normal key logic state is received by the autonomous machine, the second key logic state which is abnormal is re-

placed with the second normal key logic state.

10. The method of claim 1, when read of a key logic state stored in the database is failed, the key logic state is set to a state that steers safely.

11. A system for processing key logic states, comprising:

an initialization unit, configured to obtain a plurality of key logic states generated by a Centralized Traffic Control system during operation, determine operating devices associated with each of the plurality of key logical states, store each key logical state together with an associated operating device in a corresponding manner into a database, and transmit each key logic state to an autonomous machine;

a monitoring unit, configured to determine whether a key logic state in the Centralized Traffic Control system is changed, obtain, when a first key logic state is changed, a latest state data of the first key logic state and update the first key logic state based on the latest state data, store the updated first key logic state into the database, and transmit the updated first key logic state to the autonomous machine; and
a synchronization unit, configured to search, after a second key logic state in the autonomous machine becomes abnormal, in the database according to an operating device associated with the second key logic state to determine a second normal key logic state stored in the database, and transmit the second normal key logic state to the autonomous machine to achieve synchronization of key logic states.

12. The system of claim 11, the initialization unit is further configured to set each of the plurality of key logic states by a user input or a state of a signaling device, transmit the set key logic states to the autonomous machine for verification processing by the autonomous machine, and store the key logic states synchronously into the database after the verification processing.

13. The system of claim 11, further comprising a processing unit configured to delete any of the plurality of key logic states by a user input.

14. The system of claim 11, the key logic states comprise: states of a traction power contact network of a section, which comprise: being connected to network, being not connected to network, being powered, and being not powered.

15. The system of claim 11, the key logic states comprise: states of bad shunting of a section, which comprise: no bad shunting, section occupied for the bad

shunting, and section unoccupied for the bad shunting.

16. The system of claim 11, the key logic states comprise: open-close states of a section, which comprise: closed and open.

17. The system of claim 11, each of the key logic states received is buffered by the autonomous machine.

18. The system of claim 11, when the updated first key logic state is received by the autonomous machine, the first key logic state in a local buffer is replaced with the updated first key logic state, and the updated first key logic state is stored in the database.

19. The system of claim 11, when the second normal key logic state is received by the autonomous machine, the second key logic state which is abnormal is replaced with the second normal key logic state.

20. The system of claim 11, when read of a key logic state stored in the database is failed, the key logic state is set to a state that steers safely.

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obtaining a plurality of key logic states generated by a Centralized Traffic Control system during operation, determining operating devices associated with each of the plurality of key logical states, storing each key logical state together with an associated operating device in a corresponding manner in a database, and transmitting each key logic state to an autonomous machine

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determining whether a key logic state in the Centralized Traffic Control system is changed, obtaining, when a first key logic state is changed, a latest state data of the first key logic state and updating the first key logic state based on the latest state data, storing the updated first key logic state into the database, and transmitting the updated first key logic state to the autonomous machine

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searching, after a second key logic state in the autonomous machine becomes abnormal, in the database according to an operating device associated with the second key logic state to determine a second normal key logic state stored in the database, and transmitting the second normal key logic state to the autonomous machine to achieve synchronization of key logic states

103**FIG 1**

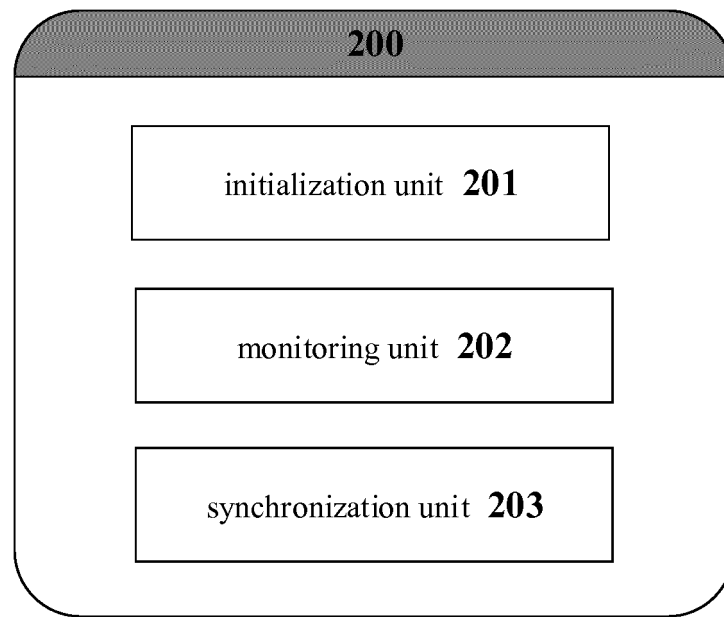


FIG 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2018/089470

A. CLASSIFICATION OF SUBJECT MATTER H04L 12/58(2006.01)i According to International Patent Classification (IPC) or to both national classification and IPC															
B. FIELDS SEARCHED															
Minimum documentation searched (classification system followed by classification symbols) H04L															
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched															
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) USTXT; VEN; CNABS; CNTXT; CNKI: 变化, 更新, 异常, 缓存, 自律机, 车站智能控制器, 备用, 同步, 逻辑状态, 数据库, chang+, updat+, error, cache, buffer, LiRC, standby, synch+, logic status, database															
C. DOCUMENTS CONSIDERED TO BE RELEVANT															
<table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>Y</td> <td>CN 105553819 A (BEIJING TRAFFIC CONTROL TECHNOLOGY CO., LTD.) 04 May 2016 (2016-05-04) description, paragraphs 47-55 and 63-65</td> <td>1-20</td> </tr> <tr> <td>Y</td> <td>CN 105574026 A (TENCENT TECHNOLOGY SHENZHEN CO., LTD.) 11 May 2016 (2016-05-11) claims 1-3</td> <td>1-20</td> </tr> <tr> <td>A</td> <td>CN 101150624 A (HUAWEI TECHNOLOGIES CO., LTD.) 26 March 2008 (2008-03-26) entire document</td> <td>1-20</td> </tr> <tr> <td>A</td> <td>EP 2388697 A1 (SAP AG) 23 November 2011 (2011-11-23) entire document</td> <td>1-20</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	Y	CN 105553819 A (BEIJING TRAFFIC CONTROL TECHNOLOGY CO., LTD.) 04 May 2016 (2016-05-04) description, paragraphs 47-55 and 63-65	1-20	Y	CN 105574026 A (TENCENT TECHNOLOGY SHENZHEN CO., LTD.) 11 May 2016 (2016-05-11) claims 1-3	1-20	A	CN 101150624 A (HUAWEI TECHNOLOGIES CO., LTD.) 26 March 2008 (2008-03-26) entire document	1-20	A	EP 2388697 A1 (SAP AG) 23 November 2011 (2011-11-23) entire document	1-20
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Date of the actual completion of the international search 18 January 2019	Date of mailing of the international search report 07 March 2019														
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Information on patent family members

International application No.
PCT/CN2018/089470

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REFERENCES CITED IN THE DESCRIPTION

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