Research on Adaptive Scheduling Method of Communication Resource Information in Internet of Things Environment

Chao Wang(✉)

School of Software, Nanyang Institute of Technology, Nanyang, China
wangchao7887@163.com

Abstract. The continuous expansion of information resources of communication resources under the Internet of things environment had led to information management problems becoming one of the core issues of communication information integration. This paper proposed an adaptive scheduling method for communication resource information in the Internet of things environment. Based on GIS technology, communication resource management was used for database communication resource information sharing. Next the three-level distributed database was used to establish the upload and storage of Internet of things communication resource information with obvious hierarchical relationship. The database synchronization mechanism was used to ensure that each database communication resource configuration was synchronized, and a network channel was established to increase the network load. Finally, based on the browser information, the communication resources were adaptively scheduled. The experimental data showed that compared with the traditional resource information scheduling method, the resource transmission speed of the designed communication resource information resource adaptive scheduling method was increased by 65%, and the information resource transmission matching rate was increased by 27%.

Keywords: Internet of things · Communication resource · Self-adaption · Scheduling method

1 Introduction

The Internet of things is the carrier of the modern Internet traditional telecommunication network, which enables a large number of ordinary object entities with independent functions to have an interconnection network. It can be said that the Internet of things is the most important component of modern electronic information technology and the most important development of modern information. As the modern Internet of things environment continues to evolve, the amount of relevant information continues to increase. The resource scheduling problem of a large amount of Internet of things communication resource information has become a key point of resource information utilization and configuration. Adaptive scheduling of communication resources can be seen as a high-precision resource supply and resource allocation in a massive information environment. The key is the collection and matching of information resource

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information. In addition, in the later research, it was found that in all Internet of things environment communication information, more than 80% of the information has spatial location. Adding geographic data based on the general information database and using GIS positioning can realize Internet of things data collection. To establish an information subsystem for database communication resource information sharing. Specifically, the third-level distributed database is used to establish and upload and store the information of the Internet of things communication resources with obvious hierarchical relationship through data positioning. The database synchronization mechanism is used to ensure the synchronization of each database communication resource configuration. Finally, the communication resources are adaptively scheduled based on the browser information [1].

2 Design of Adaptive Resource Information Scheduling Method in Internet of Things Environment

2.1 Communication Resource Management Based on GIS Core

Communication resource information management mainly includes five aspects of content as shown in Fig. 1.

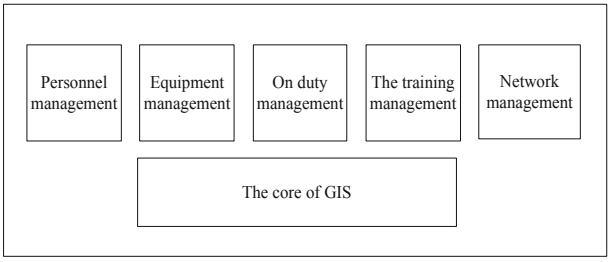

Fig. 1. Schematic diagram of communication resource management content

The five aspects shown in Fig. 1 need to be built on the GIS core data program, and the five aspects of work share the specific Internet of things data service. The communication related thematic data can be directly superimposed on the GIS data as the thematic data layer, and the low price position is the geographic coordinates of each communication data. Personnel management is to uniformly record the information of personnel related to the communication information business into the database, and centrally manage the information resources. On the basis of exerting its own information and communication management, it realizes the allocation of human resources information. Equipment management is to centrally allocate, adjust, store and scrape the equipment needed for IoT communication information transmission, and realize centralized management guarantee of data transmission hardware. Previous management refers to the unified storage management and application of all parts of the communication duty. While exerting the communication duty management function,

the daily IoT information is statistically analyzed to provide an auxiliary basis for the later information management transmission [2].

Network management is a direct reflection of communication information institutions through maps or charts and other information, comprehensive analysis of data quality and performance, and provides a network basis for subsequent data communication [3].

2.2 Data Classification Based on Three-Level Distributed Database

In order to improve the adaptive scheduling rate of data communication resource data, it is necessary to establish a three-level distributed database to classify the communication data. Each Internet of things data transmission unit needs to arrange a primary database to ensure that the database can run on the data local area network. The upper-level database data must completely cover the sub-database data, and the three-level database data table is completely consistent [4]. For example, each database needs to contain all the data of all data collection points of its subordinate branches. Each database needs long-term maintenance to ensure normal data storage and transmission. After the database data is updated, the maintenance program will send the modified data to the upper database to synchronize the data of the upper and lower levels. Although the upper-level database can receive the communication resource data played by the lower-level database, it cannot be subjectively changed. The data management structure is shown in Fig. 2.

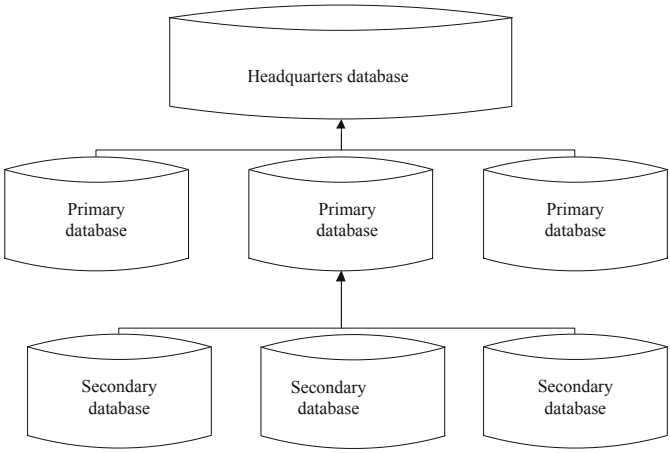

Fig. 2. Database layering diagram

The establishment of the database does not need to be limited to a special database product. Data stratification is performed by not using the data triggering device and snapshot replication feature of the Oracle database, but by modifying the communication data in the primary database record. Each time you quit, you only need to consult your own modification mark, and directly submit the modified data and added data, and

then insert it into the upper-level database [5]. The spatial thematic attribute data in the primary database can be centrally managed through the Oracle91 program. Units at all levels are added to the data management as a professional GIS layer for real-time management.

2.3 Database Data Synchronization

Because the key of the upper and lower level database lies in the database synchronization problem, the lower level database needs to send the information data in real time to the upper level database through the data wide area network. The specific way is to transfer the working database and the temporary database. The upper level database is divided into two users: system users and temporary library users [6]. The ability is given to system users to modify database data and temporary library permissions. The user of the temporary library can only modify the permissions of the temporary database, and cannot modify the working rate data for the login system. It is only used when the temporary library unit sends real-time data to the upper database unit. The relationship between the working library, the temporary library, and the system user database is shown in Fig. 3 [7].

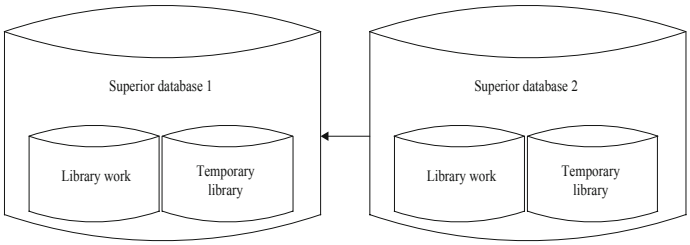

Fig. 3. Working library temporary library relationship diagram

In order to ensure the database transmission rate, a data transmission network channel of the Internet of things communication resource data needs to be established between the databases at various levels. The load channel is mainly used to improve the high load information data between databases. Establishing a load channel requires a balanced load based on TIRS.

The TIRS load channel design is mainly to directly apply the adjustment code of the database network channel to the database wide area network, and directly connect the network with the adjustment code IPS user transmission port and the channel using the user IP address. The main functions are as follows: The first is to ensure that the database information at all levels can be correctly transmitted. The other is to balance the load information that needs to be transmitted to ensure the stability of data transmission. When the data transmission is performed through the network channel, the TIPS information load protocol can directly improve the load stability of the entire network load path and the transmission result. The detailed resume process is shown in

Fig. 4. By establishing a communication channel, the data transmission path can be effectively increased, thereby increasing the network load [8].

By using multiple load protocols used by the channel, the data transmission scale can be directly increased, the data synchronization rate can be ensured, and multiple lines of database data can be evenly distributed. This ensures that the overall load capacity of the network transport channel is within a relatively safe and controllable area. In addition, when the network channel uses the network channel to perform data equalization processing on the load information used for database transmission, in order to ensure the data transmission frame number and the adaptability of the file package, it is necessary to perform the load reduction processing on the transmitted network information and the divided channels in advance according to the type of communication data. In order to avoid the information channel being stalled due to excessive channel congestion due to excessive channel information. In the process of equalization and data synchronization in the data database, the upper and lower limits of the equilibrium load are determined by the actual definition of the TIRS load balancing protocol. In general, the lower limit is 0. Table 1 shows the contents of the designed TIRS load balancing protocol [9].

Table 1. TIRS equalization protocol content

The TIRS wire transfer character		
Load balancing transmission time		
Link load identification code		
The load sequence		
Check code		
P	Regional correlation	Overload

The load balancing protocol can effectively widen the file transmission path of the load channel, thus ensuring the database synchronization rate [10].

In the actual design, the data samples and transmission extremes faced by different database network channel establishments are also different. In order to realize the simultaneous operation of multiple data channels of different levels of databases, load balancing needs to be implemented through network offloading.

R and W respectively represent the highest bandwidth of the data transmission channel of the database communication resource and the success rate of the load transmission. The formula for calculating the maximum unit load of the channel bandwidth is:

$$f = \frac{R}{W} \tag{1}$$

Since the database network channel capacity can be centrally organized and transmitted by the channel load construction protocol table proposed above, under the premise that the network bandwidth of each database has the same identity, the maximum network data channel transmission power can be utilized for network

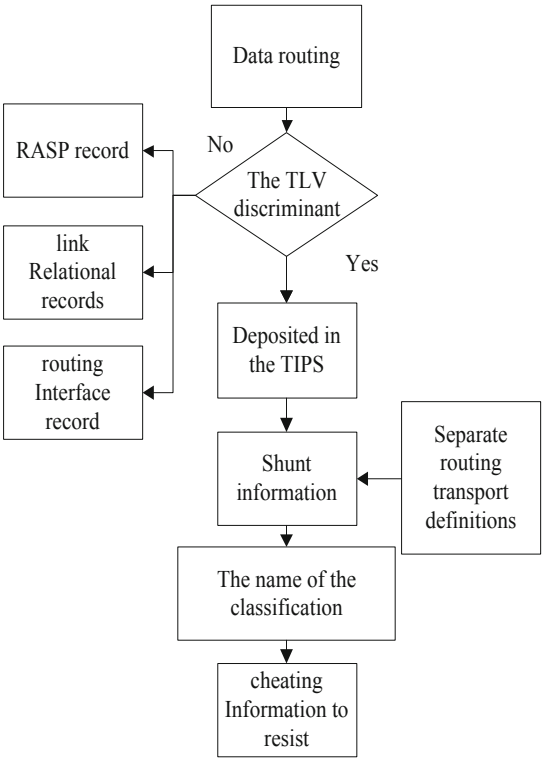

Fig. 4. Channel resume flow chart

transmission, thereby effectively reducing the average load pressure of each data channel.

If the maximum load rate of the database network data channel is k, then the maximum value of the data transmission station is N, then the formula for expressing the maximum traffic of the database network channel is:

$$C = \frac{1}{2}\log 2(1 + \frac{p}{N}) \tag{2}$$

Equation (2) is an expression for determining the maximum split flow of a normal network channel.

In the normal local routing network channel state, the network channel load definition domain in each level database will perform vertical shunting and protocol amplification according to the protocol process. Through the amplified load process, the limit value of the load shunt can be obtained. The formula expression is:

$$C_j = \frac{1}{2}\log 2(1 + \frac{pm}{N}) \tag{3}$$

In the formula, m is the limit value after the amplification of the protocol process. The smoothness of the channel data protocol can be guaranteed by Eqs. (1), (2) and (3).

2.4 Adaptive Scheduling Based on Browser Information Communication Resources

Information resource management and scheduling needs to be based on an information browser. In order to distinguish between different databases, the CLIENT/DATE-based client browser is upgraded to the BROWER/SERVER/DATAbase three-tier structure. The three-tier organization can share the database and GIS positioning kernel. The server side of the three-tier structure system is implemented by JAVA, which directly completes the client logic task. The browser adds the JAVA runtime environment plugin to display the server query results. The database is the core of the client browser upgrade, and the data codes are different in different storage locations of the database. In order to improve the scheduling efficiency of the browser information resources, some data codes in the database are given, as shown in Table 2.

Table 2. Part of the resource code

Section head	In the middle	The tail domain
Group{	MFVec2f	set crossSection
Group{	MFRotation	set orientation
eventln	MFVec2f	set scale
eventln	MFVec3f	spine
children[	appearance Appearance{I	beginCapTRUE
children[	SFBooI	TRUE
DEF desktop Shape{	SFBooI	appearance Appearance{
DEF desktop Shape{	appearance Appearance{	crossSection
field	SFBooI	endCapTRUE
field	MFRotation	orientation 0
field	MFVec2f	scale 1
field	MFVec2f	TRUE
field	SFBooI	scale
field	MFVec3f	spine

3 Simulation Experiment

In order to verify the design of the Internet of things environment, the communication resource information adaptive scheduling method application effect, experimental comparison. The comparison group selects the traditional communication resource information configuration scheduling mode, so that the experimental group selects the adaptive scheduling method of communication resource information in the designed Internet of things environment. The scheduling resource transmission speed and the information resource transmission matching rate are compared. For the accuracy of the

results, third-party software is used for parameter result recording. The verification process is as follows (Fig. 5):

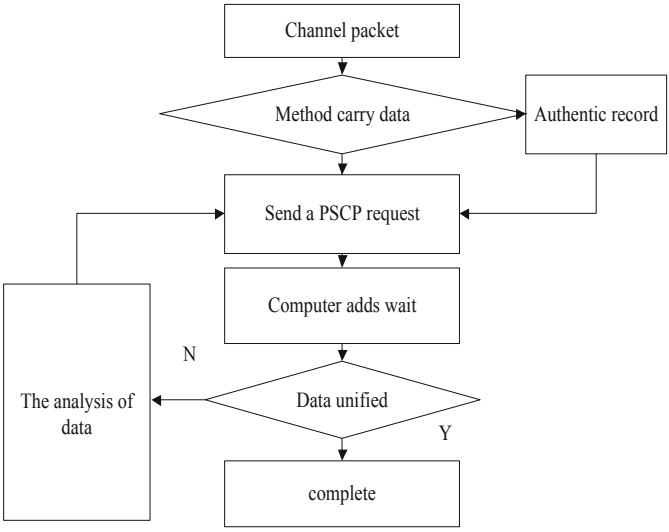

Fig. 5. Experimental flow chart

First, the resource transmission speed is compared and verified. The result is shown in Fig. 6.

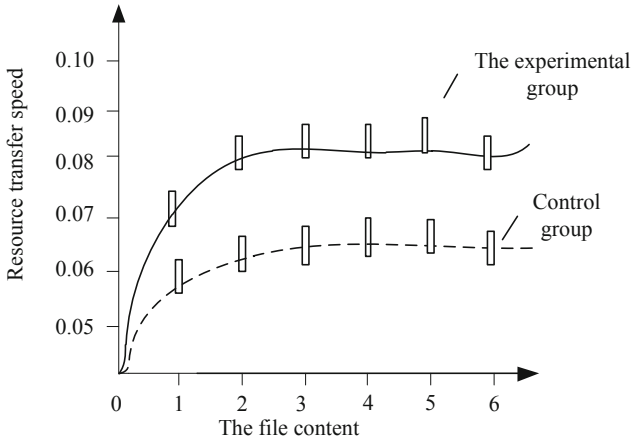

Fig. 6. Resource transmission speed comparison

It can be seen from Fig. 6 that the transmission speed of the experimental group is significantly higher than that of the comparison group. After actual quantification, it can be determined that the transmission speed of the experimental group has increased by nearly 65%. The comparison of information resource adaptive matching is shown in Fig. 7.

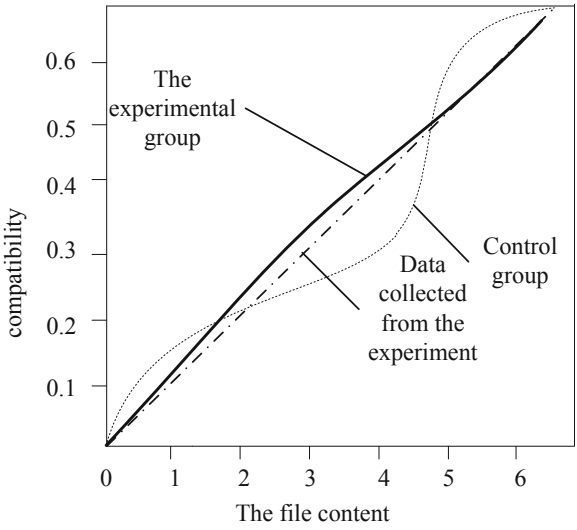

Fig. 7. Matching degree comparison chart

Figure 7 is a comparison of adaptive matching degrees. After actual quantization, it can be determined that the information resource transmission matching rate is increased by 27%. It has a certain advantage.

4 Conclusions

An adaptive scheduling method for communication resource information in the Internet of things environment is designed. First, GIS positioning is used to achieve Internet of things data collection. An information subsystem is established for sharing information of database communication resources, and a network channel is established to increase the transmission rate. Through the three-level distributed database and data location, the information uploading and storage of Internet of things communication resources with obvious hierarchical relationship is established. The database synchronization mechanism is used to ensure the synchronization of each database communication resource configuration. Finally, the communication resources are adaptively scheduled based on the browser information.

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