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LETTER TO THE EDITOR

Design of Automatic Backup Algorithm for Incremental Information of Forest Ecological Sensor Network

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Information backup can improve the integrity and accuracy of data information in the database and facilitate the development and application of data information. Therefore, discussing the solution of data backup is an effective way to promote incremental information of forest ecological sensor network. At present, database construction still needs further optimization, data backup security issues, computer network software and hardware problems, all affect the solution of data backup and effective development and utilization of backup data. Based on the current situation of incremental information application of forest ecological sensor network, some problems in the process of information data processing of forest ecological sensor network are analyzed. The purpose is to further recognize the significance and objectives of data backup, so as to promote the scientific and rational application of incremental information automatic backup of forest ecological sensor network, and thus solve the problem of incremental information automatic backup of forest ecological sensor network.

1 Introduction

With the development of computer network, the storage and backup of data information are constantly changing. At present, the main problems to be solved in data backup are the disunity of data information standardization caused by the difference of software platforms and the difficulty of data information security. With the continuous development of computer network, how to use advanced scientific and technological means to effectively carry out automatic backup of incremental information of forest ecological sensor network and excavate more value of data in the incremental information management process of forest ecological sensor network is the key to improve the current forest ecological sensor network, which has positive significance for the incremental information construction and sustainable development of forest ecological sensor network.

Feng et al (2019) published an article entitled “The Quantitative Assessment of the Ecological Assets in the Center Region of Chengdu City Based on Remote Sensing and GIS Technology” on Ekoloji's Issue 107. This paper aims at quantitative assessment of ecological assets in Chengdu Central District Based on sensing and GIS technology. Based on sensing and geographic information system technology, considering the spatio-temporal differences of ecosystem types and quality status, a quantitative evaluation model of urban ecosystem ecological assets is established by combining sensing with eco-economics. Then, six evaluation indicators of ecological assets are used to evaluate urban ecosystem ecological assets.

Zheng and Li (2017）studied an improved routing design algorithm for sensor networks in the Internet of Things. An improved routing design method for Internet of Things (IOT) sensor networks based on chain

information header extraction and information source location is proposed (Liu et al. 2018; Li et al. 2019).The network formation and routing detection model of sensor networks under the Internet of Things is constructed. Link routing information data is aggregated by link information cluster head node extraction and information source location method, and energy loss of broadcast election cluster head node is pre-aggravated.The data transmission protocol of the routing node is obtained by bidirectional link estimation, and the optimal routing design is achieved by using link node energy and link node distance layering method. Guo et al. (2018) studied weak fence coverage construction algorithm for directed wireless sensor networks. Aiming at the problem of weak fence coverage in directed wireless sensor networks, an algorithm for constructing weak fence based on projection of directed wireless sensor networks is proposed. In order to analyze the automatic backup algorithm more quickly, it is necessary to strengthen the real-time and quasi-real-time processing ability of information, especially the real-time computing and processing ability of incremental information of forest ecological sensor network. Therefore, a suitable data backup strategy is proposed to support the increment of forest ecological sensor network through data backup.

2 Perspective

2.1 Present Situation of Incremental Information System of Forest Eco-sensor Network

The incremental information content of forest ecological sensor network is too much, the amount of data is too large, and the management is very difficult. The computer network has strong computing power and large storage space, which brings a lot of convenience to the management of forest ecological sensor network. Therefore, it is necessary to improve the comprehensive level of forest ecological sensor network management (Mei and Zhang, 2017). The management of forest ecological sensor network based on large data, system failure, man-made damage, hacker attack and so on are the greatest threats to the construction of database. These events will seriously damage the integrity and accuracy of data information, and affect the fairness, justice and science of forest ecological sensor network management. Currently, data backup is the main way to solve these problems. Data backup can prevent the loss, damage and malicious tampering of data information. There are three main ways of data backup in forest ecological sensor network at present (Wang et al. 2018).First, the computer system of automatic backup of computer network and information management of forest ecological sensor network will record the relevant data in the process of operation. At the set time point, the system will automatically backup all kinds of information under the software environment, and then generate the database. This process is completed by the network information center. The second and third types of data backup are mainly managed by the management office. The second type of data backup is guided and stored by the management office using the relevant software. Because of the huge amount of data information, this process mostly adopts the form of compressed data information for data backup. The third type is the backup of key data by the management office. This process involves the security and convenience of data. On the one hand, it is necessary to ensure the integrity and accuracy of data. On the other hand, we should ensure that data can be used, exchanged, circulated and so on in a timely and convenient manner (Miao et al, 2018). At present, there are still some problems in the use of incremental information management system of forest ecological sensor network, which affect the improvement of incremental information management level of forest ecological sensor network. Data backup has become the key to solve these problems. Studying the solution of data backup can effectively improve the efficiency of the use of various data information in incremental information management of forest ecological sensor network, and has positive significance for improving the comprehensive level of incremental information management of forest ecological sensor network.

2.2 Problems in Data Backup of Incremental Information Management System of Forest Eco-sensor

Network

2.2.1 Database construction needs to be optimized

At present, the operation mode and management status of incremental information management database of forest ecological sensor network are quite different. This results in the application of forest ecological sensor network database is difficult to form an organic whole. There are many repetitive work in the process of database construction, which is not conducive to the improvement of incremental information management efficiency of forest ecological sensor network, and makes the application of data difficult to reach the highest level. At the same time, there are many incompatible data types and formats in the incremental information management system of forest ecological sensor network. In database construction, many raw data need to be sorted out for a second time before they can be input into the database. This not only increases the cost of incremental information management of forest ecological sensor network, but also affects the realization of incremental information management intellectualization of forest ecological sensor network. In addition, too much human intervention is easy to cause data problems, and the level of management is difficult to continuously improve. Therefore, the incompatibility between software and hardware of management system also affects the storage, use and storage of data, and reduces the efficiency of the application of the whole management system. Therefore, the database construction of forest ecological sensor network needs to be optimized. Only when it is optimized, the comprehensive level of incremental information management of forest ecological sensor network can be improved greatly.

2.2.2 Security problems of data Information

The security of data information is an important research topic in the development of computer network. In the use of computer network, there are malicious attacks, system failures, human destruction and other phenomena, which seriously affect the security of data information. Firstly, the large amount of data information and high utilization rate of forest ecological sensor network, and the lack of necessary safety awareness of relevant users, lead to increased risk of data security. For example, improper user permission settings and password leakage are directly related to the lack of awareness of data security of users and managers. Secondly, the risk of data information security caused by malicious hacker attacks and human destruction. For example, some people use their privileges to tamper with data for personal benefit. They can't find the tampered data in time in the process of data backup. These data will be stored and used together with other data, which threatens the accuracy, security and authenticity of data and affects the efficiency of data information use. Thirdly, computer network is an open and shared space, which also affects the security of data information. In addition, there are some loopholes in the computer system itself, so the risk of data information security is increased, and the backup of data is particularly important.

2.2.3 Discussion on other issues of data backup

The problem of data backup is more complex. Besides the above two points, there are still many problems to be solved in data backup. For example, server problems, sudden computer failure (such as crash), some data of computer management system can not be recovered in time, which will lead to data loss. For example, the shortage of professional personnel. With the increase of forest ecological sensor network data information and the expansion of database, the backup and use of data in incremental information management process of forest ecological sensor network are facing more problems, which require professional personnel to guide and maintain data, etc. The shortage of computer network professionals has affected the efficiency and efficiency of data application. For example, the slow updating of software, many problems in the running process, high maintenance costs, hardware and software mismatches and other issues also affect the backup and use of data.

3 Personal View

The purpose of data resource backup is to provide quality-assured data access services for users scattered in different places, so as to avoid bringing different quality of service to users because of the different load of data resources in grid. Creating backup data can also alleviate the congestion of communication resources caused by the fact that data is always transmitted from one place to requesters everywhere. One of the important functions of data resource backup is to support fast fault recovery and improve the reliability of the system. Because a large number of heterogeneous data resources are collected in grid system, how to choose backup resources for applications and how to backup resources are the key technologies of resource backup. In view of the actual situation of forest ecological sensor network, a new backup strategy is proposed to meet the application needs.

Usually, the strategy of backup of data resources is to record the access of data resources, and record where the requester who visits a data for a period of time comes from. When the number of accesses to data resources reaches a threshold, the backup system performs backup processing. In this study, different backup strategies are adopted, that is, the quantitative indicators of resource attributes and the reliability of backup resources are used as the measurement basis to support backup strategies.

Careful analysis of the problem of resource backup shows that there are two main problems to be solved in resource backup: which backup resources to choose and how many backup resources to choose. Therefore, the backup strategy designed in this study is based on the monitoring of resource failure rate in the system, which is used to determine the number of backup resources and the location of backup resources. When the resource failure rate reaches a pre-threshold, the backup system can use the backup strategy designed in this paper for backup processing.

3.1 Resource definition

In order to select backup resources conveniently and effectively, the method of quantifying resource attributes is adopted to simplify the problem.

Definition 1 Assuming that the resource is $r_1 = \langle Id, Attrs \rangle$, Id is the resource symbol, $Attrs$ is resource attribute group $\{Attrs_1, Attrs_2, Attrs_3, \cdots Attrs_n\}$, then r_1 is a quantifiable resource with $Attrs$ attribute value.

Definition 2 Assuming that resources r_1 and r_2 have the same definition of $Attrs$, then resources r_1 and r_2 are equivalent resources.

Definition 3 Assuming that resources r_1 and r_2 are equivalent resources, resource r_1 can replace resource r_2.

The determination of the value in Definition 1 depends on the specific resource type. For example, the hardware configuration of a workstation includes CPU, memory, hard disk memory, network card and so on, then its $Attrs$ = {main frequency, memory capacity, hard disk capacity, network card speed,... } If two workstations have the same hardware structure, they can be identified as equivalent resources according to Definition 1 and Definition 2. Usually resources are equal in the same management domain or LAN.

3.2 Reliability quantification of backup resources

In this study, resource reliability is used as an index to determine the backup strategy. It is necessary to determine how to quantify the backup resource reliability. The failure rate of resources can be tested by fault monitoring system, and if the failure rate of a resource is low, its reliability will be higher. So this study uses the failure rate of resources as the basis of measuring the reliability of the system.

3.3 Selection of backup resource

When backup processing, it is necessary to determine which backup resources are selected as candidate backup resources for source resources.

Definition 4 Assuming that resource r_1 and resource r_2 are equivalent resources in the resource set, then

resource r_1 and resource r_2 are backup resources.

Algorithm 1 was designed according to definition 4, and the resources equivalent to the source resources are selected as the candidate backup resource set to determine the candidate backup resource set.

Algorithm 1:

Input parameters: registered resource set, source resource r

Output parameter: Candidate backup resource set R_t

The steps are as follows:

(1) Initialize the set R_t of candidate backup resources to be empty.

(2) Search the resource set according to the order of resource registration, and judge whether the registered resource set has been searched. If the search is completed, then turn (4), otherwise execute (3).

(3) Select the resources r_1 that have been searched to determine whether they are equal to r. If they are equal, r_1 will be added to the candidate backup resource set $R_t = R \bigcup \{r_i\}$ and transferred to execution (2).

(4) Return to the candidate backup resource set R_t

4 Conclusion

The main purpose of data backup of incremental information management system of forest ecological sensor network is to ensure the authenticity, reliability, safety and comprehensiveness of data, and to improve the application efficiency of data on this basis. Therefore, the data backup of incremental information management system of forest ecological sensor network should be combined with the development and utilization of these data. Based on the computer network environment, a large database of incremental information management of forest ecological sensor network should be constructed. With the support of abundant teaching and management resources, the incremental information management level of forest ecological sensor network should be improved scientifically and effectively, and the number of management processes should be increased. According to the use efficiency, it can promote the sustainable and stable development of forest ecological sensor network.

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