Research on Computer Software Engineering Database Programming Technology Based on Virtualization Cloud Platform

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***Abstract*—The most important advantage of database is that it can form an intensive management system and serve a large number of information users, which shows the importance of information security in network development. However, there are many problems in the current computer software engineering industry, which seriously hinder the development of computer software engineering, among which the most remarkable and prominent one is that the database programming technology is difficult to be effectively utilized. In this paper, virtualization technology is used to manage the underlying resources of data center with the application background of big data technology, and realize the virtualization of network resources, storage resources and computing resources. It can play a constructive role in the construction of data center, integrate traditional and old resources, realize the computing data center system through virtualization, distributed storage and resource scheduling, and realize the clustering and load balancing of non-relational databases.**

Keywords—Virtualized cloud platform, Computers, Software engineering, Database programming

I. INTRODUCTION

Judging from the degree of computer utilization at present, the development speed of computer system in China is gradually accelerating, and the development of computer system depends on the highly developed network construction in China. The use of computers can help us achieve many things that cannot be accomplished manually, and can help many fields such as industrial production, scientific research, mechanical operation, supervision and control, etc. Therefore, computers themselves have great application value [1]. The running of computer software needs to be supported by the medium of network, otherwise the software in computer system can't play its role, so these related influencing factors should be considered in the process of building system database [2]. Therefore, the application of contemporary software engineering has become more and more extensive. As the core of software engineering, database programming needs to be done well if software engineering is to develop better and better.

As a new technology, database programming technology can provide significant help for the development of computer software engineering industry, but it is affected by a series of factors. Programming technology is the foundation of forming computer database, and the coordination of various functions is the main way to solve the technical problems of software. When the software is developed and put into the market for users to use, it is necessary to make good use of the resources in computer database [3]. Therefore, on the basis of effective comparison and selection according to relevant data and information content of the database, combined with various problems easily occurring in the process of reading the data and information in the database file, the computer database file design and construction should be carried out in a way that can effectively control and avoid the occurrence of related problems and facilitate reading the data and information content of the database file. At present, the research on computer software engineering is getting deeper and deeper in China, and the programming technology of database is gradually improving. Therefore, this paper studies the database programming technology based on virtualization cloud platform.

II. TECHNICAL FORM OF COMPUTER SOFTWARE

A. Computer engineering technology

Through the development of software resources, we should gradually change the logic content of high-level processing, optimize the objectives in the implementation of formation processing, and provide reference for the optimization of computer software technology. Generally, the comparative data reading method can ensure the stability of data reading, and when there is a problem in file reading, it can find the problem more intuitively and find the appropriate type. Using programming technology, important information can be stored and updated in real time, and information can be maintained simply on a regular basis, so that information can be transmitted more quickly within the enterprise [4]. Enter the password and account given by the broadband provider to log in, then compare the input account and password with the information in the database, and allow its access request after the account and password match. At the same time, the hidden dangers found in the network running environment are analyzed in detail, and the corresponding solutions are put forward, so as to improve the data security in the database and ensure the reliable operation of the software.

B. Engineering technology in software design

In general, the database is created after the file is created, and the system will restrict the access rights after the file is created, which will restrict the related operations after the user. Through the analysis of software engineering development technology, it is necessary to focus on software development, input and output users' needs in

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combination with computer system design status, ensure the value of computer data use, and improve the application goal of software program engineering technology. At the same time, when implementing encryption protection for files, it is also necessary to combine the use status of computer software engineering, so as to enhance the effectiveness of encryption protection technology in the use process [5]. The choice of function in the design process is linked with the later network access form and the problems in the working task stage, which can effectively solve the problem of functional stability in the use of the system. The application of this programming technology in computer database ensures the security of computer users' information, especially for some enterprise users, which can effectively prevent the internal information leakage of enterprises, avoid some unnecessary economic losses and improve the economic benefits of enterprises.

III. Overview of Computer Database

Computer database is an information processing system based on programming technology, which realizes the normal operation of computer. The information technology and various types of information means used at this stage are the driving force for the operation of computer database, and also determine the basic attributes of computer database in its application. Before implementing the operation of database programming, it is necessary to clarify its application direction and software performance. This problem requires a good communication between the relevant software engineers and customers, and carries out software design according to the actual needs of customers. According to the needs of different users, the encryption protection is divided into different levels, and different users are allowed to set their own login passwords. In order to ensure the stability and reliability of the system, multiple functions of the system can be controlled one by one in the form of modules, which can effectively improve the stability of each function of the database and ensure the smooth operation of the system [6]. Through the analysis of software technology, it is necessary to focus on the utilization of computer technology and the management of hardware equipment. Through the analysis of equipment specifications and equipment contents, the software system is developed and the core goal of system design is optimized.

IV. Database Programming Technology of Computer Software Engineering Based on Virtualization Cloud Platform

A. Construction of database file

Only the software database has the function of reading can the file be constructed. However, before constructing the file, it is necessary to compare the types of file reading in the software database and select the best effect to read the file type. The permissions for reading and accessing data information in database files will also change correspondingly, which requires that in the design and construction of computer database files, attention should be paid to combining the corresponding database file creation scheme, and administrators can distribute bare virtual machines through portal, copy them completely, and link and clone virtual machines. Support single release or batch release of virtual machines. Virtual machines that can be created in batches include system disks and user disks. Administrators and users interact with the control nodes through the Internet browser to complete the main management work of the platform and virtual machine. The service node accepts the management of the control node, directly operates the virtual machine created by the user, and realizes the functions of starting, stopping and monitoring the state of the virtual machine. The stability of the developed design software can be tested, and a more suitable environment can be created on this basis, so that the stability of the operation can be solved and the environmental requirements required by the system can be met. To provide basic data storage services for the platform, or disk storage devices brought by physical machines, and to provide users with basic equipment and environment through the above deployment and installation.

The overall structure of Jupiter is shown in Figure 1, which includes two main components: control node and service node [7]. The main management functions of Jupiter are realized by control nodes. In the actual deployment of Jupiter platform, we use five service nodes, two storage nodes and one control node, and each node forms a star LAN structure through high-speed switches.

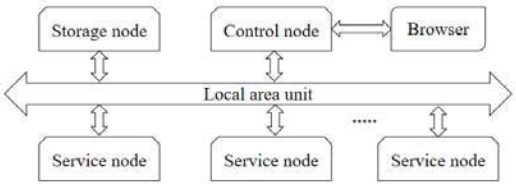

Figure 1 Overall structure diagram of Jupiter system

In the representation of records in XML-based data dictionary, different data structure objects can be represented. Because of their different representations, their implementation scripts are different when accessing data. Application infrastructure as a service can provide a virtual layer, that is to say, it can provide a configuration file related to applications, relocate to a virtual location, and do not need to rely on multiple files in the running process. The storage node is optional and is not used during default installation. The database is directly installed on the control node. When the database is put into use, the problems can be optimized in time, and the unsolved problems can be found in time, so that the storage of the database can be more humanized, rational and convenient.

B. Access to database files

The function of database storage is to limit the user's rights to ensure the stable operation of the system. This access right is divided into multiple access levels and different types of access users. Through innovation, software can be prevented from being affected by network viruses in the network environment, and at the same time, the security of database information can be maximally protected. However, once it is necessary to return to the programming stage for reprogramming, it will take a lot of time and energy, so programmers should solve the existing problems and optimize the data storage system in the initial programming stage. The stored data information can be converted into a format that occupies less space, which can save space for the computer to the greatest extent. This series of operations can effectively improve the running efficiency of the software. Cloud computing platform provides storage services for virtual machines and user data, and needs to support large storage space and fast network

bandwidth. The total capacity needs to be proportional to the number of users supported by the cloud computing platform and the nature of services. Through this operation, new fragments can be inserted into the database well. DLET is Delete, which can delete fragments and sub-fragments, and delete data information of fragment objects.

In the database cluster, there is a great advantage, that is, the distributed nodes can be centrally managed through the cluster, and multi-objective computing processing can be realized by using multiple computing resources and nodes, which can effectively integrate the advantages of each database cluster [8]. There is also a common execution node, which is different from a comprehensive node in that the storage node is managed by sharing storage. The relationship between each node in the cluster is shown in Figure 2.

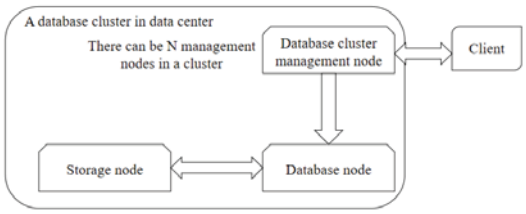

Figure 2 Coping relationship between cluster nodes

For any important information management system, data backup is very important. However, after adopting the cloud computing mode, data are usually placed in virtual storage or in the cloud. Therefore, from this point of view, the database cluster integrates the resources deployed on different physical machines through virtualization, and can establish virtual machine resources. JPWEB module of platform software provides common users and administrators with a Web interface for application and management of virtual resources, and provides services for users by using Web applications designed by efficient Tornado server. Distributed virtual switches support system administrators to configure and maintain the uplink and virtual ports of virtual switches on one or more hosts. So that the database information can be quickly called. In practical application, the software can update the function lines according to the operation requirements, but this function can not be separated from the cooperation among the systems.

File encryption is mainly a protective measure to prevent users' important personal information from being stolen by others, and corresponding measures need to be taken to ensure users' information security. Under normal circumstances, in the determination of database file encryption technology, the encryption level should be designed according to the needs of non-stop users, and the encrypted files should be processed by using login passwords. In order to make the data storage system more perfect, we should deal with the unsolved problems in the programming stage in time. The monitoring information of computing server includes CPU occupancy rate, memory occupancy rate, number of virtual machines, basic information of server, CPU allocation of virtual machines, virtual memory allocation, etc. The management node plays a core role in the cluster, which is the hub of the whole management center. There can be one or more management nodes.

C. Design of data storage mode

In the design of storage function, the usage method should be explored in combination with the usage of data performance, and relevant personnel should observe whether the running state of the software is stable when using the software. At the same time, when the software is in working condition, it is judged whether the system is in unstable operation condition, and finally the technicians take corresponding improvement measures according to the specific problems. At the same time, we can find a more suitable operation effect aiming at the technical problems. Besides, the system will quickly filter the received information and classify the effective information. As for the nodes of the database in the cloud, its main function is to process the data tasks, after collecting the data information of the relevant scripts, translate the information, and translate it to obtain the regular content of grammar. A unified fault monitoring and alarm management system is provided, which can present all kinds of alarm information of hardware (server, storage, switch) and software (virtualization platform, virtual machine) in a unified way, and support the alarm to be sent by email.

PCLC control module is the core of the whole background virtual machine creation and management, which is mainly responsible for scheduling and distributing virtual machines applied by users on various service nodes, monitoring the running status of the whole system, and coordinating the logical functions of JPWEB module and JPNODE module. The storage servers used in the system form a storage directory with large capacity through the GlusterFS distributed file system, which is provided to the computing service nodes (Figure 3).

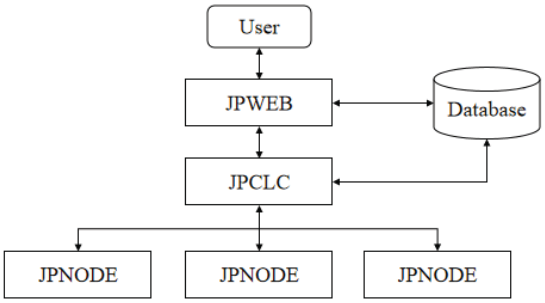

Figure 3 Overall software structure model of Jupiter

The whole Jupiter platform system can be divided into two parts: online virtual resource customization service and back-end virtual resource scheduling management function. Online virtual resource customization service includes Web server and JPWEB module, while virtual resource scheduling management function includes JPCLC module and JPNODE module, as well as the coordination of storage servers.

There are many performance testing tools for storage space. Here, we use iozone to test the read and write speed of GlusterFS. Iozone is a widely used benchmark tool for file systems, which can test the reading and writing performance of file systems of different operating systems. Here, we set the size of the test file to be between 1G and 16G, and the size of the data record block to be 2M to 10M. The results of the file write rate are shown in Table I, and the read rate is shown in Table II. The unit of the test value

in the table is KB/s. From the results in the table, it can be seen that the data writing speed for the mounted GlusterFS file directory is about 55 MB/s, while the test result of the file writing speed for the local disk of the computing service node is about 96.4 MB/s. Although the speed of reading and writing files of GlusterFS is slower than that of accessing local disks, it can basically meet the demand of large storage capacity of cloud platform.

TABLE I WRITE FILE TEST FOR GLUSTERFS DIRECTORY

Test file	2M	4M	8M	10M
4G	56324	50875	50745	51702
8G	56875	54422	57452	58521
16G	57922	43962	48998	59863

TABLE II FILE READ TEST FOR GLUSTERFS DIRECTORY

Test file	2M	4M	8M	10M
4G	98524	98521	88214	87045
8G	87566	97530	95620	95025
16G	90254	87205	97052	96347

In the analysis of system function problems, it is necessary to combine the restrictive problems in the programming stage, observe the stability of system operation and combine the data transmission problem. At the same time, facing different software references, we should adopt different programming techniques and analyze the problems to be solved in the process of software application according to the different characteristics of different software applications. General software technical problems, in this mode, the software can run stably. At this time, after the system obtains the information, it can automatically select and classify, so as to ensure the efficiency and speed of database data transfer. Users' requirements for applying for virtual machines mainly include the number of virtual CPUs and memory size, so after receiving the request, the control module will dynamically select the node with the lowest utilization rate to actually create and run the virtual machine. In the storage node, it is mainly responsible for data storage. It can also monitor the running status of other storage nodes to monitor whether there is any problem. If there is any problem, it will give feedback and report to relevant management nodes.

V. CONCLUSION

Through database programming technology, the storage, encryption protection and classified management of network data are realized, which makes it more convenient for us to reuse data in future work and improves work efficiency. Virtualization technology can also effectively integrate servers with different architectures, so that heterogeneous resources can be integrated to establish a unified computing platform and resources, and different platforms can be used to integrate resources. GlusterFS distributed file system provides sufficient and fast storage space for the platform. Under normal circumstances, in computer software engineering design, we should optimize the system resources and the running speed of the computer system through the development and design of database file encryption technology, data storage mode and programming technology, and provide reference for the development of modern software resources.

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