

Research on Cloud Computing Based on Storage Virtualization in Data Center

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Abstract—Under the background of the big data era, enterprise users are becoming more and more demanding for data storage. Traditional storage systems have become difficult to apply, and storage virtualization technology has been born. Based on this, this paper first expounds the basic concepts of cloud computing and virtualization technology, and then discusses the application of storage virtualization technology in cloud computing from three aspects, aiming to further strengthen the security of enterprise user data storage and promote enterprises. Better use of resources and cost savings.

Keywords—big data; storage virtualization technology; cloud computing; application

I. THE BASIC CONCEPT OF CLOUD COMPUTING

As China's economic level continues to increase, many companies are getting bigger and bigger, and enterprises are developing faster and faster. With the expansion of enterprises, the types of business and the number of businesses will continue to increase. Nowadays, the world has entered the information age, and computer Internet has become a necessary helper for every enterprise. However, with the addition of large amounts of data, enterprise IT systems need higher energy. Consumption and more data storage space, which will bring high cost to the enterprise. Some companies without Internet professionals will also waste a lot of resources such as storage systems. Therefore, enterprises have created a method that can protect data security, intelligent storage and large cost savings. It is very important for the future development of the enterprise. Therefore, "cloud computing" has begun to appear in the enterprise vision. Cloud computing is a kind of intensive supercomputing for large-scale data processing. It can not only realize data storage, but also manage security, programming, control and other functions of data, and can help enterprises adapt to the current business environment and build flexible and changeable. Infrastructure to achieve rapid response to business development needs. The use of cloud computing symbolizes the change of traditional information service methods. The name "cloud" implies that this method can expand resources indefinitely, and users can obtain data in time. Actual use, cloud computing can not only meet the needs of a single user, it is a collection of services, to provide users with the imagination of the IT services, such as network computing, we can see it as a virtual machine.

II. THE BASIC CONCEPT OF VIRTUALIZATION TECHNOLOGY

The types and quantities of resources that enterprises need

to calculate are huge. This requires a technology to allocate a large number of computing resources, and virtualization technology is born. In order to break the division between data centers, servers, storage, networks, data and other devices, virtualization technology separates the software, hardware, data, and network of computers to help the data network architecture become dynamic, to physical resources, and virtual. resources can be integrated management and use, so not only can improve the system structure flexibility, but also to reduce corporate business maintenance costs and risk, improve service quality. Enterprises can divide virtualization technology into the following layers through cloud environments: service level, storage level, network level, application level, client level, and so on. For different systemic problems, enterprises can choose different kinds of virtualization technologies for processing. The use of virtualization technology simplifies the resource management of cloud computing, and allows users to have a better Internet experience and reduce the waste of existing resources. Virtualization technology has improved the security and integrity of cloud computing data and provided security for the further development of enterprises. Therefore, in the process of mutual promotion with enterprises, virtualization technology has developed rapidly.

III. THE APPLICATION OF STORAGE VIRTUALIZATION TECHNOLOGY IN CLOUD COMPUTING

Storage virtualization technology has a wide range of applications, which effectively solve the integration problem of different types of storage resources, and greatly optimize the reliability and compatibility of the storage system. The main principle of storage virtualization technology is to classify physical storage from logical images, so that the network and applications are not confused in management. Not only that, for the user, in the case of the traditional disk classification in the data storage, the storage virtualization technology allows the resources to be fully integrated into a data pool, which can effectively achieve a single point of unified management.

The use of storage virtualization technology is mainly achieved through three levels: virtualization on a host basis, virtualization on a storage device basis, and virtualization on a network basis. The idea is to separate enterprise resources through logical image and physical storage, and to make enterprises use existing resources more simplified. There are two ways to implement them: in-band virtualization and out-of-band virtualization. Module virtualization and disk virtualization can be completed through three levels of

virtualization. As shown in Figure 1, the application of storage virtualization technology in cloud computing is analyzed from three aspects.

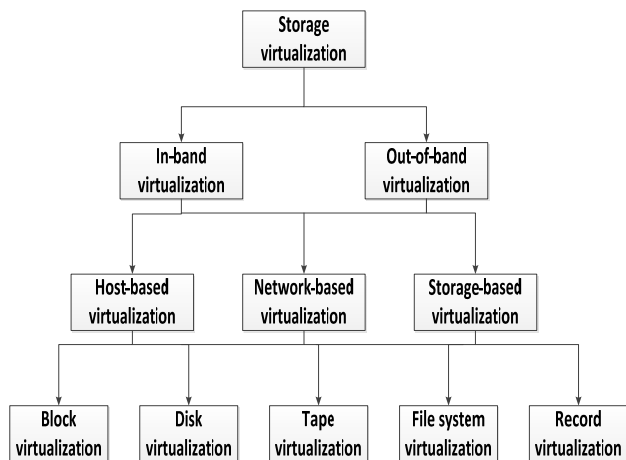


FIGURE 1. STORAGE VIRTUALIZATION IMPLEMENTATION MODE

A. Host-based Storage Virtualization System

The host-based storage virtualization system is completed by the operating system under the influence of the corresponding logic management software. The main role of this type of application is to do data mirroring protection, so that multiple heterogeneous disk arrays can be involved in the storage space. But this model can not be said to be perfect, there are also some defects that need to attract the attention of users. First, the storage virtualization system has compatibility problems between the application and the operating system, and when the host needs to be upgraded and maintained, the operation is complicated. Secondly, such a system will occupy a large amount of resources of the host, resulting in a decrease in the performance of the application, and will also affect the continuity of the service to some extent.

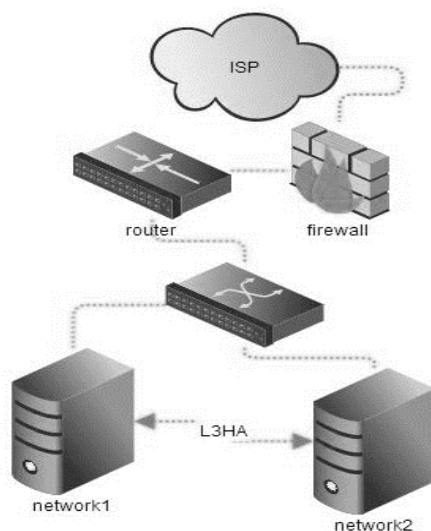


FIGURE II. FIGURE 2 HOST-BASED STORAGE VIRTUALIZATION SYSTEM

B. Storage Virtualization Based on Storage Devices

Storage virtualization based on storage devices is rare in common devices, and is often used in high-end point storage devices. It integrates the virtualization function into the storage controller, and integrates different storage systems to make it a unified platform. This effectively solves the problem of traditional management and can take advantage of the life cycle. Management promotes the application environment to be further optimized. Storage-based storage virtualization system unified management of resources, which means that neither external resources nor internal resources will be managed, and the original storage system will no longer participate in this process. The benefit is that heterogeneous storage management becomes simpler, and the storage network becomes more structured. Similarly, it also has some problems that need attention. For example, when data management functions are from different manufacturers, it may be difficult to interoperate; there are many data management softwares that need to be installed, resulting in a significant increase in costs, which is difficult for small and medium-sized enterprises to popularize. .

C. Network-based Storage Virtualization

Network-based storage virtualization refers to the integration of virtualization engines into storage areas (SAN). The application benefits of such storage virtualization technologies are also conducive to unified management of data. In addition, it does not occupy host resources, and can provide perfect support for heterogeneous storage devices and heterogeneous hosts. When the management platform can be unified, it will inevitably increase the efficiency of the enterprise. The shortcomings of network-based storage virtualization are as follows: First, although this kind of storage virtualization technology is conducive to the unified management of data, there are still many vendors that have unified management due to weak data management functions. Difficulties; Second, there are still many manufacturers with low maturity and compatibility issues have not been completely resolved. In short, although storage virtualization technology has great advantages, it still needs to be constantly improved.

When many enterprises choose to use virtualization technology, they have doubts about the deployment location of virtualization. It is not clear whether it is based on computer host or based on network. In fact, virtualization technology can be deployed in these places, and each has its own advantages. If the enterprise needs work based on the needs of the work, it is better to merge the storage systems and manage and control each system through a common storage area. In order to facilitate the selection of storage arrays for different vendors, enterprises can show them various functions that enterprises can play, such as dynamic data configuration and migration, which are mostly realized by storage virtualization technology. The average user in the use of storage virtualization technology process need to pay attention to the following points: 1) Before making use of storage virtualization technology to the enterprise storage virtualization strategy to make advance planning. 2) Before making enterprise storage virtualization, the need for various types of existing enterprise data filtering, sorting. 3) For all types of data storage virtualization expiration date be exact

understanding of storage virtualization technology to ensure efficient operation.

IV. STORAGE VIRTUALIZATION TECHNOLOGY APPLICATION AREAS

At present, virtualization technology has been used on a large scale in the Chinese storage field. Many companies that produce storage devices have already produced a large number of virtualized storage products, and the number of sales has reached new highs. At present, the application fields of storage virtualization technology are becoming more and more extensive, such as the information industry data center, the mobile telecommunications industry, the financial banking insurance industry, and government agencies. As the world is gradually entering the information age, the explosion of information data capacity is unstoppable, so traditional storage technology can no longer meet the needs of modern people, so storage virtualization technology has developed rapidly. However, there are still some shortcomings in storage virtualization technology. For example, its security and confidentiality need to be further improved. At present, most of the storage virtualization technologies are targeted at large enterprises in China. There is still no perfect solution for small and medium-sized enterprises in China. , but also because the initial investment costs of storage virtualization technology is relatively high, too much burden for small and medium enterprises.

V. CONCLUSION

In summary, although the current storage virtualization technology is widely used, it still cannot solve all questions of the enterprise. And the enterprise can only virtualize the resources and technology of the enterprise in combination with its own development, in order to create the storage method that is most suitable for the enterprise itself, achieve the purpose of rational allocation of enterprise resources and reduce costs. And enterprises need to constantly improve the system in the process of using cloud computing, in order to reduce the risks that may be encountered in the use of storage virtualization technology.

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