Architecture Research on Cloud-computing Platform Based on Virtualization Technology

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Abstract: This paper introduces the basic meaning of virtualization technology. It analyzes the characteristics of cloud computing platform on four aspects: scalability, availability, balance and applicability. Then, it combines with the key points of cloud computing platform architecture based on virtualization technology. Moreover, the paper puts forward the constructing countermeasures of cloud computing platform based on virtualization technology.

1. Introduction

The information and Internet time has led to the emergence of a large number of software and data resources. Under the action of these resources, there is a lack of scientific interaction and interaction in resource template. Therefore, due to the inefficient application of computing and data resources, some fields and relevant personnel have increased their efforts to explore the information service platform of cloud computing. Cloud computing information service platform is formed in this environment. Under the role of network computing technology, we can collect and sort out various resources in the network environment, so as to increase the efficiency of resource application. However, the gradual improvement of the dynamic level in the Internet environment makes it more difficult to integrate and transfer resources. Therefore, how to smoothly build the cloud computing information service platform and improve the application efficiency of data and system nodes has become a key issue of virtualization technology.

2. Basic overview of virtualization technology

The virtualization technology mainly refers to the virtual processing of physical units, then forming multiple logical units. Its comprehensive application can improve the efficiency of resource application and scientific management of various resources. Usually, it involves four main techniques. The first is memory virtualization technology. The second is storage virtualization technology. The third is hardware virtualization technology. And the fourth is software virtualization technology. This paper focus on server virtualization technology. Turns server virtualization into multiple servers, and before application of server virtualization, each application ran on its own physical server [1]. After server virtualization is implemented, each application runs on the corresponding virtual server. Each virtual server will be supported by a physical server. Figure 1 is the virtualization technology framework.

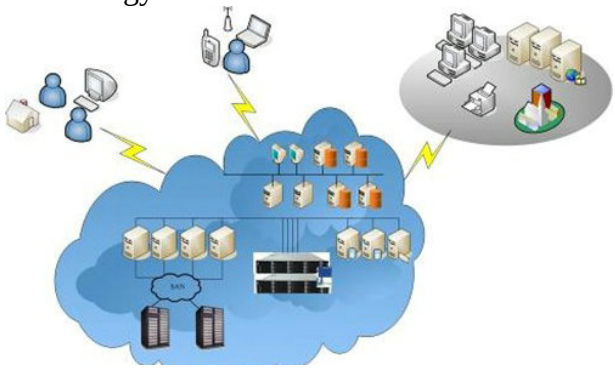

Figure 1. Virtualization technology framework

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From the research, we can find out, the core function of server virtualization is the virtualization of hardware resources. Hardware resources involve CPU, memory, IO port, etc. These hardware resource virtualization are the core content and important technology of server.

3. Cloud-computing platform features of virtualization technology

3.1 Scalability.

The cloud computing platform has some scalability features. In other words, it can combine the changes of load in the circuit, correct the distribution of its own system, and realize the scientific application of system resources to a great extent. It has strong integration characteristics in the overall cloud computing platform, and it deals with some irregular resource allocation caused by a too high load. The powerful virtualization cloud technology platform should be used to implement the resource allocation constructional modification. In the whole contraction process, it is convenient, efficient and fast, and the original cloud computing system is more sensitive and can run in multiple software systems [2].

3.2 Availability.

For the previous data computing system, we should apply redundant backup servers appropriately in the system operation, so as to ensure the data rationality and security. In this link, we need to invest a lot of resources. Moreover, redundant backup will occupy a large space in the server, leading to some problems in data recovery. Availability of virtualized cloud computing platform is that it can provide a large number of virtual machines under the role of cloud computing platform. In addition, it can utilize various virtual machines to realize the allocation of overall system functions, so that every plate can realize data backup and system migration. Under the effect of this method, we can effectively improve the application efficiency of data computing collaboration in the operation process, and greatly ensure the security of the system operation. In the operation of virtualized cloud computing platform, less space is occupied and data recovery efficiency is high.

3.3 Equilibrium.

At present, the core problem in cloud computing platform is the load problem. The user’s software application has not been combined with the corresponding process. In this case, it will provide conditions for the emergence of load imbalance. For the ambiguous nature of the user in the resource application process, the virtualized cloud computing platform can reprogram the load nodes of the entire circuit system. With the load nodes with relatively high efficiency of capital application, the system can transfer virtual machines to improve the stability of the circuit system. This migration method is generally used in nodes with relatively few layers. When moving a virtual machine, the node-level running environment is simulated to ensure that node-level framework does not change substantially throughout the system.

3.4 Utility.

When data integration is carried out in cloud computing, the data applied is usually mainly stenciled data. This leads to the circuit data nodes in the load imbalance for a long time. In the process of system operation, some nodes with low efficiency of resource application will be formed. These nodes have a low load will lead to a larger consumption of the system's physical resources [3]. With the help of a virtualized cloud computing platform, we can integrate nodes and centralize them into a virtual machine for operation. This cannot only reduce the idle nodes in the system, but also improve the application efficiency of physical resources. According to the investigation, the virtualized cloud computing platform has played a good role in operation cost management and energy consumption reduction.

4. Key points of cloud computing platform architecture based on virtualization technology

4.1 Scientific establishments of the standard.

At present, we need to improve the application of cloud services in the entire information field, and there is no unified application standard. In order to ensure that the scheme is forward-looking, we need to set corresponding standards scientifically in the process of selecting relevant facilities. Expansion capability of cloud service standard is comprehensively considered to improve its advanced nature, so as to meet the development needs of the information field in the future.

4.2 Two levels networks.

Under the influence of cloud platform, virtual machine migration and cluster are the most typical application models. Either model requires support from the two levels networks. With the gradual expansion of the application scope, this has caused a certain impact on the large-scale deployment of the two levels networks with loop problems. By applying STP+VRRP technology, the deployment of two levels network will be more complicated and the link application efficiency will be low [4]. Therefore, in the process of network design, it is necessary to think about the application concept of two levels network technologies, so as to deal with the problems existing in the original technology.

4.3 Enhance platform virtualization.

Virtual resource pool is the main direction of network development, which can effectively improve the efficiency of resource application and reduce the cost of operation. Through the server implementation, technology construction work of storage virtual resource pool, and promote the realization of network equipment virtualization goals.

4.4 Open interfaces.

To ensure that resources such as servers, storage, and networks can be integrated and managed by the cloud platform, we need open API interfaces in the system. The cloud computing operation management platform realizes the allocation and application of related devices under the function of API interface [5].

5. Construction of cloud computing platform architecture based on virtualization technology

5.1 Building methods of cloud platform architecture.

Cloud computing platform system is generally constructed with three contents: computing node, controller, and the client. In the process of building a cloud computing platform, all physical servers can be treated as clients. The controller is mainly constructed by partial authentication module, computing and storage service, mirror service, Web interface service, etc. [6]. These service templates should work with more than two server implementations. In general, the above templates are uniformly distributed across the same physical server when making design choices. Compute nodes are typically constructed using more than two physical principals of virtualization technologies. Its function is to support the operation of virtualization technology and provide corresponding computing services. The detection method applied in most fields of our country is to distribute these templates in the same equipment. Compute node work can provide computing services for virtual practice runs. Figure 1 is the deployment architecture of the cloud computing platform.

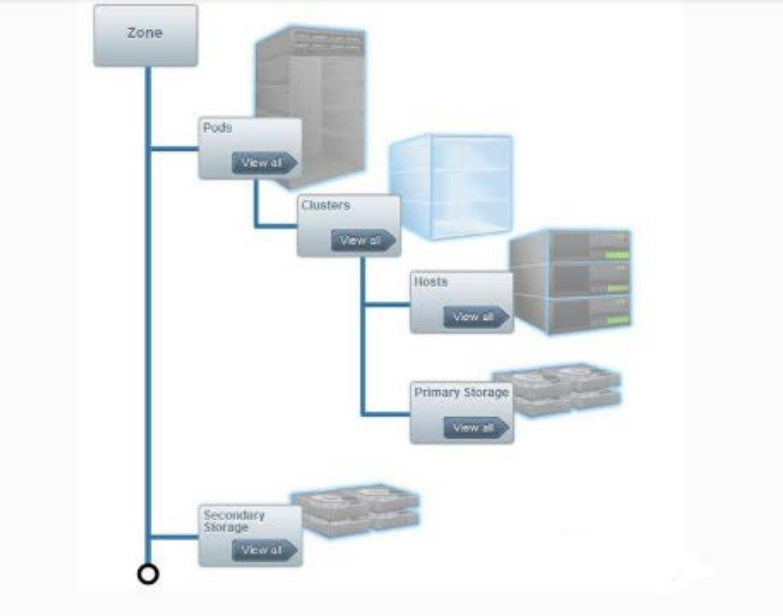

Figure 2. The deployment architecture of the cloud computing platform

5.2 Deployment processes.

When deploying a cloud computing platform, four physical hosts need to be assigned to the overall framework. It is defined as server1, server2, server3, and client. Server 1 is set up as a cloud controller and OpenStack is placed in it to provide the corresponding service. Both server2 and server3 are located in nova, where the role of the Client is the client. By building images, we can implement the web interface access and control the infrastructure by using the OpenStack command. Therefore, cloud computing platform deployment is often based on server1. Because server2 and server3 can only be placed in Nova components. We first place the Ubuntu platform on both hosts. Then we use OpenStack to get the corresponding Nova component generation and implement the Nova installation. After deploying Nova components, we need to set up the server2 and server3 network environments scientifically. Moreover, distribute it over the same network and link to server1 at the same time. Because server1 plays a vital role in this, its installation and deployment are cumbersome. We can divide it into two parts. First, preparation. The work includes the installation of cloud operating system, database setting, the link of network output input system, etc. The main concern is that after the operating system installation, we can start the work of the MySQL database and verify the database. Second, OpenStack component installation. The installation of server1 was carried out in combination with relevant processes, including Keystone, Glance, Glance, etc. [7].

6. Summary

Generally speaking, by constructing the cloud computing platform of virtualization technology, we can provide accurate data services to various fields. With the support of hardware facilities, we can realize the integration and processing of virtual machine load nodes. Moreover, we can improve the application efficiency of system resources. During architecture exploring of cloud computing platform based on virtualization technology, we should start from the perspective of customers' specific needs. We can realize the transmission and sharing of virtual network data. On the basis of improving the data operation efficiency, it provides a pleasant prospect for its operation and development.

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