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Study of Cloud Computing and Virtualization Technology

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Abstract. With the rapid development of the technology of information communication, the existing internet computing mode has failed to meet the requirement of the growing industry, leading to the development of cloud computing and virtualization technology. What is more, the virtual machine is also based on the technology of cloud computing. At the present stage, the cloud computing and virtualization technology have stood out as the major operation platform in the internet and also worked closely with the internet technology. As a matter of fact, the development of cloud computing and virtualization technology will also fuel the expansion of modern companies. After making a brief introduction of the cloud computing and the virtualization technology, this paper will also carry out an in-depth analysis of the relationship between cloud computing and virtualization technology.

Preface

It has been widely believed that the popularity of the internet has enabled the data processing to assume an increasing importance and complexity in modern world. In order to better manage and process a wide range of information resource in a safe, efficient and flexible manner, the high-quality management over the business has emerged as an important research topic in the industry. As a matter of fact, the development of cloud computing and virtualization technology just also offers the possibility of solving all of those problems appearing in the industry.

Introduction

The invention of computer has helped the human civilization make a great leap by bringing about such massive changes into people's daily life and work. Similarly, the internet technology has also led to a revolution in the way of life for modern people. As to the production, those emerging technologies have also enabled the great improvement upon labor productivity. To this day, the information-based service has become the most important work mode adopted by different industries and companies. It should be also noted, however, that the rapid development of internet technology has also resulted in the increasing complexity and importance of data processing. Therefore, the existing internet technology has failed to further push forward the development of modern enterprises, which also makes more and more people research into a more efficient mode of service and management through data center.

Fortunately, the invention of cloud computing has provided a precious opportunity for those companies to enhance their operation efficiency and reduce the operation cost. By taking advantage of brand-new computing mode, the cloud computing has made those online users accessible to a variety of information and resource that they need. What is more, the cloud computing has also carried out a commercial service mode featured by charging based on the amount of usage and self service after integrating many new technologies such as the service center processing and virtualization. To be more specific, the virtualization technology has sought to solve various real problems by imitation and modification so as to ensure the normal operation of the product. With the development of science and technology, the virtualization technology has become the technical basis of cloud computing. By making the best of the excellent elasticity and flexibility of the virtualization technology, the cloud computing has been capable of providing maintenance measures for service and resources in a simple, automatic and standardized manner, leading to a

great improvement upon service quality and efficiency. In addition, the cloud computing can also utilize the limited amount of resource to achieve comprehensive operation according to certain data mode and thus increases the operation profits on the condition of reduced operation cost. It should be also noted that the cloud computing should receive technical support from many other software technologies in a wide sense.

The concept and advantage of cloud computing

In essence, the cloud computing still falls within the category of software technology that aims to manage and utilize the single-machine and multiple-machine hardware systems by making use of various technologies. On the other hand, the cloud computing can be also referred to as an integration of load balancing, internet computing, utility computing and thin client as well as a computing mode that seeks to provide virtual resources in the form of internet-based services. To conclude, the advantages of cloud computing can be illustrated as follows.

Non-Computing in the Local Site

The cloud computing will seek to make comprehensive analysis on the various resources in the computer and also many other common resources in daily life so as to ensure the normal operation and strict control over the computer. Although most of internet resources that are available to the user are transmitted through video, file or audio, the cloud computing has sought to see the computer resources as the remote resource and transfer them through internet, which is also hard to achieve by many other computing technologies and separates the cloud computing from others.

Safe And Controllable Data

Due to the distributed storage system adopted by the cloud computing, it can also enable the speedy backup and recovery. What is more, the cloud computing can also support a variety of software and hardware platforms and thus satisfies the requirement of computers with different features and in different areas. The infinite storage of the cloud computing is also another great distinction. Due to the fact that the technology can define the firewall and isolate the access in terms of group, it is just equipped with the function of preventing ARP cheating and DDOS attack, which also further enhances the data safety.

Cost Efficiency

The cloud computing only requires simple setting to achieve an integrated platform based on the principle of instant usage in demanded amount, which means that a great deal of cost and time has been saved in establishing and maintaining the platform of computing repayment.

Increased Utilization

The virtualization technology has also reduced the amount of demand in the physical machine without the need of enhancing computing capability, which also cuts down on the demand of mechanical room capacity and electric refrigeration and thus increases the utilization rate of physical machines.

Currently, the cloud computing mode and related measures has become the major mode of production used by a lot of companies. As a new technology, the cloud computing should not only make great efforts to enhance its technological level, but also pay close attention to the general tendency of the whole computer industry so as to make better use of the computer technologies.

The Concept and Key Points of Virtualization Technology

The unique advantage of the virtualization technology has enabled it to exert profound influence on a wide range of fields. In order to perfectly interface the software technologies with the hardware system, we should also make constant improvement on the application of the virtualization technology. What is more, more efforts should be also made to work out a better and more stable operation platform for the cloud computing, which will be also crucial to avoid the flaws such as the difference in operation outcome and the inconsistency in terms of time. The virtualization technology can also achieve the rational utilization of the hardware resources through virtual software and then assigns those resources into the corresponding application software after

integrated by virtual software as a means of ensuring the indifference application in the hardware. However, there are still problems that need to be dealt with during the application of such technology, which also makes it receive increasing attention from all sides. At the present stage, it has been seen as a key problem to cut loose from the hardware so as to achieve the so-called virtualization. Once this problem is solved, a great variety of issues related to application deployment will be also worked out so as to achieve the effect of uniform computing and push forward the social development.

Given the existing application of local network, it should be noted that the virtualization technology doesn't center on the issue of terminal computing but aims to make an in-depth analysis of the control measure and provide rational computing mode so as to provide powerful support for the terminal computing and solve the problem of desktop application in the field of virtual services. Due to the fact the virtualization technology can not be operated independently on the desktop application, the computing mode just has to take actions such as the program computing and remote control to execute and analyze the technical measure of the virtualization technology. Although the technology can achieve the effective allocation of dynamic resources, the immature technology of remote control also confines the effective allocation of dynamic resources. As a matter of fact, such mode of communication traffic also works in a much complicated way on the virtual machine, which also makes it the major mode of request used by the cloud computing and virtualization technology. But the cloud computing doesn't have to deal with such problem and thus has been widely applied.

The relationship between the cloud computing and virtualization technology

The advancement of the internet has also given birth to the cloud computing whose key part has been identified as the grid computing. It has sought to integrate a series of discrete computing resources into a whole and thus put together a uniform computing equipment to provide services. In order to work out the expense of resource utilization, it will also make use of the method of utility calculation. Therefore, the essence of the cloud computing should be centered upon the virtualization of the computer [1]. More specifically, the virtualization technology has taken the increased service efficiency of the machine as the preliminary goal. One of most commonly used virtualization technologies in the industry is the virtual memory which will be divided into several fragments of physical memory so as to facilitate the data exchange if needed. Generally speaking, the virtualization technology is currently extending into two directions which are the single-machine and multi-level virtualization.

Hypervisior has been known as the basic technology of the single-machine virtualization. However, it is not until the invention of VMWare that the single-machine virtualization achieves an even faster development to the extent that the single machine can be divided into several machines for individual use. In other words, even an ordinary computer or PC can be used as a simulation so as to get the desired result of multiple operation systems working together at the same time [2]. During its early period, the single-machine virtualization used to employ one machine to simulate the test over many systems, especially applying to those enterprises devoted to cross-platform software. Since such technology does not rely on many testing equipments to work properly, it has greatly reduced the cost and energy consumption. Besides that, the VMWare technology has been also applied to simulate the OS environment as well as set up the isolated environment that involves the concern about safety.

Due to the great achievement made by the single-machine virtualization that focuses on VMWare in the field of IDC data center, it has been always wrongly assumed that the technology has an immediate connection with the cloud computing. In fact, that is not the case at all. To be more specific, the virtualization technology used in the background system of Google is the HPC technology that is similar to MPP and PVM in a sense rather than the single-machine and VMWare-based technology [3]. However, the multiple-machine virtualization is truly a kind of cloud computing and even marks a milestone in the development history of cloud computing technology.

Since the cloud computing is based on the cluster technology, it can be also regarded as the multiple-machine virtualization technology in a sense. The term of multiple-machine means the multiple systems and also virtualizes the heterogeneous system into the isomorphic system. In order to launch the cloud computing onto the market, many companies of single-machine virtualization have also tried to develop the multi-level machines based on Hypervisior. Among them, the Hadoop of Google, the Ovirt of Microsoft and the vSphere4 of VMWare have stood out as the typical examples in the market of cloud computing [4].

What is more, the COW (loosely coupled MPP) has been known as the most famous cluster technology that aims to integrate all units of the system into a whole. The computing nodes of the COW system are mostly classified as idle computing resources, suggesting that more than 90 percent of CPU and memory remain idle [5]. In order to fully utilize those available resources, we can employ COW to arrange those nodes in the form of cluster through a variety of technologies such as the multiple-machine virtualization and grid computing. What is more, the central node will be also supplied with a certain amount of computing resources. Therefore, those central nodes will function like a super computer to provide various services for the user. According to the theory of multiple-machine virtualization, a variety of computing nodes will form a cluster which will provide service through the same access point.

On the other hand, the virtualization technology can also avoid the difference between hardware software and thus solves the incompatibility problem. After integrating the hardware resources through virtual software, such technology can also assign those integrated resources to different application programs and achieves the indifference seal of the hardware. However, it should be noted that the virtualization technology is only a major technology in the cloud computing rather than the whole content of it. As a matter of fact, the cloud computing also includes many other technologies, such as the utility calculation and distributed computing. What is more, many so-called centers of cloud computing are more in name than in reality, which means that they are more of a virtual computer. Thanks to the features of isolated hardware layer and software layer seal, the virtualization technology has become the most widely used technology in cloud computing. Considering that the virtualization technology still has to confront some problems such as the inability to conduct terminal computing, it has become a meaningful topic to explore into other technological resources in the cloud computing.

The value of the cloud computing and virtualization technology to the large enterprises

As the cloud computing and virtualization technology goes through a rapid development, a series of new concepts, technologies and products have also kept emerging in recent years. The value of the cloud computing and virtualization technology to the large enterprises can be reflected in the following aspects. Firstly, it has reduced frequency of human intervention of basic equipment and also greatly enhanced the efficiency and quality of the management through simpler but more powerful tools, concentrating the energy of the administrator upon the application management. Secondly, the cloud computing is also featured by distributed service and centralized resources, which is also consistent with the goal of the integration of information resources and thus makes the technology widely used by more and more enterprises. Thirdly, the cloud computing can also enable the virtual machine to move in a flexible manner as a logic unit, which means that the administrator can move the machine even without having the ongoing services interrupted. Therefore, the virtual environment established by the cloud computing can contribute much to the further development of the enterprise.

Conclusion

The cloud computing and virtualization technology should complement each other. As a matter of fact, the cloud computing can be referred to as the highest level of virtualization technology and its mode has also cut loose from the tradition mode of software service, computing and usage and thus brought about great changes in the realm of computer technologies. To conclude, the cloud

computer will surely play an increasingly important role in pushing forward the development and technological concept of the whole society.

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