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Research Article

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Construction of cloud platform for aeronautical computer laboratory

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ABSTRACT

The article makes an introduction about research status at home and abroad and the related technology of cloud computing, emphatically introduces the architecture of cloud computing, virtualization and solution of existing cloud computing platform; In this paper, we made a thorough research and comparison between the two platforms in architecture and application, working principle, network architecture, security measures and so on, and concluded their scope of application and user colony. Based on the practical cloud as foothold, in view of the virtualization technology research, analyses the design of virtualized computing resources pool, the realization of the virtual machine live migration ability, etc, are discussed, trying to realize system's high availability and load balancing to build the aeronautical computer labs . And hope to provide some intends to explore and ideas for further research work.

Key words: Cloud Platform; aeronautical computer Laboratory; cloud computing

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INTRODUCTION

Software and hardware resources expand rapidly and decentralized deployment, greater management's difficulty. we can get help resources from cloud computing to make IT resources managed centralized, auto deployed,resources sharing and on-demand service. As a new kind of network computing technology, cloud computing can provide network users multi-level IT resources services, including infrastructure, platform and application system, through many measures, such as open, standardization, virtualization and so on. In recent years, cloud computing has become a hot research field in both academia and commercial circles, because it owns many features such as virtualization, customization, multi-tenant and so on. It has obtained attention widely. How to apply the technology of cloud computing into aeronautical computer labs is a hot issue.

1. aeronautical key technology analysis of aeronautical cloud platform

aeronautical cloud platform involves two core technologies: Virtualization and load balancing, these two technologies to ensure reliable operation and dynamic expansion of the cloud platform. aeronautical virtualization technology is the foundation of the cloud, mainly refers to computer and operating system platform for virtualization, including virtual server, CPU virtualization, virtual memory, and storage virtualization. The so-called virtualization refers to the logical representation of computational physics resources, and out of the shackles of the physical media. Virtualization technology can simplify access to computing resources and management, using common standard user interfaces and convenient access to system resources, replacing physical access to these resources to their implementation. Virtualization technology is implemented in cloud computing resource sharing of the core technology. Through virtualization, users can easily access the server and storage resources, without having to specify a specific server and storage resources. For data centers, virtualization technology to solve the dynamic data center resource management issues. At the same time, virtualization technology is very good to solve the problem of heterogeneous resources, it is possible to achieve real independence platform. The system load balancing problem can be dynamically adjusted by remapping the virtual machine to a physical machine. Due to these advantages of virtualization technology, Cloud computing using the virtualization technology to a single physical server virtualization resources out several high performance general performance of the virtual machine, in order to meet

the needs of users.

In grid computing, cloud computing, there is a problem in the distributed system, that is, if the computing cluster appeared load imbalance problem, then load the heaviest machines often become a bottleneck affecting the system's overall performance and shorter board. Only by establishing a good load balancing mechanism, in order to effectively prevent this from happening, dynamic scheduling, computing resources and load tasks, implement to improve the overall system throughput, resulting in maximum resource utilization and optimal service quality.

2. Virtualization Model of aeronautical cloud platform

Generally, we can put a cloud-based aeronautical system is technically classified as a four-layer structure: Service-Oriented Architecture (SOA) build layer, management middleware layer, resource pool layer, physical resource layer. SOA build layer is directly oriented applications, package cloud computing capability as a standard Web Services; management middleware layer service to SOA build layer, provide the necessary support of cloud computing resources and management; resource pool layer USES the underlying hardware virtualization technology integration system, forming a virtualized resource pool, includes various hardware resources, operating systems, database systems, and a collection of applications; physical resource layer involves all the hardware resources, including server hardware systems, network hardware systems.

Relying on virtualization technology, after the aeronautical room in a variety of resources to achieve the future of virtualization, the traditional physical host becomes virtual machines in computing resources pool, users use telnet client terminal to complete action on the virtual machine, receive service support computer resource pool. Through the aeronautical room of the cloud environment virtualized computing resource allocation, scheduling, management and other aspects of the analysis, formed the following virtualized computing resource pool model, as shown in figure 1.

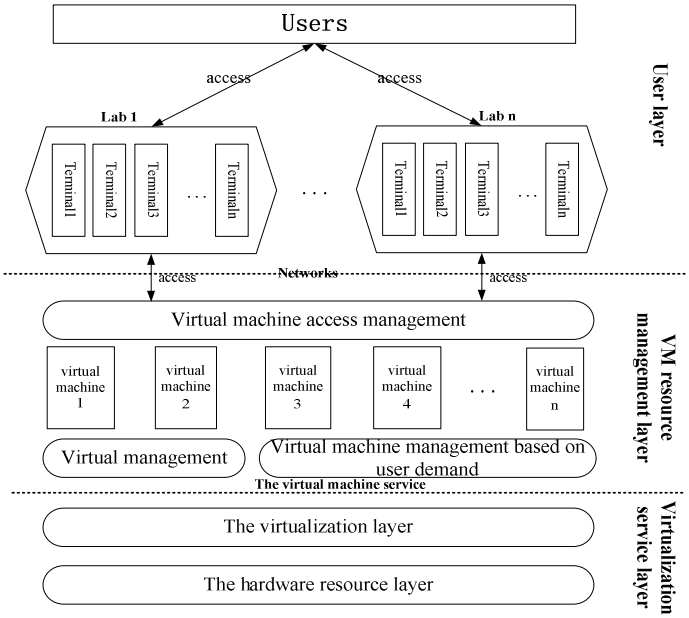

Fig. 1 The model of calculating resource pool

User application layer: this layer user uses the client terminal remotely log into the virtual machine to operate, directly facing specific application to expand the experimental task, you can use diskless workstations, thin clients as a client.

Virtual machine resource management: consists of virtual machines and related management systems. This layer, based on the virtual hardware resources to meet the huge demand of the virtual machine will be created, under the management system to control concurrent processing data. At the same time, this layer bears on system virtualization management, responsible for selecting the appropriate virtual machine template generation and destroy virtual machine basis for the demand; establish the mapping between the user terminal and the virtual machine, realize the user access to a virtual machine; solve the load balancing between servers, in order to meet the needs of students' virtual aeronautical. According to the curriculum schedule of the course, time, location, class, number and other relevant factors, automatically generated to meet the needs of the virtual machine configuration when preparation time before class, the virtual machine is automatically destroyed after school. Thus, to achieve the needs

of different courses, meet the practical Teaching needs of different courses.

Virtual hardware resource layer: consists of hardware resources and virtualization layer, which operator, a storage device, network equipment and other resources constitute the hardware resource layer; the virtualization layer provides the runtime environment and resources on one virtual machine resource management, it use virtualization layer abstract technology complete virtual abstraction of the hardware resource layer, so that the operating system and hardware resources separated, By Virtual Machine Monitor(VMM) performed on the dispatching operation system in the physical hardware resources, and to provide a full range of virtual hardware interface. At the same time, solves in a large number of virtual machines cloud server and multiple operating systems to run independently concurrency issues.

3. Load balancing under the virtualized environments

Different from traditional load balancing problem in the field of the server, in a cloud computing environment to solve this problem, we must realize the dynamic migration of virtual machines. Virtual machine migration refers to a system based on real-time load, djust the schedule those running on the server load heavier some virtual machine migration to another load lighter running on the server, thus reasonable regulation to protect system resources and the successful completion of their tasks. Virtual machine migration development is divided into two stages: the early virtual machine migration using a static manner, launched off the virtual machine before migrating to suspend services. Migration is complete, and then restarts the virtual machine. This approach makes the virtual machine during the migration process will not work, so there is no guarantee that the service quality and continuity. In order to improve the defects of static migration technology, proposed next-generation migration technology, dynamic migration of virtual machines to achieve that just a short downtime migration under conditions not even shut down the virtual machine, to ensure the continuity of the service and the quality of service.

dynamic migration conditions of virtual machine

Dynamic migration of virtual machines need to solve many problems, mainly related cpu migration, memory migration, storage migration and other equipment migration. Because of the virtual machine live migration process memory data amount is larger, so the migration difficulty is higher; therefore, the most complicated part is the memory migration in the dynamic migration of virtual machines. Analysis to obtain the dynamic migration parameters are as follows: ① Minimal interruption. Because downtime service can not be performed, so dynamic migration process to try to minimize downtime.② Consistency. During the migration process, source and destination hosts must be synchronized; otherwise, it will affect the transition effect and stability. ③ Minimal interference. To protect the virtual machine during the migration process, interfere with the implementation of other services. ④Transparency. During the migration process, migrations both safeguard all network connections and applications, maintaining the original state does not change.

CONCLUSION

The emergence of cloud computing to higher aeronautical education has brought new changes, based on cloud Desktop Network virtualization technology can make the traditional aeronautical model has been tremendous innovation, cloud desktop virtualization technology can be used to carry out a wide range of online virtual aeronautical teaching mode, from the true sense, aeronautical clouds can open laboratory, effectively alleviate the shortage of equipment pressure, and reduce maintenance strength, effectively improve the existing experimental teaching system.

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