Research Article
Food Virtual Resources Laboratory based on Cloud Computing

Jian He
School of Computer Engineering, Jinling Institute of Technology, China

Abstract: This study has researched and analyzed the core technology of the food virtualized resources Laboratory based on cloud computing environment. Design and implement a modular food virtualized resources Laboratory on this basis. As a business model innovation, there are more and more attentions to the cloud computing technology. Cloud computing tasks can be distributed in the pool of resources consisting of large number of computers in order to make a variety of applications to obtain services as needed, significantly simplify IT infrastructure, optimize resources and reduce risk.

Keywords: Cloud computing, food virtualized resources, modular

INTRODUCTION

Training Cloud is a cloud computing environment in higher education typical of a specific application, through a cloud environment can provide students with training related Laboratory services, resources, services and process services. Users can through the cloud Laboratory provides practical environment, the design of operating Laboratory and food virtual scene to complete all kinds of skills training and to get an objective evaluation system (Aiken *et al*., 2003) At the same time, practical cloud can also according to the actual demand to elastic expansion or contraction of the scale, to achieve a high degree of automation, supply-demand and self-service. In the system, the user is using the resource and contributor role, forming a reproduce, clouds dynamic growth mechanism. In addition, training cloud technology can effectively reduce overall IT equipment was cost of ownership, construct low-carbon green training Laboratory. But how to make it seamless to the field of vocational education has always received is a difficulty, next, we will discuss the technical point of view to analyze and implement build cloud systems. This study includes:

- Design the overall architecture of the food virtualized resources Laboratory and the overall architecture of the Laboratory function models. Give a detailed analysis of how to select each module and interconnect the modules. Analyze the requirements and design the modules in detail of the various functional modules of the proposed food virtualized resources Laboratory. And give the key techniques for the module implement.
- Build the food virtualized resources Laboratory based on cloud computing environment and implement the performance testing combined with the functional modules. Through the experiment, described the usage scenarios of the various module interface technology and provided an important reference for the future building and optimization of the food virtualization Laboratory (Zhang, 2009). At present, cloud computing has become the core of the industry's hot technology and development.

MATERIALS AND METHODS

Training key technology analysis of training cloud laboratory:
Training cloud laboratory involves two core technologies: Food virtualization and load balancing, these two technologies to ensure reliable operation and dynamic expansion of the cloud Laboratory. Training food virtualization technology is the foundation of the cloud, mainly refers to computer and operating system Laboratory for food virtualization, including food virtual server, CPU food virtualization, food virtual memory and storage food virtualization. The so-called food virtualization refers to the logical representation of computational physics resources and out of the shackles of the physical media. Food 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 (Pengcheng, 2009). Food virtualization technology is implemented in cloud computing resource sharing of the core technology. Through food virtualization, users can easily access the server and storage resources, without having to specify a specific server and storage resources. For data centers, food virtualization technology to solve the dynamic data

center resource management issues. At the same time, food virtualization technology is very good to solve the problem of heterogeneous resources, it is possible to achieve real independence Laboratory. The system load balancing problem can be dynamically adjusted by remapping the food virtual machine to a physical machine. Due to these advantages of food virtualization technology, Cloud computing using the food virtualization technology to a single physical server food virtualization resources out several high performance general performance of the food 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.

Food virtualization model of training cloud laboratory: Generally, we can put a cloud-based training 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 food virtualization technology integration system, forming a food 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 food virtualization technology, after the training room in a variety of resources to achieve the future of food virtualization, the traditional physical host becomes food virtual machines in computing resources pool, users use telnet client terminal to
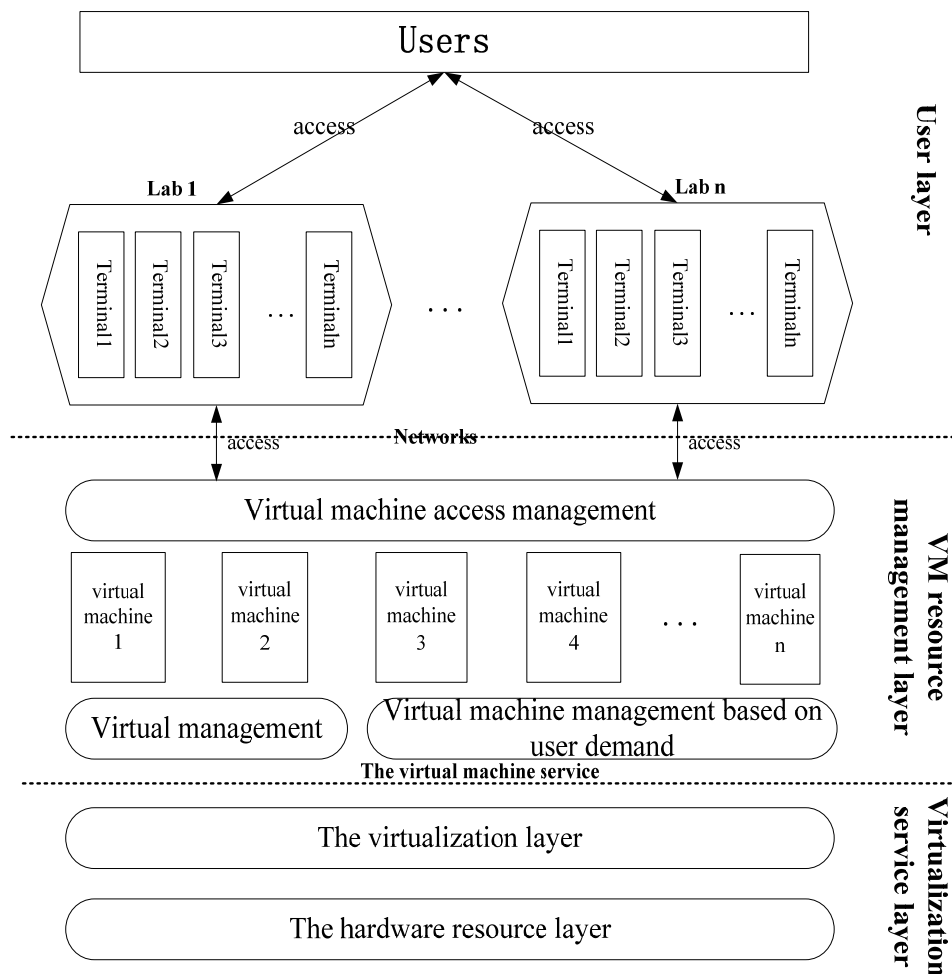

Fig. 1: The model of calculating resource pool

complete action on the food virtual machine, receive service support computer resource pool. Through the training room of the cloud environment food virtualized computing resource allocation, scheduling, management and other aspects of the analysis, formed the following food virtualized computing resource pool model, as shown in Fig. 1.

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

Food virtual machine resource management: consists of food virtual machines and related management systems (Whitaker *et al.*, 2001). This layer, based on the food virtual hardware resources to meet the huge demand of the food virtual machine will be created, under the management system to control concurrent processing data. At the same time, this layer bears on system food virtualization management, responsible for selecting the appropriate food virtual machine template generation and destroy food virtual machine basis for the demand; establish the mapping between the user terminal and the food virtual machine, realize the user access to a food virtual machine; solve the load balancing between servers, in order to meet the needs of students' food virtual training. According to the curriculum schedule of the course, time, location, class, number and other relevant factors, automatically generated to meet the needs of the food virtual machine configuration when preparation time before class, the food virtual machine is automatically destroyed after school. Thus, to achieve the needs of different courses, meet the practical Teaching needs of different courses.

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

RESULTS AND DISCUSSION

Dynamic migration framework: This paper studies the food virtual machine live migration of overall framework consists with migration run module, migration freeze module, migration listening module and wake the target domain module the interaction between several modules, function influence each other, common to complete the food virtual machine live migration process, as shown in Fig. 2.

Migration listener module: The main function of this module is to start the migration; the main work is to determine the migrated objects, when to migrate and where to migrate. Food Virtual Machine Monitor
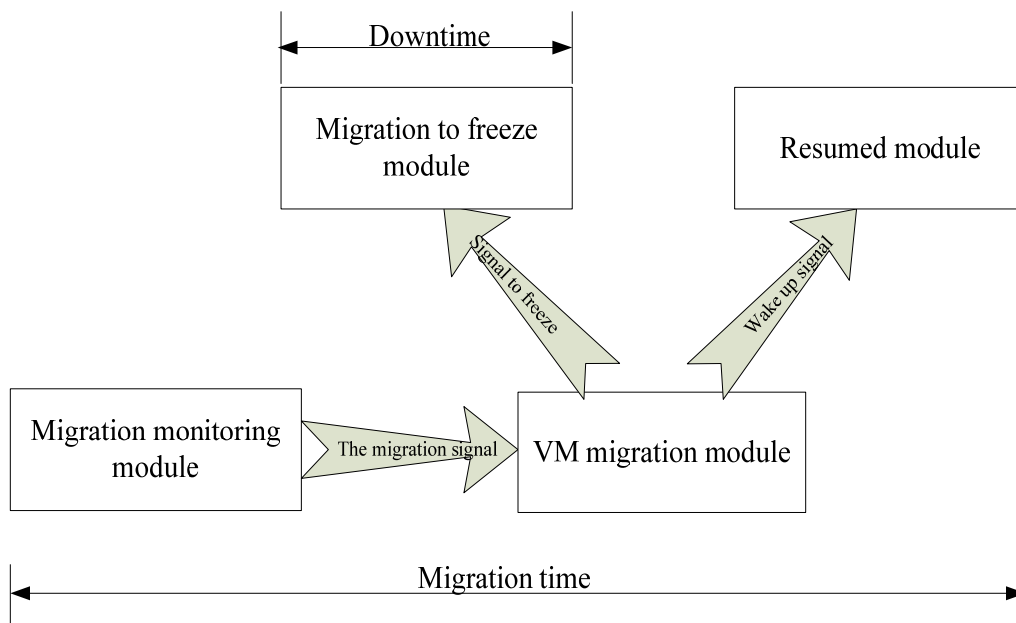

Fig. 2: The framework of VM live migration

(VMM) is responsible for managing all running food virtual Machines, if the operating system CPU utilization is too high or low memory, the need for food virtual machine migration, it will send a request to the VMM migration of signals, VMM on the managed device resource utilization, food virtual machine operation analysis to determine which food virtual machines to determine the migration and accepted by which devices are migrated food virtual machine, all the decision-making information to form a package to package submitted to the system, the system according to actual completion of follow-up.

Migration run modules: This module is primarily responsible for implementation of the migration process. This module is mainly completed work is as follows: the first step, migration listener module issues allow "Migration signal", meanwhile, collect migrate domain Q and the operation of the related domain information and to encapsulate collected information. The second step is freeze migration domain Q. The third step, enter the stage of "iterative pre copy". The fourth step is to enter the "copy down" phase. The fifth step, the copy is completed (Xinling, 2013). The sixth step, activate the target domain. Operation Migration is not only related to the module's total consumption of time and downtime, but also directly affects the performance of the target domain after the migration is complete.

Migration freeze modules: This module is the solution to freeze when migrating domain Q, as well as how to ensure the quality of service of the original system does not change after the freeze, the "continuity" of user services. Achieve migrating domain Q and the target domain D in sync. Wake target module: This module is used to determine the target domain wake-up time and settling time a new food virtual machine. But also to protect the wake-up, the migration field Q and the target domain D services in sync.

CONCLUSION

Each module can be developed independently and make cost reduction. The system built has high scalability and good interoperability of heterogeneous. There is no system solution for cloud computing which can support containers of a number of the food virtual machine vendors. So this paper studies has important practical significance to the food virtualization technology combined with cloud computing technology to improve resource utilization and reduce IT costs. Test results show that the food virtualized resources Laboratory based on cloud computing environment implemented in this study has certain performance advantages compared with the others. This laid the foundation for further study of the food virtualized resources Laboratory based on cloud computing environment.

REFERENCES

Aiken, S., D. Grunwald, A.R. Pleszkun and J. Willeke, 2003. A performance analysis of the iSCSI protocol. Proceeding of the 20th IEEE/11th NASA Goddard Conference on Mass Storage Systems and Technologies (MSST), pp: 123-134.

Pengcheng, L., 2009. Research on cloud food virtual machine live migration. Fudan University, Shanghai.

Whitaker, A., M. Shaw and S. Gribble, 2001. Denali: Lightweight virtual machines for distributed and networked applications. Technical Report, University of Washington.

Xinling, Z., 2013. Performance of cloud computing Laboratory food virtualization software GUIDE.11. pp:1-6.

Zhang, Y.S.Z., 2009. Virtualization technology for trustworthy network research. Chinese J. Comput., 32(3): 417-423.