

The Management of Computer Room Research based on VMware Virtual Machine Technology

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Abstract—Experiments in the computer teaching process often need to use a number of operating systems, which often destroys the computer room in common operating system. Maintenance of the engine room has brought some difficulties. If the traditional experiments build a virtual experimental platform to complete on the basis of virtual machine technology, it cannot only improve the use of the engine room, but also can release the administrator from the tedious maintenance work. Therefore, it has important practical value.

Keywords-Virtual machine; virtual experiment platform; computer room management

I. INTRODUCTION

Virtual machine technology appeared in the last century 60's. At that time the virtual machine technology has been widely studied and applied in order to improve the utilization of precious computing resources to promote. To the (80 and 90's) multi task and multi-user operating system popularity and the decline of the hardware cost, so that the machine technology virtual cannot display its advantages. So people have cooled their research on it. By the beginning of this century, how to reduce system cost, improve system resource utilization, reduce management costs, improve security and reliability and improve the efficiency of software development, are becoming more and more important which makes virtual machine technology becomes the focus on computer technology research[1]. Here's a virtual machine system virtual machine based on instruction system abstract interface ISA, different from the application program interface ABI. It is achieved(Virtual machine monitor) to add a virtual layer on the existing platform, bare metal or the operating system.

The so-called virtual machine is virtual computer[2]. There are many types of virtual machine, a virtual machine software can be a part of a computer to take out a number of hard drives and a number of machines, each machine can run a separate operating system without interference, each of these machines have their own independent COMS hard drive and operating system. A common machine can be used to partition the "format" of the installation system and application software. It can also be a network of these operating systems. After the crash of the virtual system it can be directly removed without the sound of the machine system. Similarly, the crash of the aircraft system does not affect the virtual system. It can be used in the next reload

after adding virtual system. These characteristics of the virtual machine can provide a great experimental environment for the application of computer teaching.

II. PRESENT SITUATION OF UNIVERSITY COMPUTER CENTER ROOM

At present, the scale of enrollment in colleges and universities of China is increasing, and the investment of teaching funds can not meet the needs of practical teaching[3].

Due to the expansion of the scale of the students, the computer room increased from 600 to more than 2000 units in the last three years, which makes the machine room of the machine is not only be used in the most advanced P4 model but also can use 486 compatible with pure DOS.

Limited experimental technicians and management personnel. The experimental preparation is relatively tight for many years cause the lack of laboratory technicians relatively, experimental tasks, education level of laboratory technicians working time is relatively long, relatively workload, all makes the experimental equipment cannot be effectively used[4]! My school computer room experimental technology and management personnel with 16 people management who are located in four floors of the building 14 room more than 2000 computers open every day for 13 hours, (8 a.m. to 9 p.m.) assuming all students computer knowledge and professional courses from two, three level It also take the task of non professional computer grade examination. It is very heavy for the staff to cope with !

Some of the computer system maintenance experiments such as disk partition, format, installation and operation system, system backup and recovery, and so on[5]. Due to the disk of destructive test, to worry about the damage of hardware equipment, teachers often take classroom demonstration or speaking in leveling teaching!

Windows server maintenance and management of the RAID technology experiments, multi machine interconnected routing experiments, teachers can only explain the theory to explain, cannot be demonstrated in the classroom, so students are unable to further deepen understanding through experiments!

Computer network experiments, such as the formation of local area network, network configuration and management, FTP, IIS, Telnet and other network services configuration, remote access and routing settings, etc.. this kind of experiments need to use multiple computers and a

variety of devices, but the existing teaching conditions are limited, resulting in students on completion of the course cannot solve practical problems! In fact, various problems in the above mentioned computer practice teaching can in a certain extent can alleviate or be solved through VMware virtual machine technology[6]. As depicted in Fig. 1.

III. USING VMWARE VIRTUAL MACHINE TO CARRY OUT SYSTEM INSTALLATION EXPERIMENT

A. *VMware The main features of the virtual machine are as follows:*

Using virtual machine technology can virtual out more than a number of virtual computer Virtual machine used in the physical computer as independent PC machine, You can install a different operating system, these virtual computers can run and run concurrently, each virtual machine, between the virtual machine and the host computer can also be dialogue file sharing application of network resources, and can run in C/S[7].

The hardware of the virtual machine is the standard hardware. Driver hardware inconsistencies due to compatibility problems or to find problems. In the primary system virtual hardware are alike can be simply between different host replication directly use 'without consideration of the hardware differences so any damage caused in the experiment of the virtual machine can get rapid recovery.

Virtual hard drives are actually one or more files' virtual. The machine has the characteristics of fast recovery, and has the function of keeping the system state and reducing system. The virtual machine system and the host system have good isolation. On the virtual machine to the existing host of hard disk partition and data will not make any impact[8].

Because the hardware of the virtual machine is virtual, so that scalability is flexible and can be added or deleted at any hardware!

As the virtual machine hardware is standard hardware installed on the virtual machine operating system.

It can not only be cloned into another virtual machine but also can be cloned into a virtual machine on the same physical computer or even a system on virtual machine!

B. *Introduction to virtual machine software VMwar*

Workstation VMwar is a virtual machine software produced by VMwar. It can be used to simulate a number of machines on a computer. The virtual machine has its own independent operating system, CPU, hard disk, memory and other hardware. The same machine can be used as the same as the ordinary machine! The "grid" installation system and application software for them are not affected by the operation of the software and all of these operations. VMwar virtual machine is the biggest feature which is no need to restart the machine and can run multiple operating systems on a computer. This is different with the installation of operating system on the same machine PC. PC on a multi operating system installed on the 'at any one time' can only run one of the system. To switch to another system, the machine must be restarted. In the virtual machine environment, multiple operating systems can run simultaneously. People can switch back and forth between multiple operating systems with the

standard Windows application without restarting the machine. The most noteworthy is the VMwar: powerful network functions can be connected with a number of virtual machines, the formation of a local area network. The behavior of the network is completely consistent with the real network, and it is not to worry about damage to the virtual network card and the virtual switch. As depicted in Figure 1.

IV. APPLICATION OF VIRTUAL MACHINE IN THE MANAGEMENT COMPUTER ROOM

A. *experiment of Computer maintenance*

School room is for the whole school students' public, by the special room management personnel management, unified installation necessary software. Students on the machine when a person, not allow students to install the software, but do not allow students to the hard disk partition, format and install the operating system and set up BIOS. Because these operations will change or even destroy the computer system may make the computer work improperly. Teachers are also difficult to demonstrate in the field, because the operation of the calculation is also common[9]. Teachers and students can use virtual machine to carry out these destructive operations, to ensure the normal operation of the host system, but also to ensure the smooth completion of the experiment. As depicted in Fig. 2.

B. *The experiment of computer network*

In order to meet the general requirements of the public computer room, application software are installed only in necessary. Computer network experiments need to set up a certain computer to install the appropriate software, and some settings or software installation need to restart the computer. In order to prevent the system from being damaged, guarantee the normal teaching, manage and maintain the computer room easily. Because the system has a reduction card, once the restart, the machine will be restored to the initial state before the setting, unable to complete the user's requirements. In addition, computer network experiment requires a variety of computer equipment, the use of virtual machine can be on a computer, a number of virtual machines, and to virtual out such as switches, network cards and other equipment, to meet the needs of the network. In a world of virtual machine, it can set up a network environment on a physical machine. Students can set up a working group in the virtual network, and based on the local area network, and on the basis of DNS, FTP, Web server, mail server, DHCP server, streaming media server and other servers. According to the characteristics of the virtual machine it can delete the hardware and the hard disk of the virtual machine can be set up without a network. There are some virtual machines in the virtual network as a server, some virtual machines as a client, so that students from the middle school to the configuration of the server, can understanding of the network principle more fully and understand what is a server workstation, what is the peer-to-peer work mode, t what is he client server model, and so on. Students can build up a network to meet certain conditions and applications on the virtual platform. An

experimental platform is created for students' design and innovation[10].

C. Network security experiment

With the development and popularization of Internet, the network virus is also more and more popular. Computer network security courses are very important, and teachers teaching in the computer virus, Trojans, and so on only stay at the stage of the story. Using virtual machine can change the situation. The virus file can be implanted in the virtual machine system to carry out the system attack experiment, as well as the operation of the security defense. To make students be more intuitive understanding of the system's security and defense technology, in order to achieve the purpose of the consolidation and improvement of knowledge.

D. Software testing

Students written programs in the learning software design, web design and others need to test in a variety of environments (stand-alone environment, network environment, different browser version, etc.) and a variety of operating systems (XP Windows operating system, Windows2000 operating system, Linux, etc.). A virtual machine can be carried out easily and quickly.

E. Cluster construction

In order to meet the demand of high performance computer, parallel computer has become an important direction of computer development. The understanding and

use of parallel computers have become an important content in computer teaching. Under the virtual environment, the operation and construction of the PC cluster are basically the same as the operation of the virtual machine network teaching environment. Only need to install parallel computing software PVM on each virtual machine to run PVM on the virtual machine and execute the related commands. As depicted in Fig. 3

V. CONCLUSION

The application of virtual machine technology in computer room management provides an effective means for computer teaching practice. Virtual machine experiment environment simulate the real environment well. The experimental effect on the virtual machine is equivalent to the experimental results which are finished in the real machine. In the virtual environment, students can carry out all kinds of experiments safely, without concern about the destruction of the host system. It can increase students' practice skills and increase the chance of practice. The construction of virtual experiment environment based on virtual machine technology cannot only alleviate the problems, improve the safety of experimental equipment, utilization rate and the difficulty of the laboratory management but also meet the requirement of the experiment course, ensure the normal production of the experimental class without adding hardware devices .

Figures and Tables

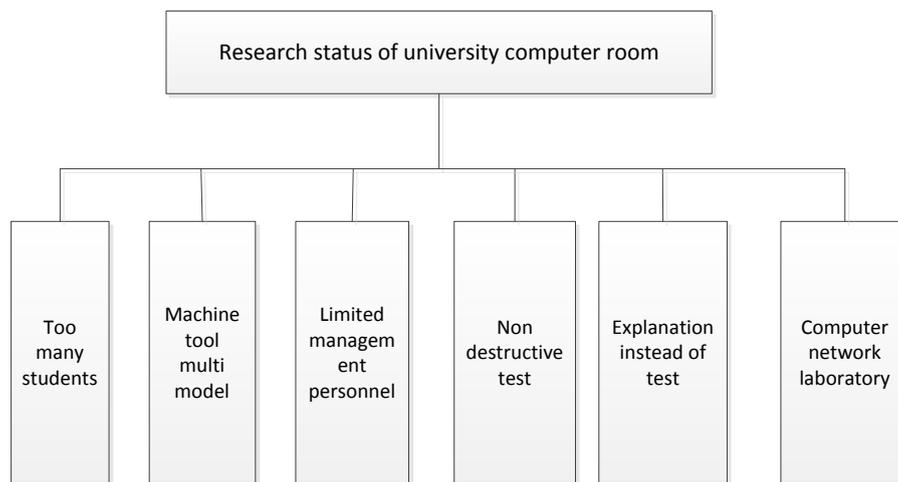


Figure 1. Domestic research status

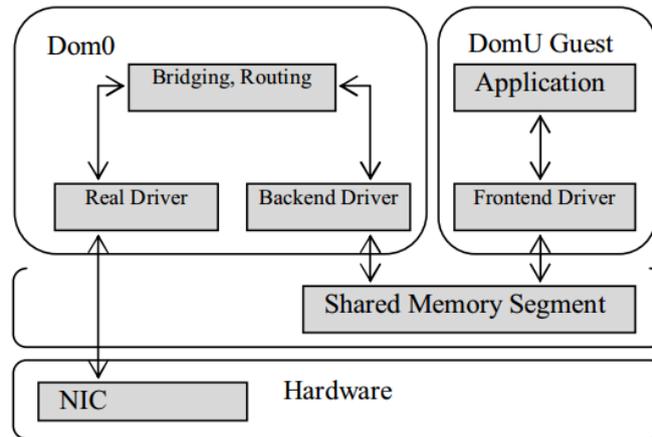


Figure 2. Typical networking path of an application running inside DomU in a Xen-based environment

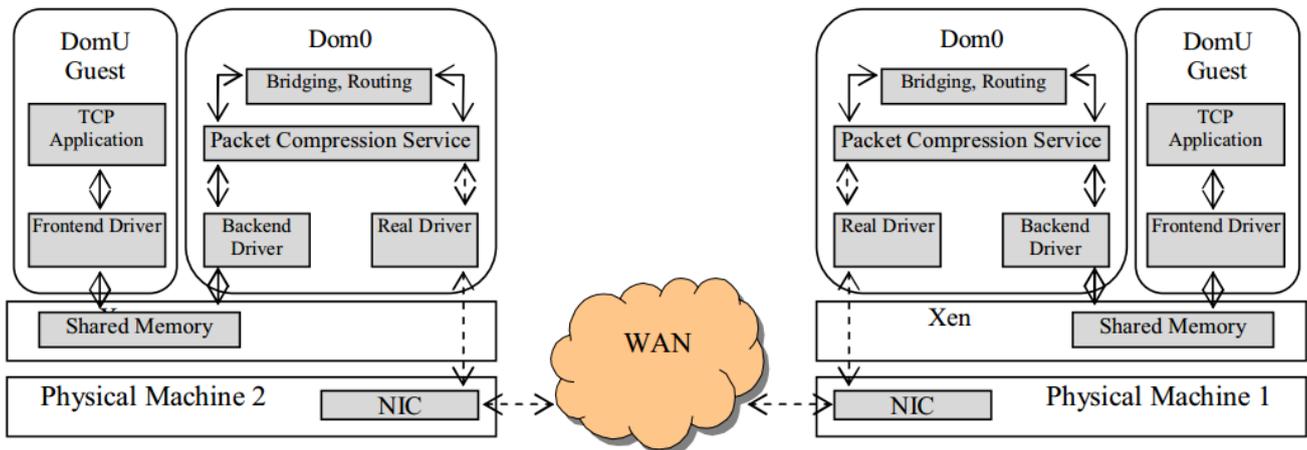


Figure 3. Packet compression network service installed inside Dom0 of two physical machines

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