Research on the Education Reform of Desktop Virtualization Teaching Based on Cloud Computing

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Abstract. Education informatization has entered the period of application transformation, and is gradually changing from building infrastructure platforms such as campus network to deepening application, so as to drive the development of modern education. This paper proposes to use the desktop virtualization teaching platform based on cloud computing to realize the rapid development of education informatization compared with the traditional PC application program with its features of low cost, high reliability, low maintenance, high security and flexibility.

Introduction

At present, education informatization has entered the period of application transformation, and is gradually changing from building infrastructure platforms such as campus network to deepening application, so as to drive the development and transformation of modern education. How to use the new generation of information technology to realize the rapid development of education informatization is a new challenge for education informatization construction. With the popularization of cloud computing technology and application, and the development of desktop virtualization, the application program of traditional PC has become more and more popular in education industry due to its features of low cost, high reliability, low maintenance, high security and flexibility.

In the industry of education, the use of cloud computing technology to build education cloud is to transform the current “teacher-centered” passive learning mode, as well as the “student-centered” active learning mode, integrate education resources and provide audiences that need education services by means of cloud computing. The education cloud is a highly integrated education ecosystem, a set of top-down integrated education solutions that require classification, hierarchical implementation, and management. Different users can apply for the corresponding software or application type to obtain the service according to their own requirements. For different users, education cloud is independent of each other. Private data of different users can only be seen by themselves. But physically it's integrated.

The construction of education cloud should start from the actual situation and start from the current problems. 1. Vertical application infrastructure and inefficient resource use: the traditional application based IT construction mode rapidly spreads using IT; Low work efficiency; Data center capacity is in crisis; The average efficiency of students' IT resources is about 30%. 2. Challenges in infrastructure management: decentralized and inconsistent management tools; Manual operation is easy to cause error; Maintenance staff load is high, the effect is not obvious, especially for the teaching PC management; 3. The traditional IT resource delivery process is complex and long: a large number of people are occupied and many manual operation steps are taken; Time is long and there are many fault points. 4. Mismatch between business demand and IT resource supply: excessive supply leads to resource waste; Lack of supply affects business performance.
The Benefits of Cloud-Based Platforms

Improve Teaching Quality Effectively

Advantages based on education cloud platform: change the current “teacher-centered” passive learning model to “student-centered” active learning model.

Currently the vast majority of school teaching and teachers taught in the form of PPT, not on the specific needs of each professional course provides students with the corresponding teaching scenarios (such as the computer foundation course impossible to give each student a clean bare machine to let the students make actual installed on the computer, the comprehensive experiment course in each major school when it is impossible to give every student 2) or more than two (2) computer experiment. After class, students can no longer study the unfinished homework or teaching content.

Desktop virtualization can set different teaching scenarios according to different courses. For example, the course of database application requires Windows XP system, and the teaching software needs VFP, etc. Then specific environment configuration can be set according to the specific course requirements, forming an independent teaching scenario of database application course. In class, the teacher only needs to use the course password to enter the corresponding course scene. Different course passwords correspond to different course scenarios, which is equivalent to starting a new computer. During the classroom teaching, students can be provided with multiple virtual machines according to the requirements of the course. The monitor is only used as a terminal for teaching. After class, students can still enter the corresponding course scenes in the dormitory or any place with network access and continue to complete homework or study. Using desktop virtualization can prepare students for different classrooms and classes with different operating systems and desktop environments (i.e., different course scenarios). According to the actual teaching situation, students can get a clean and complete new desktop when they log in for each class. Students can switch the operating system and operating environment at any time in class to achieve flexible teaching purposes. The functions such as the automatic introduction of class schedules and the automatic startup of class appointments allow the combination of desktop virtualization and teaching, greatly reducing the workload of administrators and improving the efficiency of teaching. The function of screen broadcasting and lock screen enables teachers to be more efficient in class. Screen broadcasting facilitates every student to clearly see the operation and detailed explanation of teachers. The function of screen lock enables students to only listen to lectures when listening to the teacher.

Efficient and Unified Management, Reduce the Intensity of Management Work

Desktop virtualization platform enables flexible rapid deployment and on-demand use by pooling desktop computing resources. For desktop deployment and distribution, administrators only need to make a mirror template at the admin desk, and then batch produce and start dozens or even hundreds of desktops with one key, and the whole process is only a few minutes. After resource pooling management, the desktop resource can be opened to students with special needs at a time of low resource utilization rate and charged by time, so as to make use of IT resources on demand and pay by use.

The platform integrates with the teaching, provides the introduction of the curriculum schedule, and makes an appointment to start up and shut down according to the curriculum schedule. The workload of IT management staff is greatly reduced. Administrators only need to enter the management console, create and adjust scheduled tasks as required, and then they can be handed over to the system for automatic execution. All an administrator needs to do is monitor and manage the entire running environment.

The application of desktop virtualization based on cloud computing technology centralizes the management and configuration of all the desktop to the data center. Such centralized management and configuration avoids the management difficulties and high cost of procurement and maintenance caused by the decentralization of terminals in traditional forms. Enable IT management and
maintenance personnel to adjust the deployment of the teaching environment at any time as required to simplify the configuration and use requirements of students and teachers clients.

In the traditional PC desktop environment, an administrator can only manage 100 desktop environments, while with the desktop virtualization platform, an administrator can easily manage more than 1,000 desktop environments. Greatly reduce IT management and maintenance costs and improve user satisfaction.

Administrator information according to the arrangement of curriculum teaching environment to create a desktop publishing program task, before the beginning of each class, the system automatically prepare the corresponding section of this course teaching environment (including the corresponding virtual desktops, applications and configuration) for the use of teachers and students, at the end of the course system automatically turn off the corresponding virtual desktop and effective implementation of the intelligent automation of IT teaching.

Simplify Terminal Equipment and Reduce Desktop Maintenance Costs

At present, the reduced-card system is adopted in all computer rooms of the school. There are some problems:

(1) hard disk memory, mouse and keyboard are easy to lose and damage;
(2) bad environment in machine room, overheating, dust and peculiar smell;
(3) the power consumption of computer is large, with an average of about 200w and 80 sets of about 16000w;
(4) the computer generates more heat and increases the power consumption of air conditioning
(5) the computer is updated at a fast speed, and it must be replaced within 5 years on average, otherwise it is difficult to meet the teaching requirements
(6) low computer reliability, frequent failures began to occur three years later, which affected the continuity of teaching, especially the machine room of luchong guan campus.
(7) it is very difficult to manage the computer. Even if there is restore card, it is still threatened by virus such as robot dog.
(8) the machine has little use value after being scrapped and can only be sold as waste.

As a way of cloud computing, desktop virtualization has greatly reduced the requirements on terminal devices. Various computing terminals can be used to access the desktop virtualization platform to obtain the virtual desktop for use. The desktop virtualization platform, based on the server computing architecture, greatly reduces the computing needs of front-end equipment, thus extending the service life of the original PC terminals. With the elimination of the old equipment, the display can be retained for use, saving a large amount of input cost of desktop terminals.

Centralized desktop and application management and maintenance enables IT department personnel to manage only a single instance of the operating system, applications, and configuration files in the background to deliver personalized desktops to all users while meeting the needs of different types of users, which can be optimized from flexibility to security.

The computer that is about to be phased out at Lu-Chong Guan campus of Guizhou University of finance and economics can use desktop virtualization to retain its display as the terminal for continuous use. Obsolete mainframe equipment can be provided to the information institute for use as a student hardware laboratory.

Desktop Virtualization Solutions

Overall Schema

Through the desktop virtual platform education (TDP) centralized deployment and release of user desktop, the whole post-architecture is the same as the traditional system deployment method, without any big changes, TDP desktop virtualization platform is deployed to the data center to provide virtual desktop services. Users can access the centrally published desktop teaching environment through the TDP client. The administrator manages the virtual machine image template,
user configuration and desktop operating environment through the virtualization management platform.

**Centralized and Unified Management**

Desktop virtualization platform education edition (TDP) centralized deployment patterns will be deployed in a virtual desktop environment performance strong data center, customer terminal handling only for display and operation, and the client and the server is located in the same local area network (LAN), thus fully improve desktop performance and security, users use any terminal through the network can access their virtual desktop environment, very convenient and flexible.

The school IT manager only needs to manage the software and hardware of the data center in the LAN to simplify the management and maintenance. The installation and configuration changes of the application can be centralized on the server side through the administrative console, which greatly simplifies the configuration and deployment of the office environment.

It usually takes more than 10 minutes to deploy 100 virtual desktop environments and 3 minutes to recover a virtual desktop from failure.

**Desktop Virtualization**

Desktop virtualization platform education (TDP) is an end-to-end desktop delivery solution for the education industry. The virtual desktop can be generated dynamically on demand, and according to the actual teaching situation, students can get a clean and new desktop with complete learning environment every time they login in class—thus ensuring that the performance will not decline. In addition, the efficient remote desktop transport protocol used by TDP provides unparalleled response speed and high-definition video playback in general network conditions. For the characteristics of school teaching, TDP can greatly simplify desktop life cycle management and significantly reduce IT total cost of ownership (TCO) by delivering different desktop operating systems, applications and user Settings, respectively.

Desktop virtualization platform education (TDP) can deliver desktops on demand for users anywhere, while significantly simplifying lifecycle management. It provides an end-to-end desktop delivery solution that accelerates desktop delivery for end users, provides greater data protection and monitoring, and reduces the cost of ownership by up to 40 per cent.

Desktop virtualization allows centralized desktop management in a data center and easy security and backup. However, the same life-cycle management issues that often occur persist—IT departments still need to manage, maintain, and update each virtual desktop image and the applications and user Settings IT installs.

**Store the Isolation and Remote Access Control**

Desktop virtualization platform for education (TDP) for each virtual desktop version provides a cloud drive, for each user assigned a cloud drive for user data storage, the user’s cloud drive is the user’s private storage space on the server side, the private file system, user is stored in the above data can be safety management and effective data backup, because cloud drive of TDP desktop virtualization platform generally stored in the cloud storage platform, can fully enjoy the cloud storage system and the high security and high performance of the benefits of infinite space.

The desktop virtualization platform education (TDP) virtual desktop provides VPN access for remote access. Meanwhile, because of the virtual desktop running server, TDP can effectively control the access of resources through the network control function of the platform.

**Implementation of Desktop Virtualization Based on Cloud Computing**

Cloud computing is a further encapsulation of data center virtualization. In cloud management software, you also need two (or more) different roles and different permissions for cloud administrators and regular users. Administrators have administrative authority over physical and virtual machines throughout the data center, but generally do not interfere with normal virtual
machines. Ordinary users can do virtual machine lifecycle management either by themselves via a browser or by writing programs to do virtual machine lifecycle management automatically via Web services.

At the cloud level, virtual machine lifecycle management is completely decentralized to real ordinary users, but it also shields concepts such as resource pools and physical machines from the perspective of ordinary users. Regular users can obtain computing resources without having to know anything about the physical resources behind them. On the surface, cloud computing seems to provide computing resources in a mode compatible with Amazon EC2/S3. In essence, cloud computing is a model of computing resource management that has changed so that end users can access and manage computing resources without the help of system administrators.

For cloud administrators, delegating virtual machine lifecycle management to end users does not reduce their workload. Instead, he has more headaches to deal with. In traditional IT architecture, an application is often equipped with a set of computing resources, and there is physical isolation between applications and problem diagnosis is relatively easy. After upgrading to cloud computing mode, multiple applications may share the same set of computing resources, and there is resource contention between applications, which makes the problem diagnosis relatively difficult. Therefore, cloud administrators often want to choose cloud computing management software that has relatively comprehensive data center virtualization management capabilities. For cloud administrators, vital functions include (1) monitoring, reporting, warning and accounting functions; (2) high availability, dynamic load balancing, backup and recovery, etc. And (3) dynamic migration can be used for local load adjustment and fault diagnosis.

Summary

Desktop virtualization solution is tailored specifically for education industry desktop virtualization solutions, not only can provide the industry general desktop virtualization capabilities, but also the school of education offers many teaching support functions, such as: schedule import, booking class functions such as automatic startup for desktop virtualization and the combination of teaching, greatly reduce the administrator's work burden, improve the efficiency of teaching; Screen radio, lock screen and other functions make teachers more efficient in class. Screen radio is convenient for everyone to clearly see the operation and detailed explanation of teachers. Using desktop virtual can prepare different operating systems and desktop environments for students in different classrooms and classes, and even allow students to switch operating systems and operating environments at any time during class, so as to achieve the purpose of flexible teaching.

References