The application and research of cloud platform in practice teaching integrated service

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Abstract. The paper introduces the characteristics of cloud desktop and cloud desktop system composition structure, including hardware structure and software structure, it can be done from cloud desktop functionality in the application of computer network laboratory is put forward.

1. Introduction
IT has become a basic condition to support the development of various industries. But in recent years, traditional IT office system is gradually exposed the poor safety, low operational efficiency, branch management, complex, and the cost is big shortcomings such as high energy consumption. According to the survey: 80% of security threats from within the enterprise, 60% for those who leave or fired when they leave carry enterprise data, the internal leakage has become the enterprise's leading cause of leakage of data; Second, when IT systems are large, often faced with operational task, equipment management, constructing the network, complex, high operational cost, while branches of cross-regional deployment and management more difficult. So it needs urgently to introduce new, advanced construction scheme, and nurtures the cloud desktop mode can meet this need [1].

2. The objective and significance of cloud platform
The use of cloud platform can form a closed loop of teaching feedback in the teaching process to highlight the teaching information of teachers and the learning effect of students. The third, it can realize the customized cultivation of talents and teach students according to their aptitude truly. It can realize the ecological construction of education and meet a social need, which is one of the main meanings of cloud platform; with the new engineering construction as the goal and the project education as the standard, the integrated service cloud platform for the integration of science and practice teaching will be finally built.

3. Features of the Cloud platform

3.1. Rapid deployment
The cloud platform can provide a variety of architectural patterns, and some software based on bare-machine automated installation, it can one-click deployment.
3.2. Provides end-to-end integrated desktop virtualization solutions
The cloud platform has perfect cloud computing products, including cloud terminal, desktop virtualization, virtualization software platform, cloud storage, etc. It provides customers with a comprehensive end-to-end desktop virtualization solution[2].

The client device can be used as a variety of operating system and configuration of hardware devices, including laptop, PC, smartphone, etc.

3.3. Provide a unified resource monitoring view
Cloud service platform provides cloud host, such as the kernel, memory, network monitoring view, run the systems for administrator or operations staff quotas such resources usage in the process of query and download the print. Make them understand the usage of the resources in the system platform, operation and quotas. Administrators can monitor resources in a unified interface. It includes cloud host number, type, operation, the virtual network of the network topology and so on.

3.4. Network Security Isolation
In order to meet the requirements of security isolation, users usually build multiple sets of networks, which are separated by different networks to ensure the security of internal networks. But it also brings a lot of inconvenience to our daily work, for example, some companies in order to prevent employees from the company data through the network, specifically set up several computers were all employees use the Internet, it will appear because of the complexity of their employees to use the Internet between staff may need to wait for each other, reduce the work efficiency.

Cloud platform by setting up a virtual network, virtual writers and setting fire wall, can easily solve the problem, it makes every employee has a virtual online machine, you can always use the Internet, and download the data to the local, but restricting local data can't be transferred to the virtual machine and the online, so you don't have to worry about data security issues. The cloud platform also supports dividing a physical LAN into multiple virtual local area networks, allowing different IP addresses to be assigned to different departments.

3.4.1. Support multicast capabilities
In the process of teaching or working, we usually use a user's desktop sharing for multiple users, such as company training or teacher’s lectures, we need to share the teacher's explanation process with students in real time, In the case of large Numbers of students, unicast mechanism will inevitably bring great pressure on the bandwidth and performance of the server, and the original virtualized desktop unicast push mechanism cannot meet the requirements. System can use multicast way pushed to many students, the teacher's desktop virtualization without their desktop, directly pushed to the students on the thin client. So, the network pressure becomes small, and students can't perform other operations, only can watch the push of the desktop.

3.4.2. Streaming video
Traditional thin client uses virtual machine soft decoding. It consumes virtual machine resources when playing, and causes great pressure on the server when playing concurrently. We can use video redirection technology, so that video is decoded in the thin client, so as to solve the video playback appeared stuck and occupied a large number of server resources.

3.4.3. Desktop portable office mode
In order to adapt to the trend of mobile information construction, desktop cloud solution can be safely and efficiently connected to the office desktop at any place through diversified terminal devices, so as to improve the work efficiency of employees. Administrators can view resource usage at any time.
3.4.4. **Energy saving and environmental protection, reduce the workload of deployment management**

Cloud platform virtualization is a kind of using cloud computing technology; create a new application mode of desktop operating system image template. It is different from traditional computer deployment. It can be used on the server according to user requirements and quantity allowed number of equipment, adopt cloud platform deployment way to use a computer, not only help users reduce the purchase cost of hardware, in promoting the user to the efficient use of computing resources at the same time, which can help the user to energy conservation and environmental protection, sharply reduce the deployment and management work. Cloud platform can maximize the use of server hardware computing resources, and share a desktop computing pressure to backend servers, prolong the service life of the cloud terminal, also promoted the server-side computing resources efficient use [3].

4. **Cloud platform system architecture**

The cloud platform consists of hardware and software components, and the underlying server virtualization architecture runs on a mature, stable, and efficient cluster platform. Users can log on to the cloud host of the cloud platform through the thin client.

4.1. **The hardware system**

The hardware deployment structure of cloud desktop is shown in fig.1.

![Figure 1. The structure of cloud desktop](image)

4.1.1. **Cloud service platform’s server**

Cloud service platform’s server using in1 master-slave backup mechanism, when the third cloud service platform server all normal work, because the three machines at the same time processing a message queue, thus improve the efficiency. When one of them cloud services platform server is damaged, the system will automatically play station server, and send the email to the administrator, shows that the station server fails, is advantageous to the administrator contact manufacturer to repair the fault in time. During the whole process of failure occurrence and repair, the data will not be lost due to the normal operation of the remaining two servers, nor will it affect the normal work or learning of users.

4.1.2. **Cloud component server**

The cloud platform will be calculated for the same server, network, storage, installation, and named cloud server component, using four SSD do raid 0 mode, increase the size of the storage at the same time, speed up the hard disk processing, improve the work efficiency [4]. And according to the
customer's demand for storage, add ordinary hard disk for LVM, and provide hard disk space for storage. A set of cloud service platform server can be corresponding to the set of cloud component server, through the way of additional amount of cloud component server, can achieve the goal of expanding cloud host number.

4.1.3. The thin client
As the terminal of desktop cloud, it has small volume, light weight, small power consumption, safe and reliable, portable and easy to use, green and energy-saving. Support multicast function, support red spider multimedia classroom teaching software, teaching demonstration, teachers can use red spider software screen monitor, a blank screen silence, synchronization, file transfer, submit homework, such as a remote command operation; Support smooth video playback, etc.

4.2. Software part
The software part mainly consists of the following parts:

4.2.1. Computational virtualization
Calculation module is the core of the cloud desktop module, is mainly responsible for various cloud host life cycle, responsible for cloud hosting the creation, startup, shutdown and hang, pause, reconstruction, edition, binding IP and termination of operations, and is responsible for the allocation of resources and scheduling.

4.2.2. Network virtualization
Network virtualization provides cloud desktop network connections to other function template, you can create a virtual network, virtual subnet, virtual routing, configure the DHCP operation, etc.

4.2.3. Storage virtualization
Storage virtualization provides a stable data block storage service for cloud hosts, provides additional disk space for virtual machines, and expands the capacity of cloud hosts. Create and delete the cloud hard disk, create cloud snapshot according to the cloud hard disk, mount, unload the cloud hard disk and other operations.

4.2.4. Image Management
Image management mainly manages the creation, deletion and other management operations of images and snapshots on the cloud desktop.

4.2.5. ID authentication
It can provide functions such as authentication, service rules, and service tokens.

5. Cloud platform function

5.1. system functions

5.1.1. Show an overview
The overview shows total quota availability and usage and cloud host usage. As shown in the figure below:
5.1.2. Mirror
Implement some operations and management of the image by the administrator; The page displays a list of information such as "mirror name," "type," "status," "public," "protected," "formatted," and "action."

Figure 3. The Mirror
The administrator can click the "create image" button to create the image. After clicking the button, a "create an image" page will pop up and the image name will be filled in the corresponding text box of "name". Some mirror information can be filled in the "description" for future use. Mirror image source selection in the "image source", a total of two kinds, one kind is "mirror" address, fill out the mirror in the url, another kind is the "image", select "image" is in the image file has a "browse" button, click the browse button and select the image file path. Choose the format of the image in "formatting". The common formats are "Raw" and "QCOW2". In the "architecture", it is not necessary to fill in the "minimum disk (GB)". In the "minimum disk", the minimum disk needed to generate the cloud host image is filled in GB. In "minimum memory (MB)", the minimum memory required to generate the cloud host for the image is filled in MB. The "public" option is optional or optional and is selected.

5.1.3. Access & security
This page displays four tabs: security group, key pair, floating IP, and access API. Security group in the system will provide a default security group, click on the "management rules" button, enter the "default" security group, the security group can be add, modify, and delete operations.

The key page displays key pair names, fingerprints, and action items that can be created, imported, deleted, and modified for key pair images.
Table 1. The Security group Settings page

| Directio n | Input Type | IP protocol | Port Range | long distance | action |
|------------|------------|-------------|------------|---------------|--------|
| Exit       | IPv4       | Any         | -          | 0.0.0.0/0 (CIDR) | delete |
| Entrance   | IPv6       | Any         | -          | /0 (CIDR)     | delete |
| Entrance   | IPv4       | Any         | -          | 0.0.0.0/0 (CIDR) | delete |
| Exit       | IPv6       | Any         | -          | /0 (CIDR)     | delete |

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5.2. The thin client function

The cloud platform provides two login modes. One is to log in to the local system, and users can log in to the teaching experiment system through the browser to participate in learning experiment system through the browser to participate in learning. The other is to log in to a remote Server, whose operating system supports more than 30 types of Windows Server 2003/2008, Windows 7, Windows XP, Centos, and Linux etc.

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