

The based on Cloud Computing Management Mode of Digital Language Lab

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Abstract

Cloud computing has been already widely used in many fields, as a novel information technology. Many web service companies provided their hardware, or some resources to organizations and netizens for online use. Cloud management based on cloud computing uses virtual machines or virtual desktops to manage resources that are restored in the certain server or the cloud. Language lab is important for assisting language teaching in many colleges, especially English teaching. How to efficiently manage language lab for improving teaching effects is the focus of many laboratory researchers. The finding of the study is that the cloud desktop (a kind of cloud management platform) is the first option for the staff to manage language labs. It is more convenient to share resources, install software, and get the data resorted in the server, compared with traditional management. Moreover, the utilization of cloud desktop has additional advantages of saving human labor and cost. The study also suggested that teaching effects would be improved fast when using the cloud management combined big data technology. Future studies are still needed to develop more function of the cloud desktop in language labs.

Keywords

Cloud computing; Cloud Management; Cloud desktop; Language Lab.

1. INTRODUCTION

In recent years, cloud computing has becoming the strategic focus in the development of information technology industry. Global information technology enterprises are transformed for cloud computing (Xu and Tian, 2019). Cloud computing, combined with network technology, can be widely used in many fields Big companies often provide cloud services (based on cloud computing technique) online called open cloud. Many companies and organizations have their own clouds in which local resources are stored for their own special services. Such clouds are called local cloud (Guo and Ma, 2015). There are also many branch cloud services in a local cloud for special use, such as teaching, administrative, logistics service and other services. The local cloud provides virtual server for these special usages. Such branch services may share data via the local network which is deployed in the same organization. It really has more advantages for storing data in the local server. Cloud Management, a kind of management modes, uses some softwares deployed in the server to manage local resources, like controlling a set of operating procedures to a certain server and clients (Ali, et al., 2020). In fact, this is like a platform on which an administrator can manage the server and clients. Cloud management is popular among many computer administrators because it provides easy operations and convenient management (Fang, Po Tso, et al., 2016). So, where there is a cloud service, there is a cloud management in a college department.

Furthermore, the cloud desktop, a kind of management softwares, rises in the market recently. Many small groups or companies have their own servers and use the cloud desktop to manage their affairs. In fact, cloud desktop is a combined technology that integrates cloud computing and virtual desktop technology for management of computers (Song, 2017). Computer administrators are provides a virtual desktop, a platform to manage the server and clients, which makes it easier for administrators to controls their computes and local clients which are in the local network, even if they sit at a table where is far away from the server. The cloud desktop also brings the big change for managing and maintaining some big computer rooms (Zhao, 2017). Now more and more colleges are considering the use of the cloud desktop to maintain and manage their language labs, where most hardware equipments are computers, switches and network cables.

College language laboratories are very important for language teaching. Such a laboratory can help teachers to achieve teaching goals by using some hardwares and softwares. It also facilitates students to improve listening, speaking, reading, writing, translating skills (Qin & He, 2015). Moreover, a college language lab is a public lab for all students who exercise their language skills and take a large number of language experiments and most important language national tests. Therefore, the language lab management is really more onerous and difficult work. The one side, a large number of hardwares need to be maintained and some software needs to be upgraded in time to match the requirements of language teaching. And the other side, the shortage of workers in the labs makes management more arduous and difficult. Many workers complain that the maintenance is overloaded and they almost work over 10 hours per day to guarantee normal language teaching next day. Now in big colleges, Language lab really needs an effective management mode for the teaching and the Cloud Desktop may give the management a new face.

2. METHODS

2.1. The Condition of Language Lab in NWAUFU

The Language Lab Center of Northwest A & F University (NWAUFU) is composed of 14 rooms for language teaching. These 14 rooms are divided into five different labs in our study. Two labs of them for English major students for exercises are called English Major Listening Labs, and one is simultaneous interpretation laboratory. Others are basic language labs for English online courses from other colleges students of NWAUFU. In addition, there are two conference rooms in the building. One is for small group meeting, such a small of number of teachers and students exercise speaking before their contests. The other is for a meeting of over 100 people, like all staff meeting, or for some large English contests. All these labs are located in the building of the Foreign Language Department. Because more than 10,000 students use labs for their language study per term, the lab occupancy is very high. There are more than 1,000 computers in the labs which are located on the first and second floor in the 7th teaching building. However, there are only three persons who work in the labs. The maintenance and management of the labs are really overloaded for the workers, especially for aged laboratory assistants. The traditional management mode of the language lab can hardly match teaching requirements under the condition of huge teaching burden and the shortage of human resource. Therefore, the school plans to buy a cloud desktop product for the language labs to improve management efficiency.

2.2. The Choice of the Cloud Desktop Product

There are many products of different cloud services on the market, like the Ali and Tengxun cloud. But the cloud desktop products are mainly supported by three technologies, such as VDI (Virtual Desktop Infrastructure), VOI (Virtual OS Infrastructure), and IDV (Intelligent Desktop Virtualization). The first two technologies are mature and the third one is still in development.

Many IT (information technology) companies have developed their cloud desktop products, such as Lingji, Jiangbo, Lange and Zhenglong. However, the administrator like the cloud desktop management product from lingji whose technologies are based on VOI. The following chart shows the different product features between VDI and VOI technologies.

Table 1. The comparison of product features between VOI and VDI

Item	VOI (Lingji)	VDI
Centralized management?	Yes. Easy managing.	Yes. Simple managing
Features	Buying terminal products with the server free	Buying the server with terminal products free
Performance	exclusive CPU, higher real-time GPU, hardware acceleration, clear pictures	Sharing CPU, lower real-time
Supporting Video/3D		Challenges of technology
Software compatibility	Good compatibility	Poor compatibility
network bandwidth occupation	Lower bandwidth occupation	higher bandwidth occupation and easy to jam
Suitable place	Language teaching	Handling small business

The conclusion from the Table 1 comparisons is that VOI technology is a good choice for language lab. It can match most requirements of language teaching for a college, but VDI cannot.

At last, we choose the Lingji VOI cloud desktop after comparing several products from different companies. It is more suitable for the language lab than others. There are three reasons for the decision. First, computers in the labs are not the same brand, or not be bought at the same time. Some of them are very outdated and bought 10 years ago. The operating systems installed on the computers are also different. Outdated computers are installed with windows XP, some are windows 7, and the others are windows 10. Furthermore, there are five different types of labs according to their functions which are mentioned above. It is a big problem to update or install the software and maintain the hardware under the traditional management mode with limited human resources. But the cloud desktop can simplify the updating and installation tasks by using the image of operating system on the server. Secondly, Lingji is a company whose main products serve digital language labs. And the company has more mature technology to develop compatible software with different operating systems installed in the hardware devices in language labs. It is good for serving language teaching, compared with other products from other companies that are mentioned above. The last reason is the cost and labor. Now there are only three laboratory assistants in our language labs because some assistants retired and some are resigned last year. One worker needs to maintain 4 or 5 computer rooms. Moreover, some outdated computers always have this or that problem from time to time. Limited assistants cannot finish too much tasks at the limited time. Traditional management mode cannot really meet the requirements of lab functioning. However, the cloud desktop can simplify the management and save the labor. Therefore, our university wants to buy Lingji cloud desktop for the language lab management.

2.3. The Deploy of Cloud Desktop

Before deploying the cloud desktop, some hardwares were bought, like the local server which is used for saving some databases and some operating system images. In order to match college's network speed, fiber optic switches are needed, one switch per room. Every student's

PC or terminal is connected with the switch, so does the teacher PC in every lab. The switch of the laboratory is connected with the main switch that is connected to the local server. The main switch is also connected to the network center of NWAUFU. We use the CAT6 network cables to replace older CAT5 cables for connecting hardware devices. In addition, we bought 400 new PCs for English listening teaching. The architecture of hardware deployment is shown in the figure 1.

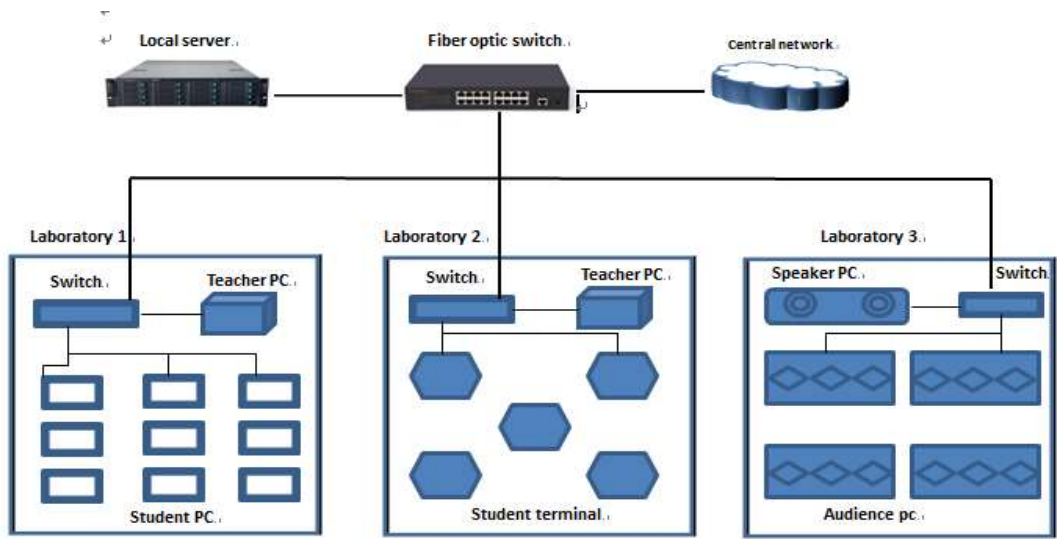


Figure 1. Hardware architecture of language labs

In The figure 1, there are several different function labs in the language lab center. The local server can communicate with all computers (also called clients) or terminals (clients) in labs via switches and cables. A client visits internet by Fiber optic switch (the main switch) that connecting to the central network of NWAUFU.

After the hardwares have been constructed, the Lingji cloud Desktop is ready for being deployed. It is composed of three main parts, Mysql databases, VEMSServer and VEMSmanager Web and these parts are installed on the local server in order. The minimum requirement of the server is an installed windows 2012 server, an operating system.

The overall system architecture of the Lingji cloud desktop is shown in figure 2.

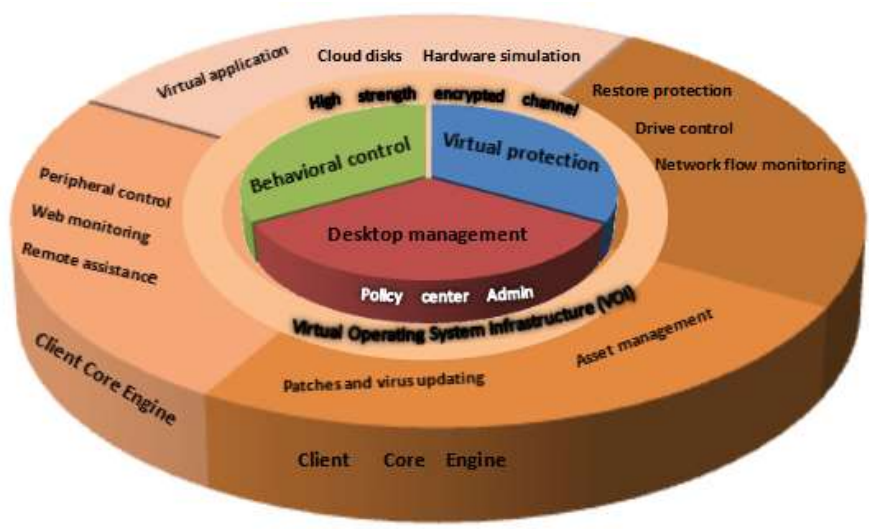


Figure 2. Overall architecture of the Lingji system

The core functions of the cloud desktop are virtual protection, behavioral control and desktop management. The module of the policy center administration may set some policies to realize high strength encrypted function and this function can protect the communication between client-client and client-server. The virtual operating system infrastructure (VOI) is like a platform on which administrators can manage all clients or the local server in any one of the PCs in any one of labs. On the platform, an administrator also can easily perform other functions. For example, they can manage resources saved in cloud disks, and realize hardware simulation and virtual application. Moreover, they can reset any one of computers in the local network, control the divers, and monitor the network flows. Similarly, a manager can use this platform to manage the asset and update patches and virus databases in time for the server and clients. A webmaster may also monitor the websites which students browse, check the condition of peripheral applications, and give a remote assistance on the platform.

In a word, the Lingji cloud desktop can match most requirements of language labs and realize the functions what language teaching needs. A highlighted function is simplifying the management of language labs.

3. RESULT

After deploying the Lingji cloud desktop, the following test was conducted and one administrator participated in the test, who works at the labs. Five of 12 labs were chosen to be tested. In the test, we mainly checked if the Lingji cloud desktop could reach the management requirements of labs.

Table 2. A List of the requirements are in a language lab

number	Requirements	Can it reach?
1	Deploying various operating system images	yes
2	Remote control of client resetting and turning on & off	yes
3	Installing software into various images easily	yes
4	High encryption for protecting resources in the server	yes
5	Simplifying the interface of management	yes
6	Virtualizing the server desktop on one client	yes
7	Easily controlling various clients of the different labs	yes
8	High-definition video (HD 1080p) playing smoothly	yes
9	Supporting software self-protection	yes
10	Clients are relatively independent.	yes
11	Supporting cross-network segment management	yes

400 clients from labs were chosen to test different management functions by using the cloud desktop for one month. During the test, one of the technicians deployed the cloud desktop in the local server and made several operating software images for multiple functions of the labs, including windows 7 and windows 10. Instead of installing the operating system on a certain client, he just used the cloud desktop with a click of the button, and all clients in the same labs will have the operating system. The procedure took about half an hour in order to deploy all clients and this saved a lot time, compared with the traditional management mode. Thus, high speed transmission and simple management are advantages of the cloud desktop.

After installing several language teaching softwares on the clients of the English major labs, a technician used one client to play a HD (1080p) movie saved in the local server. The pictures

were clear and smooth, so are playing 3D videos. Furthermore, during the test, the technician can turn on/off clients in any one of the labs, even if clients are placed in crossing network segment rooms. It really saves much more time for a technician to do others things. We test all items shown in Table 2. Fortunately, the cloud desktop completely met all the requirements. Moreover, the cloud desktop can be used for monitoring what the clients do, such as browsing websites, saving data, and playing game during the course. It makes it much easier for a technician or teacher to supervise what students in class. One other advantage of the Lingji cloud desktop is that all clients are independent from the local serve. That is to say, all clients can work normally and surf the internet even if the server is shut down.

At last, after the test, no assistants in language labs didn't like using the cloud desktop for management and maintenance of the labs.

4. CONCLUSION

The Lingli cloud desktop is a kind of management software which is mostly used in Language labs. It provides for administrators a platform to manage their local servers and clients. Based on cloud computing, it brings a big change for managing and maintaining the language labs. Before the cloud desktop was introduced to the labs, lab assistants complained there were too much heavy and difficult work in the labs, and they often took off-duty time to maintain the labs. While, now, their complaints become much less and heavy and difficult work becomes simple and easy. They think it can save their time and simplify the maintenance of labs. They really pull themselves out of much more work in the labs. For example, they needn't spent a lot time on updating patches of some software for all clients any more. They just need to open the website and click a certain button, and so, the software installation will automatically go on step by step in all clients at the same time, not like before, that is one client after another one client. And they don't worry about loss of some system resources and some software collapses because the cloud desktop has the function of software self-protection and self-restoration. Moreover, the assistants can also use the cloud desktop to check the usage conditions of clients. On the web, they can learn about which one is in good or bad condition, how many clients are out of use, and who is the hardware maintainer. However, during the test, we found the cloud desktop also has some disadvantages. For example, it is dependent on the network too much. If the network was in jam, many managements and teaching tasks couldn't go on. Furthermore, the cloud desktop only protects system disks, but not resources saved on non-system disks of clients.

In a word, the cloud desktop can really simplify the management of labs and absolutely save the human resources. Because the cloud desktop was first introduced into our labs and we just did a test, many other functions are still unknown and we would find them in the future. More studies are needed to test it. In the future for its usage in language labs.

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