

# Research and Practice of Characteristic Teaching Resources Sharing and Interactive Platform

Wu Yun  
Zhejiang University of Media and Communications  
Hangzhou, Zhejiang Province, 310018. China  
[yunwu@zjcm.edu.cn](mailto:yunwu@zjcm.edu.cn)



**ABSTRACT:** By using advanced cloud computing, virtualization and distributed video load balance technology, the paper constructs an interactive platform which shares the teaching resources. On the one hand it provides a beyond time and space, free and equal interactive teaching and learning platform for the teachers and students. On the other hand it offers teaching resources Networked storage, utilization, communication and show space. Dispersive resources will be classified automatically and integrated modularly in order to perform Characteristic and high-quality multimedia resource database and media teaching characteristic of material database.

## Categories and Subject Descriptors:

**I.2.6 [Learning]: K 3[Computers and Education]:** Computer-managed instruction

**General Terms:** Networked Learning, Multimedia database

**Keywords:** Characteristic Teaching Resource, Sharing, Interactive Platform

**Received:** 16 November 2011, Revised 5 January 2012, Accepted 12 January 2012

## 1. Introduction

University teaching resources which can be shared include teaching resources, high-quality course resources, network curriculum resources, teaching hardware facilities resources, books, literature and electronic information resources, etc.[1]. After a few years or even decades teaching practices and the different characteristics of running a school, the curriculum resources and the related resources produced in the teaching process become a rarely intellectual wealth which has obvious subject and professional characteristics.

Many scholars at home and abroad are studying how to share the open high quality teaching resources effectively, and how to achieve significant results [2-5]. Now, people

pay a lot of attention to the resources from teachers' teaching[6-8], but neglect the resources of course assignments and opus which are produced by learning process, and also neglect to collect, show, utilize, interflow and share the resources and have not form the interactive platform which is needed by these teaching resources.

This paper expounds the building and the realization of the special teaching resources sharing interactive platform combining with courses demo, case analysis, homework material, the contents reading after class, the handed homework which are emerged in the media professional teaching process. A great many multimedia form such as audio video, animation, figure, image, and operation on the treatment of these multimedia form file such as shooting, collection, draw, cutting, create, edit, storage, format conversion are related.

## 2. Design of the whole system

The system architecture includes both hardware and software. Hardware platform is the foundation of the whole system, its usability, reliability, expansibility and high-speed access is the most basic requirements.

### 2.1 The structure of hardware platform

By using virtualization, cloud computing and distributed video load balance technology, a cloud computing interactive hardware platform has been constructed. The main features include:

Double blade server chassis ;  
Unified storage framework: SAN+NAS+iSCSI; Front-end NAS double gateway clusters, rear-end disk array, double live redundancy controller; Double link 10 Gigabit network connections; No single point of failure. As shown in figure 1:

The whole disk storage is virtualized into a single storage pool. All volume astride all disks without disk hot, the increased disk can seamlessly add to the storage pool. The dynamic capacity allocation has eliminated the

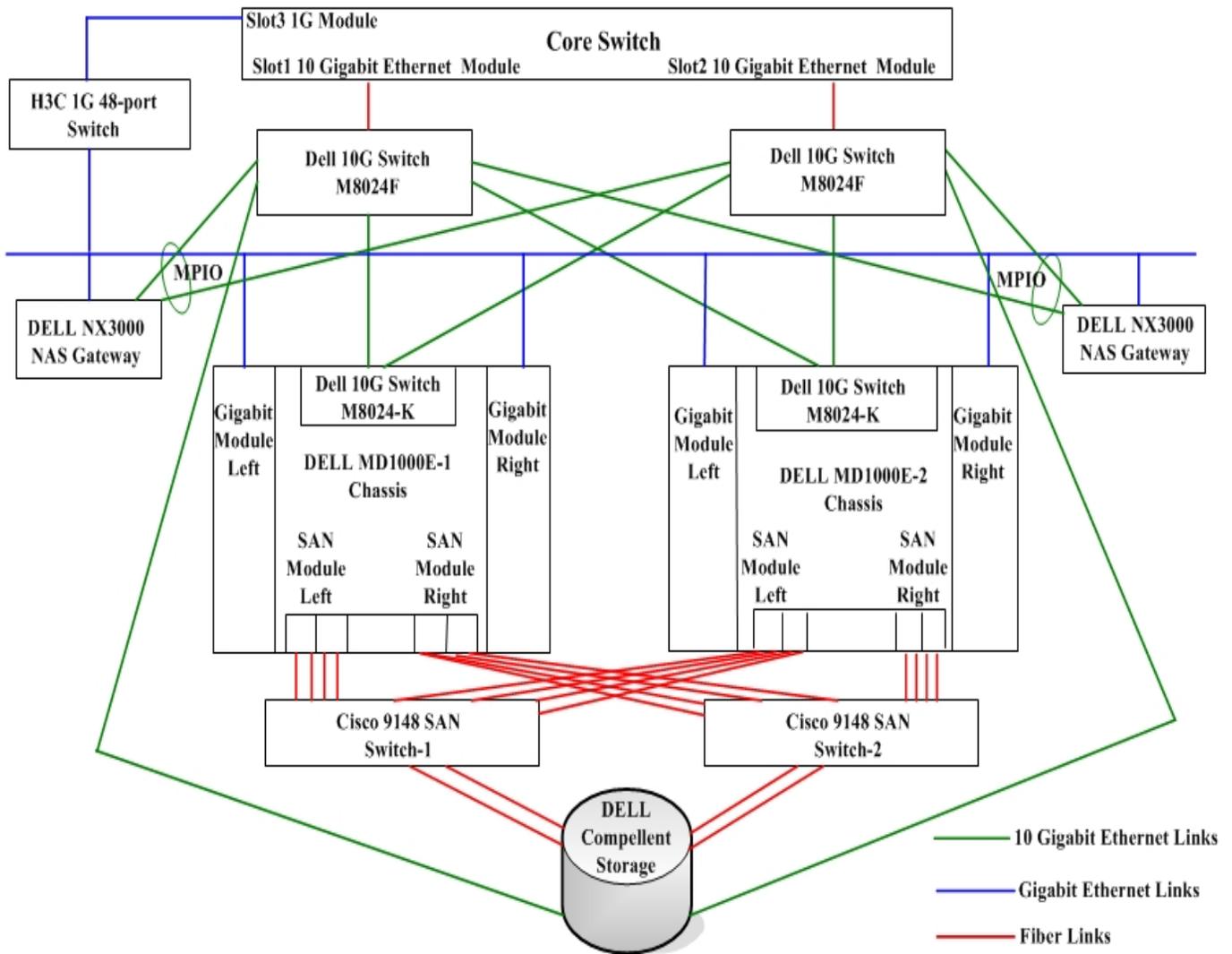


Figure 1. Hardware System Structure

reserved space which is needed in traditional storage configuration; it will be consumed only when the data is writing. While high reliable and efficient operation of the system is insured. As shown in figure 2:

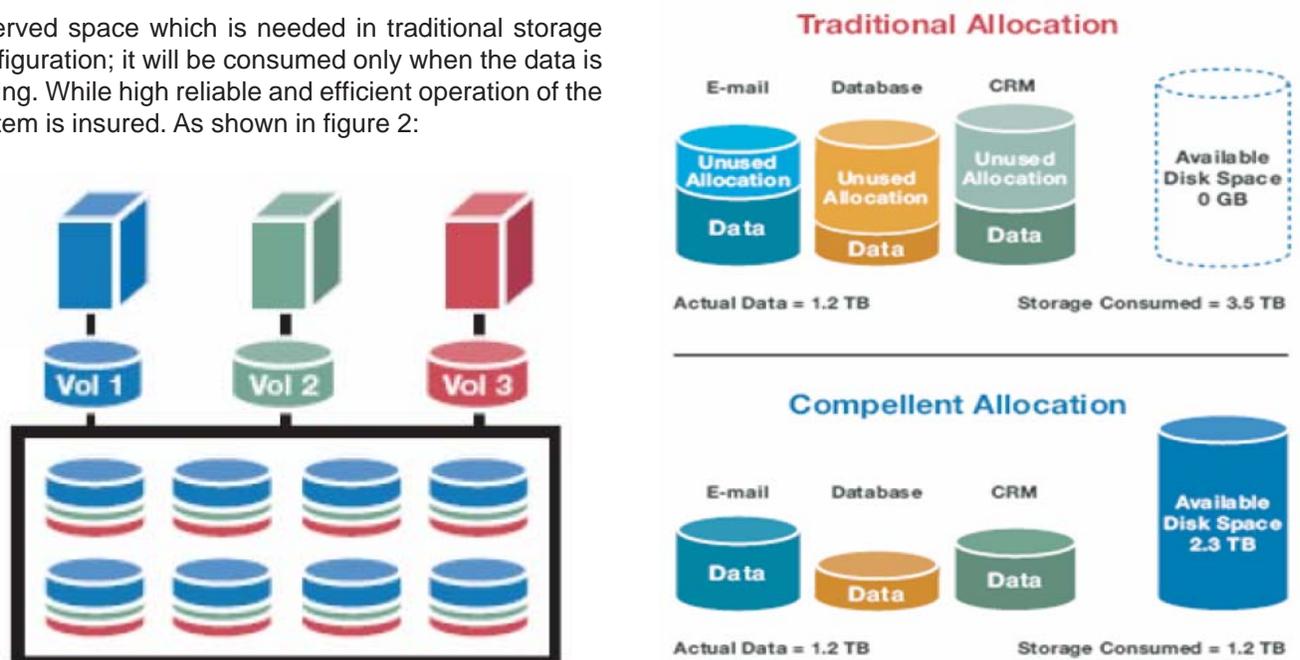


Figure 2. A Single Pool of Storage Resources and Thin Provisioning (Called Dynamic Capacity)

According to the scheduled rules, automatic hierarchical storage can transfer data automatically between different types of disks. The inactive data was automatically moved to the low layer of storage, while the visited frequently data is kept in a rapid storage. It guarantees a lot of inactive data work online and improve the storage function, as shown in figure 3:

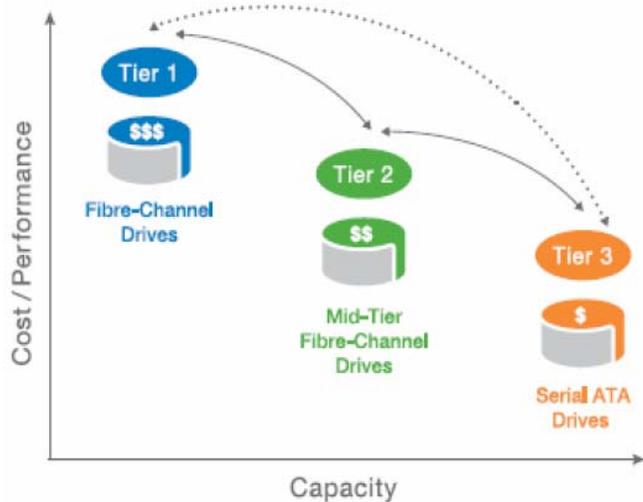


Figure 3. Automatic Tiered Storage

## 2.2 The structure of software platform

The teaching resources sharing interactive platform basically include the following modules: teaching resources management, teaching and learning management, interflow and evaluation, individual work space, system management.

1) Teaching resources management: It mainly is used to upload, class, audit, preview, retrieve, modify, delete, download resources, and to control access, display information, convert video format and so on. The most formats of video are supported and can be translated into FLV format by the system. The quality of the uploading video can be controlled by the parameters. Common definition, standard definition and high definition format are all allowed. The video also can be uploaded by client tool with interruption resuming capability. It can cut several pictures as alternative covers when video is being uploaded, and we can set the start time of screenshots.

2) The management of teaching and learning: it mainly realizes the function of network teaching and learning. Teacher can upload the teaching outline, the teaching requirement, teaching schedules, teaching content, the assignment, extracurricular learning referenced resources to the individual work space, and the format can be video, audio, PPT, animation, pictures, word, PDF, etc. These resources can be organized according to their own habits. The teacher authorizes visiting permissions to the students for learning by the way of anonymity, friend, password, username, etc. Students can study appointed content in the teacher authorized work space, and also can study network course and excellent course which is stored in the learning platform. They can watch excellent films on-

line which are claimed by profession, and complete the study requirements for recessive course, namely "read lots of books, watch lots of movies". They can submit assignments online which are the reviews about films and so on.

3) Interflow and evaluation: There are the powerful man-machine interaction functions in the platform, such as information query, message consulting, Internet survey, vote, to sign up, works review, etc.

4) Individual work space: Each of the teachers and students can have their own individual work space. In their individual work space, they can maintain their own information such as nicknames, head portrait, password and others. The teachers and students can add each other for good friend and can divide different friends into different categories. They can send others short messages for communication. They can view the latest updated information and visit and control the contents of the individual work space. They can upload their own course, homework and opus to their individual work spaces to display and communicate. Teachers and students can inaugurate blog. Each blog has a separate secondary domain name. The opus which is for exchanging and showing can be watermarked as a copyright protection. In order to avoid opus to be pirated copying the stickup are not allowed. It has those functions like writing journaling, making personal photo album and NetUSB. Groups can be formed which to be a teaching and research group, a school community, a class or other network virtual organizations. Each group would have their over corresponding role, such as the teacher in charge, the monitor and other class leader. The teachers and students can communicate, discuss and learn through groups. Content of individual working space can be submitted to the school resource center. It will have been set up a characteristic multimedia resource stock which consists of the teachers and students' all kinds of assignments and opus. A characteristic multimedia resource database and a material database which is needed by media teaching will have been set up by teachers and students' all kinds of assignments and opus.

5) System management, it includes user management function, system setting function and the analysis of the platform's use. It manages different users of the system, such as resource manager, the people who upload the resources, common registered users. Different users will be divided into different roles and be given different permissions. It has the complete authentication mechanism so as to ensure the security of the system. The system parameters, style and interface are set. It provides detailed analysis of the use condition in order to know the condition of platform using at any time. The user can know their own using condition at any time including login, uploading opus, the visitor volume of their own blog and rankings. The administrator can know the using condition of the whole platform including all user landing situation, using situation, uploading situation, the

highest visitor volume, resources uploading rankings, real-time operation situation of platform, the online user, the online playing number of a video users, the CPU resources consumption situation, etc.

### 3. The feature of system platform

The sharing interactive platform of media teaching resources carries a lot of interactive contents, such as audio and video, animation, pictures etc, including the use of teaching resources, materials, audio and video works, homework, excellent course, network curriculum and so on, It needs a lot of storage space, network bandwidth, the ability of video online playing, and the real-name system user management.

#### 3.1 The distributed video on demand system which has load balance function

The distributed video on demand system includes web server, database server and resources server. According to the number of users, it can decide either to share server equipment, or use multiple servers, and can increase the number of servers according to the needs. As a result of using the distributed services coordination technology, it can monitor and regulate users' request and data flow automatically, realize the server load balance function, so it no longer needs to deploy special load equilibrium equipment server or reduce the equipment investment and the complexity of the system, while under the premise of all the server performance balanced, it ensured the users access to video of fluency.

The client computers use the most popular flash broadcast way, which is only need to install flash plug in, while no special client player (h.264 coding mode), supporting common definition, standard definition and high definition, when the video played on, we can drag to any place, and do not need to wait for buffer, don't allow downloads save, support insert live text, spots, and other functions, to realize the notice and related information release in time.

#### 3.2 The personalized nickname and "all-in-one-card" real-name system user management

The real-name system is the necessary conditions to ensure the information authenticity and effective operation of education, teaching, management in the system. This system uses "all-in-one-card" as the media of management to connect the campus information system, to share information resources, to set up the real-name system quickly and to ensure the authenticity of name, picture, college, class, department and other basic information.

The user must use "all-in-one-card" account to register and login, but it can display the nickname. Students can hide their true identity to express their views, while the teacher don't know students' real name, so as not to have personal preferences to students scoring with a personal emotion, but the final statistical scores can be confirmed by contrasting with the students' real name in the system.

Through the background management, the administrator can view all users of information which include the user's nickname and "all-in-one-card" information corresponding relationship, and solve the contradictions between the user's real identity login and the personalized requirements of hidden nickname. In the hidden curriculum, the practical application about "read lots of books, watch lots of movies" achieved good results.

#### 3.3 Powerful media asset management

Multimedia content is the main information in the using, emergence, spread, display and exchange of the teaching process in media kind of professional, and it's wide varieties and huge quantity, such as sound, video, animation, pictures, image and text. It's mainly made up of the students' original homework, works, and teachers' needs of all kinds of media resources. This platform provides a powerful function to collect, upload, download, digital storage, catalogue, search, the new material transcending, and information release of these resources, and it provides a strong technical support for the building of the features high quality teaching resource and material database.

### 4. Application effect

#### 4.1 Change teaching mode, extend the teaching space, communicate everywhere

The platform provides online information, online learning, communication and interaction between teachers and students, students and students as well. By using all sorts of sharing resources and feedback information, it brings all the participants in teaching and learning into education process. According to the need of the curriculum, a teacher will organically compose all kinds of knowledge, information, resources, problem, and requirements to guide and inspire their innovation consciousness, stimulate the students' thinking and promote the students' independent study in practice, exploration in knowledge, expand the study thinking and learning vision, improve students' thirsty for knowledge and interest in study, make students learn happily, and make them feel happy in learning.

#### 4.2 Timely, objective, open and fair in tracking and testing the teaching effect

The teacher regularly organizes student's registration and group discussion, connects each student's study space, evaluates and records the learning process, mutual communication and homework in the network platform. The teacher realizes the dynamic network management for students' study process. Students will also pay close attention to the situation of teachers' space, whether teaching contents are updated, assignments are corrected; problems are timely replied and so on. Due to the students' supervision, the evaluation for students from teachers is more fair and justice. And the students can independently manage the learning process and effect through the space.

### 4.3 Form unique teaching resources and media material database

As the network space teaching process continue, using the effective storage and management mechanism to the resources, the platform will classify and collect the teaching resources, courseware, material, opus and operation in the hands of teachers and students and on the network automatically. It will form tens thousands of characteristic high-quality multimedia resources and media teaching characteristic material databases, and its role in resources sharing and the benefited range of teaching will be invaluable.

### 5. Acknowledgements

The authors thank editor-in-chief and anonymous reviewers for their comments and suggestions. The work is supported by Zhejiang Province Education Technology Research and Planning Issues (NO. 2011JB123).

### References

[1] Gao, Fengxiang(2011). Discussion on Teaching Resource Sharing of Institutions of Higher Learning and the Construction of Its Mechanism. *Journal of Xi'an Aero Technical College*, 29(4) Jul.

[2] Wang, Qin (2007). Discussion on Construction of Digital Instructional Resource Base in College. *Science and Technology Consulting Herald*. NO.21.

[3] Li, Yin., Liu, Youhua, Fang., Huang, (2009). A Construction Method of Service – oriented Learning Resource Sharing Framework, *Journal of Modern Information*, 29 (10) Oct.

[4] Keats, Derek(2009). The road to Free and Open Educational Resources at the University of the Western Cape: a personal and institutional journey. *Open Learning*, 24 (1) 47–55, February.

[5] Lefoe, G., Philip, R., O'Reilly, M., Parrish, D. (2009). Sharing quality resources for teaching and learning: a peer review model for the ALTC Exchange in Australia', *Australian Journal of Educational Technology*, 25 (1) 45-59.

[6] Okada, Alexandra., Connolly, Teresa, (2008). Designing Open Educational Resources through Knowledge Maps to enhance Meaningful learning. *International Journal of Learning Technology*, 15 (7) 209–220.

[7] Mikroyannidis, Alexander., Okada, Alexandra Teresa Connolly, (2011). Adapting and Sharing Open Educational Resources: A Social Networking Approach, *In: 2011 11th IEEE International Conference on Advanced Learning Technologies*.

[8] Jiang, Yong-ping., Xu., Du, Xu., Jing, Jiang Jiao-li, Huang Feng-ai, (2008). Establishing Shared Platform of Compositive Professional Resource for Supporting Independent Study of Learner, *Journal of UESTC (Social Science s Edition)*, 10 (2) Apr.