



Design and Development of Multimedia Educational Resource Sharing Platform Based on Cloud Technology

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Abstract. Using Web technology to build a multimedia education resource sharing system, and upload it to the SAE cloud platform, users can log in directly through the network client. The design and development of the multimedia educational resource sharing platform combines cloud technology, trying to integrate and redistribute multimedia educational resources, reducing resource storage and management costs, improving the efficiency and accuracy of resource search, and realizing resource sharing.. After testing, the platform works well and achieves the expected results, and can provide a technical reference for the development and implementation of other similar platforms.

Keywords: multimedia educational resources · cloud technology · SAE · sharing

1 Introduction

Multimedia education is a teaching method, which is implemented through teaching equipment such as projectors, audio equipment, and computers, in conjunction with teaching software. It uses the characteristics of multimedia pictures, texts, sounds and even images to create an ideal teaching environment. This environment is conducive to stimulating students' interest, deepening students' understanding and experience, and is conducive to the implementation of quality education. Based on the basic viewpoints published in educational technology magazines and educational multimedia and hypermedia world conferences in recent years, it can be seen that the current multimedia education is very closely related to network communication technology, simulation technology, and artificial intelligence technology. In multimedia education, resources are the precondition for the implementation of education. Multimedia educational resources refer to the general term of various systems, learning materials and environmental conditions that use multimedia to promote learning and support the whole process of learning and teaching. With the rapid development of information technology, the application of multimedia educational resources has become a topic that must be discussed in educational resources. At present, its current situation is that the application mode can no longer meet the needs of users. Storage becomes a problem etc. The emergence of cloud technology can eliminate the drawbacks in the process of applying multimedia educational resources.

Cloud technology is the product of the integration and development of traditional computer and network technologies such as distributed computing, parallel computing, utility computing, network storage, virtualization, and load balancing [8]. There are three types of cloud technologies. One is public cloud, which is owned and operated by third-party cloud vendors. The other is private cloud, which is only used for cloud computing resources by one enterprise or organization. A hybrid cloud is a combination of public and private clouds that allows data and applications to be shared between them. Cloud technology has the following advantages: low cost of technology development, unlimited access areas, and can be stopped at any time. It can be seen that the advantages of cloud technology just make up for the defects in the process of applying multimedia educational resources. Therefore, this paper believes that, in view of the defects in the application of multimedia educational resources, a multimedia educational resource sharing platform is developed by using Web technology and cloud technology, and the platform reflects the sharing, convenience, accuracy, stability and low efficiency of data acquisition. Cost characteristics.

2 Overview of Key Technologies

2.1 Web Technology

Web is an Internet-based service, that is, the process in which users run Web server programs through the network and obtain services, and the technologies for realizing Web services are collectively referred to as Web technologies. The formation of the web page is that according to the URL specified in the address bar of the browser, the web browser obtains information such as file resources from the web server, thereby displaying the web page. The client refers to the party that obtains server resources by sending requests, and the server refers to the party that responds to the client's request and provides resources. The web page formation process is shown in Fig. 1.

The B/S architecture adopted in this paper, that is, the Browser/Server (browser/server) architecture, is a new architecture generated by making corresponding improvements on the basis of the C/S architecture. B/S adopts three-tier architecture: client browser, application server and database system, as shown in Fig. 2. That is, the

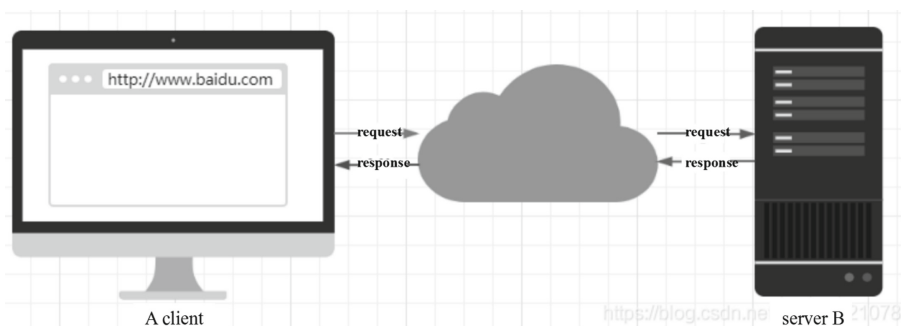


Fig. 1. Web page formation process

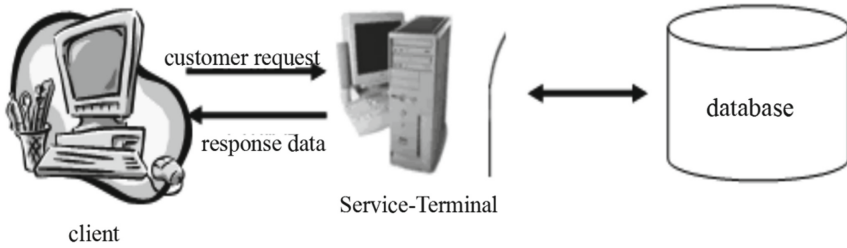


Fig. 2. B/S three-tier architecture

user sends a request to the server through the client, and the server returns to the client after calling the database. In this mode, users can make multiple requests to servers on the Internet through their browsers. Compared with the C/S mode, the B/S mode has the following advantages: it does not need to develop client software, which makes system maintenance and upgrade more convenient; it can operate across platforms, and the client only needs to install a browser; B/ Mode S has good openness and scalability; it can reduce network traffic and alleviate the broadband problem of the network.

2.2 Yii Framework

Yii is a component-based, high-performance PHP framework for developing large-scale web applications. Yii framework is one of the most efficient PHP frameworks. The advantage of the Yii framework is that it is easy to install; it allows to define aliases to simplify namespaces; it is highly extensible, and every component port on the framework can be extended; it can simplify unit testing and functional acceptance processes; its own security application components provide creation Approaches for more secure applications, such as generatePasswordHash, validatePassword, generateRandomKey; tools provided by the framework can shorten development time, such as Gii; better performance can be achieved by tuning, such as providing caching components to make applications run faster, And it also supports APC, Memcache, Redis, WinCache, XCache and Zend Data Cache caching. It is characterized by fast loading of functions, high security using standards, and professional development of clean and reusable code. Yii has all the features of current web application development, such as MVC, DAO, Active Record. It is suitable for developing all web applications.

2.3 PHP

PHP is a hypertext preprocessor, a general-purpose open-source scripting language, and one of the most used scripting languages for websites worldwide. Its syntax absorbs the characteristics of C language, java, and Perl, and is mainly suitable for the field of web development. Dynamic pages made with PHP have the following differences from other programming languages: First, PHP needs to embed programs into HTML files for execution, and its execution efficiency is higher than CGI; second, PHP can make the compiled code run smoothly faster. When PHP is writing code, it is necessary to pay attention to the use of half-width English for all code information; a semicolon needs

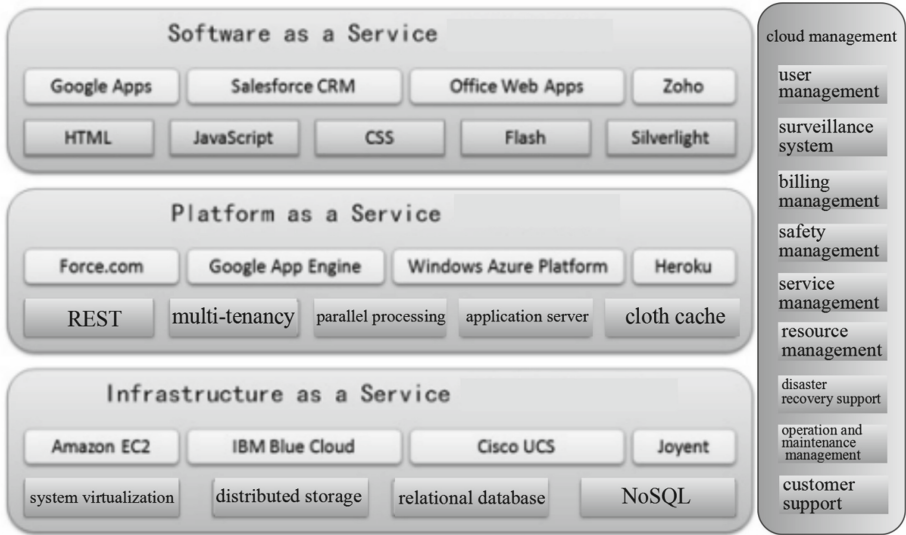


Fig. 3. Cloud technology architecture

to be added at the end of the last line of the code; when naming the file test.php, only half-width English is used, and Chinese, special symbols, add spaces, and be careful about capitalization.

2.4 Cloud Technology

Cloud technology is the product of the combination of distributed computing and computer network. The architecture of cloud technology is shown in Fig. 3. The architecture is divided into two parts: service and management. In terms of services, there are three service models: one is infrastructure as a service (IaaS), which provides users with resources such as underlying computing and storage; the other is software as a service (SaaS), which provides user applications, and This service can measure the amount and duration of resources used; the third is Platform as a Service (PaaS), which is a fusion model of the first two service models, that is, the developed applications and deployed platforms are provided to users [7]. In terms of management, cloud management ensures the normal operation of the entire cloud computing center and conducts effective management.

This article adopts the SA E cloud service provider based on PaaS.

2.5 Development Process

According to the use requirements of the above related technologies, the development and design of the multimedia educational resource sharing platform is completed. The platform adopts the B/S framework, selects Javascript and HTML as its design and development languages on the client side, the server is Apache2.4.2, the database MySQL5.5.27,

the development language is PHP5.5.0, and the Yii framework chooses Yii2.0.0 version, the development environment is under the Linux operating system for related operations. In the Linux environment, MySQL 5.5.27 needs to be installed first, and the database password needs to be set during the installation process. After the installation is successful, the database needs to be started; then install and start Apache2.4.2, and configure httpd.conf to make Apache support PHP, and then browse Enter localhost in the address of the server for access, and it shows that it works that the installation is successful; finally install PHP and configure it. In the PHP development environment, all local project files designed and developed by the system are packaged to form a War package, and uploaded to the SAE cloud through the Xshell software.

The cloud used in this article is the SAE cloud service provider based on PaaS. The advantage of the SAE platform is that it supports multiple languages, such as PHP, Python, and Java. Its usage mode is to upload the locally developed code to the SAE environment. The SAE side provides the running environment and storage space for the code, and also provides storage, Computing, auxiliary, expansion and other services [4].

Through the introduction of the above key technical theories, the overall environment of the system development and the relevant software conditions are determined, and the technical feasibility of the platform is also clarified.

3 Demand Analysis

3.1 System Requirements Analysis

The application requirements of multimedia educational resources are expounded from three perspectives. The first functional requirement is the content, that is, the aggregate of information presented by the platform. The content here mainly refers to the text, numbers and data information of the multimedia education sharing platform. The function of the multimedia education sharing platform is to meet the needs of users for knowledge by designing these information. For example, users can quickly and accurately find information and achieve the purpose of information exchange. In addition, the content of the information also needs to achieve the effect of being available to anyone. That is, to realize the function of information sharing. The specific function description is that any user can enter the platform to learn, understand the relevant information of the course to review and consolidate the teaching content, such as the syllabus, teaching difficulties. And any user conduct exchanges and discussions. The second is the interface requirement. The multimedia education sharing platform not only meets the requirement that users can quickly and accurately find information, but also provides users with a rich visual experience. For example, multimedia elements such as images, text, videos and animations are unified in form and content. The third is technical demand, which needs to use technology to reduce the cost of information storage and management, and to keep the information in a stable state [9].

3.2 Overall Design

This article is based on the B/S architecture, using cloud technology, and combining the ThinkPHP framework to build a multimedia educational resource sharing platform.

The overall design of the platform consists of three major blocks, namely the application layer, the business control layer and the data service layer. The relationship between these three layers is that the business layer receives the command, uses the SQL language to send the command to the data service layer, and after the data service layer processes the information, it feeds the information back to the user. Users enter the homepage of the platform by logging in. The main functions of the homepage include system management, resource management, shared space, and interactive communication. Users can enter the function module by clicking, query resources or related information, and exit the window directly after learning [2]. The design of the platform not only achieves the goals of searching, communicating and sharing resources, but also improves the user experience. In addition, the multimedia education resource sharing platform is uploaded to the SAE cloud to reduce resource storage and management costs.

4 Design Implementation

This part mainly explains the functional modules of the business layer and the data service layer in detail.

4.1 Business Layer

There are four functional modules in the business layer, as shown in Fig. 4.

System management includes four parts: user management, system settings, login management and operation log management. User management refers to user information management; system settings include system hardware, software settings, function settings, etc.; login management includes user registration, user login, user logout (logout), user password modification, user password retrieval, and user mailboxes Modified content; Operation log management is to record and manage various operations

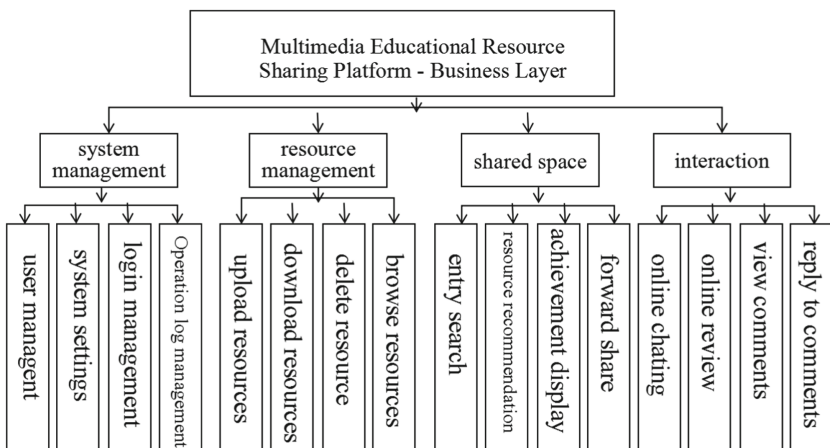


Fig. 4. Multimedia Education Sharing Platform - Business Layer Functional Module Diagram

after users log in to the platform [10]. The function realization for system management needs to be realized by technologies such as dynamic page technology.

The sub-modules of resource management include uploading, downloading, deleting and browsing resources. The function of this part is that users can upload, download, delete and browse any resource according to their own needs, and the realization of the function needs to be completed by PHP technology. This module plays the role of storage. [3]

The shared space module solves the inconvenient application of multimedia educational resources, such as data sharing and quick query resources. The shared space involves a total of four sub-module functions, such as entry retrieval, resource recommendation, achievement display, and forwarding and sharing. The entry retrieval needs to use the meta tag to realize the function, and the meta tag involves the HTTP-EQUIV and NAME variables. HTTP-EQUIV is similar to the HTTP protocol. The content is more accurate. Commonly used HTTP-EQUIV types are expires (duration), Pragma (cach mode), Refresh (refresh), Set-Cookie (cookie setting), Window-target (setting of the display window) and Content-Type (Display character set settings). The NAME variable refers to the grammatical format of the variable. The operation process of entry retrieval is to search for keywords under this module, and to retrieve multimedia resources related to keywords uploaded by other users in the cloud storage space. What needs to be noted here is that you must memorize the meta tags of Keywords and description, so that you can quickly find information. Resource recommendation is divided into two parts. One is to automatically recommend related resources according to the user's habit of searching for resources. For example, most of the resources used by users on the platform are English subjects. When recommending resources, English-related resources will be recommended. Resources, and the second is to make recommendations based on network hotspots. Here it is by utilizing web crawling technology to filter content. The achievement display is the user's feedback after using the platform, such as the evaluation of multimedia resources and the evaluation of platform modules. Forwarding and sharing means that users can forward and share resources on the platform to their friends. [6]

The functions of the interactive communication module include online comments, online comments, viewing comments and replying comments. This part reflects the characteristics of full exchange of information. The commenting function of this section is implemented through database storage. Specifically, the database table `t_comment` is created to store the comment database, and then a single table `t_comments` is created to store the ID and content of the comment, and the comments can be deleted and viewed by using `t_comments`. Figure 5 is a code map to view all comments.

4.2 Data Service Layer

The function of the data service layer involves two parts, namely the mathematical resource pool and the virtualization resource pool. The math resource pool can also be referred to as the digital resource pool. The digital resource pool utilizes the method of enca psulation processing, in which the independent unit module is the content of media resources, teaching courseware and so on. The teaching resource pool is designed based on MySQL, which puts teaching information in a space that can be expanded at

```
@GetMapping("/comments")
public String comments(@PageableDefault(size=10, sort = {"id"}, direction=
Sort.Direction.DESC) Pageable pageable, Model model) {
    model.addAttribute("page", commentsService.listComments(pageable));
    Return "admin/comments";
}
```

Fig. 5. Code diagram for viewing all comments

any time. MySQL is a relational database management system. It mainly relies on SQL statements to achieve various functions. SQL statements include DQL (Data Query Language), DML (Data Manipulation Language), DDL (Data Definition Language), TCL (Things) Control language) and DCL (data control language), the functions that can be realized are query, sorting, multi-line processing functions, etc. MySQL database has the following characteristics: atomicity, consistency, isolation and durability. Its features and advantages are: stable service, rarely downtime; open source code without copyright, low cost of use; small size, easy installation, easy maintenance; support for multiple development languages, especially PHP language [1].

The virtualized resource pool uses VMware technology to obtain the resources of the resource pool at the bottom, and saves energy and improves the utilization rate of equipment resources through the resources in the virtual math resource pool, which reduces the development and management costs [5].

5 Conclusions

The multimedia educational resource sharing platform constructed in this paper is to first develop a resource sharing platform, and then package and compress the software involved in the platform and upload it to SAE. Therefore, the main work of this paper is the design and development of the framework and functions of the entire platform. One of the advantages is that the platform satisfies the functional requirements of fast and accurate information search and exchange and sharing, and meets the conditions of application technology. Finally, the overall design of the platform leaves users with a coordinated and unified experience. But at the same time, there are also shortcomings. For example, resources are stored in the cloud, and the security of personal privacy cannot be guaranteed after users use the platform, which requires further exploration by scholars.

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