Research on Design of Mobile Learning Platform Based on Big Data and Cloud Computers

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Abstract：

"Cloud Computing Learning" is a learning mode based on "cloud computing", which uses cloud computing technology to manage and allocate resources in a unified manner through the cloud computing platform, so that they can be provided for users in the form of services. "Cloud computing learning" is mobile learning in the true sense, which can be flexibly expanded according to the needs of users. The object of user learning is integrable wares of fragmented knowledge, while user requirements are regarded as demand for cloud computing services. The system is rooted on the Internet and based on the browser. A lot of data are stored in the cloud, and application services are also placed in the cloud; Besides, it emphasizes services, where users use services on demand and pay according to how much they use.

Key words: big data; Cloud Computers; Mobile Learning Platform

"Cloud computing learning" is a learning mode based on "cloud computing", whichis also a learning mode that uses cloud computing technology to manage and allocate resources in a unified manner through the cloud computing platform, so that they can be provided for users in the form of services.The storage and computing capacity provided by "Cloud" can be adjusted at will, because it can realize some forms of courses and communication that are difficult to be achieved under some traditional hardware conditions. "Cloud" can not only establishmobile learning in the true sense but also realize the "miniaturization learning" and "miniaturization learning" advocated by some domestic scholars. The cloud computing learning model requires that knowledge must be fragmented to be flexible enough.

I. INTRODUCTION TO CLOUD COMPUTING

Cloud computing is essentially a dynamic integration of server virtualization technology and Infrastructure as a Service(IaaS), and its core is to virtualize computing resources in several data centers and provide users with services in the form of renting computing resources. Therefore, it can be considered as a combination of multiple computers located in the same location or in different locations to provide various services for users.

Cloud computing offers cloud computing services on a powerful infrastructure platform provided by the cloud computing platform. There are three basic forms of cloud computing services, including Infrastructure services (IaaS), platform as a service (PaaS), and software as a service (SaaS), which form the pyramid of cloud computing from bottom to top. At the bottom level is IaaS, which provides various physical resources including hardware and servers.The above layer is Platform as a Service (PaaS), which is typically represented by Microsoft's Cloud Operating System Azure, SalesForce.com's Force.com, and Google's APP Engine. The top layer is Software as a Service (PaaS), and SalesForce.com is the most representative provider, and the online CRM Service is one of the representatives.The main applications of cloud computing include software as a Service (SaaS), public/utility computing, WEB services in the field of cloud computing, platform as a service, managed service Provider (MSP), service business platform, cloud computing integration, etc. Moreover, "cloud security" is also discussed in the security sector, such as Trend Micro and Rising. Through the huge functions of cloud computing, users can rent some expensive equipment, conduct experiments in virtual laboratories, rent the computing function of supercomputers, rent large software, and so on.

II. INTRODUCTION TO INTEGRABLE WARES

The cloud computing learning model requires that knowledge must be fragmented to be flexible enough, and the fragmentation of knowledge is actually the integration of knowledge.

As a systematic thought about the development of computer-assisted instruction (CAI), the thought of integrable wares is the theory and practice of preparing, searching, designing, combining, using, managing, and evaluating multimedia teaching information resources and the teaching process.Integrable Ware is not only a basic teaching component of courseware but also a micro teaching unit, teaching material, or micro teaching strategy based on a certain knowledge point. People can arrange, combine, and use them according to teaching needs, and generate multimedia teaching programs with certain teaching functions. The integrableware database composed of integrablewares and the software environment that is used for the development, management, combination, generation, and use of integrablewares is collectively referred

to as an integrableware system, which is a collection of teaching materials and expressions and can provide a large amount of knowledge information materials for teachers and students to use freely in classroom teaching.There are five categories of integrableware databases: multimedia teaching database, micro-teaching unit database, virtual integrals resource database, data presentation method database,as well as teaching strategy database. An platform for integrable wareassemble is a software environment for teachers and students to combine integrableware databases and ultimately use them for teaching. Integrable ware is a new teaching software model and a new teaching material construction thought developed to overcome the limitations of courseware, and its main characteristics are basic and integrable, opening and self-propagating, inheritance and development, ease of use, universality, flexibility, and practicability. To achieve the product on the reconfigurability of integrable wares on the cloud computing platform, various types of information resources must obey the current mainstream standards and norms in the world. For example, text format, graphic format, sound format, animation format, and the format of the Internet network interface must be in line with the world's mainstream applications, otherwise, they will be unable to realize the combination of materials and information.

III.SYSTEM MODEL OF CLOUD COMPUTING LEARNING PLATFORM

3.1 System model

The cloud computing learning model uses cloud computing technology to centrally allocate and manage all resources on one platform through a unified cloud computing service platform, aiming to provide various cloud computing learning services for users. To realize this cloud computing learning model and carry out mobile learning in the real sense, a cloud computing learning system must be established. The cloud computing learning system can be elastically expanded according to the needs of users. The users learning objects are integrable wares of fragmented knowledge, while user needs are regarded as a request of cloud computing services. User terminals can be a mobile phone, e-commerce, IE browser, a PDA, or other electronic products. Cloud computing learning system is a cloud computing application system based on a cloud computing platform, in which developers can use.NET, PHP and other tools to develop cloud computing learning systems. Cloud computing learning system architecture is a cloud computing service platform, which can provide users with various cloud computing learning application services through various cloud computing Windows operating systems, as shown in Figure 1.

3.2 System composition of cloud computing learning platform
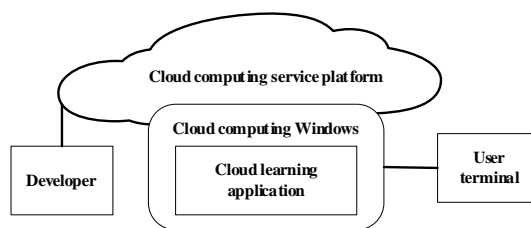
Figure 1 System model of cloud computing learning platform

The model of a cloud computing learning system consists of three modules: the interactive control module, the user evaluation module, and the guidance module, as well as three databases: namely product resource database, evaluation database, and teacher guidance database. The interactive control module, user evaluation module, and teacher guidance module are constructed into the network courseware system (cloud computing learning foreground system). Resource base, user evaluation base, and teacher guidance base are built into the background database system of the cloud computing learning system. A network courseware system is a cloud computing learning application system based on the cloud computing platform, and managers maintain and manage the network courseware system and database system through the cloud computing platform. Meanwhile, users and teachers exchange and communication information with the network courseware system and database system through the interactive control modules. The information or resources improve and update the three databaseswith three modules. The structure of the cloud computing learning system model is shown in Figure 2.

In this system, ordinary users, managers or instructors can log in through a unified man-machine interface, and the system will analyze and record their behavior and register them through the billing system. The user evaluation module is used to evaluate the function of the system, so as to improve the system. The interactive control module is used for users to carry out interactive control operations, through which general interactive control operations are realized. The teacher guidance module is used by teachers to guide and manage articles.
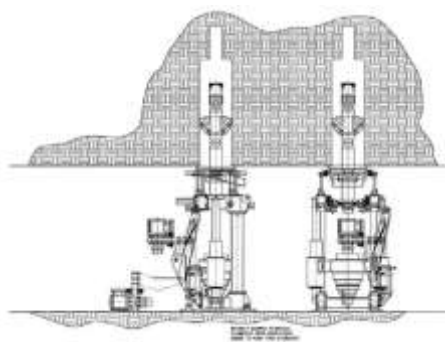

Figure 2 Composition of cloud computing learning system

IV. Key technologies of cloud computing learning system

4.1 Standards of integrable wares

4.1.1 Standards of integrable wares

Bandwidth: 0K and above;

Display size: can be scaledarbitrarily;

File size: below 500K (it can reach 500K-5M, or even more in special cases);

Main file formats: pictures, text, FLASH animation, online MP3, online video, etc.

Play method: a player;

Implementation modes: browser, mobile phone, e-commerce, PDA or other electronic telecommunications products.

4.1.2 Combination standard for integrablewares

Integrablewares must be combined into courseware before they can run completely, but how to combine integrable wares? we can organize these resources by using a markup language. It is very powerful to describe the expression of these resources in plain text, and unique events and code sections make the markup language extensible enough to enable complex interactions.

4.2 Video play streaming media technology

The maturity and development of streaming media technology provide effective technical support for the realization of multimedia teaching functions such as video on Demand (VOD). Streaming media technology uses streaming media format to compress and parse the entire multimedia file into multiple data packets, which are transmitted sequentially to the client in real time. Therefore, users can download while decompressing and playing without waiting for the download of the entire file.

4.3 Billing technology of cloud computing leaning

As for the charging, consumers use cloud computing learning systems to pay only for the resources they use. Therefore, the cloud computing learning billing system should have such functions as statistical analysis and billing of online history data, the query of logs and fees, automatic generation of log reports, as well as management and offline backup. Besides, the system should be able to count the access requests, access time, access duration and data traffic of users within a certain period of time. Meanwhile, different charging unit prices can distinguish working hours from non-working hours, and working days from holidays, and charge users by using the cloud computing learning system. Moreover, it should also meet the following functional requirements: unified format of various billing raw data; integration of different billing keywords in different services on the same billing platform; support of real-time deduction for prepaid users.

4.4 Highly reliable system technology

A large-scale cluster computing systemsupports cloud computing. When the system size increases, reliability and stability will become one of the biggest challenges. Effective system configuration, monitoring, management, scheduling, and virtualization technologies are required to realize a powerful, dynamic, and autonomous computing storage resource pool to provide the large computing capacity

required by cloud computing. System-level fault-tolerant technology is a difficult point in system technology.

4.5 Data Storage Technology

To ensure the high reliability and economy of the cloud computing learning system, the cloud computing data is stored in a distributed form and the redundant storage technology is used to guarantee the data reliability. As cloud computing learning systems need to provide services for a large number of users in parallel, the data storage technology of cloud computing must have the characteristics of high throughput and high transmission rate simultaneously. The direction of cloud computing data storage technology public relations will focus on super-large-scale data storage, data encryption, security improvement, as well as I/O rate improvement.

4.6 Data management technology

Cloud computing learning systems manage learning resources, and their basic management functions are to accept resource requests from cloud users, allocate specific resources to resource requesters, reasonably schedule corresponding resources, and make the work of requesting resources run normally. To realize the above functions, the resource management system of cloud computing learning systems should provide four basic services, including resource discovery, resource distribution, resource storage, and resource scheduling. Resource discovery and resource distribution provide complementary functions. Resource distribution is initiated by a resource and provides information about a machine resource or a pointer of a source information resource and attempts to find suitable applications that can utilize that resource. However, resource discovery starts with a network application and discovers resources suitable for the application in cloud computing.In general, resource information in cloud computing is published by using a resource information protocol, butresource information protocol is found by the resource and implemented by the resource distribution function. Resource distribution, discovery and storage are the preconditions of resource scheduling, which allocate the required resources to the corresponding requests, including the collaborative allocation of resources on different nodes. Cloud computing resource storage is cloud storage, which is not onlya kind of hardware, but also a complex system consisting of network devices, storage devices, servers, application software, public access interfaces, and client programs.Each part takes storage devices as the core and uses application software to provide external data storage and service access services. Moreover, users use the entire cloud storage system to bring a data access service, rather than a storage device. Strictly speaking, cloud storage is not storage, but a service and its core is the combination of application software and storage devices and realizesthe transformation from storage devices into storage services through application software.

"Cloud computing learning" is a learning based on "cloud computing", which uses the most advanced cloud computing to manage and allocate resources through the cloud computing platform. "Cloud" can establish mobile learning in the real senseand realize the "miniaturization learning"

and"microminiaturizationlearning" advocated by some domestic scholars. Various cloud computing learning services provided by the cloud computing learning system can be flexibly expanded according to user requirements. The user terminal can be a browser, mobile phone, business, PDA, or other electronic telecommunication products. User learning objectsare various integrable wares of knowledge fragments. In the cloud computing learning system, all user requirements are considered cloud computing service requirements. It's based on the Internet and browser, stores data and applications in the cloud, and emphasizes services, so users use services on demand and pay according to how much they use. Cloud computing learning systems can provide users with a new IT deployment and delivery modeand will have a broad application prospect.

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