Research on Sports Teaching Resource Platform Based on Cloud Computing

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Abstract. To improve sports teaching, the sports teaching resource platform based on cloud computing is designed. This paper introduces the structure of Cloud Computing and its functions firstly. And then we describe this platform's framework and its module. According to the advantages of Cloud Computing we discuss how this platform is arranged in the Cloud Computing. So this platform can store multimedia material efficiently. And Teachers can share the sports multimedia material and design a dynamic courseware in this platform. The students can view this dynamic courseware through the platform's GUI. So it will be convenient for students to learn themselves.

Keywords: Cloud Computing · Sports teaching · Multimedia database · Dynamic courseware

1 Introduction

Now, many of universities have their own teaching resource management systems [1]. But there are some same problems in these systems such as the restrictions of storing multimedia data, or insufficient sharing. And other problems caused by these such as the flexibility of system is not enough and utilization rate is not high [2]. All of these restrict the popularization of information technology in education and are unfavourable for the teacher's teaching and student's learning.

And in the traditional sports teaching teachers always show the sports action themselves. Even in the sports theory teaching they seldom use courseware. This is related to the way of sports teaching. And at the same time this is also related to the computer technology which the teachers know. This teaching module has obvious disadvantage. If students want to review the content of courses, they will only depend on their memory. And if a teacher can not grasp a new sports technology completely, he can not teach his students.

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The sports teaching resource platform based on cloud computing is designed to solve above problems [3, 4]. This platform has the advantages of cloud computing such as super computing power, storage capacity and performance [5]. And teachers can share the sports multimedia material and design a dynamic courseware in this platform. Teachers can upload the multimedia material such as text, picture, voice and video to the platform which is in the cloud computing service. Platform will manage them. It can share the resource completely. Teachers can design teaching program in this platform and add different types of multimedia material to the program. After this, a dynamic courseware will be complete. The students can view this dynamic courseware through the platform's GUI. So it will be convenient for students to learn themselves. And platform can provide a succinct program editing function. The advantages are simple operation and easy to use. Even the teachers who operate computer unskilled also can design a good teaching program and multimedia courseware.

2 The Overview of Cloud Computing

There is not a general concept module about Cloud Computing. It is a development of Parallel Computing, Distributed Computing and Grid Computing. It includes concepts of Virtualization, Utility Computing, Iaas (Infrastructure as a Service), Paas (Platform as a Service) SaaS (Software as a Service) [3, 4]. Generally speaking, Cloud Computing can concentrate the resource in the network and provide many services (Computing, storage and software) for network users. According to the actual demand, users can get service resource any time and any place. Cloud Computing is a new concept. It breaks the resource constraints in the traditional module. As long as the users connect the network, they will get super computing ability, storage ability and software resource.

Cloud Computing can manage and schedule a lot of computer resource in the network such hard disk, platform and service. This forms a resource pool to provide services for users. Its architecture is given in Fig. 1.

The architecture of Cloud Computing includes fore layers: physical resource, resource pool, management middleware and SOA (Service-Oriented Architecture). The physical resource includes computer, storage, network equipment, database and software. Resource pool assembles the resource as their types. The main works of resource pool are assembling and management. Management middleware manages the resource of Cloud Computing. And it also schedules the application tasks and makes the resource provide efficient and security service. SOA packages the performance of Cloud Computing as a standard web services and manages it. Resource pool and management middleware are the primary keys of architecture. The functions of SOA most depend on external features.

The works of management middleware are resource management, task management, user management and security management. Resource management balances every point of cloud resource and detects the point's failure and recovers or shields it. At the same time it will monitor and gather the data of resource. Task management

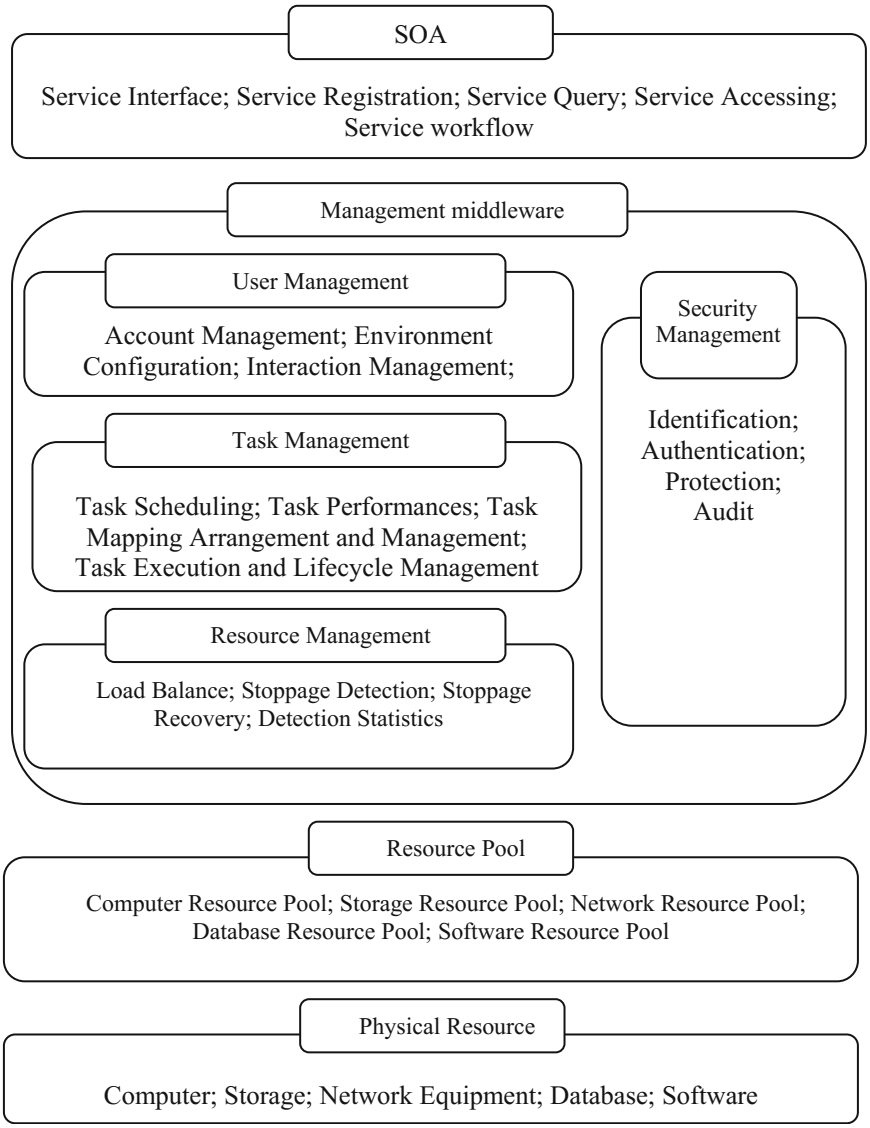

Fig. 1. Architecture of cloud computing

will perform the mission which is submitted by user or application. It includes the arrangement and management of user task mapping, task scheduling, task execution and the task lifecycle management. User management is important for accomplishing the business module of Cloud Computing. It includes providing user interface, managing and identifying the user, creating the environment for user's program and counting the cost. Security management can ensure the device safety. It includes identification, authentication, protection and audit.

Because Cloud Computing has super performance, capability, security and better transparent for user, it provides a good condition for sports teaching resource platform. It can process mass multimedia data efficiently through application interface. And because of its better transparent for user, we don't consider the hardware when we place an application to the server. This can reduce workload and save development cost [6, 7].

3 The Design of Sports Teaching Resource Platform in the Cloud Computing

3.1 The Structure of Platform

The platform has three layers: data resource layer, logical function layer and application layer. Its framework is given in Fig. 2.

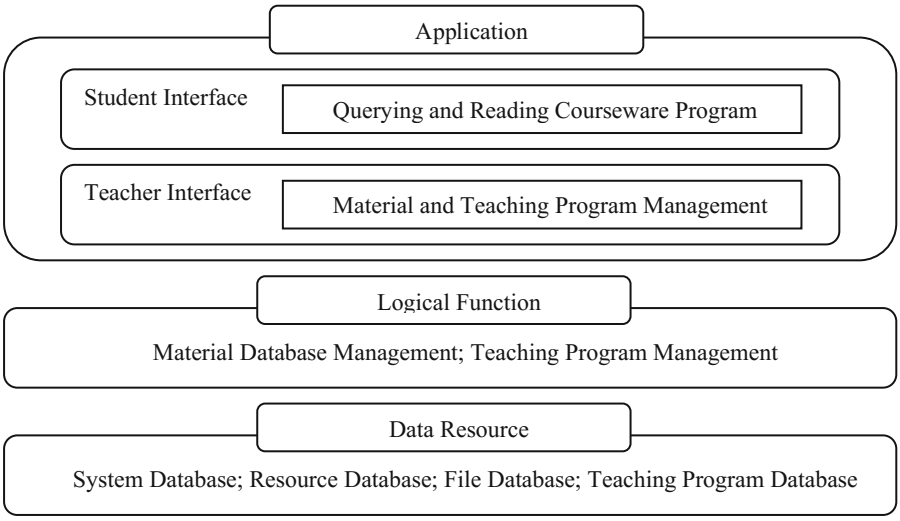

Fig. 2. Framework of sports teaching resource platform

Data resource layer will include fore databases. System database will storage system information such as user information. Resource database will store the ordinary teaching material such as text and image. File database will store special multimedia material such as voice and video. Teaching program database will store the final teaching program. This structure can depart the data as its logic and facilitate to arrange database.

Logical function layer will realize the logic between resource data and teaching program. It will process data as its type. At the same time it will accept the user's service request and return the result to the user. There are two modules in this layer:

(a) The module of material database. This module will manage the multimedia material database including adding and deleting material, and creating, altering and dropping the type of material, and querying material.
(b) The module of teaching program. Through this module user can design a teaching program, select appropriate material from database and add it to the teaching program. So a dynamic courseware is shown to us. The operation will include adding, altering and delete the material for program, and saving and sharing the program.

Application layer will provide different service interface for different user. The students can query and read the courseware program through the student interface. Through the teacher interface teachers can manager their own course and its material database. The teachers who teach same course can share this course's material database and edit their own teaching program.

3.2 The Development of Sports Teaching Resource Database

3.2.1 The Development of Multimedia Material Resource

This development is the kernel of system. The multimedia information has different type and includes large data. It is hard to store in the normal database. Especially in the sports students are interested in animation and video. Only text courseware is not appropriate for teaching. And Cloud Computing has powerful processing capability. It can manage and store multimedia information efficiently. At the same time it also provides the functions of querying, uploading and downloading.

The material resource is managed by teacher. Every course has a director. This director will check the multimedia material. Other teachers who have same course can upload the multimedia material and share it each other.

3.2.2 The Development of Teaching Program Resource

The teaching program resource is an characteristic of system. The ordinary CAI software always adds all the multimedia material in the courseware. This is inconvenient for updating, storing and conveying. In this part, we propose a method about teaching program based on Cloud Computing. Teachers can not edit a courseware by pages. This courseware will be replaced by class program. Its materials will come from the multimedia material database in the Cloud Computing. When the teachers design a class program, they only need find an appropriate resource from the database and link it to the program. Then a dynamic courseware is finished. And it will be stored into database. The students who learn this course can query these teaching programs through the interface. When students want to learn a section in the class program, the material linked to this section will be shown. If the teachers find a better material, they will only edit the link about this program and will not adjustment the whole program.

3.3 The Design of Platform

This platform placed on the Cloud Computing. It can improve the degree of resource sharing and constructing. And it can also implement the storage functions of large capacity and high speed about multimedia information. For the clients, they can view the teaching resource from the browser and can not install any other software. The server program can upload to a Cloud Computing Platform. It can save the money using to buy hardware and can provide the high quality information services (Fig. 3).

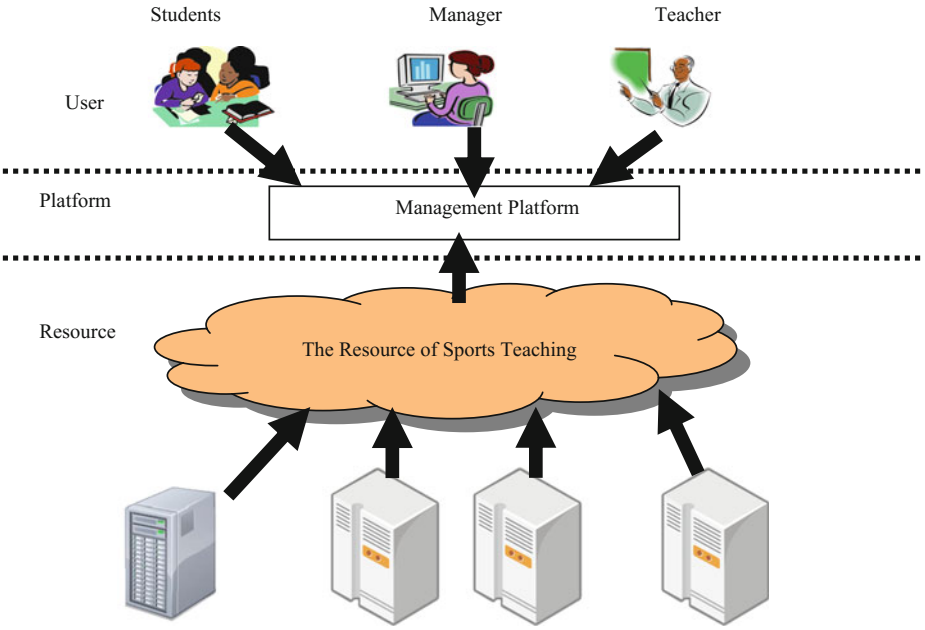

Fig. 3. The design of sports teaching resource platform

This design can utilize advantages of the Cloud Computing in the resource sharing and service. Users can get information they need from the complex and different construction data source. And at the same time the resource service will be intelligence. The resource sharing will be ultimate extent.

4 Conclusions

This paper designs a sports teaching resources platform based on cloud computing and discuss the structure of this platform and the arrangement in the Cloud Computing. Cloud Computing service can concentrate and integrate the sports teaching resources. It can provide open service about resource sharing for the network users. Placing the teaching resource to the Cloud Computing is an effective solution for ultimate sharing of teaching resource.

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