

# Research on Education Management Information System Based on Cloud Computing

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**Abstract.** Teaching management information system (TMIS) is an important part of education informatization. Education informatization will be deployed to the cloud, supporting mobile applications, which is the trend of future. Cloud computing provides a new platform for the TMIS. Based on the functional analysis of TMIS and combining with technical characteristics of cloud computing, This article presents a software system architecture of the TMIS, and discusses its implementation.

## Introduction

Education Management Information System is computer technology, communications technology and network technology used in teaching network management software systems, is to regulate the management of school education, improve the quality and efficiency of software tools is an important part of digital campus.

At present, represented by cloud computing application of network technology and represented by mobile technology is increasingly popular, and the development of technology and the application will push the change of education informatization. Education informatization development to the clouds, in the mobile application is clearly the trend of future development, the corresponding teaching management information system should also go into the rig. Compared with the traditional teaching management information system based on Web, the teaching management information data and applications are stored in the cloud computing platform has the following advantages: one is to reduce investment and operating costs, construction costs include traditional network application infrastructure costs, software and hardware cost, operation cost and maintenance cost, etc. To adopt cloud computing could save hardware and software systems as well as the operation and maintenance costs, purchase in cloud computing mode, the end user only need according to how much to pay for use of the service for the application is deployed to the cloud infrastructure to reduce the threshold; The second is to increase computing capacity flexibility, traditional network configuration software infrastructure must be to ensure the fluency of the peak operation, in most of the time these hardware resources utilization rate is low, the waste due to the fact. The resources of the cloud computing environment is elastic, the application, the number of users, no specific restrictions, many aspects, such as traffic can be as the demand of the business activities and expansion or contraction. At the same time, the cloud computing platform has super computing power, and mass storage capacity, the expansion of the scale there is almost no limit; Three is to achieve anytime, anywhere access to education management data and applications are deployed to the cloud platform, into cloud services, users can through the computer and smart

mobile devices anytime, anywhere access to the "cloud" of teaching information, can effectively improve data access ability and work efficiency.

Therefore, the research and development of teaching management information system based on cloud computing is the inevitable requirement of technology development, has the very vital significance. This article on the basis of the teaching management information system function analysis, combining with the characteristics of cloud computing technology and put forward a kind of teaching management information system based on cloud computing architecture, and discuss the implementation scheme.

### **The teaching management information system function analysis**

**The function of the teaching management information system analysis:** Teaching management information system's main function is to realize the teaching management, at the same time as a software system should also have the necessary system maintenance function, thus the whole system function is divided into general "teaching management" and "system maintenance" two big modules, as shown in figure 1. Among them, the teaching management module includes: the management, teacher management, student status management, professional management, curriculum management, examination management, grade management, statistical query and report DengZi module. System maintenance module includes: user management, password Settings, data import and export, data backup and recovery, custom DengZi advanced query, operation log management module. In all these function modules in the achievements management in the amount of data, and it also involves the input, modify, and query results, design thinking is achievements recorded by the teacher, at the same time submit paper transcripts to teaching management department. Specially set up the input window, the window period teachers can input and change the result, after the window by the teaching management staff will result to archive into the library history, the teacher can't change, and change the teaching management staff is responsible for the maintenance.

**The teaching management information system analysis of the user:** Teaching management information system users can be divided into: students, teachers, administrators, teaching administrators and system administrators five levels. Student users with information, curriculum information and performance of the query function. Teacher users have input scores and various historical data query function. Administrative users are mainly oriented to the school management, providing a variety of data query, reporting and statistical analysis functions, administrative users do not have the rights to maintain data. The teaching management staff is divided into the basic level teaching administrators and the central teaching administrators. Basic teaching management personnel in open data window period can be to did not enter the History Library of the faculty data with maintenance of the authority, the central teaching administrator in any period of time to enter the school data repository history has the jurisdiction maintenance, also all kinds of management personnel has historical data according to the inquiry function. The system administrator has the authority to inquire and maintain the system of all the data, and the whole system is responsible for the maintenance work, to ensure the safe operation of the system.

The contents of the user classification and functional modules are integrated together, which forms the function module of the teaching management information system (Figure 1).

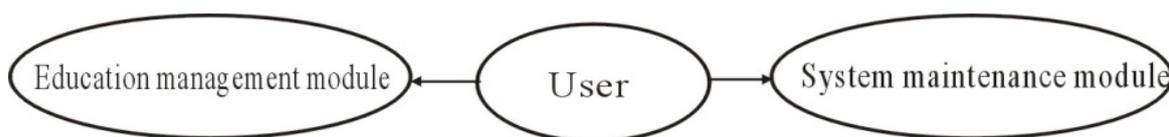


Figure1.The teaching management information system function module chart

### System design implementation

**System architecture design:** Development is based on two key EMIS cloud for Giving: one is to achieve the basic functions of teaching management information system; another is to use cloud computing platform as a base platform system. Cloud computing offers three levels of service: First, infrastructure as a service (IaaS), by the underlying hardware or virtual machine resources constitute, provide computing, storage and network communications, and other resources; Second, Platform as a Service (PaaS), built on the infrastructure, cloud application development platform for programmers, as shown in Figure 2.

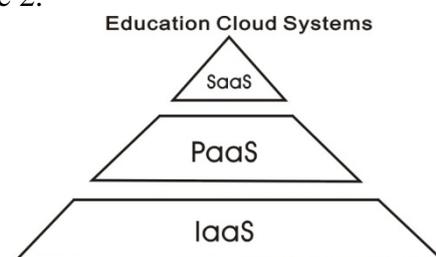


Figure 2.The teaching management information system based on cloud computing architecture

Software as a service (SaaS), cloud-based platform for all kinds of application development services. According to the basic function of cloud computing and service-level teaching management information systems, application systems architecture design fig2. The entire application system architecture is divided into the infrastructure layer, cloud computing platform layer, application layer of management education. System hierarchy corresponding to the three cloud computing service levels. Cloud-based computer teaching management information systems architecture infrastructure layer: is the foundation of the whole structure, the use of virtual machine technology into the virtualization layer on top of the underlying physical hardware resources. The virtualization layer to the underlying hardware to manage, provide computing, storage and network communications, and other virtual resources up to mask the underlying physical hardware dynamic, distributed and heterogeneous, supporting hardware resource sharing and reuse, and for each user applications independent computing environments, and provides administrators centralized management of hardware resources and software resources. Cloud computing platform layer: built on top of the infrastructure layer, for developers, provides a common API for the development of cloud-based educational applications, database systems, file systems, and development environments. Teaching management application layer: use the platform provided API layer developed teaching management software, the functional modules of teaching management, to provide for teaching management SaaS services. In order to ensure clear application-layer structure, and improve the maintainability of the system, using the hierarchical structure of the design data access, business logic and forms of application layer separately. Client: Because the system deployed in the cloud browser, users simply through PC, mobile phones and other mobile devices can use the software, enjoy cloud computing offers mass storage, computing power and unlimited anytime, anywhere access.

**System function implementation:** For the realization of the system function first need to set up cloud computing platform, the current Hadoop is considered to be one of the best open source cloud computing framework, it put all Google business technology basically according to his concept to design, can be implemented in a large number of distributed data storage and processing on the cluster, and does not require the high-end storage. Can use a few private cloud server install Hadoop to build school, let the education management information system in the private cloud. At the same time, very cloudy computing service providers also support the Hadoop, such as amazon EC2 elastic computing services, especially the domestic has many cloud services based on Hadoop, so also facilitate system to the public cloud migration. Using the Eclipse + Hadoop plugin structure can build a good programming environment.

After erection of cloud computing platform, the major system development work focused on programming the application layer functions. A three-tier system function, that is, the entire application is divided into: a hierarchical presentation layer, logic layer, data access layer. Various education management information data storage in the cloud platform layer, data access layer is a uniform interface to access the underlying data, the logical layer through the interface to read or write data. Logic level teaching management and system maintenance functions, and the results fed back through the presentation to the user. Design the presentation layer should be considered support for mobile applications can be used when developing the formula response Bootstrap 3.0 web technologies, web interface makes the system adaptively different size display screen, which can support computers, smart phones and other mobile terminals.

## Conclusion

The article presents a viable cloud-based analysis and design of teaching management information systems based on system design architecture of cloud computing. By programming in Hadoop cloud computing platform to achieve the various functions of teaching management information system. Compared with the traditional teaching Web-based management information system, its biggest innovation is the use of cloud computing platforms and support mobile applications. Consider handheld mobile applications is the future trend of development, you can also develop mobile client APP to better support mobile applications.

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