Design and Implementation of MOOCs Platform based on B/S Framework

Meng Xu and XiWen Bi

Abstract. With the constant development of computer Web technology as well as improvement of internet environment, it is easy and common to realize distance education by internet and distance education have been effectively solved with the emergence of MOOCs. In this paper, the MOOCs and technology feasibility based on B/S framework will be used with adopting many technologies like JavaEE, Flex, Red5 video server as well as WebService, which is a learning platform for online study and teaching interactions.

Keywords: Flex4, MOOCs platform, SSH2, Red 5 video server.

Introduction

With the development of Web technology, online education has been very popular, but new problems will arise. Traditional online education is only for actual classroom to classroom for a network transfer and did not highlight the advantages of online education where, and large most are small-scale programs in the Institute for the unit, also limited the scope of the present school students learning, interaction between teachers and students are few. For problems now have a new solution, that is the lesson Mu internet. MOOCs platform has the following characteristics: Students only need to register an account on the network platform, you can log on to the internet, through a simple enrollment process will be able to learn a variety of courses provided by the platform, and the platform courses offered are diverse, each course is independent of each other, by the relevant teachers in maintenance. For learning the contents of the video are in accordance with short courses divided knowledge or with related programs in a few exercises, are not the kind of traditional classroom course about an hour. Because there are a lot of learning the number, the interactive learning to a higher demand for the exercises must implement real-time display scores, because with increasing student teachers for correcting exercises are unrealistic. As can be seen from the Feature class platform Mu, MOOCs is an open platform that can support a large number of students while online learning and can provide many courses conducted for a teaching platform management. According to the characteristics MOOCs platform, the platform is the main problem is how to achieve a large number of students while online

Meng Xu, College of Information Technology and Media, Beihua University, 132013, Jilin City, China, meng-xu007@126.com,
Xiwen Bi, College of Information Technology and Media, Beihua University, 132013, Jilin City, China, xiwen_bi@126.com
*Corresponding author: Xiwen Bi
learning and courses on how to effectively manage for example, to maintain the relative independence between different courses, teachers should only be responsible for their own operations courses. For classroom exercises how to achieve the outcome can be done directly to the subject and the ability to calculate the scores of students, improve teaching interactive. For video course how to achieve in the case of a large number of students to watch the plays correctly, how to share the curriculum courseware to students, for the students questions about how the course feedback to teachers. These are the platforms need priority issues.

**MOOCs platform needs analysis**

The overall objective of MOOCs platform to provide users with an open register of teaching platform, capable of supporting a large number of students into the platform online learning, you can publish different courses, each course can be divided into sections of the curriculum structure, teachers can depending on the course structure for curriculum set the actual course content, such as video, exercises and so on. If you have questions about the program students can ask questions online to teachers, while teachers can respond to the problem. For information on courses courseware can be categorized according to the curriculum for unified management. Platform to satisfy the needs of different user roles of the following three functions: (1) platform allows administrators to teachers and students to add, modify user information already exists, already present in the platform user delete operation. You can also maintain some static information and public information programs of courses, such as courses announcements, course introduction. (2) Teachers can publish courses through the platform, a teacher can publish many courses, but the teachers publish course is independent, that teachers can only control their own publishing programs can not operate on other teachers’ publish course. Courses for teachers have been published in accordance with section may set syllabus structure, can be added according to the structure of the curriculum subsections specific content. The course is not just a single section also includes video exercises and so on. Teachers can also publish courseware curriculum, according to the classification of the curriculum courseware for unified management. At the same time, teachers can also publish student problems reply to see students’ complete exercises resulting scores. (3) Student Sign-On Platform, you can view all courses teachers released, you can choose a course to learn according to your preference, mainly can operate for viewing the syllabus according to the course section, in accordance with subsection course video learning and exercises the answer, after the completion of exercises answer platform can give the correct answer and the answer to show students score obtained. Students can ask questions to teachers, according to the problem view your reply teachers.

**Key Technology**

SSH2 framework is an acronym Struts2, spring, Hibernate three lightweight framework abbreviations. Framework is based on the MVC design pattern to achieve; you can decouple operation between the various components in the MVC design pattern. Struts2 for WebWork2 is an update, Struts2 design a floating design, it does not depend directly in Java Servlet class, in the course of Struts2 not directly Servlet. Struts2 provides the interceptor, the interceptor capable of aspect-oriented programming, is used in the development of permissions feature in; Struts2 also provides a type
converter can convert JSP pages sent by special request parameters into the desired type; Struts2 also provides its own Web page tab, you can easily return to the background of the data presented in the JSP page. The platform was uses Struts2 processing data for all JSP pages, and uses a variety of request parameter type which contains JSON type of return parameters. Spring recently done a lot of updating, he can provide inversion of control similar to EJB and lightweight aspect-oriented framework for the development of the project, it can simplify the coding complexity of the project development process, save time spent. Inversion of control is defined as a program dependent objects such as entity objects in the normal workflow of the program not be instantiated, but will create and release objects to the Spring to achieve control authority objects to such an entity from the program workflow transferred to Spring, this conversion is called inversion. During the program run will depend on the dynamic object creation process is called dependency injection. Through these two concepts Spring advantage of the project is reflected in direct contact between the various components of the platform is broken between the various levels are reduced by spring to contact coupling. Spring and commonly used Jdbc, Hibernate and so on the package, use this platform to manage data persistence layer spring (Dao layer) and Struts2 in Action (Web layer) in all classes, dynamic injection class. For example: connecting to the database code and release the database connection code. Hibernate is an object-relational mapping framework, Hibernate Jdbc by Java objects in the package to make the program operate on the database can be used to achieve the object-oriented thinking, Hibernate framework is a lightweight database layer. The main components are composed Hibernate: session factory, dialect converter, SQL builder, HQL standard configuration and components. These interfaces can be achieved through persistence and transaction processing data and other operations. The platform provides for the use of Spring Hibernate template class platform packaged for data persistence operations.

Flex4 is a free open source framework, Flex4 can build rich Internet applications (RIA), as long as the Flash Player virtual machine operating system installed will be able to cross-browser, cross-platform applications developed using Flex4. For most browsers now offer Flash Player virtual machine support and installation, which makes video processing Flex4 become a very convenient programming tools. After Flex4 compiled .swf file can receive other data transfer language Java, .net, etc., and .swf files can be embedded into JSP, HTML page. Flex4 can be achieved without dynamic refresh the page and get the data that is sent to the server without repeated requests to be dynamically generating the required data. The platform uses Flex4 to handle video playback and statistics charts generated and displayed.

Red5 is to design a partial substitute for Flash Media Server open source server that contains the HTTP communication service, RTMP communication services and other components, which architecture is implemented in Java has three main components: Jetty6, Mina and Spring. Red5 server only supports RTMP protocol. RTMP protocol (Real Time Messaging Protocol) is an Adobe Systems specifically for virtual machines between Flash and streaming server large file transfer traffic and the development of communication protocols. It appears to be used to package Flash dedicated packet, currently only supports RTMP protocol AMF format and FLV format. RTMP communication protocol like TCP / IP protocol, but also to connect 4-way handshake, RTMP protocol encapsulates data into an RTMP message block, the transmitted message block must contain a timestamp and payload types. Each message block is called a Chunk; a large data stream is divided into several message blocks to transmit.
MOOCs design platform

Analysis of the structure of the platform, the platform is open for registration and therefore need the support of a large number of concurrent users to access the internet confirm using B/S architecture using Java EE enterprise application framework for the development of non-functional requirements through analysis, as well. Because open platform, so the amount of data platforms and the complexity of the data will be demanding, requires that the database should have distributed storage and data technologies such as cutting, decided to persistent data using SQL Server 2008 is complete, and SQL Server 2008 are also Great corresponding data support. Since the target platform to achieve large-scale open teaching platform Web server should be able to support load balancing technology for deploying Tomcat6 web servers, effectively reducing the overall cost of deployment also supports load balancing. Platform need to publish a large number of courses, but also need the support of a large number of students to watch, and determine its use Flex4 Red5 video server technology for processing video file playback. The main function of the completion platform support large-scale student online learning, and student requirements data relating to remain independent, to have student and course data consistency. Course curriculum during the publishing process data in accordance with section specification for entry, organization of data in strict accordance to the course from the last chapter to the section of the form and limits of each course have a teacher's curriculum to prevent data from unauthorized tampering. For the course in accordance with the structure of the course curriculum needs of video or practice management, strictly in accordance with the video data to measure program to match each other, there is video curriculum system can not appear the case. Course data exercises also need to follow the course sections to organize storage, statistical needs for the course grade curriculum in accordance with subsections summarize, and then determine the number of individual scores section for teachers teaching in the curriculum have an intuitive understanding.

MOOCs implementation c platform

This chapter is based on the detailed design of the MOOCs platform encoding platforms to achieve, through the platform user management module is designed with sub-role management for large-scale student data management, design management module syllabus and curriculum teachers use to manage the way course data to achieve independence, curriculum management module uses video streaming technology for video playback pressure bearing, online test management module and curriculum resource management module to achieve results and statistics and remote resource management through Flex WebService service, described in detail by the flowchart specific implementation process.

User access login.jsp page, select the correct identity of the drop-down list, and then type the login information, select the Login button to call login.jsp page check1() function on the input data is empty for testing. After detection by calling LogService class login() method of user information stored in the database for comparison, if the teacher is logged in login information will be teachers (teachers entity "tea") to save the session object. If the login is administrator in the administrator's login information (the entity administrator "admin") to save the session object. login() method returns a value of type string of "yes" or "no". Upon completion also triggers login.jsp page callback match() function returns the database than to verify the results, if the return is "yes" will be called tiao loginSuccess.jsp page () function of the jump page, tiao () function will
jump session object based on different types of entities. If the return is "no" call login.jsp page pop-up method to pop up an error message and returns login.jsp page. After a successful login, if you are an administrator platform will jump to the index.jsp page admin directory. Teachers will jump to the platform teacher page at a directory. For not through login and direct access to the internet page of the case will be used to intercept LogAOP class, LogAOP work steps: Spring reads the configuration file is information about AOP, and find the corresponding section implementation class (LogAOP) according to the configuration information, configuration information will be defined entry points, the entry points will define the need to intercept a class or method, when calling to a blocked class or method, AOP will first perform a before () method prior to the current method of execution performed The method has permission to judge. For there is no authority it will jump to the login page.

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References


