The Construction of Double Network Simulation Training System for College Students Based on Cloud Platform

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Abstract. In order to promote the innovation and entrepreneurship reform of college students in national construction, this paper designs college students' double-innovation training system based on cloud learning platform and realizes the development of related application platforms. The system adopts java technology development language for system design, SSM architecture of spring + springmvc + mybatis and IntelliJ IDEA software for development environment. The cloud server is built by Google Cloud combined with tomcat and redis cluster, nginx is used as load balancing, and mysql relational database and nosql database are used for database development. The construction of cloud learning platform can effectively solve all kinds of difficulties encountered in innovation and entrepreneurship, and form a virtual industrial cluster supported by big data technology and cloud technology to serve the development of double innovation in universities.

Keywords: java · Double training · SSM · Cloud learning

1 Introduction

Nowadays, there are all kinds of increasingly fierce competition for survival and development in society, the essence of which is the industrial competition of innovation and entrepreneurship. And the competition system of innovation and entrepreneurship should start from the stage of higher education. The universities shoulder the mission of cultivating high-quality entrepreneurial and innovative technical talents for the society. Most of the knowledge of innovation and entrepreneurship education in colleges and universities stays in the traditional classroom book teaching, which is divorced from the core practical ability of Shuangchuang, which is not conducive to the growth of college students' entrepreneurial experience. And different majors choose to use a unified dual-innovation teaching system, which makes it difficult for students to enhance their dual-innovation consciousness from a professional perspective. The cloud platform technology has the characteristics of convenience, rapidness and large amount of data, and it can be combined with the training cloud learning platform to solve the above problems [1].

Based on the above analysis, the author thinks that we should develop a cloud platform-based dual-creation practical learning application for college students. The system adopts javweb technology for system design, SSM architecture of spring + springmvc + mybati is used for development, and IDEA is used as the development environment. The cloud server is built by combining Google Cloud with tomcat and redis cluster, and the database is built by combining mysql relational database with nosql database. The focus of practical training lies in the direction of entrepreneurship. It is necessary to simulate the whole process with systematic functions, so that students can feel the tasks and difficulties in different stages of entrepreneurship through role-playing, and make preparations for their own career development and planning after graduation. Meanwhile, the system will also improve the current traditional education and teaching with the concept of "integration of production and education" and "double-qualified" education mode, so as to combine theory with practice.

2　Key Technologies

2.1　Cloud Platform Technology

The cloud platform technology is not a single technology, but a fusion technology of various Internet technologies. The cloud platform technology is the combination of cloud computing technology, cloud storage technology and cloud network resources, which is a concept of pooling. This system adopts cloud server technology and supports large-scale distributed storage and cloud computing to achieve the purpose of data security and flexible deployment. As far as cloud computing technology is concerned, it mainly includes iaas, paas and saas, which refer to infrastructure and services, platform as a service and software and services, respectively.

2.2　B/S

This system is designed with a three-tier structure of B/S mode, which is divided into data layer, presentation layer and application layer. It is combined with the cloud technology, so the data layer chooses the database server under the cloud technology to build. The presentation layer is used to transfer the client's request instructions to the data layer for calling, while the application layer is used to handle the logic sum of user interaction functions in the cloud learning platform and provide permissions.

2.3　Google Cloud Platform

The cloud platform server selected by this system is Google Cloud Platform, which has a complete set of cloud platform system functions, including computing, storage and application development and hosting. This system mainly uses GFS, mapreduce and GAE, which represent the distributed file system, distributed programming model and application service engine [2].

2.4 Development Process

The service mode of cloud learning platform in this paper adopts saas software and service mode. The collected data comes from the network storage in the campus server. This server needs to collect the memory, usage rate and various configuration data. After the collection is completed, start snmp service and upload it to the cloud server and report to the gateway. The system deploys the cloud server through Google Cloud Shield, and uses nginx load balancing technology and CDN to accelerate. At first, a static resource server and five ECS application servers are deployed, with Linux red hat 7 as the operating system and tomcat7.0 as the server environment. After that, two OSS video servers are deployed, one for private cloud and the other for intranet secrecy. And set up two NAS file sharing servers. Using redis distributed cache deployment. So we can quickly cache the hot-spot data such as course information and exam information, which are the most intensively accessed in the system, so as to facilitate the user's response and improve the system efficiency. In the data storage, MongoDB is deployed as no sql non-relational database through Google Cloud. The system is developed with SSM architecture of spring + springmvc + mybati and IDEA as the development environment. The server side of the Web system should be stored under Google Cloud Platform, and different users can log in from the PC software [3].

3 Function Realization

The client of college students' double-creation training cloud learning platform is divided into two user ports: teacher's port and student's port. It is divided into three functional modules, namely, theoretical study, information creation and simulation training. When students click on the theoretical learning module, they will jump to the front page of course screening. Users need to choose double-creation courses to study according to their major. The code of the course screening foreground page is shown in Fig. 1. The dual-creation course learning is presented in the form of on-demand courses, and the platform relies on Google Cloud. The content of the course is uploaded by the teacher, and the uploaded content is shot or selected by the teacher himself. The cloud can help the cloud learning platform to upload, transcode, store, manage and play audio and video files, and can also provide related audio and video communication service protocols [4].

The python language combined with scrapy framework is used to collect relevant information and data from innovation and entrepreneurship websites and major government function websites, and the excellent students' double-creation case information obtained by teachers is used for input and reference. After collecting relevant information, cloud learning platform technology uses the established keyword database and Chinese word segmentation algorithm to classify data information. It also has the function of search engine, and users can search the data they are interested in according to their own needs. After the cloud server where the search engine of the system is located receives the message queue message sent by the client, it parses and completes related operations, and the definition code of building index message is shown in Fig. 2 [5].

The user clicks on the simulation training module, and selects the virtual industrial cluster to practice the double-innovation project according to the reference project cases. The students started the online Internet entrepreneurial project training. The system

```
<div class="course-sort">
                    <ul>
    (It class="active"   ng-repeat="item in sorts" ng-click="sort(item.id)"
    Style="background:{{item.sort?themeColor:"}};"ng-class ="-true:'bgColor',false:"} [item.sort]">
                        <input type="radio"   ng-model="item .sort">{{item,text}}
                        <span class="sort_icon" ng-
    If="{true:'shoeIcon', false:"} [item.sort]"></span>
                    </li>
                        <div class="shuaixuan" ng-click="screen()"   ng-
    Class="{true:'screenColor',false:"} [isShowScreen]"style="color:{{isShouScreen?themeColor:"}};">
    Sift
                            <div class="iconfont icon-takeUp"ng-class="{true:'icon-
    Closed_icon',false:'icon-Open_icon'}[isShouScreen]"></div>
                    </div>
                </ul>
            </div>
```

Fig. 1. Course Screening Front Page Code (Original)

```
{"type" :"INDEX_CREATE",
"extName":"Resource expansion type",
"fd_ id":"Resource ID",
"fdMongo_ id":"The resource mongoid is used to obtain the resource file stream",
"fdName":"Resource name"}
```

Fig. 2. Building Index Message Definition Code (Original)

Table 1. Multi-user access performance test

Number of concurrent users	Minimum response time	Average response time	Maximum response time
1000	0.735	0.846	0.978
5000	0.981	1.273	1.455
10000	1.172	1.389	1.685

automatically jumps to the decision option, and the user selects different decisions, which will lead to different results of operation and order sales. In the simulation training period, students also need to fill in the project data regularly for analysis and study. When the operation is abnormal, the tutor will be informed and will intervene in time to solve it.

The performance test of multi-user participation in virtual industrial cluster construction is shown in Table 1. We selected different numbers of concurrent users to test, and analyzed the performance of multi-users participating in the cluster. Through this test, it is shown that this function has a strong concurrency, and its response time gradually increases with the continuous increase of the number of concurrent users. When the number of concurrent users is 10,000, the maximum response time is 1.685 s, the minimum response time is 1.172, and the average response time is 1.389 s Experiments show that this system can meet the users' needs with large concurrency.

4 Conclusion

The application of college students' double-innovation training based on cloud learning platform starts with cloud storage, cloud server and cloud computing infrastructure, and organically combines the theoretical teaching, practical teaching and employment and entrepreneurship of double-innovation education. It has built a practical teaching system of entrepreneurship which integrates teaching, ability training and quality education. This system still has a sense of the times and is forward-looking in the current Internet era. The platform has created an online business incubation platform for colleges and universities by building virtual industrial clusters at a lower cost. The campus innovation and entrepreneurship service ecosystem supported by big data will be formed to better serve the development of innovation and entrepreneurship in colleges and universities.

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