Realization And Network Security Design of Information System Digitization of Scientific Project By JAVA+STRUTS

Fan Zhao*
Gansu Institute of Scientific and Technological Information, Lanzhou 730000, Gansu, China

*Corresponding author: fan_zhao2021@foxmail.com

Abstract. At present, the technical plan project appraised the management systematic characteristic, continuous, the independent not strong third party appraised carries out the advancement to be slow; The project may supervise the measure not strong not to have the explicit monitor target and the baseline data; Has not established a set to conform to the technical project characteristic and the project monitor appraisal system which matches with the science and technology project management. In view of above question, uses JAVA and the STRUTS method of exploitation realization easy to maintain, the easy dynamic expansion, to have the secure technical plan project appraisal management process. Through in the recent three years in the Gansu Province science and technology plan project appraised in the management the application indicated, the system enormous enhancement project appraisal management working efficiency, the system movement has been stable, the speed of response is quick, the security is high.

Keywords: Science and technology plan, Project evaluation, JAVA STRUTS, Security design.

1. Introduction
The evaluation and management of science and technology planning projects has become an important subject in the development of science and technology today. The evaluation and management of science and technology plan projects is an important task of the science and technology department (provincial science and technology department). [1-8] In the past, the evaluation and management information of science and technology projects used to fill in a large number of paper forms on an annual or stage basis, which was not conducive to the updating of information at any time, and also consumed a lot of manpower and material resources of the science and technology department. With the continuous advancement of science and technology and the rapid development of computer technology, the evaluation and management of scientific and technological projects must also be raised to a new level of management.

2. Demand analysis
The scientific and technological plan project evaluation management information system is an informatization method to strengthen the evaluation management, use and service of scientific and
technological projects, and the project evaluation is dynamically managed through the system. The goal of the system is to build a multi-faceted information management platform for data reporting, information management, and expert evaluation.

2.1. Data management requirements
The system is used to fill in the evaluation index information of science and technology projects; the project leader of each project undertaking unit updates the evaluation information of science and technology projects at any time and independently; it is convenient for the science and technology department to understand the project progress, project funding, phase results, equipment and equipment in the project evaluation in time. The project undertaking unit self-examined the evaluation report and other conditions.

2.2. Information management needs
Through this system, real-time information of all evaluation items can be grasped and managed. Classify, query, and manage different items; provide intuitive data statistics results for science and technology departments through graphic statistical analysis; convert statistical results into different document formats through format conversion, and perform online real-time printing according to data statistics conditions Summary.

2.3. Experts assess management needs
The project evaluation expert database is generated through the system, and according to different evaluation projects, different experts are selected to complete the evaluation expert evaluation scoring table and evaluation opinion table, and provide a reference for the final evaluation conclusion.

2.4. Business process requirements
The business process is based on the design principles of layer-by-layer reporting and layer-by-layer review to ensure the authority of the data. The project undertaking unit is responsible for the authenticity of the various information that needs to be evaluated, and the evaluation information management unit performs classified statistics and report summary on the submitted evaluation projects. Expert evaluation management for the evaluation submitted by the information management department

The information is responsible, and the final evaluation of the project is carried out by means of online scoring and filling in the opinion form.

3. System design
The system design follows the principles of scalability, flexibility, reliability and safety. The starting point of the system design is: a good framework structure and parameter-driven to facilitate future upgrades and reuse; relatively independent subsystems to ensure stability and easy scalability; good and unified user interface, and strive to be concise, clear, convenient and easy use.

The system is divided into three major subsystems: data reporting, information management and expert evaluation. System function structure.

3.1. Data reporting subsystem
The main operation of the data reporting subsystem is to fill in the "Science and Technology Project Evaluation Form". There are 29 indicators divided into 7 categories. They are: basic information, including: project name, undertaking unit, detailed address, project start and end time, field, approved department, plan category, unit attribute, unit affiliation, and project leader information, Cooperation units, etc.; project progress, including: project progress, completion, content and target changes, personnel input, participating units; project funding, including: funding, funding; phase results, including; scientific and technological achievements, applications Patent, authorized patent, scientific and technological achievements, software registration, formulation of technical standards, scientific
and technological papers, scientific and technological works; equipment; self-examination and evaluation report of the project undertaking unit; upload of attachments. After filling in item by item and saving, click "query" to see all the filled evaluation forms, the status at this time is "not submitted", click the "submit" button to submit the operation of the project process, click the "modify" button to modify the project is modified. Click the "Print" button to automatically generate a form in WORD or EXCEL format and print it in real time, which is convenient for the project undertaker to report the paper form of the project to be evaluated.

When entering the system, you must first fill in the account number and basic information to register, and you can log in only after passing the review by the superior authority. Then proceed to fill in the "Science and Technology Project Evaluation Form" operation.

3.2. Information Management Subsystem

The information management subsystem is mainly a management platform for technology management users to collect annual data. It is mainly composed of administrator login, project query, data return, classified data statistics, data statistics graphic analysis, data format conversion, index maintenance, template control, etc. composition. Among them: data return: mainly the administrator can return and modify the data that does not meet the requirements. Data conversion: The system needs to convert the html result format reported by users into word and excel data formats for management users to print. Classified data statistics: It is the core function of the system. It can combine and query the required data according to the project type, technical field, project name, data statistics start year and end year options; at the same time, according to the basic situation of personnel, project funding, project expenditures, number of scientific and technological achievements, number of project patents, awards of scientific and technological achievements, technical standards for the development of scientific and technological papers, statistics on academic exchanges and achievement transfers, project demonstration bases and subsequent funding and supporting information, talents Cultivate and new product situation, project economic benefit situation, project instrument and equipment situation, carry on the data summary statistical analysis, form the data analysis report.

3.3. Expert evaluation subsystem

The expert evaluation subsystem is mainly a data management platform for experts to evaluate projects and evaluate opinions. It is mainly composed of expert user login, project allocation, project query, project evaluation, project evaluation management, project evaluation submission and other functions.

User verification: The system uses real-name registration for identity verification, avoiding repeated logins for users. Project allocation: After the project administrator enters the system, the experts will be allocated projects. The principle of allocation is based on the experts’ research fields. Projects in the same project field can also be allocated to multiple experts in the same field to achieve multiple projects. The mode of evaluation by two experts together. Improve the accuracy and fairness of project evaluation. Project query: query the assigned project, query according to the conditions of project name and expert user name. Project evaluation: Carry out project evaluation work, fill in the evaluation scoring form and the opinion form. Project evaluation submission: Submit the project after evaluation, and the administrator will save it. Project evaluation management: Manage users to delete and modify evaluation projects, and manage expert accounts, etc. Completion of project evaluation: Inquiry about the progress of project evaluation, you can understand the project evaluation stage in time and make reasonable time arrangements.
3.4. Business Process
According to the demand analysis of the business process, the business process is shown in Figure 1:

![Business flowchart]

Figure 1. Business flowchart

4. System implementation
The operating system adopts Microsoft Server2003, the WEB application server adopts Apache, and Microsoft SQL Server2008 is adopted as the network database server of the entire system.

The online system development tool uses a rich J2EE integrated development environment MyEclipse7.0. Use Sybase PowerDesigner 9 modeling tool to model the system. Microsoft Visual Source Safe (VSS) is used to manage the project files and control the source code version. The development tool adopts the integrated development environment zend Studio for Eclipse 6.1.

5. Key technology
JAVA is an object-oriented programming language that can write cross-platform application software. It is the general term for Java programming language and Java platform (ie JavaEE, JavaME, JavaSE) launched by Sun Microsystems in May 1995. Java has been very popular since its appearance and developed rapidly, which has had a strong impact on the C++ language. Java technology has excellent versatility, efficiency, platform portability and security, and is widely used in personal PCs, data centers, game consoles, scientific supercomputers, mobile phones, and the Internet. It also has the world’s largest professional developer community. In the global cloud computing and mobile Internet industry environment, Java has significant advantages and broad prospects.

Struts is an open-source project sponsored by the Apache Software Foundation (ASF). It was originally a sub-project of the Jakarta project and became the top project of ASF in March 2004. It adopts JavaServlet/JSP technology to realize the application framework based on the MVC design.
pattern of Java EEEWeb application, which includes model, view, controller and an XML file. Struts has two corresponding configuration files web.xml and struts-config.xml, where web.xml needs to make corresponding declarations for the struts tag library used in the Web presentation layer. And Struts-conf.xml describes the files related to Struts, which is mainly used to store configuration information describing the path of the user's request and the corresponding Action mapping relationship. The system mainly configures and realizes the above files.

The realization of the database is mainly based on the input data information of the technology evaluation form, user authority and data management, and the summary statistics and output operations are carried out in an appropriate manner.

The data call of the science and technology evaluation table is through the framework structure of struts, using Java technology to directly call the data in the database, and call the relevant information through SQL query statements to realize the automatic synchronization and binding of the front desk and the database. Due to space, only the SQL query statements of the unit are listed. As follows:

```sql
select DECLARE_UNIT_ID as declareUnitId,
    LOCUS_ID as locusId,
    PARENT_MANAGE_UNIT as parentManageUnit,
    UNIT_NAME as unitName,
    UNIT_TYPE as unitType,
    UNIT_ADDRESS as unitAddress,
    UNIT_POSTAL_CODE as unitPostalCode,
    UNIT_CATEGOARY as unitCategoary,
    CORPORATION_PHONE as corporationPhone,
    CORPORATION_EMAIL as corporationEmail,
    UNIT_FAX as unitFax,
    UNIT_CORPORATION as unitCorporation,
    CORPORATION_DEPUTY_SEX as corporationDeputySex,
    EMPOLDER_NAME as empolderName,
    UNIT_CHARACTERISTIC as unitCharacteristic,
    ACTION_CODE as actionCode
from DECLARE_UNIT
Where unit_name = #name: VARCHAR# and unit_organization_code = #org: VARCHAR# and action_code = 'A'
```

Different user rights correspond to different data management rights. For data reporting users, the information modification and query requests of the data reporting personnel obtain the needs of the personnel after the analysis of the query request. Then the requirements are transformed into structured query language SQL statements and sent to the database system. The database queries the result according to the SQL statement and returns it. The system receives the query result set returned by the database, after a certain analysis and processing, converts it into an HTML browsing page, and returns it to the client browser. For the data modification, addition, and deletion requests of the user administrator and evaluation expert users, the request is verified after the data modification, addition,
and deletion request is checked, and the request is confirmed as a valid request by an administrator who has obtained the authority. Analyze and get the specific content of the request. Then it is transformed into a structured query language SQL statement and sent to the database system to update the database information.

6. Security of the system
Through the demand analysis of the platform, the security of the system is improved. The system performs security protection from the following three aspects: hardware protection and account security.

Through the configuration of the firewall, the application layer and data layer of the system are placed in the DMZ zone, and the corresponding access addresses are converted through one-to-one addresses. In addition, the unused port of the system server was closed and the port number of the system open port was changed to prevent network attacks through commonly used port numbers.

In terms of account settings, real-name registration is used for identity verification, and relevant permissions are granted through the nature of not requiring users. For example: data reporting users can only modify and submit operations; evaluation expert accounts can only perform operations such as viewing and filling in scoring tables; administrator accounts are divided into system administrators and data administrators. The system administrator can only modify, delete and review accounts. The data administrator can only perform operations such as statistics, return, modification, and deletion. The database password is encrypted by MD5.

7. Conclusion
The system has been put into use. A total of more than 50 units in 14 cities (prefectures) and 86 counties (districts) in Gansu Province have conducted evaluations. The data statistics have reached 100,000 times, and more than 50 scientific and technological evaluation reports have been published. The use of this system has greatly improved the depth and breadth of science and technology assessment, and provided a good decision support service platform for science and technology plan assessment management departments.

References
[1] Qiang Chen, Huanhuan Hu, Yuehua Bao. Science and Technology Evaluation Standards: Foreign Experience and Enlightenment [J]. Forum on Science and Technology in China. 2012, (5): 22-28.
[2] Xu Duoyong, Wang Jisheng, Xu Xiaohong. Postgraduate information management platform based on Web.2.0 service [J]. Information System Engineering. 2013, (1): 62-64.
[3] Haoqianman. JAVA core technology: Volume I + Volume 2 (the 8th edition of the original book) [J]. China Science and Technology Information, 2014, (2): 110-130.
[4] Di Chang, Xia Zhang, et al. "Location based robust audio watermarking algorithm for social TV system." In Pacific-Rim Conference on Multimedia, pp. 726-738. Springer, Berlin, Heidelberg, 2012.
[5] Di Chang, Xia Zhang, and Yue Wu. "A Multi-Source Steganography for Stereo Audio." Journal of Wuhan University (Natural Science Edition) , 2013(3): 277-284.
[6] Xia Zhang, Di Chang, et al. "An Audio Steganography Algorithm Based on Air-Channel Transmitting." Journal of Wuhan University(Natural Science Edition) 57, no. 6 (2011): 499-505.
[7] Xia Zhang, Di Chang, et al. "Tree-like Dimensionality Reduction for Cancer-informatics." In IOP Conference Series: Materials Science and Engineering, vol. 490, no. 4, pp. 042028. IOP Publishing, 2019.
[8] Xia Zhang, Di Chang, et al. "A Study on Different Functionalities and Performances among Different Activation Functions across Different ANNs for Image Classification." In Journal of Physics: Conference Series, vol. 1732, no. 1, p. 012026. IOP Publishing, 2021.