

A Study of Document Management System Based on J2EE

Jing Ni, Liangwei Zhong, Qingqiang Ma, Guangle Yan

Business School, University of Shanghai for Science and Technology, Shanghai 200093, China

Tel: 86-21-5527 6487 E-mail: nijing501@126.com

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Abstract

The ways to set up document management system are proposed. These ways based on Java B/S adopts N-tier framework of MVC Model 2 in J2EE platform and uses EJB, Struts Web Framework and Hibernate technology and so on. The framework of this system and its functional modules are studied, which perfect and improve expansibility, robustness, loaded capability and executive efficiency. A basis for improving the quality of knowledge management and achieving data share and cooperative design based on Internet will be provided by this research for enterprises.

Keywords: J2EE, Document Management, Component, Framework

Along with the rapid development of computer technology and the gradual popularization of information technology, the enterprises adopt many advanced ways to design products, which contributes to improve design efficiency and production efficiency greatly. Meanwhile, it produces tremendous and various electronic datum and information as well. Original document management methods, which have no perfect solution to cooperate product data management and departments, cannot meet the demand of developing coordinate networked products. The document management system based on J2EE, which is on the basis of Java B/S technology and adopts N-tier framework of MVC Model 2 in J2EE platform and uses EJB, Struts Web Framework and Hibernate technology and so on, will perfect and improve expansibility, robustness, loaded capability and executive efficiency.

1. J2EE Platform

J2EE, consists of Java, component, service and communication technology, is a calculated platform which can simplify the complex problems of development, deployment and management for enterprise solution. Among them, the component technology is widely applied. J2EE platform supports Applets, EJB, JSP, Servlet and the other components. These components execute their functions in individual container. It has some advantages: 1) Independence of platform. It concerns document management information being distributed on various platforms. 2) Reusability. Component reused and packaged technology can greatly improve efficiency and quality of system development. 3) Module. It is useful to develop the system that is divided into different modules in terms of its function. This system chooses J2EE as basic platform to research and achieve distributed, object-oriented and web-based system framework.

The system provides working service of life cycle management, safety control, transaction management and thread management and so on for components. Therefore, the computer engineer can devote his mind to achieve business logic of enterprise without concerning the complex problems in distribution.

2. Framework Design of Document Management System

In this project, we choose MVC (Model/View/Controllers) whole framework and Struts Web Framework technology as solution of presentation tier, Enterprise Session Bean technology as solution of business logic tier, Hibernate technology as solution of persistence tier. See Figure 1.

2.1 MVC Module Framework of Document Management

MVC is a program method and framework which is based on object-oriented design thought. Its core idea is to reduce the interdependence of all tiers and loose the relation of all modules in order to make best reuse of them. In this MVC framework, application program is divided into three core components: Model, View and Controller. They execute their tasks respectively and separate input, processing and output of application program forcibly. To apply MVC framework can detach core data access function from data presentation and logic control. This detachment will make the whole system form an incompact coupling framework, so that the system design is clear and possesses reusability, expansibility and flexibility.

The document management system framework based on MVC is very flexible. It can connect different modules and views to meet clients' demand with controller. Therefore, the controller can provide forceful means for setting up application program. Through some reusable modules and views the controller can process the modules according to the demand of



client, and then choose corresponding views to show the client processing result. Figure 2 shows MVC module framework:

Figure 1. System framework view



Figure 2. MVC module framework view

2.2 Web Presentation Tier -Struts Web Framework

MVC framework can be realized by Struts, which abstracts display, control of application program and back-end code of data and integrates advantages of JSP and Servlet. It gets reuse code and abstract Java code by using Taglib technology and achieves navigation of the whole system by using ActionServlet with Struts-config.xml, so as to improve maintainability and expandability of the system. Figure 3 shows Struts MVC framework view:



Figure 3. Struts MVC framework view

To choose Struts as the solution to view and controller in the document management system framework improves the reusability and flexibility of Web application program. By parting the problem into smaller components Struts can have more chance to reuse codes when technology space and problem space change. In addition, Struts detach Web presentation tier from business logic tier, which contributes to assign engineers in the process of system development.

2.3 Business Tier---Enterprise JavaBean

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EJB can meet the demands of enterprise system in versatility, expandability, portability, fast construction and customization. It provides a framework to develop and execute distributed business logic, which simplifies development of expandable and extreme complex application system. In addition, EJB container takes charge of public services, such as JNDI, JTS, safety, resource buffer pool and fault-tolerant processing. This document management, which uses EJB as solution to business tier to achieve module of MVC framework, can meet the demand of enterprise business.

2.4 Persistence Tier--Hibernate

Data persistence is a very important link in the development process of enterprise application program. It means that data in outside storage medium (such as database and flat document system)can be protected for a long time even if application server is broken down.

In J2EE framework, the standard of realizing data persistence is to map from object expressed by object model to relational model data structure by Bean in EJB component model. And in the actual application it appears high consumption, low performance, complex configuration and general development efficiency in Entity Bean memory. Hibernate is an excellent lightweight O/R Mapping framework of open source code. It packages JDBC and simplifies program of data persistence. It maps from object expressed by object model to relational model database and provides means of inquiring and obtaining data, which greatly reduces the time to use SQL and JDBC processing data manually. It is convenient to use object-oriented programming thought to manipulate database. The application of Hibernate lower the application difficulty in using large and complex enterprise J2EE framework . In fact, it is so simple and practical that Hibernate is widely applied in the process of enterprise information construction.

2.5 Application Server-JBoss Application Server

JBoss Server is applicable to develop, integrate, deploy and manage large distributed Web application, network application and database application. It introduces dynamic function of Java and safety of J2EE into development, integration, deployment and management of large network application. Both webpage cluster and component cluster are critical to expandability and usability needed by document management. JBoss Server realizes not only webpage cluster but EJB component cluster. Meanwhile, it needs no support from any special hardware and operation system. The enterprise application system of document management should be developed rapidly. It requires that server components possesses not only good flexibility and safety, but expandability and strong usability to support key task. JBoss Sever can meet the demand of enterprise application system development of document management. It simplifies the development of portable and extendable application system and provides rich interoperability for the other application systems.

3.System Function



Figure 4. Functional configuration of product database management system

3.2 Module of System Function

This system includes five modules: organization structure and access control management, product structure and version management, design index and part library management, workflow and process management, project management.

3.2.1 Organization structure and access control management

By this module enterprise can control all staff to operate database according to their duties. Its main functions are to set up and maintain enterprise organization structure, carry out access control management of project data in the process of product design, including authorization and verification, and provide the basic support for the operation of the other

modules.

3.2.2 Product structure and version management

This module is in charge of setting up and maintaining complete product structure tree model. Its main functions include creation of product structure tree, dynamic tier view, storage version of parts in design procedure. This system can automatically get product structure information to set up product structure tree from CAX. Each node of product structure tree contains not only CAD/CAE/CAM/CAPP file but all kinds of files produced in design process. Therefore, it can take product as basic unit to orderly organize the related technology document and management document in terms of the ways of organization structure and forms main model of product information.

3.2.3 Design index and part library management

This module provides support for creating new products by reusing present design to the greatest extent. Its functions mainly include interface of part data, index based on content but not classification, maintenance system of database, transformation mechanism of technical data obtained from design process.

3.2.4 Workflow and process management

Workflow and process management module is to define, execute, track and monitor all the things and activity in the process of product development and project modification. It consists of definition tool of workflow module, workflow engine which executes workflow, workflow monitor and management tool and so on. It defines workflow module according to business process, instantiates workflow module and submits it to workflow executing. It can track the executing condition of workflow by using workflow monitor and management tool. The workflow management in the system plays emphasis on the management of data and document life cycle. To generate, audit, publish, change and file data can be realized through workflow. In addition, management efficiency and quality will be improved by making best use of auxiliary function in workflow and process management (such as triggering, warning, notice mechanism and interface of email and so on).

3.2.5 Project management

The design and manufacture of product is a system project, which involves many aspects of project areas. Project management module is in charge of dividing data process and workflow task into subtasks and allocates related staff, process and workflow to product project, so as to reduce the complexity of product object management. This module includes fixed value, monitor, audit, feedback and submitting of project. With the help of this module, project supervisor can send progress reports to project director, with which director may arrange the whole task easily. To some extent, this document management system can save tremendous resource.

4. Conclusion

As the above stated, in this paper it programs much more overall function module of document management based on advanced thought of life cycle management. The successful implementation of this system can effectively improve the quality of enterprise knowledge management and achieve knowledge management of product. With this system the enterprises can stably develop products and enhance competitive power of enterprise, so as to meet with the challenge of variable international market environment. We will continue to perfect and extend its function to meet the demand of enterprises and go further to strengthen the security of system information.

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