

Weak Electricity Pipeline Management System Development Based on Seam Framework

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Abstract—As information technology and accelerating the process of the network, many companies, schools or government agencies are densely covered with a variety of weak lines, of which both China Unicom's mobile telecommunications network cable has a telephone line and broadcast television Some TV lines. Although this information for the automated management and teaching provides a great convenience, but also for the management of these lines offer a wide variety of great difficulty. To solve this problem, we choose as our component-oriented development platform for J2EE, JBoss Seam, as by introducing the main framework for development based on B / S model of the campus weak pipeline management system. Seam framework is the ability to develop the advantages of rapid generation development model based on the database, while a large number of integrated development framework to accelerate the speed of system development, reduce maintenance costs.

Keywords—weak electricity pipeline management system; Seam; J2EE; B/S mode

I. INTRODUCTION

The 21st century is the era of information technology, Along with the informatization process accelerate ceaselessly, company, school, government agencies and the community in various places densely covered the various weak electricity lines. They have both China mobile and China Unicom network cable and Telecommunications telephone lines and cable TV circuit, the circuit is mainly composed of well holes, pipes and cables. Information technology for the automated management and teaching to provide a great convenience, but also brought great difficulties to manage a wide variety of lines^[1]. Traditional network management approach to manual management, the pipeline data record by drawings and forms^[2]. This manual way to feel powerless in the management of a huge network of tunnels. For example in two distant buildings add a new optical cable between them which may have a lot of pipeline and the well bore may go. But for managers, how to choose the pipeline to achieve the purpose of saving cable? Apparently the original manual measurement has failed to meet the rapid development of enterprises and service needs of the community. In order to solve these problems it requires the establishment of a convenient management of weak electricity pipeline management system. The weak electricity pipeline management system will provide important guiding role for construction work^[3].

For weak electricity pipeline management system, it select component-oriented J2EE as development platform. At

present, the most popular development framework of the J2EE is the SSH(Spring+Hibernate+Struts) framework. Its disadvantage is that the development is slow, difficult to maintain. The JBoss Seam is a tailor-made lightweight framework for Java EE 5.0. It is located in the upper layers of the Java EE 5.0 framework. It is for all Web application components to provide a consistent and easy to understand programming model. It makes the state based applications developed and based on business process driven application development become easy. Seam has broken the barrier between EJB 3.0 and JSF. It provides a unified and annotation-based solution to integrate the EJB3.0 and JSF. So Seam is the glue between EJB3.0 and JSF. At the same time, Seam also known as next-generation Web framework. There are many places in the J2EE 6 builds on the Seam of the standard. This shows that the development of the Seam's future form is very optimistic. Advantage of the Seam framework developed is the development model based on the database to quickly generate a large number of integrated development framework to accelerate the speed of the system development, reduce maintenance costs. By introducing JBoss Seam as the main framework to develop a weak electricity pipeline management system based on B / S model is an ideal fit^[4].

II. THE GENERAL FRAMEWORK OF THE WEAK ELECTRICITY PIPELINE MANAGEMENT SYSTEM

The most important features of the weak electricity pipeline management system is CRUD and statistical operations on the pipeline data. Around main objective of systems development, the weak electricity pipeline management system needs analysis as follows:

- It can calculate the number of various types of fiber optic cable, pipeline and well bore (Such as the number of Telecom Global Eye).
- It can calculate the length of each weak electricity cable.
- Users can browse the location of the well bores, pipelines and cables.
- User rights management.
- Using B/S design pattern.

Based on the above system requirements analysis, weak electricity pipeline management system design of the structure shown in Figure 1:

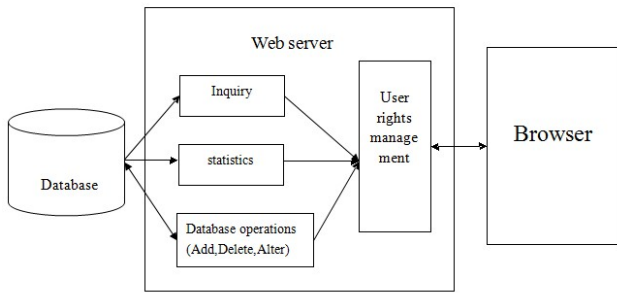


Figure1 System structure

In Figure 1, The user through the browser on the system operation. First, Determine whether the user is ordinary user or administrator. Then, given different system functions. When the user operation of the system, the server through the operation of the database to complete the user's operation request.

Use case view is provided to enhance understanding of the needs of a technology. Use case is to target system business process description^[5]. The weak electricity pipeline management system use-case modeling. First of all to make sure the use case diagram of the system boundary to the function expansion subsystem. Then according to the system boundary identification use case diagram roles that including system administrators and ordinary users. Through the user needs analysis to build the system use case diagram, as shown in the figure 2.

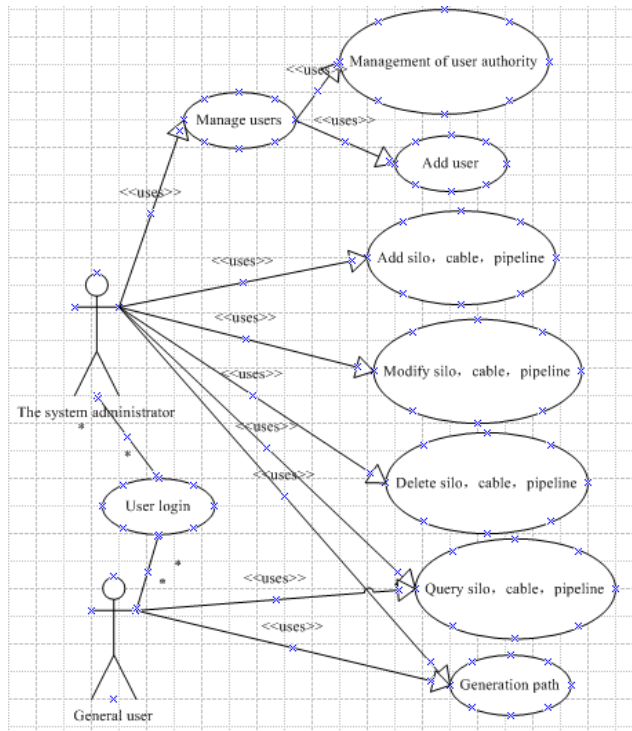


Figure 2 System use case diagram

III. DATABASE DESIGN

In Seam can use database reverse generation system. A good database design can make Seam good use of tables in the database and the data directly reverse generation web based on a simple Java application prototype. Using this procedure prototype and user further communication, can get more accurate demand information, then improve the system design. This can greatly reduce the programming time and improve the efficiency of development^[6].

According to figure 3 we can see, there are five tables in the database of this project. They are respectively cable table, silo table, silo table, cable_pipeline table, silo_hole table.

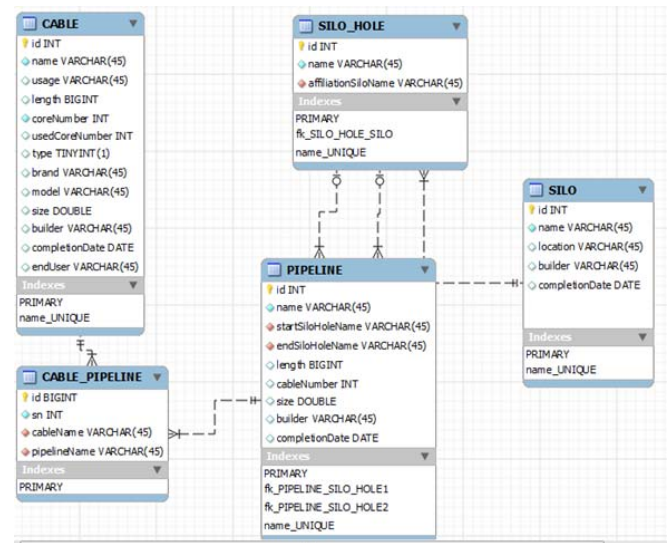


Figure 3 Database diagram

IV. THE REALIZATION OF THE BASIC FUNCTIONS

A. Generate the project skeleton

After the completion of the database table design, The project skeleton is generated by Seam-gen in Seam^[7]. The specific steps are as follows

First step: Seam setup command to configure the Seam basic attributes. Seam setup will issue a series of problems that seam-gen to collect the information that it need. Each issue consists of 3 parts: the problem, the current value and an effective reply list (if any). For each question, need to input a reply and press enter. And then move on to the next question.

Second step: Use Seam create-project to create infrastructure project framework. Let seam uses the template to generate a project, but also need to perform seam create-project command. So that the seam will create a new project. Seam will configure the new project with an Ant build, used to compile, test, package and deploy applications.

The third step: Use the Seam generate command to reverse generation the CRUD that is database management procedures. There is a project based framework, it can be deployed. If it is based on a database, can first database reverse engineering. Use the seam generate command from an existing

database of Schema to generate JPA entity class.And generation used to manage these entities CRUD user interface.

The fourth step:Use Seam explode to deploy the application to JBoss application server.After application of the prototype builds, in order to make the application program to start, need to be deployed to the JBoss application server.In order to application for hot deployment.Use the seam explode

command to deploy or direct deployment inside the IDE.After applications to change,can be rerun the seam explode command to re-deploy.

This reverse generated project can achieve the most basic functions.Such as browsing the database tables, add and delete pipeline and cable.As shown in the figure 4 is just to generate the original system interface.

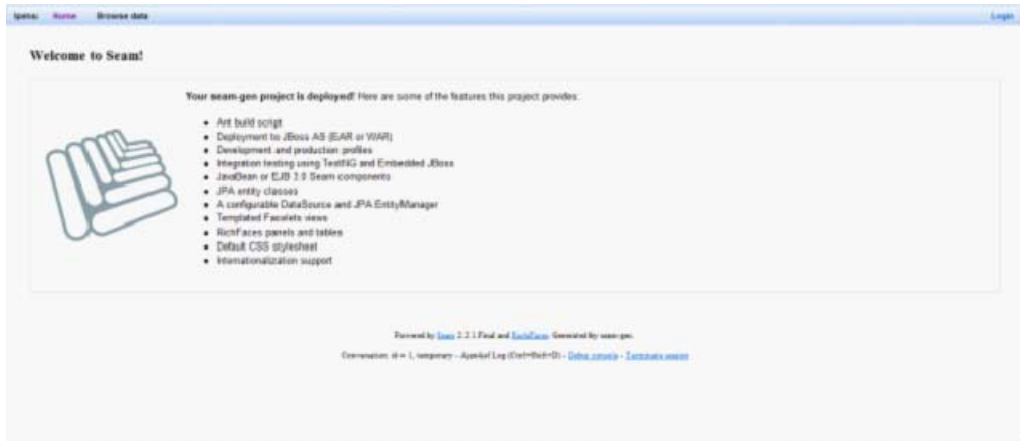


Figure 4 Initial system interface

B. Business logic implementation

The development of this system is based on the MVC development mode(Model View Controller).The view layer for display users visit the page.It main use of JSF, Facelets and RichFaces to realize.View page for the xhtml file.The controller has a XML file to play to achieve the user parameter acquisition, control, transmission and navigation.Model is the Java entity class it is endorsed by the Seam-gen database reverse generation.Through these classes of entities and the Hibernate that have realized the JPA specification to the database persistence^[8].

The next task is designed good webpage interfaces according to user's requirements.By acquiring the user request and then use the XML file transfer parameters and control the business logic in the direction.Then through writing Java operations to achieve the operating entity class.Finally through the persistent to update the database.The following is the realization of pipeline management Java operation class code:

```
@Name("pipeLineHome")
public class PipeLineHome extends
EntityHome<PipeLine> {

    public void setPipeLineId(Integer id) {
        setId(id);
    }
    public Integer getPipeLineId() {
        return (Integer) getId();
    }
    @Override
    protected PipeLine createInstance() {
        PipeLine pipeLine = new PipeLine();
```

```
        return pipeLine;
    }
    public void load() {
        if (isIdDefined()) {
            wire();
        }
    }
    public void wire() {
        getInstance();
    }
    public boolean isWired() {
        return true;
    }
}
```

In the code, the use of a number of comments .Through these comments to the Seam container declaration services.Seam through the interceptor achieved these services.In addition to these comments, the class and normal class Java no difference.These are lightweight framework advocated.

V. SUMMARY

In this paper,based on the weak electricity pipeline management system functional requirements analysis design an overall system framework.Through the the JBoss Seam quickly generate the basic skeleton of the project.This is consistent with the rapid development of requirements.And by the rapid prototyping can effectively communicate with customers to continuous improvement the system.

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