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Further Analysis and Multiple View of Assist Developed Platform

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Abstract. SSH framework software is a system implemented by struts or struts2, spring, hibernate, It is used to implementing java web application system. This article study concept of struts2, spring, hibernate and character of SSH Framework, design and implement an assist developed platform based on SSH framework, It may provide efficient, simple, stable support for SSH framework system.

Introduction

At present, Java Web application system is mostly designed and implemented by adopting the multiple-level architecture of J2EE（Java 2 Platform Enterprise Edition）. In fact, J2EE is just a set of technical specifications and guides which contains various components, service architecture and technical levels with common standards and specifications. Following various J2EE frameworks, it permits a good compatibility between different platforms to get rid of the dilemma where the information products used back-end by enterprise cannot be compatible with each other and the internal and external of the enterprise can hardly get in contact[1]. The three open source middlewares, Struts2, Spring and Hibernate, are the implementation of presentation, business logic and data persistence layer in the J2EE specifications. Integrating those three techniques can implement J2EE framework system. The assist developed platform of SSH framework is to abstract and implement a J2EE developed basic software based on the features of this framework system. The platform provides rapid integration and general components of SSH technology, such as page menu, directory tree, data display table and reports.etc. Besides, it is convenient for the platform to expand the components of its other functions.

The research of J2EE-related middlwares

J2EE is just a specification of framework, that is to say, there is noly design but not concrete implementation. So a good many companies implement function components at different levels based on such a specification. Those components can be called middlewares. Figure 1[2] shows the structure of the entire J2EE system.

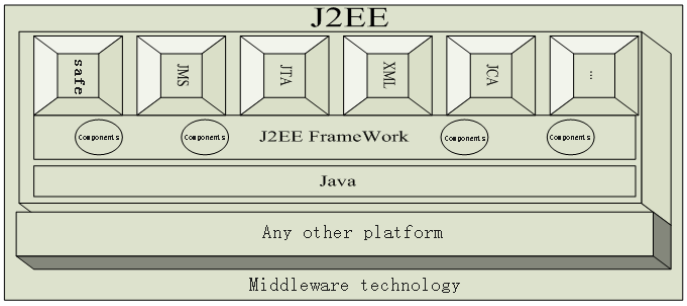

Fig.1. J2EE system structure

The article intends to discourse that Struts2, Spring and Hibernate belong to J2EE middlewares, which are respective implementations of presentation, business logic and data persistence layer among the J2EE specifications.

Struts2. Struts2 is based on the design concept of Web Work. It inherits some merits from Struts1 and construct a Web framework to make Web Work and Struts1 compatible, which garantees the stability and capability on all sides. It is a framework to be developed in a long term. The framework processes pages as follows.

- Clients send a request to the server.
- Filter and process the request.
- Core controller applies some Action to process on the request.
- Load all the relevant interceptors of Action to process on configures.
- Send the results back to clients on configurating files

Spring. Spring is an open source framework founded to solve the complexity when enterprises are developed. It is a multiple-level JavaEE application framework to offer JavaEE solutions at each level. Spring is the first option to apply and develop Web. It runs through presentation, business layer and persistence layer and can be integrated seamlessly among all the levels. Here are the main features of Spring.

Lightweight: Spring requires a very low processing expense. Concerning the overall consumption of resource, the solution of Spring is lightweight, compared with other frameworks of the same type, for example, EJB3.0.

Inversion of Control: It is also known as Dependency Injection, which is a core design concept of Spring. It's shown that the connection between objects and service is not given directly by codes but associated by containers to describe which component needs what service in the configurate files.

Aspect-oriented: It is a continuation of the object-oriented programming. It maily disintegrates basic business logic from the codes of practical projects and implements it in a non-business logic manner, such as logging, performance statistics, security control, transaction processing and exception handling.etc. In the way of pre-compiling and dynamic loading, the programme will adjust some fundamental functions dynamically without modifying the source code.

Containers: It is the hub of Spring, which takes charge of administrating the creation of application objects and its life circle.

Hibernate. Hibernate is a Object-Relational mapping persistent framework, providing a Object-Relational (OR) mapping solutions. Database can be operated by object programming concept without considering how to access it from the database. Hibernate is applied in HQL (Hibernate query language). It manipulates persistent objects. The bottom persistent objects will refresh the data and store them into the database. The data to be operated are persistent, which means the data of persistent objects keep consistent with those in the database.

In the course of developing application systems, the Hibernate configuration file can be used to specify the driver information for JDBC to link the database. When the application programme accesses the database, it will firstly read Hibernate configuration files, and then find out the persistent XML mapping document through those files. The mapping document assists founding relevant persistent objects to be manipulated. Those objects can help users to implement some operations of data in the database table, such as add, modify, query, delete.etc.

The analysis and design of the demand for the assistant management platform of SSH framework

Usually, application softwares will possess the following general functions: authority control, reports, task processing.etc. and some general components for simple design such as menu components, query components.etc.

The application software consists of core business function and system assist function. Core business function is the more important one, showing the core value of the software. This function can mostly be customized. Different application systems perform different business, so the codes of this part will barely be reused but re-designed based on its concrete demand. Assist functions are the functions to expand system assist core business, such as authority control, reports, task processing and

general components.etc. Most of the assist functions are general or semi-general, such as authority, reports, task processing.etc. To improve the efficiency of development, there are some general components in need, such as menu, query.etc.

The research and implementation of the system cannot solve the problems appearing in the process of developing softwares. It just releases programmers from some repeated work and makes them devote more energy to solving system core business, thus improving system quality and the efficiency of its development and its competitive capability. It can be worked out in three aspects. First, abstract and generalize the code of general functions, such as add, delete, modify and read (CRUD) data. Second, component functions like menu, query and page (widget). Third, function template such as authority, reports, tasks.etc.

The assist management platform of SSH framework possesses the following functions: Application, Lightweight, Quick and Console. Therefore, it can be calledl ALQC management platform in short. Its functions are extracted by considering the purposes of the three aspects above. In order to enhance the reusablility of SSH framework, these functions are designed into separate application management programmes, disintegrated with practical business programmes. Practical application programmes can conduct a direct secondary exploration on the engine of the platform. At present, the functions of platform include the distribution of interface framework, date component, report component, query component, menu component and timer.etc. Figure 2 illustrates the design architecture of the entire functions of platform.

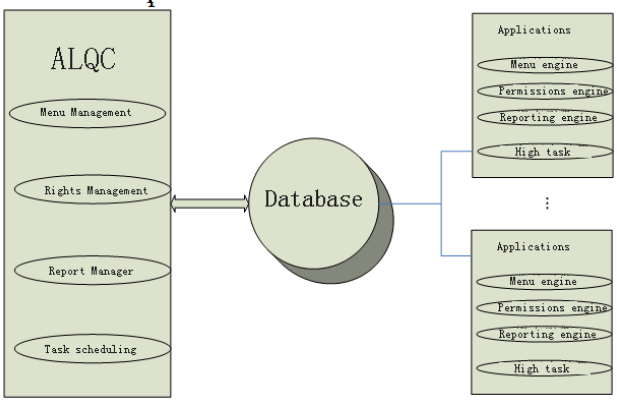

Fig.2. The design architecture of SSH framework assist management platform

Figure 3 shows the structure of technology framework of the entire platform. Every part is not only separate but also associated with other template to some extent. The entire system platform is composed by Struts2, Spring, Hibernate, Spring security and Jasper report, in charge of display, business logic, security, and report engine respectively. The aim of the platform is to offer service to the entire SSH framework as a elementary platform. Hence, in design, it is supposed to be flexible enough to satisfy the need of various software. Besides the three-tier architecture of the most basic MVC mode to separate vision, business and data model from one another, the system platform is also packed and applied in the form of plugins.

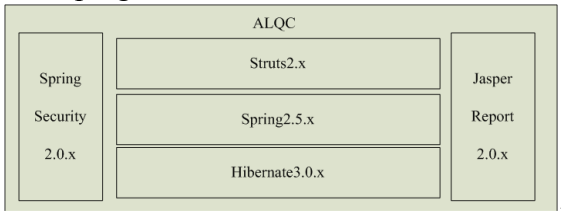

Fig.3. The system architecture of ALQC platform

The implementation and application of SSH framework assist management platform

Aimed at improving the readability and maintainability of the programme, combining the design features of SSH framework, the function of platform can be implemented elementarily based on united level specifications[4]. Figure 4 demonstrates the level structure of implementing the platform's functions.

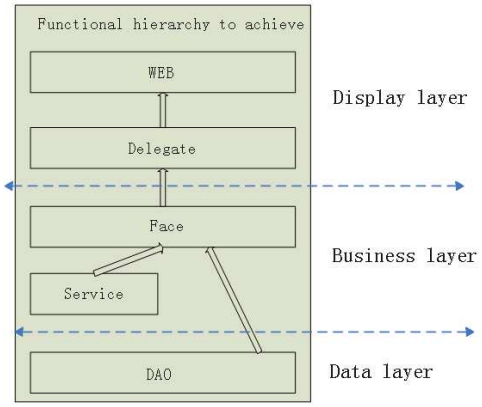

Fig.4. The constraint hierarchy of implementing the functions of system

Nowadays, based on the constraint hierarchy introduced above, SSH framework assist management platform implements the management of templates and their engines for use, which include menu, authority, query, reports and timer. This article takes an example of menu function to analyze the practical function codes on different levels.

The layer of presentation: It mainly takes charge of the interface display, input and check.etc. without referring to business operation. The tasks include pages and Action which communicates interactively with bottom business through Delegate or Facade[5]. The following are some codes to refer to which are completed by menu on the layer of presentation[7].

Edit.jsp—some codes to implement menu property to edit pages

```
<s:form action="/menu/edit.do"> //a list of Struts2 data tables
    <table cellSpacing=1 cellPadding=3 border=0 width="100%">
        <tr>
            <td class="texttd">name：</td> //entry of menu name property
            <td class="inputtd"><s:textfield name="menuItem.title"
                                    required="true"/></td>
        </tr>
</table>
</s:form>
```

EditAction—some codes to implement menu to edit and process Action [7]

```
//inherit the connector of Struts2 ActionSupport to implement and process EditAction
 public class EditAction extends ActionSupport{
    @Autowired //inject dependently the bottom business objects through Spring
    private MenuFacable menuFac;
    public String execute(){//process
    menuFac.addMenuItem(menuItem,resourceId);//use the bottom business to add a menu
        return SUCCESS;
    }
}
```

The layer of business: It mainly takes charge of implementing the business procedures in the system, whose tasks are to pack Facade business and to implement Service business[6]. Facade packs the service connectors of business layer to reduce the coincidence of the codes of the same ones on the layer of presentation so that the code has good maintainability and consistency. The implementation

of Service practical business procedures is the core of the programme. It can access and manipulate data in the database through DAO. The following are some codes to refer to which are completed by menu on the layer of business.

MenuService—some codes to implement menu property to edit and process Service[7]

```
@Service("menuService")//define a Service object
public class MenuService{
    @Autowired //inject dependently the DAO object on the data layer through Spring
    private MenuItemDAO menuItemDAO;
    public Integer addMenuItem(Integer parentId, String title) {
            MenuItem item = new MenuItem();
            item.setTitle(title);
            return menuItemDAO.add(item);
    }
}
```

The layer of data: It mainly takes charge of access to data resource, whose aim is to develop DAO and Entity mapped by database table. DAO is applied to manipulate database, inplementing data plug, refresh, delete, query.etc., while Entity is the loading object stored by data of the data table in database. The following are some codes to refer to which are completed by menu on the layer of data.

MenuItemDAO—some codes to implement menu property to edit and process DAO

```
@Service("menuItemDAO")//define a DAO object
public class MenuItemDAO extends GenericDAO<MenuItem,Integer>{
    //implement plug, refresh, delete query.etc. of MenuItem by inheriting GenericDAO.
}
```

Conclusion

Based on the research of relevant technology and the fundamental features of Web application software and combining the design features of SSH framework, SSH framework assist management platform is implemented in this article. Considering that this system is a basic assist development platform, it emphasizes its scalability, stability adaptability and reconfigurability so as to expand the basic functions of softwares in this framework, which makes it possible to reuse the existing design and functions of the platform in practice. The platform is intended to accumulate large amounts of experience and concept about design and development of SSH framework and enhance its efficiency and quality in practice.

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