

Jakarta Struts

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August 19, 2003

What is Struts?

- A Java Model 2 application framework
- Based on JSP, Servlets and XML
- Cross platform (runs anywhere Java does)
- Open Source – part of Apache's Jakarta project
- Free Software (even for commercial use)
- Very flexible
- Makes building Web apps faster and easier!

What's Wrong with ASP/PHP/JSP?

- These technologies generally encourage (or at least don't strongly discourage) inline scripting:

```
<h1>Some HTML</h1>
```

```
<%
```

```
    Dim objConn
```

```
    Set objConn = Server.CreateObject("ADODB.connection")
```

```
    objConn.ConnectionString = "DSN=foobar.dsn"
```

```
    objConn.open
```

```
    ' More code goes here
```

```
%>
```

```
<p>More HTML here</p>
```

Disadvantages of Inline Scripting

- Maintenance of application is difficult
- It's hard to follow code flow with all the surrounding HTML
- It's hard to follow the HTML with all the embedded code (especially with HTML in `out.write()` and `response.write()` calls)
- Cannot easily create custom UIs or reuse code

OK, So What's The Solution?

- The goal is to separate data, logic and presentation into separate “layers” of an application.
- This ideal was first defined many years ago in Smalltalk, one of the early Object-Oriented Languages.
- It became a “design pattern” known as Model-View-Controller (MVC).

What is Model-View-Controller?

- The Model contains objects that represents the data in an application (e.g. a “Customer” object).
- The Controller contains objects that define business logic (e.g. “ProcessOrder”)
- The View implements the UI (e.g. A Web page, a report or a GUI application).

Other Benefits of Struts....

- Struts also...
- Supports internationalization (i18n)
- Is not browser-specific
- Is not vendor-specific (app server, database, etc.)
- Provides automatic form validation (both client- and server-side)
- (Finally) has lots of documentation (books, JavaDoc, User Guide, mailing lists, tutorials)

Some Struts Terminology, Part I

Action Class = The custom controller components of your application. These are Java classes, and might have names like `CheckShoppingCartAction` or `UpdateCustomerAction`.

ActionClasses extend the `org.apache.struts.action.Action` class.

Some Struts Terminology, Part II

Action Form = These are Java classes that represent data collected and/or shown to the user. They might have names like CustomerForm or ComputerDescriptionForm.

They are essentially JavaBeans (but not EJBs).

ActionForms extend the
`org.apache.struts.action.ActionForm` class.

Some Struts Terminology, Part III

Custom Tag = These allow page designers to cleanly insert dynamic functionality in a page. It looks like HTML, but actually references a Java class. They are also known as Tag Libraries.

Example (Get the first name from the CustomerActionForm):

```
First Name: <bean:write name="Customer" property="firstName"/>
```

Some Struts Terminology, Part IV

Resource Bundle = A file containing key/value pairs that represent text shown in the UI.

These are used in concert with Struts custom tags in order to create labels, buttons, etc., so the text isn't hardcoded. This lets you make widespread changes easily, and also allows for internationalization (to be shown later).

How Does Struts Work? Part I

- 1) A browser makes a request to the server
- 2) The Struts “Master Servlet” determines if it should be handled by Struts (static content, like images, is typically not handled by Struts).
- 3) If it is to be handled by Struts, the servlet looks up in a configuration file what “Action Class” should handle it (based on the URL).

How Does Struts Work? Part II

- 4) The Struts “master servlet” also looks into the configuration file to find what “Action Form” goes with this request.
- 5) If there is no instance of this “Action Form” currently available, Struts creates a new one.
- 6) Control is passed to the “Action Class”, which runs some logic and passes off to the view component (typically a JSP).

A Simple Application

- To help illustrate these points, I created a simple Struts application.
- The application allows the user to view/create/update and delete contact information for their friends and relatives.
- Here is a brief tour of the application (from the outside looking in)...

A Simple Application, Part II

- The project layout
- The struts-config.xml file
- An ActionForm: ContactDetailAction
- An ActionClass: EditContactPopulateAction
- A View component: EditContact.jsp
- Resource Bundle:
ApplicationResources.properties

A Simple Application, Part III

- Tiles (like server side includes)
- Validation (as seen in the edit form) does both server-side and client-side (Javascript) from the same set of rules!
- Internationalization

Some Other Features...

- I didn't have time to demonstrate these features, but Struts...
- Let's you configure how exceptions (errors) are handled, via the struts-config.xml file
- You can configure DB pools via the struts-config.xml file, and access them generically.
- You can create “DynaForms” -- which work the same as ActionForms -- without writing Java!

Thanks

More information about Struts is at:

<http://jakarta.apache.org/struts/>

Any questions?