



# STRUTS

CREATED BY  
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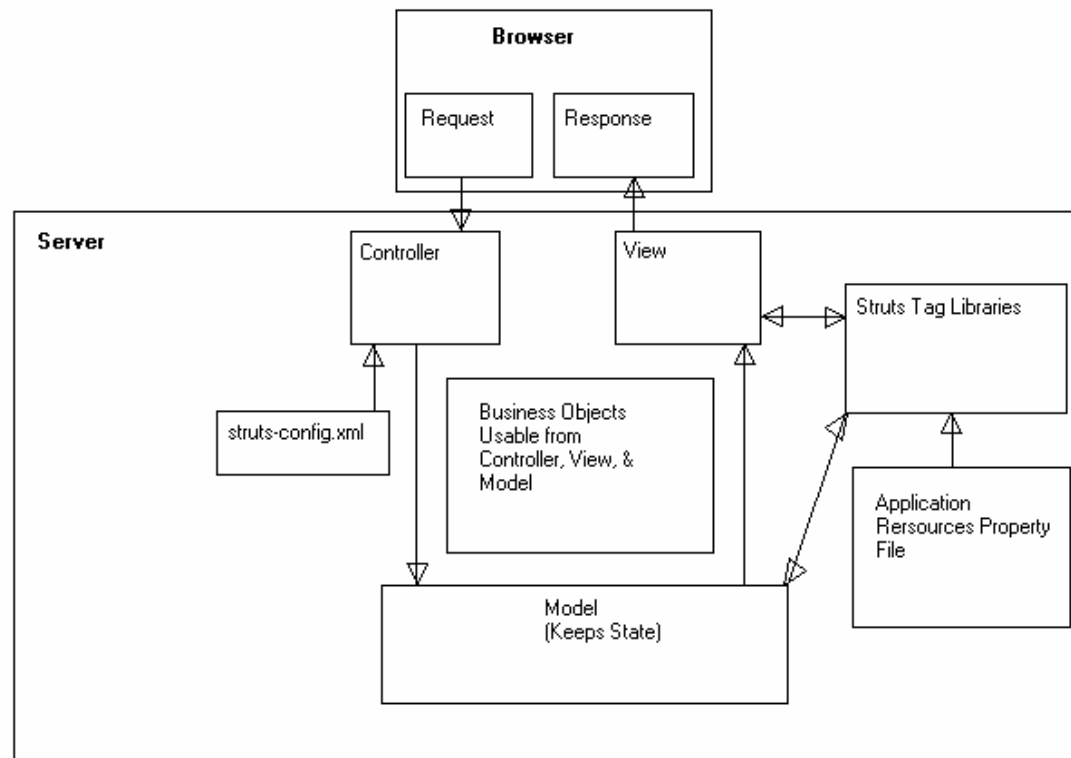
# INTRODUCTION TO STRUTS

- Based on the MVC Pattern
- Launched in May 2000 by Craig R. McClanahan
- Widely used for web based forms
- Preferred for complicated applications

# MVC Pattern

- Full Form is Model View Controller Pattern
- Model contains the business logic (Core Java class)
- View is the User Interface (JSP/XSLT)
- Controller (Servlet)
  - *Provided by Struts*
  - *Receives client request and passes it to the appropriate View*

# MVC Pattern



Source: Roger W Barnes of Project Refinery, Inc.

# Model Component

- Contains the business logic
- Contains Java Beans classes
- Contains all functional requirements
- Contains mainly classes written in Core Java, JDBC connections, Database queries etc.

# Model Component

## JavaBeans and Scope

- page - Beans that are visible within a single JSP page, for the lifetime of the current request. (Local variables of the service method)
- request - Beans that are visible within a single JSP page, as well as to any page or servlet that is included in this page, or forwarded to by this page.  
(Request attributes)

Source:[http://struts.apache.org/1.x/userGuide/building\\_model.html](http://struts.apache.org/1.x/userGuide/building_model.html)



# Model Component

- session - Beans that are visible to all JSP pages and servlets that participate in a particular user session, across one or more requests. (Session attributes)
- application - Beans that are visible to all JSP pages and servlets that are part of a web application. (Servlet context attributes)

Source:[http://struts.apache.org/1.x/userGuide/building\\_model.html](http://struts.apache.org/1.x/userGuide/building_model.html)

# Model Component

- **ActionForm Beans**

- Extends ActionForm class
- The ActionForm class itself requires no specific methods to be implemented. It is used to identify the role these particular beans play in the overall architecture. Typically, an ActionForm bean will have only property getter and property setter methods, with no business logic

Source: Roger W Barnes of Project Refinery, Inc.

# Model Component

- The ActionForm object also offers a standard validation mechanism. If you override a "stub" method, and provide error messages in the standard application resource, Struts will automatically validate the input from the form

Source: Roger W Barnes of Project Refinery, Inc.

# View Component

- Contains the presentation logic
- Cocoon, JSP, Velocity Templates, and XSLT. are some of the presentation technologies used
- XML + XSLT = HTML
- XML contains the data and XSLT contains the presentation logic

# View Component

- **Internationalized Messages**

- Locale - fundamental Java class that supports internationalization
- ResourceBundle - supports messages in multiple languages
- PropertyResourceBundle - standard implementation of ResourceBundle that allows you to define resources using the same "name=value" syntax used to initialize properties files

# View Component

- MessageFormat - allows you to replace portions of a message string with arguments specified at run time
- MessageResources - lets you treat a set of resource bundles like a database, and allows you to request a particular message string for a particular Locale



# View Component

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## Automatic Form Validation

- `validate(ActionMapping mapping, HttpServletRequest request);`

# View Component

## The Struts Validator

- The ActionForm bean must extend ValidatorForm.
- The form's JSP must include the <html:javascript> tag for client side validation.

[http://struts.apache.org/1.x/userGuide/building\\_view.html](http://struts.apache.org/1.x/userGuide/building_view.html)



# View Component

- Define the validation rules in an xml file like this:

```
<form-validation>
  <formset>
    <form name="logonForm">
      <field property="username" depends="required">
        <msg name="required" key="error.username"/>
      </field>
    </form>
  </formset>
</form-validation>
```

# View Component

- Lastly, enable the ValidatorPlugin in the struts-config.xml file like this:

```
<plug-in className="org.apache.struts.validator.ValidatorPlugIn"> <set-  
  property property="pathnames"  
  value="/org/apache/struts/validator/validator-rules.xml, /WEB-  
  INF/validation.xml"/>  
  
</plug-in>
```

# View Component

```
<%@ page language="java" %>
<%@ taglib uri="/WEB-INF/struts-html.tld" prefix="html" %>
<%@ taglib uri="/WEB-INF/struts-bean.tld" prefix="bean" %>
<html:html>
<head> <title> <bean:message key="logon.title"/> </title>
<body bgcolor="white">
  <html:errors/>
  <html:form action="/logonpath.do">
  <table border="0" width="100%">
  <tr> <th align="right"> <html:message key="prompt.username"/> </th>
  <td align="left"> <html:text property="username" size="16"/> </td> </tr>
  <tr> <td align="right"> <html:submit> <bean:message key="button.submit"/> </html:submit> </td>
```

# CONTROLLER COMPONENT

- Transfers control when an URL is accessed
- Parses the configuration file
- ActionServlet is the default primary Servlet of the Controller Section given by Struts

# CONTROLLER COMPONENT

- Action Classes method to be overridden
  - `public ActionForward perform(ActionMapping mapping, ActionForm form, HttpServletRequest request, HttpServletResponse response) throws IOException, ServletException;`

# CONTROLLER COMPONENT

## Action Class

- This class forwards the request to the appropriate html file (View component)
- The appropriate html file is obtained by parsing the struts\_config.xml file

# struts\_config.xml

- XML file that is placed in the WEB-INF directory
- XML header must be <struts-config>
- Contains **<form-beans>** and **<action-mappings>**
- Mapping as to which file the control must be transferred

# struts\_config.xml

- **<form-beans>**

- **name**

- The name of the request or session level attribute that this form bean will be stored as

- **type**

- The fully-qualified Java classname of your form bean

Source: Roger W Barnes of Project Refinery, Inc.



# struts\_config.xml

- **<action-mappings>**
  - **path**
    - path to the Action
  - **type**
    - Full name of the Java class (Action class)
  - **name**
    - Name of the Form Bean

# struts\_config.xml

Example of an action mapping entry in the xml file

```
<action path="/StrutsDemoAction"  
        type="com.da.tcb.StrutsDemoAction "  
        name=" StrutsDemoFormBean"  
        scope="request"  
        input="/demo.jsp">  
  <forward name="Save"  
    path="/saveDemo.jsp"/>  
  <forward name="Cancel"      path="/pgindex.jsp"/>
```

# struts\_config.xml

## <forward>

- name
  - Name of the View Component (html file) to be transferred to
- path
  - Path of the html component

# Struts Tags

Attribute	Used for
id	the name of a bean for temporary use by the tag
name	the name of a pre-existing bean for use with the tag
property	the property of the bean named in the name attribute for use with the tag
scope	the scope to search for the bean named in the name attribute

Source:<http://j2ee.masslight.com/Chapter4.html#intro>

# Struts html tags

- `<html:base>` Generates a `<base>` tag. This tag should be used inside of a `<head>` tag.
- `<html:button>`  
Generates an `<input type="button">` tag. This tag should be used inside a `<form>` element.

## Struts html tags

- `<html:cancel>`

Generates an `<input type="submit">` tag and causes the Action servlet not to invoke its `validate()` method. This tag should be used inside a `<form>` element.

## Struts html tags

- `<html:errors>` Generates html to display any errors that may have occurred during invocation of the `validate()` method.
- `<html:form>` Generates `<form>`.

# Struts html tags

- `<html:hidden>`            There is a hidden element here which is invisible.  
Generates `<input type="hidden">`.
- `<html:html>` Generates `<html>`.
- `<html:password>`
- Generates `<input type="password">` for use in collecting information that should not be shown on-screen.



# Struts html tags

- `<html:hidden>`            There is a hidden element here which is invisible.  
Generates `<input type="hidden">`.
- `<html:html>` Generates `<html>`.
- `<html:password>`
- Generates `<input type="password">` for use in collecting information that should not be shown on-screen.

## Struts html tags

For some more html tags see,

<http://j2ee.masslight.com/Chapter4.html#simplestruts>

# Struts Scripting

This component allows Struts Actions to be written in the scripting language of one's choice rather than as Java classes. It uses the Bean Scripting Framework to allow scripts to be written in any language BSF supports like Perl, Python, Ruby, JavaScript, Groovy, and even VBScript.

<http://struts.apache.org/1.x/struts-scripting/index.html>

# Testing Struts Applications

## Unit Testing

- Testing each module after developing it.
- Performed by the developer
- Documented in test cases which record the expected output as well as the actual output

# Testing Struts Applications

- <http://jakarta.apache.org/cactus> refer to three types of unit testing:
  - Code logic testing – Unit is tested in isolation
  - Integration unit testing- Unit is tested in communication with other units
  - Functional unit testing- Black box integration testing

# StrutsTestCase

- Open source JUnit extension
- Provides framework of Java classes for testing Struts actions
- Support for unit-testing

# FAQs

- <http://struts.apache.org/kickstart.html#struts>

# Download and Install STRUTS

<http://struts.apache.org/download.cgi>



# Sources

- **The Apache Source Foundation**
  - <http://struts.apache.org>
  - [http://struts.apache.org/1.x/userGuide/building\\_controller.html](http://struts.apache.org/1.x/userGuide/building_controller.html)
  - [http://struts.apache.org/1.x/userGuide/building\\_model.html](http://struts.apache.org/1.x/userGuide/building_model.html)
  - [http://struts.apache.org/1.x/userGuide/building\\_view.html](http://struts.apache.org/1.x/userGuide/building_view.html)
  - <http://struts.apache.org/1.x/struts-scripting/index.html>
- <http://j2ee.masslight.com/Chapter4.html#intro>
- **Introduction to Struts**
  - [Developed by: Roger W Barnes of Project Refinery, Inc.](#)
- **The Complete Reference Struts Second Edition (Mc.Graw Hill Publications)**
  - James Holmes



QUESTIONS?



Thank You!!!😊