Struts Roadmap

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Agenda

- What is Struts?
- What does Struts do for me?
- How does Struts work?
- Where did Struts originate?
- What is the future of Struts?
- What are the latest features?
Agenda (Continued)

- What extensions are available?
- Should I choose Struts?
- Where can I find additional information?
- Demo
What Is Struts?

- The official site:
  - http://struts.apache.org

- An open source framework for building Java web applications.
- Encourages application architectures based on Model 2 (a variation of MVC)
Model 2

1. Request from Browser
2. ActionServlet sends request to JavaBean
3. JavaBean processes request
4. JavaBean sends response to JSP
5. JSP generates response

Application Server

Enterprise Resources

Model

Browser

Controller

ActionServlet

View

JSP

Enterprise

LDAP

DB

JavaBean

Request

Response
Core Technology

- Core based on:
  - Java Servlets
  - JavaBeans
  - Resource Bundles
  - XML
  - Open source technologies like Jakarta-Commons
What Does Struts Do for Me?

- Struts provides a framework to collect input from a user, direct that input to server-side code, and forward to output page(s).
- Solves common problems found by “the community” while building enterprise web applications.
Compelling Features

- Validation – a very robust XML based validation framework is built into Struts.
- Security – you can add role based security.
- Internationalization (i18n) – built in support using Java resource bundles
How Does Struts Work?

- It uses a deployment descriptor very similar to servlets.
  - `struts-config.xml` vs. `web.xml`

- Struts “processes” HTTP requests using a handful of components configured in the `struts-config.xml` file.
Basic Steps

- User fills in form & clicks “submit”
- HttpRequest is sent to the ActionServlet
- ActionServlet delegates processing to the RequestProcessor
- RequestProcessor loads form values into an ActionForm
- RequestProcessor sends ActionForm to Action
Basic Steps (Continued)

- Action implements Business Logic as the `execute()` method
- Business Logic performs application specific instructions
- CRUD operations, Workflow, Email, LDAP, Legacy Integration, *etc.*
- Action saves any Model data as JavaBeans to appropriate Scope
Basic Steps *(Continued)*

- Action returns ActionForward to RequestProcessor
- RequestProcessor forwards / includes / redirects to appropriate View defined in the ActionMapping
- View “renders” presentation including any Model data stored in JavaBeans or MessageResources to provide i18n.
Sample Config File

```xml
<struts-config>
  <form-beans>
    <form-bean name="logonForm" type="app.LogonForm"/>
  </form-beans>
  <action-mappings>
    <action path="/Welcome" forward="/pages/Welcome.jsp"/>
    <action path="/Logon" forward="/pages/Logon.jsp"/>
    <action path="/LogonSubmit"
      type="app.LogonAction" name="logonForm"
      validate="true" input="/Logon.do">
      <forward name="success" path="/Welcome.do"/>
      <forward name="failure" path="/Logon.do"/>
    </action>
  </action-mappings>
  <message-resources parameter="resources.application"/>
</struts-config>
```
ActionServlet

- **Responsibility:**
  - Bootstrap configuration upon init().

- **Config:**
  - `<struts-config>`

- **API:**
  - This class is provided.
RequestProcessor

- Responsibility:
  - Handles all processing of Request/Response lifecycle.

- Config:
  - `<controller processorClass=""/>

- API:
  - This class is provided, but if default behavior is not suitable then subclass:
    - `org.apache.struts.action.RequestProcessor`
  - Override any of the process methods required
ActionMapping (aka ActionConfig)

- **Responsibility:**
  - Contains configuration information that relates the path, form-bean, and action together along with other basic instructions. This is the primary "instruction set" for the controller.

- **Config:**
  - `<action path="" name="" type=""/>

- **API:**
  - This class is provided, but to include additional information you can subclass org.apache.struts.action.ActionMapping
Action Form

- **Responsibility:**
  - Holds all information from the client, typically HTML form data. Perform validation of client input.

- **Config:**
  - Uses an associated ActionFormBean (aka FormBeanConfig) for configuration:
    - `<form-bean name="" type=""/>

- **API:**
  - Subclass (or use one of the DynaForm classes)
    - `org.apache.struts.action.ActionForm`
    - Override reset() and validate() methods.
Action

- **Responsibility:**
  - This is the binding layer to business logic. Should also store any JavaBeans required by view.

- **Config:**
  - Associated to a path and form-bean, and configured using the ActionMapping

- **API:**
  - Subclass org.apache.struts.action.Action
  - Override the execute() method.
ActionForward (*aka* ForwardConfig)

- **Responsibility:**
  - Typically contains the location of a JSP, tile definition, or other view component.

- **Config:**
  - `<forward name="" path=""/>`

- **API:**
  - This class is provided.
**ActionMessage**

- **Responsibility:**
  - Constructs a message string from the resource bundle.

- **Config:**
  - `<message-resources parameter="" />

- **API:**
  - This class is provided.
Where Did Struts Originate?

- Initial releases 0.5 (May 2000) – 1.0 (Mar 2001)
  - Implemented core Model2 concept
    - Action perform()
    - FormBean validate()
    - ActionMapping path="xxx.do"
    - ActionForward path="nextStep.jsp"
    - Struts Taglibs
- Donated to the Apache foundation by Sun’s Chief Web Architect, Craig McClanahan
1.1 Release

- Struts 1.1 (Aug 2003)
  - Expanded Core Features
    - Tiles
    - Plugins
    - Module Support
    - Validation
  - Explore interoperability with emerging standards
    - EL
    - JSTL
    - JSF
Latest Release

- **Struts 1.2.4 (Sep 2004)**
  - Remove deprecations from 1.0 to 1.1, and prior
  - Building greater stability and feature integration
    - Further module integration
    - Further support EL and JSTL

- **New Features**
  - Wildcard mappings
  - DigestingPlugIn
  - MappingDispatchAction
  - Migrate build from Ant to Maven
What Is the Future of Struts?

- With so many emerging standards, the future of Struts is still unclear.
- The current thinking is to begin 2 main branches for ongoing development:
  - 1.x series – Servlet 2.2 / JSP 1.1
  - 2.x series – Servlet 2.4 / JSP 2.0
Development Release

- **Struts 1.2.5** *(Oct. 17, 2004)*
  - Continuing to correct bugs and cleanup codebase.
  - Migrated to Subversion
  - Website updates
  - Any new enhancements will most likely be in the 1.3.x series.
Future Release

- Struts 1.3 (late 2004, 2005)
  - Use jakarta-commons Resources
  - Separate into multiple builds
    - * core, apps, el, faces, site, taglib
    - * flow, scripting (new)
  - Allow configuration extends="" in all other elements (similar to tiles)
  - Move core to "Struts Chain" Request Processor
  - Complete Maven migration
Future Release

- **Struts 1.4** *(2005, 2006)*
  - Review approach to RequestProcessor
  - Consider ActionContext
  - Enhanced support for newer servlet and jsp specs.
  - Consider adding support for Porlets by specifying an alternate Request Processor catalog
Future Release

- **Struts 2.0** (late 2005, 2006)
  - Enhanced support for using Struts in large team environments.
  - Provide broad enhancements using Servlet 2.4 and JSP 2.0 platforms
  - Comprehensive unit test coverage for all core features
  - Transparent support for a portlet environment (JSR 168), with minimal-to-no changes in your business logic and pages.
Future Release (Continued)

- Struts 2.0 (Continued)
  - Direct support for JSTL/JSF taglibs and the JSF API
  - Enhanced support for other presentation layers, such as XLST
  - Enhanced support for scriptable Actions, using technologies like BSF or Jelly
What Are the Latest Features?

- There are several features in ongoing development.
  - Struts EL
  - Struts Faces
  - CoRe – Chain of Responsibility Request Processor
  - Commons Resources
Struts EL

- This is a port of the Struts taglib to JSTL.
  - Any new development should focus on using this taglib.
Bean EL taglib

- All struts bean tags that provided behavior not present in JSTL have been ported.
- Use JSTL tags
  - c:set, EL
    - Replaces: cookie, define, header, parameter
  - c:import
    - Replaces: include
  - c:out
    - Replaces: write
Logic EL taglib

- All struts logic tags that provided behavior not present in JSTL have been ported.
- Use JSTL tags
  - c:if, c:when, EL
    - Replaces: empty, equal, greaterEqual, greaterThan, lessEqual, lessThan, notEmpty, notEqual
HTML EL Taglib

- All Struts HTML tags have been ported.
Tiles EL Taglib

- As of Struts 1.2.1 the tiles taglib has been ported to JSTL
Struts – Faces

- This is an integration library to explore methods of integrating Struts with JSF.

  Note: At the time of this writing, this library is not current. If possible, I will include more current information and potentially an example during the week of my presentation.
Jakarta Commons – Chain of Responsibility

- A new commons library to support the “Chain of Responsibility” design pattern.
- A CoRe Request Processor is being built using this new library.

http://cvs.apache.org/viewcvs.cgi/jakarta-struts/contrib/struts-chain/README.txt
Jakarta Commons Resources

- Allows you greater flexibility in managing resource bundles.
  - Store message resources in other formats in database.
What Extensions Are Available?

- SSL Ext
- Spring Framework
- Xdoclet
- AppFuse
Extensions?  *(Continued)*

- BSF
- Cocoon
- ControlFlow
- Doc
Struts SSL Ext

- This extension allows you to define transmission protocol behavior.
  - *i.e.*, which Actions require HTTPS protocol.

- Extends:
  - ActionConfig, RequestProcessor, Plugin
  - `<html:link>` and `<html:form>`

http://struts.apache.org/faqs/ssl.html
http://sslext.sourceforge.net/
Spring Framework Extensions

- **IoC and AOP**
  - Allows concentration on business logic development, and separates logging, auditing, ...
  - [http://www.springframework.org](http://www.springframework.org)

- **Struts package**: org.springframework.web.struts
  - ContextLoaderPlugin
  - DelegatingRequestProcessor
  - ActionSupport, DispatchActionSupport
  - ActionServletAwareProcessor

- Made the “Struts Spring Plugin” extension obsolete.
XDoclet Extensions

- Component Code Generation
  - Uses @javadoc attributes to provide code generation capabilities.

- Examples
  - @struts.action
  - @struts.form
  - @struts.validation
AppFuse Extension

- Starter application that includes integration with Hibernate, DBUnit, Cactus, Log4j, and Struts

Bean Scripting Framework Ext.

- Using the Jakarta BSF framework allows struts Action classes to be written in a scripting framework
  - Perl
  - Python
  - Ruby
  - JavaScript
  - BeanShell
  - VBScript (?)

http://struts.sourceforge.net/struts-bsf/index.html
Cocoon Extensions

- Allows you to leverage the presentation power of the Cocoon framework.
- Struts ActionForwards are passed to Cocoon to be rendered as XML Pipelines.

➤ See [http://cocoon.apache.org](http://cocoon.apache.org) for more details.

Struts Flow

- Port of Cocoon’s ControlFlow concept.
  - Allows complex workflow using “continuations-capable” JavaScript.

http://struts.sourceforge.net/struts-flow/index.html
Struts Doc

- An Ant task to generate javadoc like documentation from the Struts config file.

http://struts.sourceforge.net/strutsdoc/index.html
JAAS Techniques

- There is no definite JAAS resource at this time for Struts.
- Potential sources of further information:
  - [http://www.mooreds.com/jaas.html](http://www.mooreds.com/jaas.html)
  - [http://sourceforge.net/projects/jguard](http://sourceforge.net/projects/jguard)
Should I Choose Struts?

- Large community of support
- Stable and mature technology
- Don’t take Risk alone
- For a more in-depth analysis:
  
  http://www.scioworks.net/devnews/articles/struts_adoption_issues
Where Can I Find Additional Information?

- [http://struts.apache.org](http://struts.apache.org)
  - Warning: Not always very current!

  - Help wanted, NewFAQs, ShortTermPlans, Whiteboard, ReleasePlans, IdeaJar
  - Resources
    - Books, articles, tools, training, weblinks
  - Typically much more current.

- [http://struts.sourceforge.net](http://struts.sourceforge.net)
  - Extensions and examples
Questions

Are there any questions?
The End

Thank you for coming!

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