Comparing Web Frameworks

Struts, Spring MVC, WebWork, Tapestry & JSF

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Today's Agenda

- Introductions
- Web Framework Overviews: How Each Works
- Intermission
- Web Framework Comparison: What each does well
- Lunch
- Architecture discussions, open forum

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Introductions

- Your experience with webapps?
- Your experience with J2EE?
- What do you want to get from this session?
- Experience with Ant, Tomcat, Hibernate, Spring?
- Web Framework Experience:
  - Struts, Spring MVC, WebWork, Tapestry, JSF

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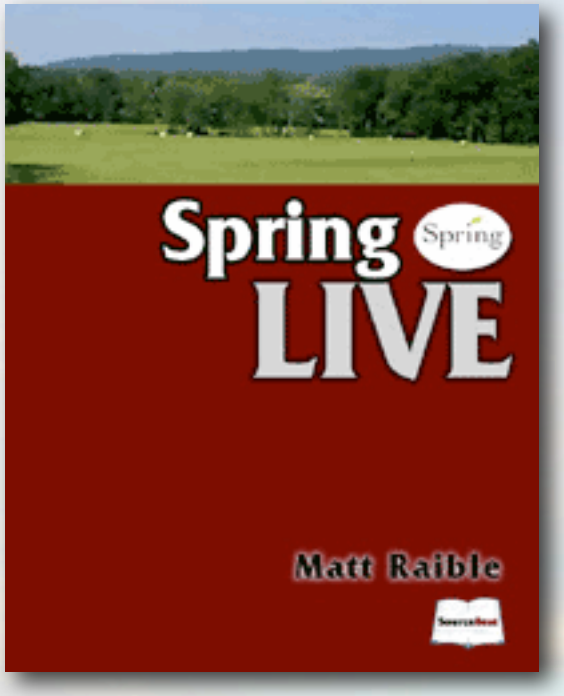

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AppFuse

Roller

Struts Menu

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My Experience

- **Struts**: used since June 2001 - same time 1.0 was released.
- **Spring MVC**: used since January 2004 - before 1.0 was released.
- **WebWork**: used since July 2004.
- **Tapestry**: used since July 2004.
- **JSF**: used since July 2004 - both Sun's RI and MyFaces.

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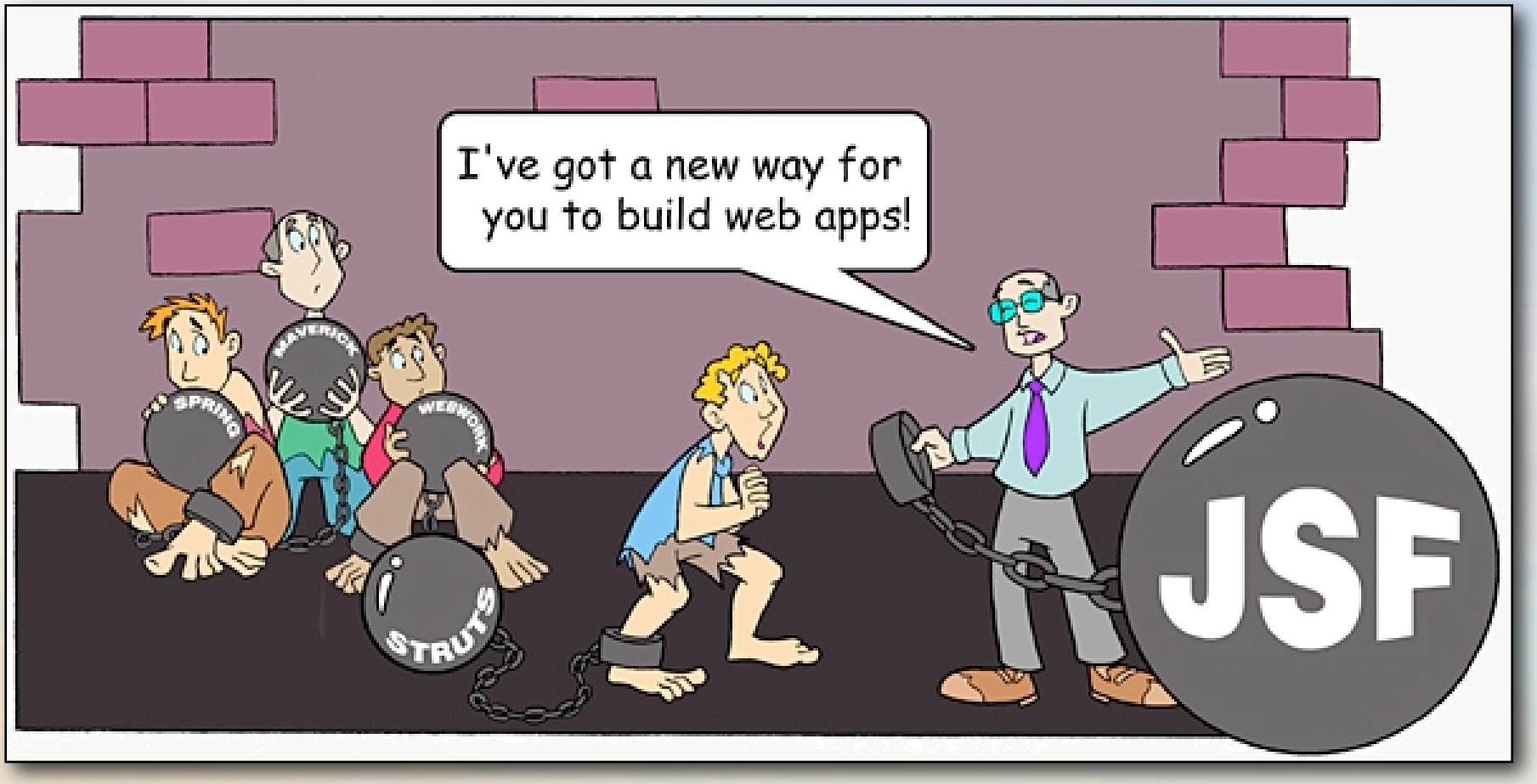
Meet the Candidates



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Struts

- Pros:
  - The “Standard” - lots of Struts jobs
  - Lots of information and examples
  - HTML tag library is one of the best
- Cons:
  - ActionForms - they’re a pain
  - Can’t unit test - StrutsTestCase only does integration
  - Project has been rumored as “dead”

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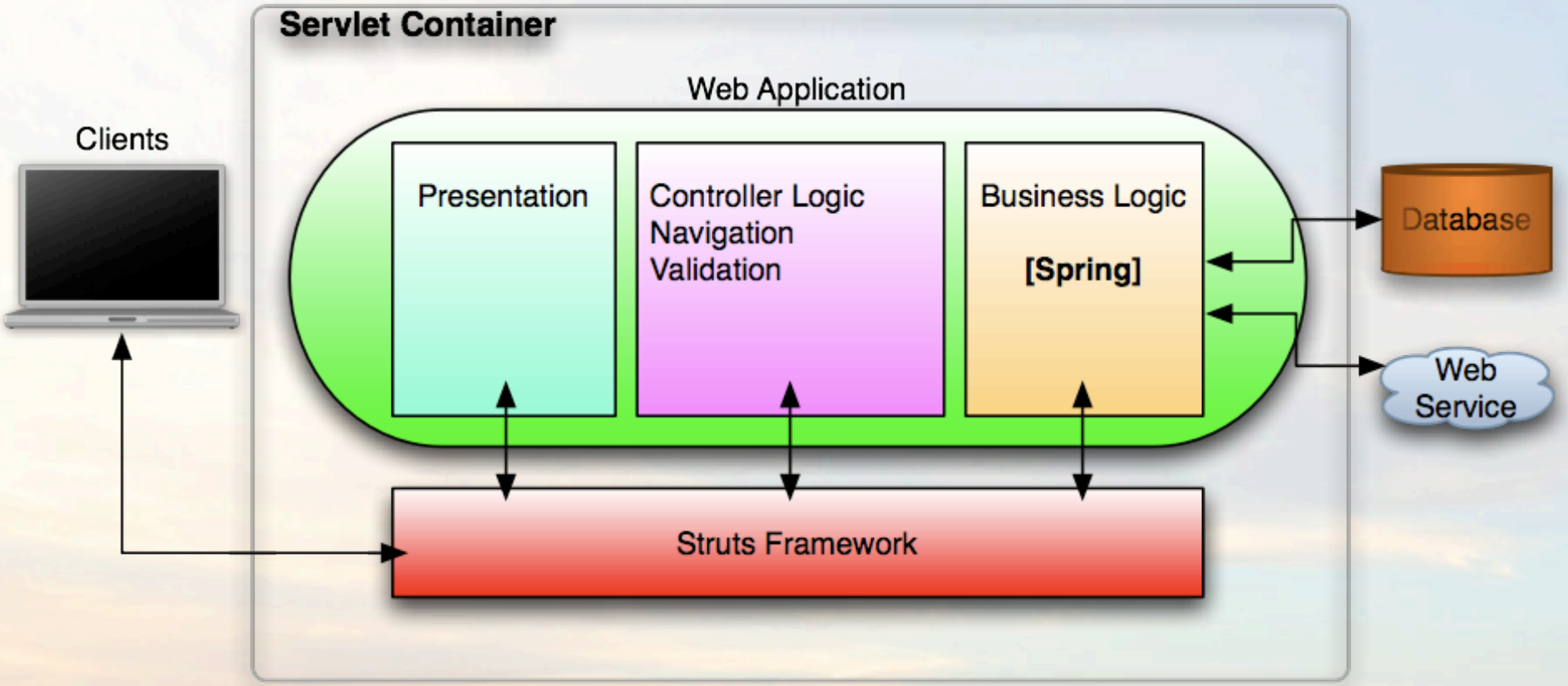
Struts



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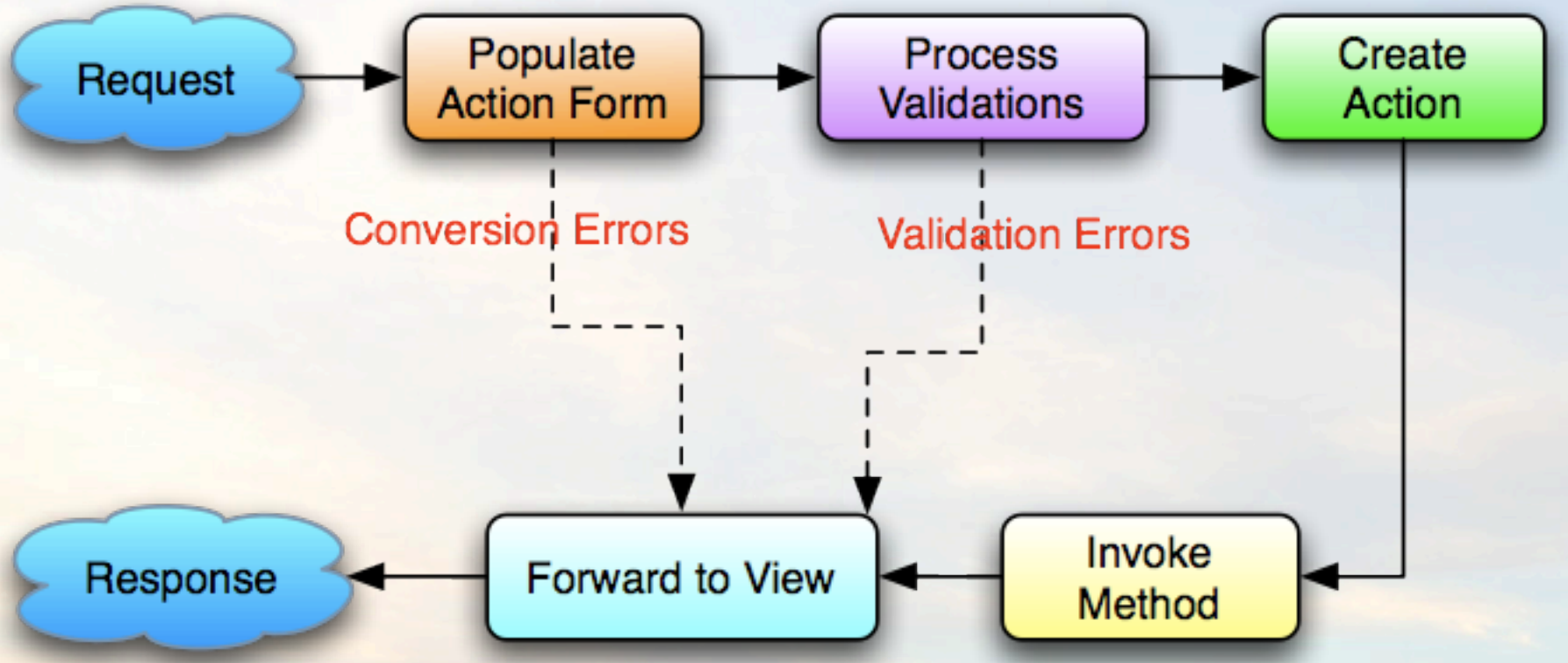
Struts Lifecycle



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Struts Action

```
public class UserAction extends DispatchAction {
    private UserManager mgr = null;

    public void setUserManager(UserManager userManager) {
        this.mgr = userManager;
    }

    public ActionForward delete(ActionMapping mapping, ActionForm form,
                                HttpServletRequest request,
                                HttpServletResponse response)
            throws Exception {
        DynaActionForm userForm = (DynaActionForm) form;
        User user = (User) userForm.get("user");

        mgr.removeUser(request.getParameter("user.id"));

        ActionMessages messages = new ActionMessages();
        messages.add(ActionMessages.GLOBAL_MESSAGE,
                new ActionMessage("user.deleted", user.getFullName()));

        saveMessages(request.getSession(), messages);

        return mapping.findForward("users");
    }
```

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        saveMessages(request.getSession(), messages);

        return mapping.findForward("users");
    }
```

struts-config.xml

```
<form-bean name="userForm" type="org.apache.struts.validator.DynaValidatorForm">
    <form-property name="user" type="org.appfuse.model.User"/>
</form-bean>
```


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struts-config.xml

```
<form-bean name="userForm" type="org.apache.struts.validator.DynaValidatorForm">
    <form-property name="user" type="org.appfuse.model.User"/>
</form-bean>


<action path="/user" type="org.springframework.web.struts.DelegatingActionProxy"
    name="userForm" scope="request" parameter="method" validate="false">
    <forward name="list" path="/userList.jsp"/>
    <forward name="edit" path="/userForm.jsp"/>
</action>
```

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struts-config.xml

```
<form-bean name="userForm" type="org.apache.struts.validator.DynaValidatorForm">
    <form-property name="user" type="org.appfuse.model.User"/>
</form-bean>


<action path="/user" type="org.springframework.web.struts.DelegatingActionProxy"
    name="userForm" scope="request" parameter="method" validate="false">
    <forward name="list" path="/userList.jsp"/>
    <forward name="edit" path="/userForm.jsp"/>
</action>


<plug-in className="org.springframework.web.struts.ContextLoaderPlugIn">
    <set-property property="contextConfigLocation"
                  value="/WEB-INF/action-servlet.xml"/>
</plug-in>
```

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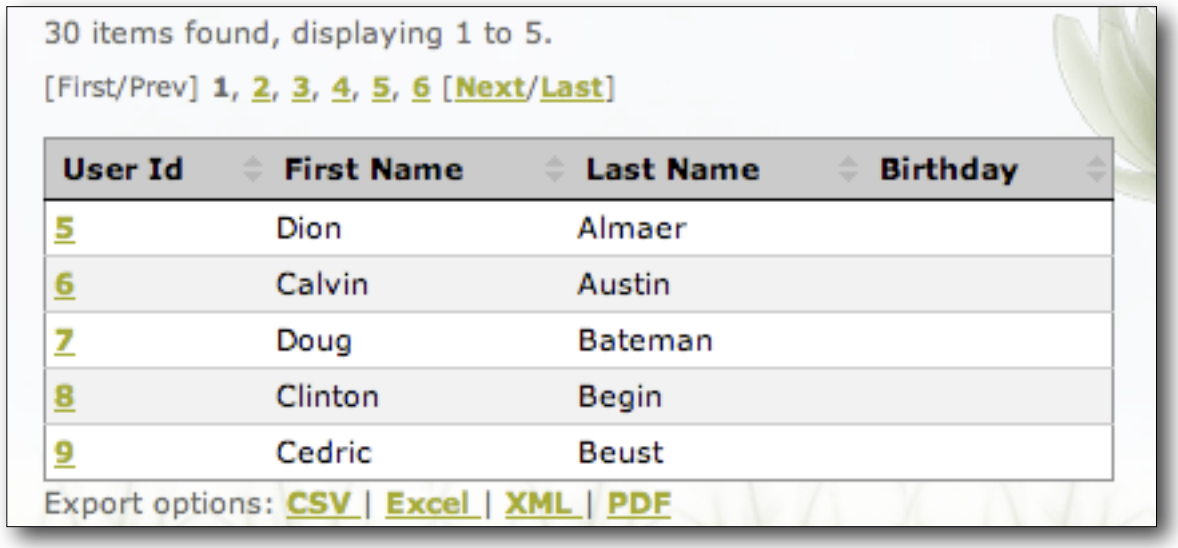
Display Tag

```
<display:table name="users" class="list" requestURI="" id="userList" export="true">
    <display:column property="id" sort="true" href="editUser.html"
        paramId="id" paramProperty="id" titleKey="user.id"/>
    <display:column property="firstName" sort="true" titleKey="user.firstName"/>
    <display:column property="lastName" sort="true" titleKey="user.lastName"/>
    <display:column titleKey="user.birthday" sort="true" sortProperty="birthday">
        <fmt:formatDate value="${userList.birthday}" pattern="${datePattern}"/>
    </display:column>
</display:table>
```



30 items found, displaying 1 to 5.

[First/Prev] 1, 2, 3, 4, 5, 6 [Next/Last]

User Id	First Name	Last Name	Birthday
5	Dion	Almaer	
6	Calvin	Austin	
7	Doug	Bateman	
8	Clinton	Begin	
9	Cedric	Beust	

Export options: CSV | Excel | XML | PDF

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Struts: JSP View

```
<html:form action="/user" focus="user.firstName" onsubmit="return validateUserForm(this)">
<input type="hidden" name="method" value="save"/>
<html:hidden property="user.id"/>
<table class="detail">
<tr>
    <th><label for="user.firstName"><fmt:message key="user.firstName"/>:</label></th>
    <td><html:text property="user.firstName" styleId="user.firstName"/></td>
</tr>
<tr>
    <th><label for="user.lastName"><fmt:message key="user.lastName"/>:</label></th>
    <td>
        <html:text property="user.lastName" styleId="user.lastName"/>
        <span class="fieldError"><html:errors property="user.lastName"/></span>
    </td>
</tr>
    <th><label for="user.birthday"><fmt:message key="user.birthday"/>:</label></th>
    <td>
        <c:set var="datePattern"><fmt:message key="date.format"/></c:set>
        <input type="text" size="11" name="user.birthday" id="user.birthday"
            value="<fmt:formatDate value="${userForm.map.user.birthday}"
            pattern="${datePattern}"/>"/> [${datePattern}]
    </td>
<tr>
```

Struts: JSP View

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<html:form action="/user" focus="user.firstName" onsubmit="return validateUserForm(this)">
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        <html:text property="user.lastName" styleId="user.lastName"/>
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    </td>
</tr>
    <th><label for="user.birthday"><fmt:message key="user.birthday"/>:</label></th>
    <td>
        <c:set var="datePattern"><fmt:message key="date.format"/></c:set>
        <input type="text" size="11" name="user.birthday" id="user.birthday"
            value="<fmt:formatDate value="${userForm.map.user.birthday}"
            pattern="${datePattern}"/>"/> [${datePattern}]
    </td>
<tr>
```


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Spring MVC

- Pros:
  - Lifecyle for overriding binding, validation, etc.
  - Integrates with many view options seamlessly: JSP/JSTL, Tiles, Velocity, FreeMarker, Excel, XSL, PDF
  - Inversion of Control makes it easy to test
- Cons:
  - Configuration intensive - lots of XML
  - Requires writing lots of code in JSPs
  - Almost too flexible - no common parent Controller

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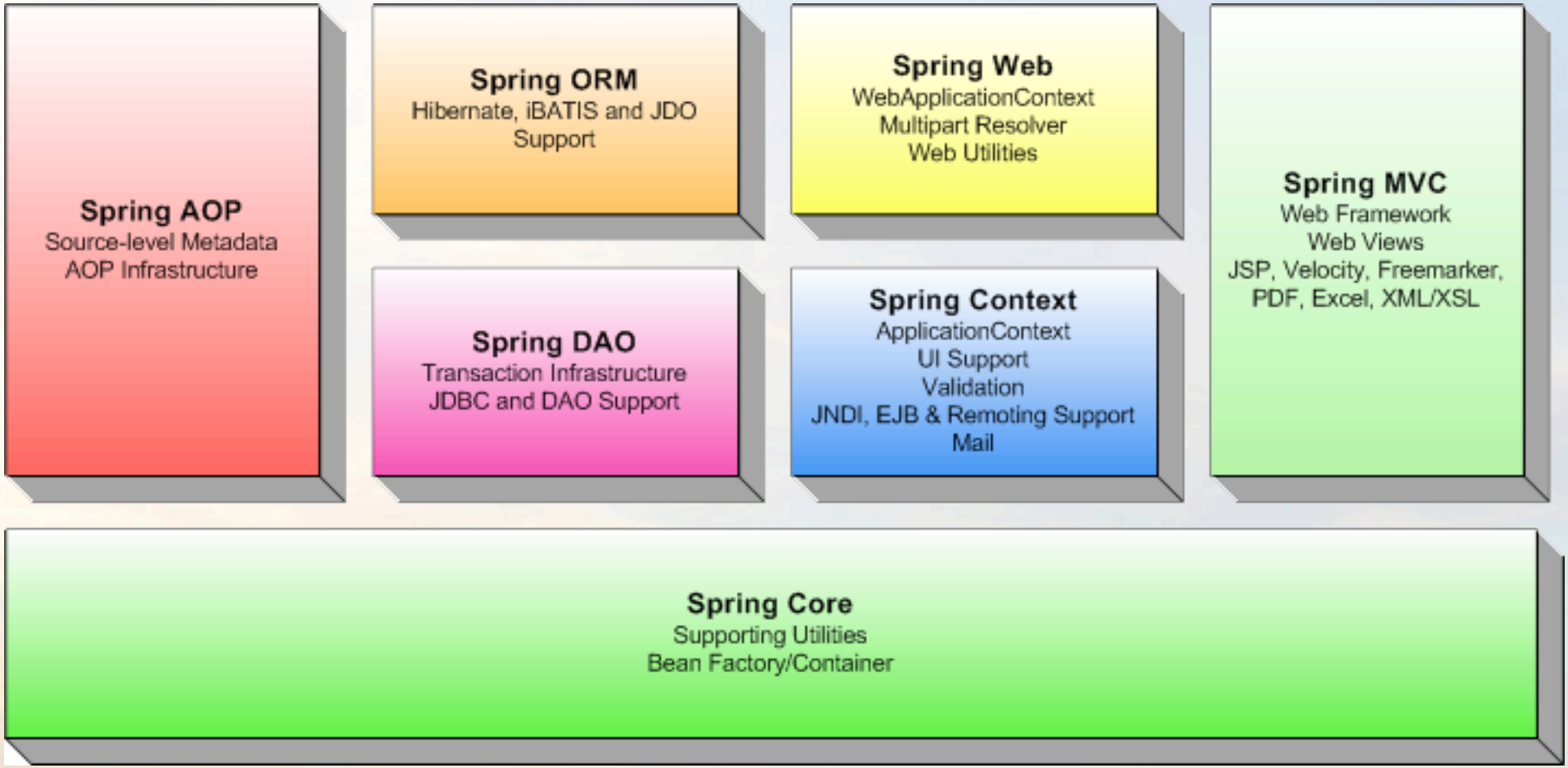
Spring MVC



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Spring Workflow GET

By default, returns an instance of the commandClass that has been configured. You will need to override this method if you want to retrieve an object from the database.

Allows registering custom editor for certain properties of the command class. This is where you'll convert request parameters to Object types (i.e. Dates, Longs, etc.). This is also a good place to format dates to be locale-specific.

Returns the view to be rendered. In the SimpleFormController, this calls the specified "formView" property.

Allows you to bind any reference data you might need when editing a form. This is a good method to populate drop-downs in.

Model gets exposed and view gets rendered. User can fill out form in their browser.

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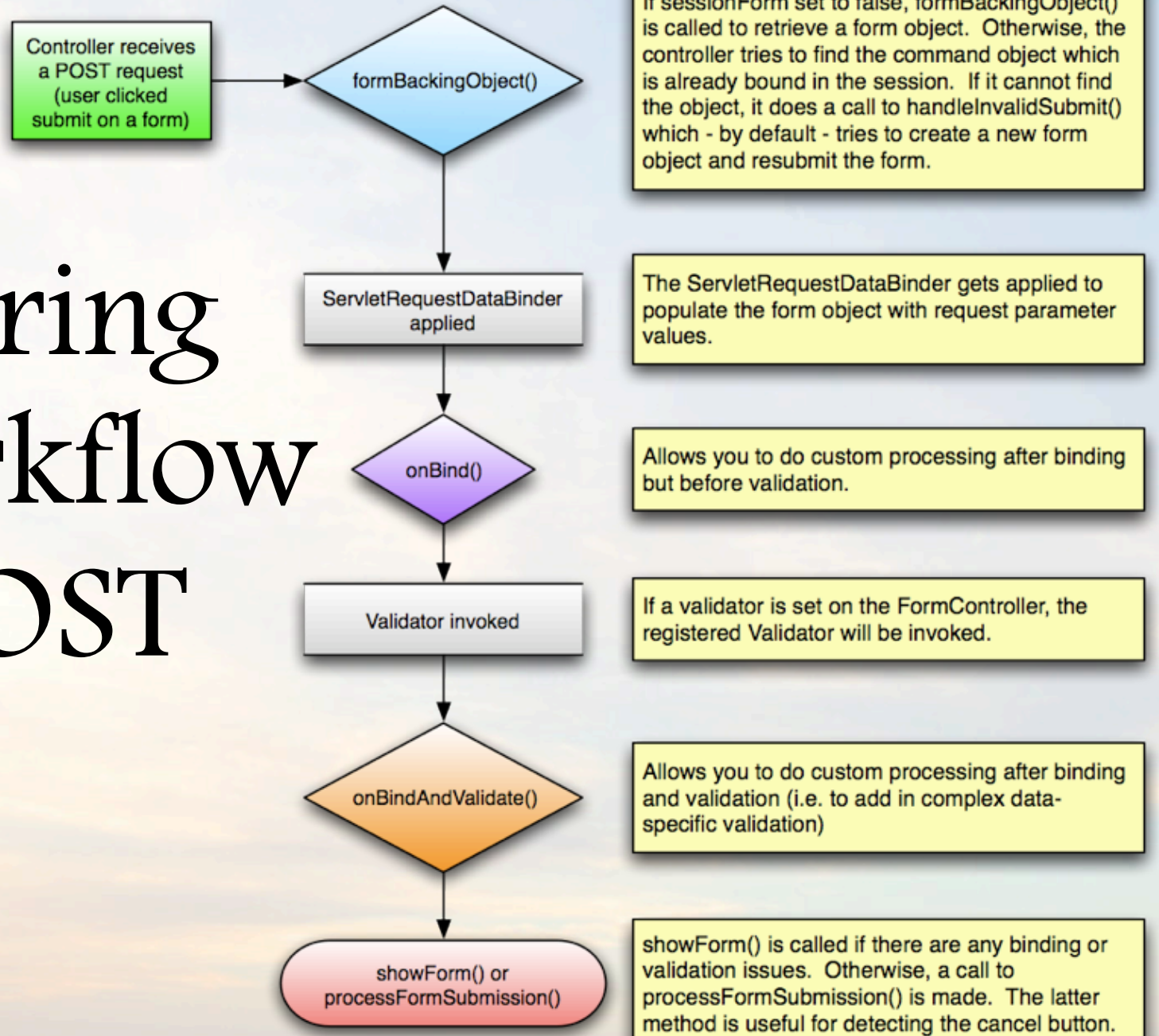
Spring Workflow POST



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Spring Controller

```
public class UserController implements Controller {
    private final Log log = LogFactory.getLog(UserController.class);
    private UserManager mgr = null;

    public void setUserManager(UserManager userManager) {
        this.mgr = userManager;
    }

    public ModelAndView handleRequest(HttpServletRequest request,
                                      HttpServletResponse response)
    throws Exception {
        if (log.isDebugEnabled()) {
            log.debug("entering 'handleRequest' method...");
        }

        return new ModelAndView("userList", "users", mgr.getUsers());
    }
}
```


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```
public class UserController implements Controller {
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    private UserManager mgr = null;

    public void setUserManager(UserManager userManager) {
        this.mgr = userManager;
    }

    public ModelAndView handleRequest(HttpServletRequest request,
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    throws Exception {
        if (log.isDebugEnabled()) {
            log.debug("entering 'handleRequest' method...");
        }

        return new ModelAndView("userList", "users", mgr.getUsers());
    }
}
```


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Spring: Configuration

```
<bean id="userController" class="org.appfuse.web.UserController">
    <property name="userManager" ref="userManager"/>
</bean>
```

Spring: Configuration

```
<bean id="userController" class="org.appfuse.web.UserController">
    <property name="userManager" ref="userManager"/>
</bean>


<bean id="viewResolver"
    class="org.springframework.web.servlet.view.InternalResourceViewResolver">
    <property name="viewClass" value="org.springframework.web.servlet.view.JstlView"/>
    <property name="prefix" value="/"/>
    <property name="suffix" value=".jsp"/>
 </bean>
```


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Spring: Configuration

```
<bean id="userController" class="org.appfuse.web.UserController">
    <property name="userManager" ref="userManager"/>
</bean>


<bean id="viewResolver"
    class="org.springframework.web.servlet.view.InternalResourceViewResolver">
    <property name="viewClass" value="org.springframework.web.servlet.view.JstlView"/>
    <property name="prefix" value="/"/>
    <property name="suffix" value=".jsp"/>
 </bean>


<bean id="urlMapping"
    class="org.springframework.web.servlet.handler.SimpleUrlHandlerMapping">
    <property name="mappings">
        <value>
            /users.html=userController
        </value>
    </property>
</bean>
```


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Spring JSP View

```
<form:form commandName="user" method="post">
<form:errors path="*" cssClass="error"/>
<form:hidden path="id" />
<table class="detail">
<tr>
    <th><label for="firstName">
        <fmt:message key="user.firstName"/>:</label></th>
    <td>
        <form:input path="firstName" id="firstName"/>
        <form:errors path="firstName" cssClass="fieldError"/>
    </td>
</tr>
<tr>
    <th><label for="lastName" class="required">
        * <fmt:message key="user.lastName"/>:</label></th>
    <td>
        <form:input path="lastName" id="firstName"/>
        <form:errors path="lastName" cssClass="fieldError"/>
    </td>
</tr>
```

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Spring JSP View

```
<form:form commandName="user" method="post">
<form:errors path="*" cssClass="error"/>
<form:hidden path="id" />
<table class="detail">
<tr>
    <th><label for="firstName">
        <fmt:message key="user.firstName"/>:</label></th>
    <td>
        <form:input path="firstName" id="firstName"/>
        <form:errors path="firstName" cssClass="fieldError"/>
    </td>
</tr>
<tr>
    <th><label for="lastName" class="required">
        * <fmt:message key="user.lastName"/>:</label></th>
    <td>
        <form:input path="lastName" id="firstName"/>
        <form:errors path="lastName" cssClass="fieldError"/>
    </td>
</tr>
```


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Spring FreeMarker View

```
<form method="post" action="<@spring.url '/editUser.html'/>">
<@spring.formHiddenInput "user.id"/>
<table>
<tr>
    <th><label for="firstName"><@spring.message "user.firstName"/>:</label></th>
    <td>
        <@spring.formInput "user.firstName", 'id="firstName"'/>
        <@spring.showErrors "<br>", "fieldError"/>
    </td>
</tr>
<tr>
    <th><label for="lastName"><@spring.message "user.lastName"/>:</label></th>
    <td>
        <@spring.formInput "user.lastName", 'id="lastName"'/>
        <@spring.showErrors "<br>", "fieldError"/>
    </td>
</tr>
```

Spring Velocity View

```
<form method="post" action="#springUrl('/editUser.html')">
#springFormHiddenInput("user.id" '')
<table>
<tr>
    <th><label for="firstName">#springMessage("user.firstName"):</label></th>
    <td>
        #springFormInput("user.firstName" 'id="firstName"')
        #springShowErrors("<br/>" "fieldError")
    </td>
</tr>
<tr>
    <th><label for="lastName">#springMessage("user.lastName"):</label></th>
    <td>
        #springFormInput("user.lastName" 'id="lastName"')
        #springShowErrors("<br/>" "fieldError")
    </td>
</tr>
```

Spring Web Flow

- A web framework that allows you to define *page flows* in your application
- In XML (or programmatically in Java), you specify simple or complex navigation rules
- Navigation rules enforced based on the String value that a method returns (similar to JSF)
- Can call middle-tier methods declaratively - no controllers needed!

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Spring Web Flow

```
<webflow id="userFlow" start-state="setupForm">

    <action-state id="setupForm">
        <action bean="userFormAction"/>
        <transition on="success" to="display.nameForm"/>
    </action-state>

    <view-state id="display.nameForm" view="flow/name">
        <transition on="submit" to="display.addressForm">
            <action bean="userFormAction" method="bindAndValidate"/>
        </transition>
        <transition on="cancel" to="finish"/>
    </view-state>

    <view-state id="display.addressForm" view="flow/address">
        <transition on="previous" to="display.nameForm">
            <action bean="userFormAction" method="bindAndValidate"/>
        </transition>
        <transition on="submit" to="display.otherForm">
            <action bean="userFormAction" method="bindAndValidate"/>
        </transition>
        <transition on="cancel" to="finish"/>
    </view-state>
```

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WebWork

- Pros:
  - Simple architecture - easy to extend
  - Tag Library is easy to customize with FreeMarker or Velocity
  - Interceptors are pretty slick
  - Controller-based or page-based navigation
- Cons:
  - Small Community
  - Documentation is poorly organized

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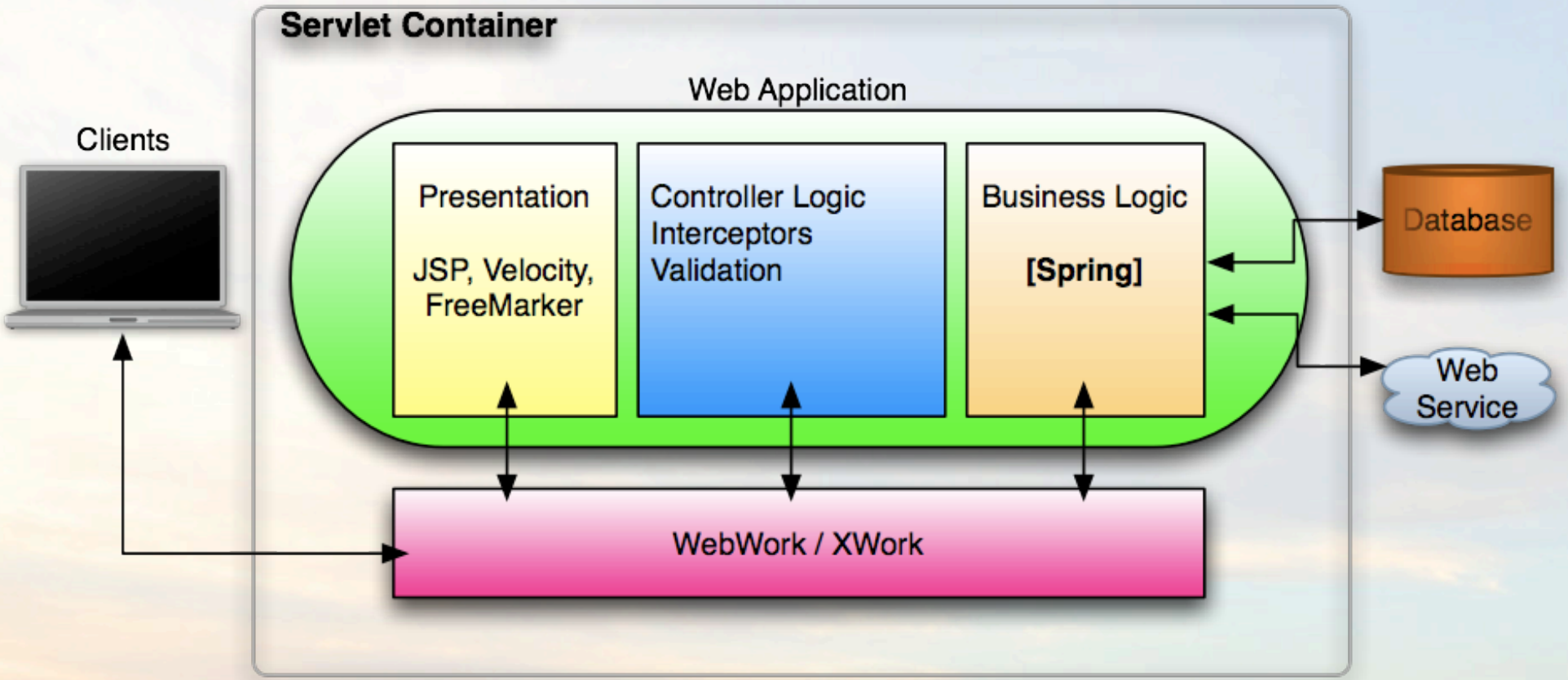
WebWork



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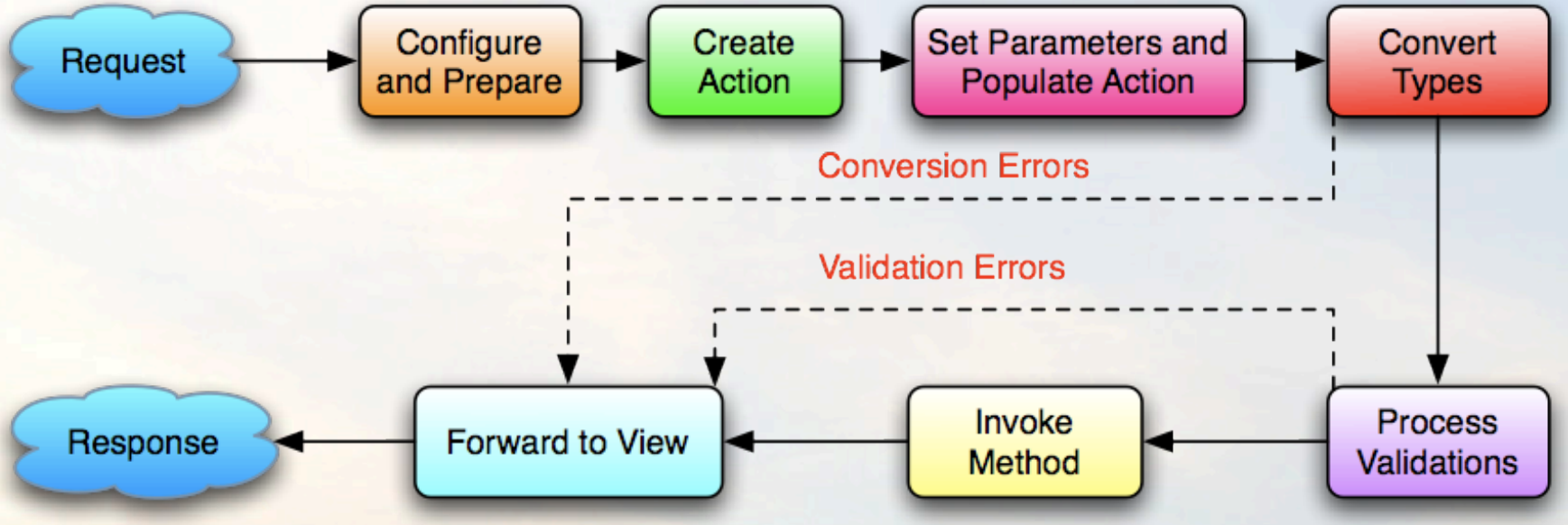
WebWork Lifecycle



WebWork Action

```
public class UserAction extends ActionSupport {
    private UserManager mgr;
    private User user;
    private String id;

    public void setUserManager(UserManager userManager) {
        this.mgr = userManager;
    }

    public void setId(String id) {
        this.id = id;
    }

    public User getUser() {
        return user;
    }

    public String edit() {
        // check for an add
        if (id != null) {
            user = mgr.getUser(id);
        } else {
            user = new User();
        }
        return SUCCESS;
    }
```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WebWork Interceptors

```
public class ValidationInterceptor extends AroundInterceptor {

    protected void after(ActionInvocation dispatcher, String result) throws Exception {
    }

    protected void before(ActionInvocation invocation) throws Exception {
        Action action = invocation.getAction();
        String context = invocation.getProxy().getActionName();

        final Map parameters = ActionContext.getContext().getParameters();
        // don't validate on cancel, delete or GET
        if (ServletActionContext.getRequest().getMethod().equals("GET")) {
            log.debug("Cancelling validation, detected GET request");
        } else if (parameters.containsKey("cancel") || parameters.containsKey("delete")) {
            log.debug("Cancelling validation, detected clicking cancel or delete");
        } else {
            ActionValidatorManager.validate(action, context);
        }
    }
}
```

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xwork.xml

```
<!-- List of Users -->
<action name="users" class="userAction" method="list">
    <result name="success">userList.jsp</result>
    <result name="input">userList.jsp</result>
</action>

<!-- Edit User -->
<action name="editUser" class="userAction" method="edit">
    <result name="success">userForm.jsp</result>
    <result name="input">userList.jsp</result>
</action>

<!-- Save User -->
<action name="saveUser" class="userAction">
    <result name="cancel" type="redirect">users.html</result>
    <result name="delete" type="redirect">users.html</result>
    <result name="input">userForm.jsp</result>
    <result name="success" type="chain">saveUserWithValidation</result>
</action>
```

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WebWork JSP View

```
<ww:form name="userForm" action="saveUser" method="post" validate="true">
    <ww:hidden name="user.id" value="%{user.id}"/>

    <ww:textfield label="%{getText('user.firstName')}" name="user.firstName"
        value="%{user.firstName}" id="user.firstName"/>

    <ww:textfield label="%{getText('user.lastName')}" name="user.lastName"
        value="%{user.lastName}" required="true"/>

    <ww:datepicker label="%{getText('user.birthday')}" name="user.birthday"
        size="11"/>
```

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WebWork DatePicker


```
<ww:form name                                    e="true">
    <ww:hidde

    <ww:textf                                    r.firstName"
        value

    <ww:textf                                    .lastName"
        value

    <ww:datep                                    r.birthday"
        size=
```


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Page-based Navigation

```
<%@ include file="/common/taglibs.jsp"%>

<h2>Author Blogs</h2>

<ww:action name="authors" id="%{authors}" namespace="default"/>

<div class="item">
    <ww:iterator value="#authors.authors" status="index">
        <a href="<ww:property value="blog.feedUrl"/>">
            <img src="${ctxPath}/images/icons/xml.gif" alt="XML Feed"/></a>
        <a href="<ww:property value="blog.url"/>"><ww:property value="name"/></a>
        <br />
    </ww:iterator>
</div>
```


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OGNL

```
<ww:form name="userForm" action="saveUser" method="post" validate="true">
    <ww:hidden name="user.id" value="%{user.id}"/>

    <ww:textfield label="%{getText('user.firstName')}" name="user.firstName"
        value="%{user.firstName}" id="user.firstName"/>

    <ww:textfield label="%{getText('user.lastName')}" name="user.lastName"
        value="%{user.lastName}" required="true"/>
</tr>
    <th><label for="user.birthday"><fmt:message key="user.birthday"/>:</label></th>
    <td>
        <ww:set name="birthday" scope="request"
            value="(user.birthday instanceof java.util.Date) ? user.birthday : ''"/>
        <input type="text" size="11" name="user.birthday" id="user.birthday"
            value="<fmt:formatDate value="${birthday}" pattern="${datePattern}"/>"/>
            [${datePattern}]
    </td>
<tr>
```


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New in WebWork 2.2

- Built-in Ajax Support: DWR and Dojo
- Spring as default inversion of control container
- Changed from front-controller servlet to filter
- Much better client-side validation support
- QuickStart and Annotations
- Soon to be Struts Action 2.0

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Tapestry

- Pros:
  - Very productive once you learn it
  - Templates are HTML - great for designers
  - Healthy and smart user community
- Cons:
  - Documentation very conceptual, rather than pragmatic
  - Steep learning curve - very few examples
  - Long release cycles - major upgrades every year

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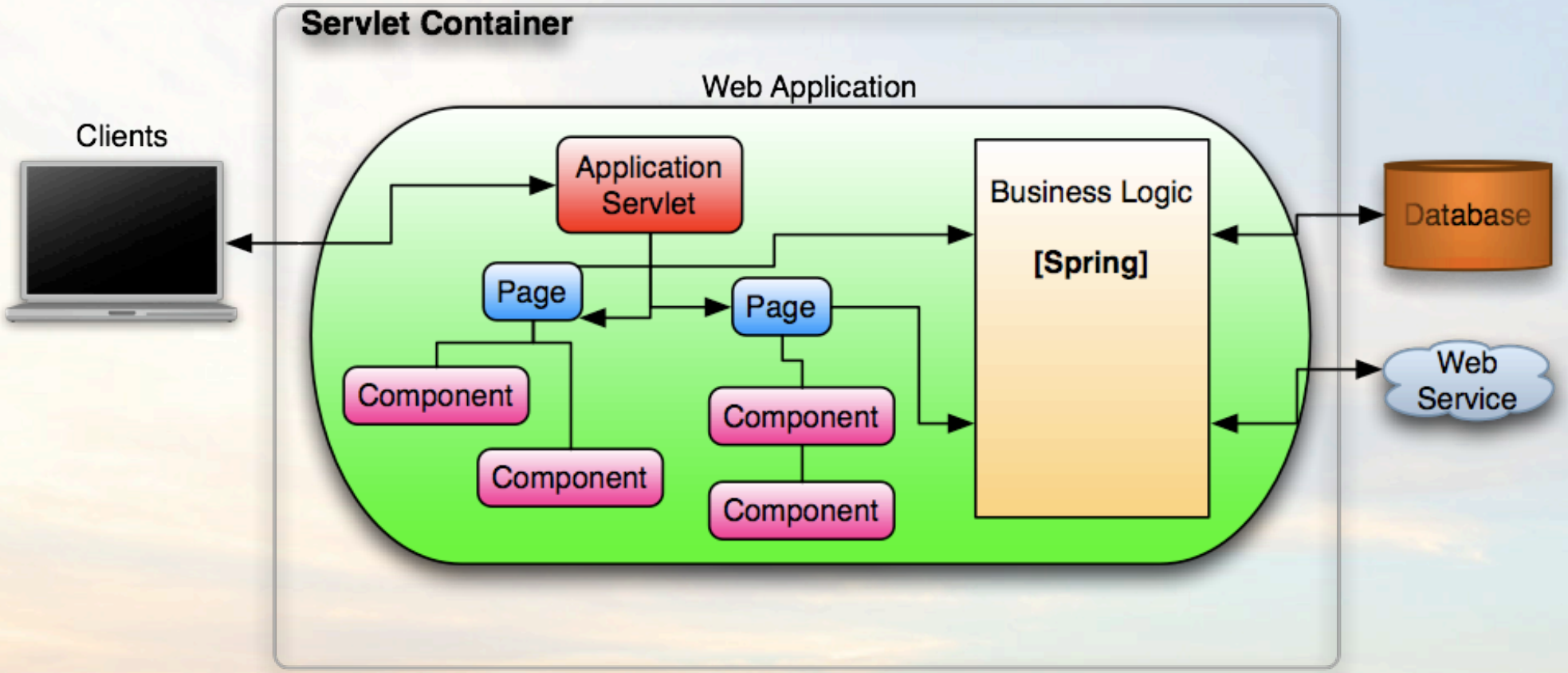
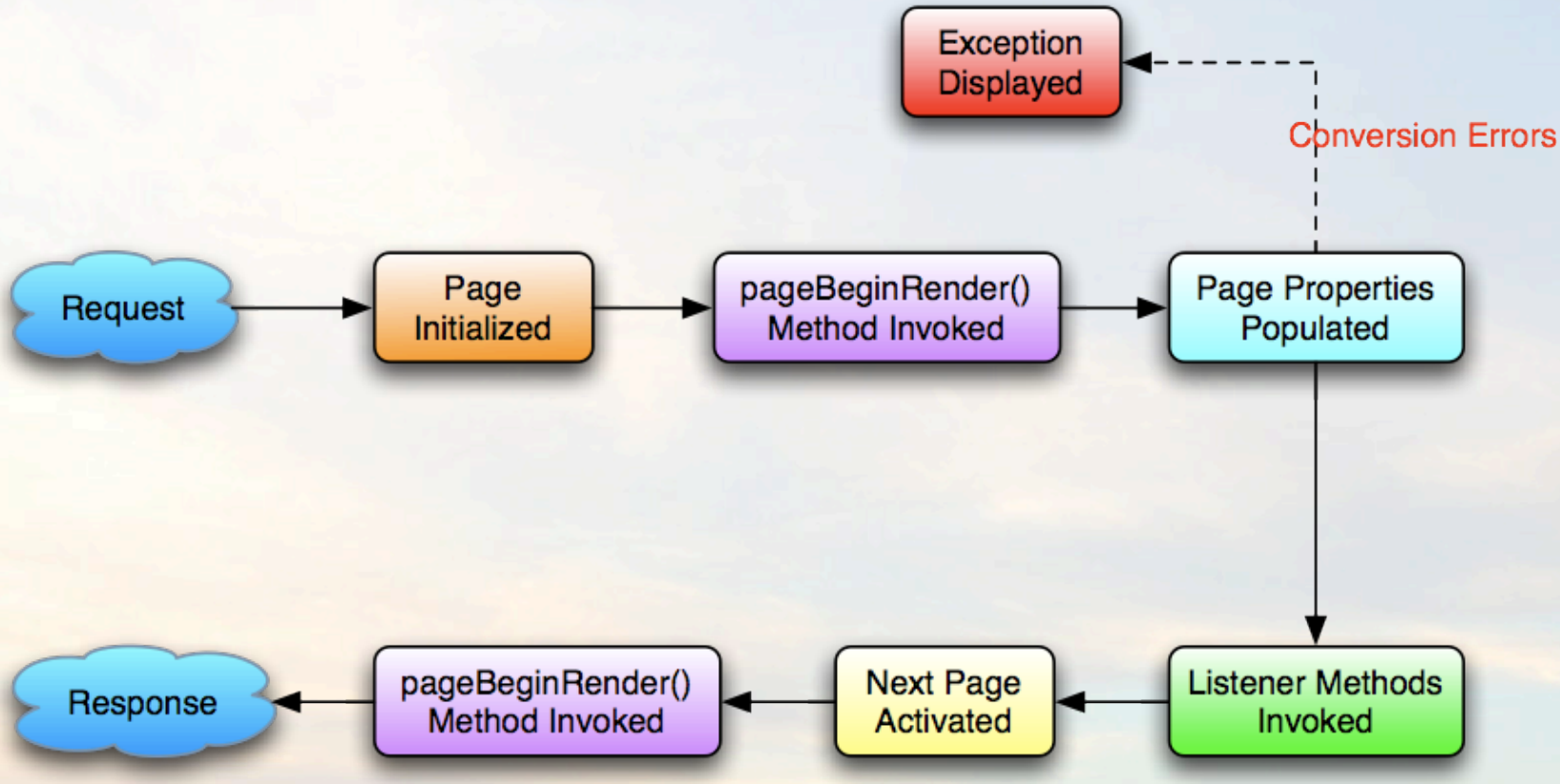
Tapestry



VIRTUAS

Tapestry Lifecycle



Tapestry Page

```
public abstract class UserForm extends BasePage {

    public abstract UserManager getUserManager();
    public abstract void setUser(User user);
    public abstract User getUser();

    public void save(IRequestCycle cycle) {
        if (log.isDebugEnabled()) {
            log.debug("entered 'save' method");
        }

        getUserManager().saveUser(getUser());

        UserList nextPage = (UserList) cycle.getPage("users");
        nextPage.setMessage(getMessages().format("user.saved",
                                getUser().getFullName()));
        throw new PageRedirectException(nextPage);
    }
```


VIRTUAS

Tapestry Configuration

```
<application name="tapestry">
    <page name="Home" specification-path="/pages/home.page"/>
    <page name="users" specification-path="/pages/users.page"/>
    <page name="userForm" specification-path="/pages/userForm.page"/>

    <library id="contrib"
        specification-path="/org/apache/tapestry/contrib/Contrib.library"/>
</application>
```

VIRTUAS

Page Configuration

```
<page-specification class="org.appfuse.web.UserForm">
    <bean name="delegate" class="org.apache.tapestry.valid.ValidationDelegate"/>

    <component id="form" type="Form">
        <binding name="delegate" value="ognl:beans.delegate"/>
        <binding name="clientValidationEnabled" value="true"/>
    </component>

    <property name="user"/>
    <inject property="userManager" object="spring:userManager"/>

    <component id="lastNameField" type="TextField">
        <binding name="value" value="user.lastName"/>
        <binding name="validators" value="validators:required"/>
        <binding name="displayName" value="message:lastName"/>
    </component>

</page-specification>
```


VIRTUAS

Tapestry HTML View

```
<form jwcid="@Form" delegate="ognl:beans.delegate" name="userForm">
<input type="hidden" jwcid="@Hidden" value="ognl:user.id"/>
<table class="detail">
<tr>
    <th>
        <label for="firstName"><span key="firstName">First Name</span></label>:
    </th>
    <td><input jwcid="@TextField" type="text" value="ognl:user.firstName" id="firstName"/></td>
</tr>
<tr>
    <th>
        <label jwcid="@FieldLabel" field="ognl:components.lastNameField">Last Name</label>:
    </th>
    <td><input jwcid="lastNameField" type="text" id="lastName"/></td>
</tr>
<tr>
    <th>
        <label for="birthday"><span key="birthday">Birthday</span></label>:
    </th>
    <td>
        <input jwcid="@DatePicker" format="message:date.format" type="text"
            size="11" value="ognl:user.birthday" id="birthday"/>
    </td>
</tr>
```

VIRTUAS

Tapestry HTML View

```
<form jwcid="@Form" delegate="ognl:beans.delegate" name="userForm">
<input type="hidden" jwcid="@Hidden" value="ognl:user.id"/>
<table class="detail">
<tr>
    <th>
        <label for="firstName"><span key="firstName">First Name</span></label>:
    </th>
    <td><input jwcid="@TextField" type="text" value="ognl:user.firstName" id="firstName"/></td>
</tr>
<tr>
    <th>
        <label jwcid="@FieldLabel" field="ognl:components.lastNameField">Last Name</label>:
    </th>
    <td><input jwcid="lastNameField" type="text" id="lastName"/></td>
</tr>
<tr>
    <th>
        <label for="birthday"><span key="birthday">Birthday</span></label>:
    </th>
    <td>
        <input jwcid="@DatePicker" format="message:date.format" type="text"
            size="11" value="ognl:user.birthday" id="birthday"/>
    </td>
</tr>
```

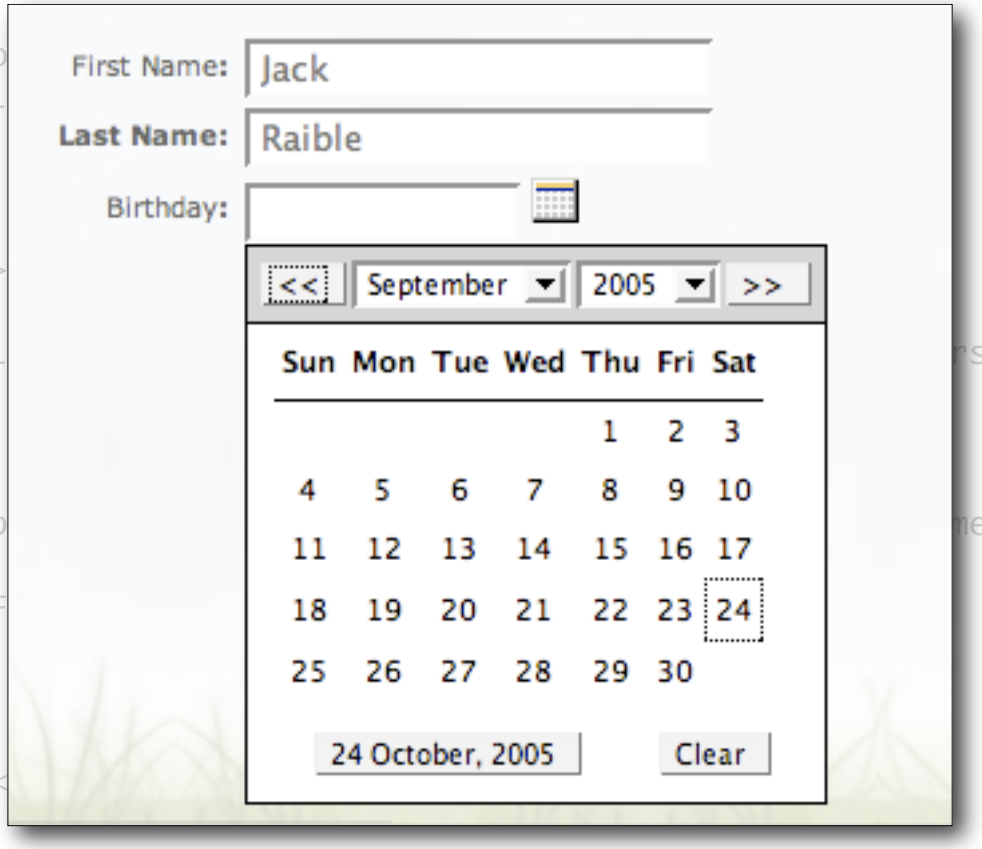
DatePicker Component

VIRTUAS

DatePicker Component

```
<form jwcid="@Form" delegate="ognl:beans.delegate" name="userForm">
<input type="hidden" jwcid="@Hidden" value="ognl:user.id"/>
<table class="detail">
<tr>
    <th>
        <label for="firstName"><span key="firstName">First Name</span></label>:
    </th>
    <td><input jwcid="@TextField" type="text" value="ognl:user.firstName" id="firstName"/></td>
</tr>
<tr>
    <th>
        <label jwcid="@FieldLabel" field="ognl:components.lastNameField">Last Name</label>:
    </th>
    <td><input jwcid="lastNameField" type="text" id="lastName"/></td>
</tr>
<tr>
    <th>
        <label for="birthday"><span key="birthday">Birthday</span></label>:
    </th>
    <td>
        <input jwcid="@DatePicker" format="message:date.format" type="text"
            size="11" value="ognl:user.birthday" id="birthday"/>
    </td>
</tr>
```

DatePicker Component




```
<form jwcid="@Form" delegate="o
<input type="hidden" jwcid="@Hi
<table class="detail">
<tr>
    <th>
        <label for="firstName">
    </th>
    <td><input jwcid="@TextFiel                                    rstName"/></td>
</tr>
<tr>
    <th>
        <label jwcid="@FieldLab                                    me</label>:
    </th>
    <td><input jwcid="lastNameF
</tr>
<tr>
    <th>
        <label for="birthday"><
    </th>
    <td>
        <input jwcid="@DatePicker" format="message:date.format" type="text"
            size="11" value="ognl:user.birthday" id="birthday"/>
    </td>
</tr>
```


VIRTUAS

New in Tapestry 4.0

- Rich Annotation support
- Extremely configurable - now based on Hivemind
- Less code required - page-backing objects simpler
- Friendly URLs support
- Tacos Ajax Components

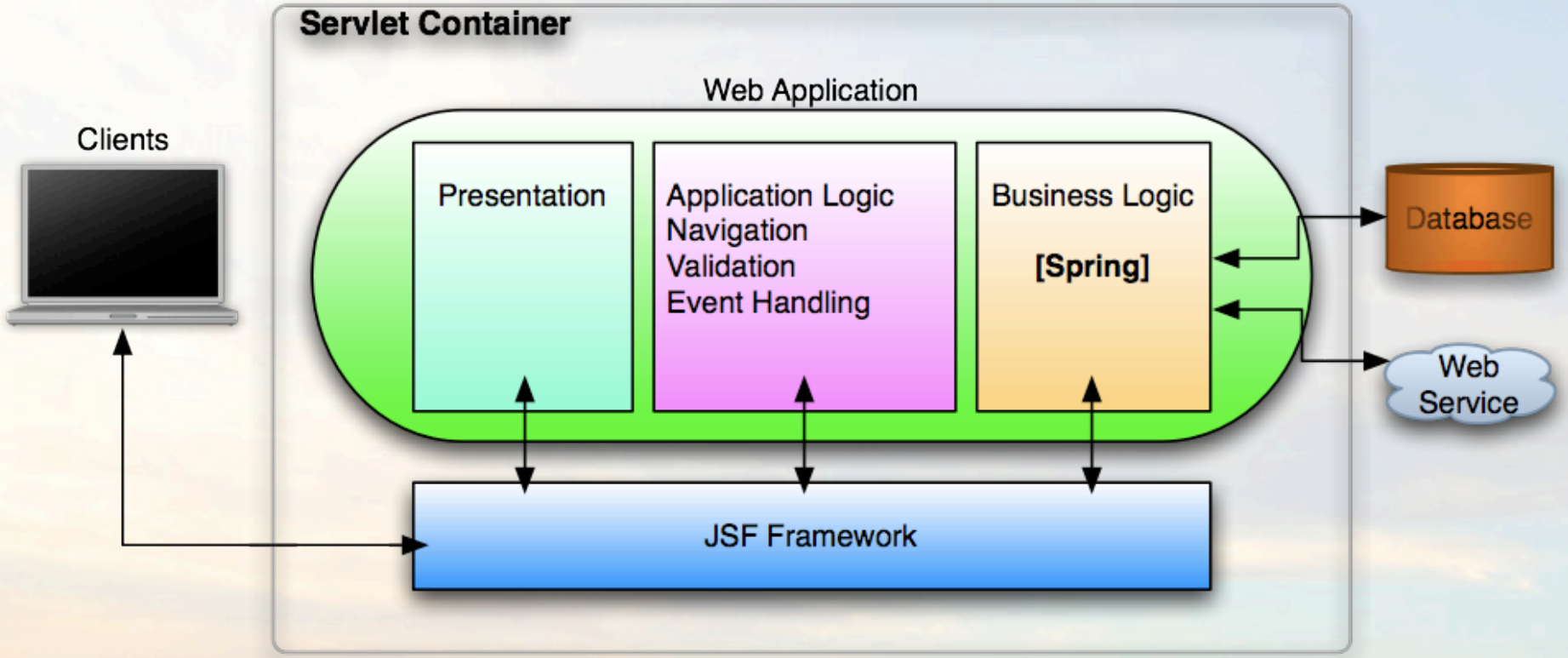
VIRTUAS

JSF

- Pros:
  - J2EE Standard - lots of demand and jobs
  - Fast and easy to develop with
  - Rich Navigation framework
- Cons:
  - Tag soup for JSPs
  - Doesn't play well with REST or Security
  - No single source for implementation

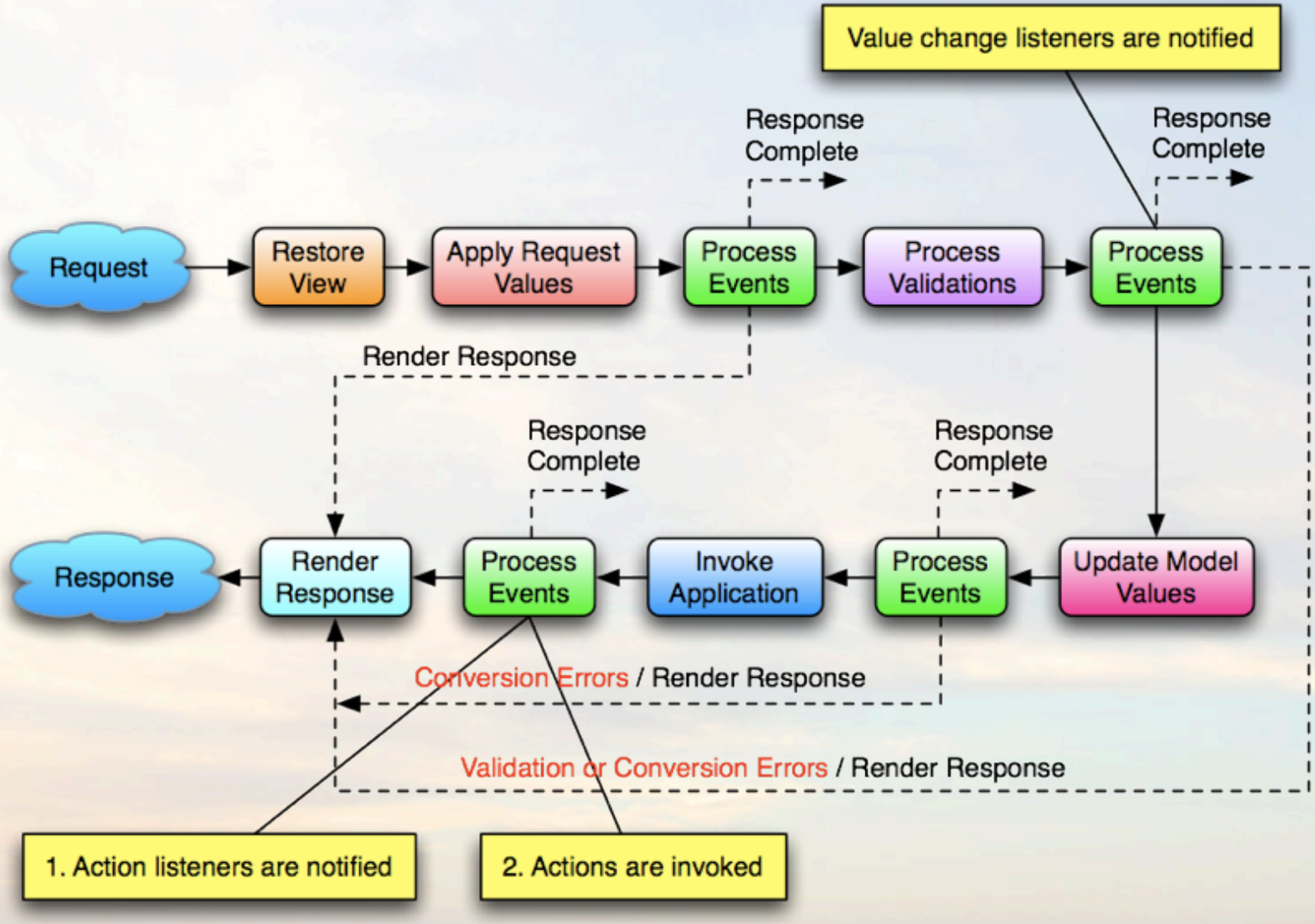
VIRTUAS

JSF



VIRTUAS

JSF



JSF Managed Bean

```
public class UserForm {
    private String id;
    public User user = new User();
    public UserManager mgr;

    public void setId(String id) {
        this.id = id;
    }

    public void setUser(User user) {
        this.user = user;
    }

    public void setUserManager(UserManager userManager) {
        this.mgr = userManager;
    }

    public String edit() {
        if (id != null) {
            // assuming edit
            setUser(mgr.getUser(id));
        }

        return "success";
    }
```


VIRTUAS

faces-config.xml

```
<application>
    <variable-resolver>
        org.springframework.web.jsf.DelegatingVariableResolver
    </variable-resolver>
    <locale-config>
        <default-locale>en</default-locale>
        <supported-locale>en</supported-locale>
        <supported-locale>es</supported-locale>
    </locale-config>
    <message-bundle>messages</message-bundle>
</application>

<navigation-rule>
    <from-view-id>/userForm.jsp</from-view-id>
    <navigation-case>
        <from-outcome>cancel</from-outcome>
        <to-view-id>/userList.jsp</to-view-id>
    </navigation-case>
    <navigation-case>
        <from-outcome>success</from-outcome>
        <to-view-id>/userList.jsp</to-view-id>
        <redirect/>
    </navigation-case>
</navigation-rule>
```


VIRTUAS

faces-config.xml

```
<application>
    <variable-resolver>
        org.springframework.web.jsf.DelegatingVariableResolver
    </variable-resolver>
    <locale-config>
        <default-locale>en</default-locale>
        <supported-locale>en</supported-locale>
        <supported-locale>es</supported-locale>
    </locale-config>
    <message-bundle>messages</message-bundle>
</application>

<navigation-rule>
    <from-view-id>/userForm.jsp</from-view-id>
    <navigation-case>
        <from-outcome>*</from-outcome>
        <to-view-id>/userList.jsp</to-view-id>
        <redirect/>
    </navigation-case>
</navigation-rule>
```


VIRTUAS

faces-config.xml

```
<managed-bean>
    <managed-bean-name>userForm</managed-bean-name>
    <managed-bean-class>org.appfuse.web.UserForm</managed-bean-class>
    <managed-bean-scope>request</managed-bean-scope>
    <managed-property>
        <property-name>id</property-name>
        <value>#{param.id}</value>
    </managed-property>
    <managed-property>
        <property-name>userManager</property-name>
        <value>#{userManager}</value>
    </managed-property>
</managed-bean>
```


VIRTUAS

JSF JSP View

```
<f:view>
<f:loadBundle var="messages" basename="messages"/>

<h:form id="userForm">
<h:inputHidden value="#{userForm.user.id}">
    <f:convertNumber/>
</h:inputHidden>
<h:panelGrid columns="3" styleClass="detail" columnClasses="label">

    <h:outputLabel for="firstName" value="#{messages['user.firstName']}"/>
    <h:inputText value="#{userForm.user.firstName}" id="firstName"/>
    <h:message for="firstName" styleClass="errorMessage"/>

    <h:outputLabel for="lastName" value="#{messages['user.lastName']}"/>
    <h:inputText value="#{userForm.user.lastName}" id="lastName" required="true"/>
    <h:message for="lastName" styleClass="errorMessage"/>

    <h:outputLabel for="birthday" value="#{messages['user.birthday']}"/>
    <t:inputCalendar monthYearRowClass="yearMonthHeader"
            weekRowClass="weekHeader" id="birthday"
            currentDayCellClass="currentDayCell" value="#{userForm.user.birthday}"
            renderAsPopup="true" addResources="false"/>
    <h:message for="birthday" styleClass="errorMessage"/>
```

VIRTUAS

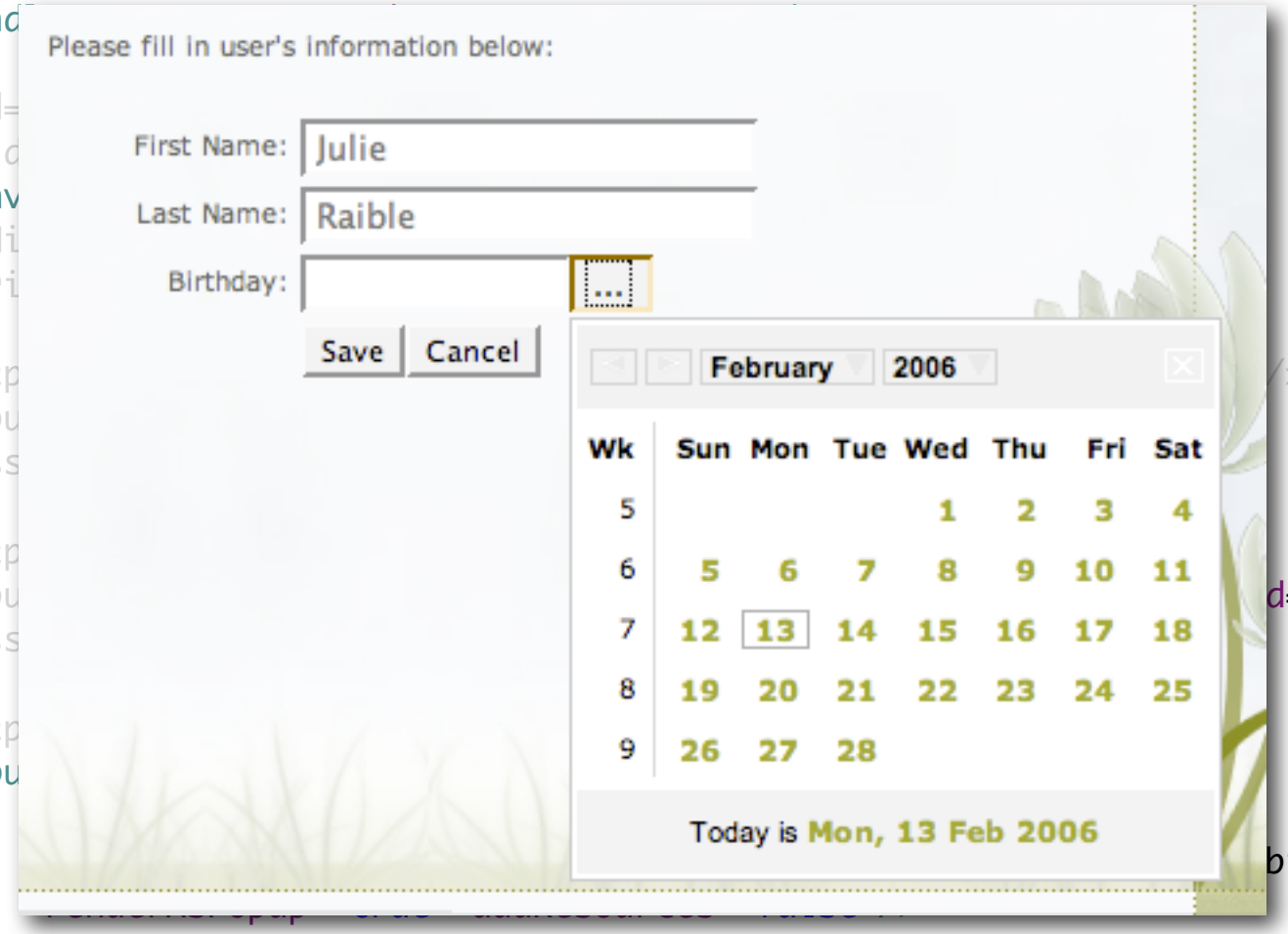
JSF JSP View

```
<f:view>
<f:loadBundle var="messages" basename="messages"/>

<h:form id="userForm">
<h:inputHidden value="#{userForm.user.id}">
    <f:convertNumber/>
</h:inputHidden>
<h:panelGrid columns="3" styleClass="detail" columnClasses="label">

    <h:outputLabel for="firstName" value="#{messages['user.firstName']}"/>
    <h:inputText value="#{userForm.user.firstName}" id="firstName"/>
    <h:message for="firstName" styleClass="errorMessage"/>

    <h:outputLabel for="lastName" value="#{messages['user.lastName']}"/>
    <h:inputText value="#{userForm.user.lastName}" id="lastName" required="true"/>
    <h:message for="lastName" styleClass="errorMessage"/>

    <h:outputLabel for="birthday" value="#{messages['user.birthday']}"/>
    <t:inputCalendar monthYearRowClass="yearMonthHeader"
            weekRowClass="weekHeader" id="birthday"
            currentDayCellClass="currentDayCell" value="#{userForm.user.birthday}"
            renderAsPopup="true" addResources="false"/>
    <h:message for="birthday" styleClass="errorMessage"/>
```

VIRTUAS

JSF JSP View

```
<f:view>
<f:loadBund
<h:form id=
<h:inputHid
    <f:conv
</h:inputHi
<h:panelGri
    <h:outp
    <h:inpu
    <h:mess
    <h:outp
    <h:inpu                                          d="true"/>
    <h:mess
    <h:outp
    <t:inpu                                          birthday}"
    <h:message for="birthday" styleClass="errorMessage"/>
```



VIRTUAS

New in JSF 1.2

- Unified EL - better support for JSTL
- Focus on ease of use
- Java Studio Creator 2.0
- Many Ajax Components and Examples
- Open Source: ADF Faces, MyFaces/Tomahawk, Facelets

VIRTUAS

The Smackdown

VIRTUAS

Evaluation Criteria

- **List Screens**: How easy is it to code pageable, sortable lists?
- **Bookmarkability**: Can users bookmark pages and return to them easily?
- **Validation**: How easy is it to use and does it support client-side (JavaScript) validation?
- **Testability**: How easy is it to test Controllers out of container?

VIRTUAS

Evaluation Criteria, cont.

- **Post and Redirect**: How does the framework handle the duplicate post problem?
- **Spring Integration**: Does the framework support using Spring in the middle tier; how easily?
- **Internationalization**: How is i18n supported and how easy is it to get messages in Controllers?
- **Page Decoration**: What sort of page decoration/ composition mechanisms does the framework support?

VIRTUAS

Evaluation Criteria, cont.

- **Tools**: Is there good tool (particularly IDE) support for the framework?
- **Marketability of Skills**: If you learn the framework, will it help you get a job?
- **Job Count**: What is the demand for framework skills on dice.com?

VIRTUAS

List Screens

- How easy is it to integrate a sortable/pageable list of data?
  - Struts, Spring MVC and WebWork can all use Tag Libraries like the Display Tag
  - Tapestry has a contrib:Table component
  - JSF has a dataTable with no sorting - have to write your own logic if you want it

VIRTUAS

Bookmarking and URLs

- Using container-managed authentication (or other filter-based security systems) allow users to bookmark pages. They can click the bookmark, login and go directly to the page.
  - WebWork has **namespaces** - makes it easy
  - Struts and Spring allow **full URL control**
  - Tapestry still has somewhat ugly URLs
  - JSF does a POST for everything - URLs not even considered

VIRTUAS

Validation

- Validation should be easy to configure, be robust on the client side and either provide good out of the box messages or allow you to easily customize them.
  - Struts and Spring MVC use Commons Validator - a mature solution
  - WebWork uses OGNL for powerful expressions - client-side support is awesome
  - Tapestry has very robust validation - good messages without need to customize
  - JSF - ugly default messages, but easiest to configure

VIRTUAS

Testability

- Struts - can use StrutsTestCase
- Spring and WebWork allow easy testing with mocks (e.g. EasyMock, jMock, Spring Mocks)
- Tapestry appears difficult to test because page classes are abstract, Creator class simplifies
- JSF page classes can be easily tested and actually look a lot like WebWork actions

VIRTUAS

Post and Redirect

- The duplicate-post problem, what is it?
- Easiest way to solve: redirect after POST
- Is there support for allowing success messages to live through a redirect?
  - Struts and Spring are the only framework that allows success messages to live through a redirect
  - WebWork requires a custom solution
  - Tapestry requires you to throw an Exception to redirect
  - JSF requires a custom solution, i18n messages difficult to get in page beans

VIRTUAS

Spring Integration

- All frameworks have integration with Spring
  - **Struts**: ContextLoaderPlugin and Support classes
  - **WebWork**: SpringObjectFactory (built-in)
  - **Tapestry**: Easily plug Spring into Hivemind
  - **JSF**: DelegatingVariableResolver or JSF-Spring Library

VIRTUAS

Internationalization

- JSTL's <fmt:message> tag makes it easy
- No standard for getting i18n messages in controller classes
- Struts, Spring and JSF use a single ResourceBundle per locale
- WebWork and Tapestry advocate separate files for each page/action
- JSF requires resource bundle to be declared on each page
- Tapestry's is awesome

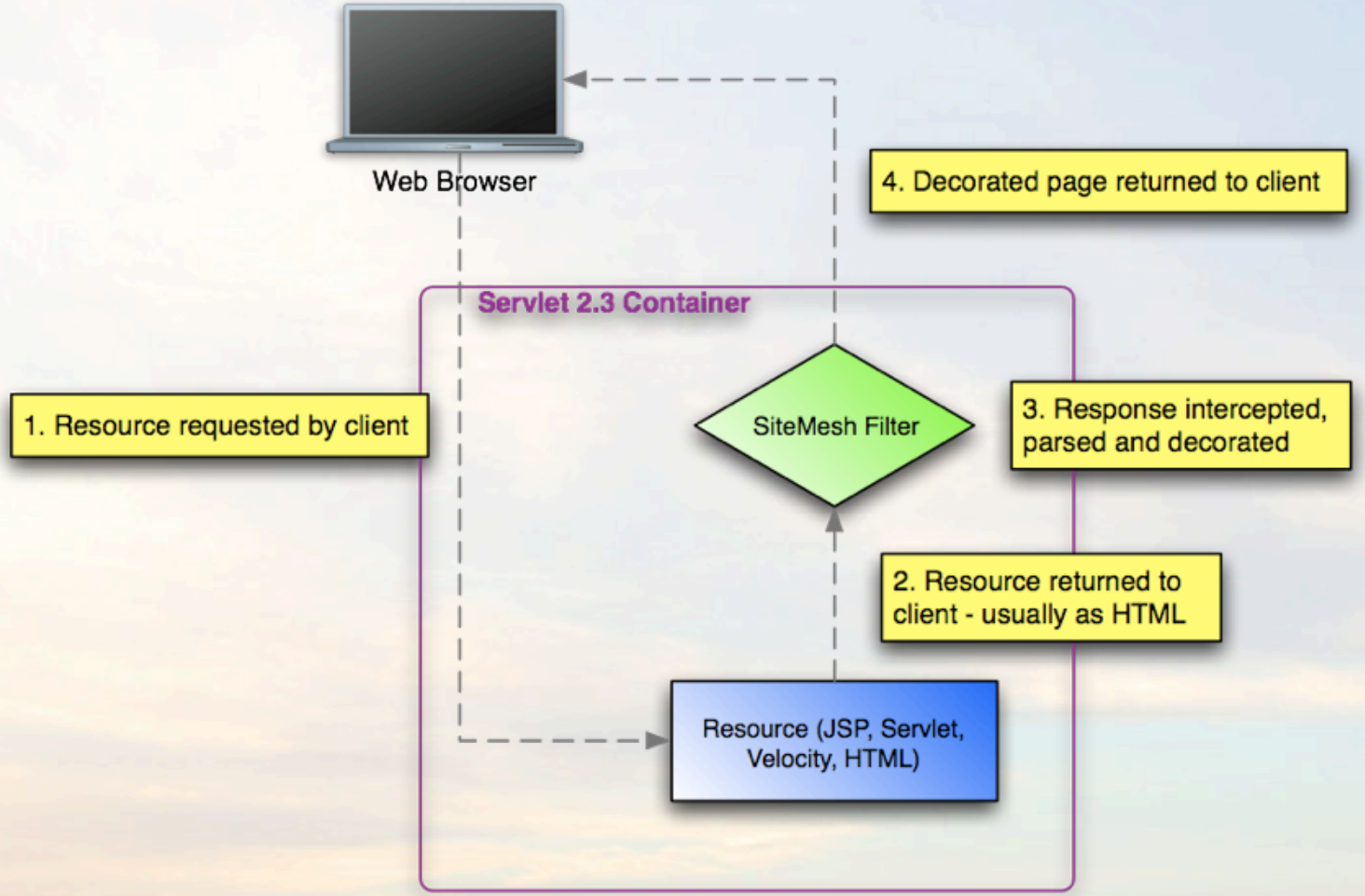
VIRTUAS

Page Decoration

- Tiles Experience: used since it first came out
- SiteMesh is much easier to setup and use
- Tiles can be used in Struts, Spring and JSF
  - Requires configuration for each page
- SiteMesh can be used with all frameworks
  - Requires very little maintenance after setup
- Use both for powerful decoration/composition

VIRTUAS

SiteMesh



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SiteMesh: web.xml

```
<filter>
    <filter-name>sitemesh</filter-name>
    <filter-class>
        com.opensymphony.module.sitemesh.filter.PageFilter
    </filter-class>
</filter>

<filter-mapping>
    <filter-name>sitemesh</filter-name>
    <url-pattern>/*</url-pattern>
    <dispatcher>REQUEST</dispatcher>
    <dispatcher>FORWARD</dispatcher>
</filter-mapping>
```


VIRTUAS

/WEB-INF/sitemesh.xml

```
<sitemesh>
    <property name="decorators-file" value="/WEB-INF/decorators.xml"/>
    <excludes file="${decorators-file}"/>
    <page-parsers>
        <parser default="true"
            class="com.opensymphony.module.sitemesh.parser.FastPageParser"/>
        <parser content-type="text/html"
            class="com.opensymphony.module.sitemesh.parser.FastPageParser"/>
        <parser content-type="text/html;charset=ISO-8859-1"
            class="com.opensymphony.module.sitemesh.parser.FastPageParser"/>
    </page-parsers>

    <decorator-mappers>
        <mapper class="com.opensymphony.module.sitemesh.mapper.ConfigDecoratorMapper">
            <param name="config" value="${decorators-file}"/>
        </mapper>
    </decorator-mappers>
</sitemesh>
```


VIRTUAS

/WEB-INF/decorators.xml

```
<decorators defaultdir="/decorators">
    <excludes>
        <pattern>/demos/*</pattern>
        <pattern>/resources/*</pattern>
    </excludes>
    <decorator name="default" page="default.jsp">
        <pattern>/*</pattern>
    </decorator>
</decorators>
```


VIRTUAS

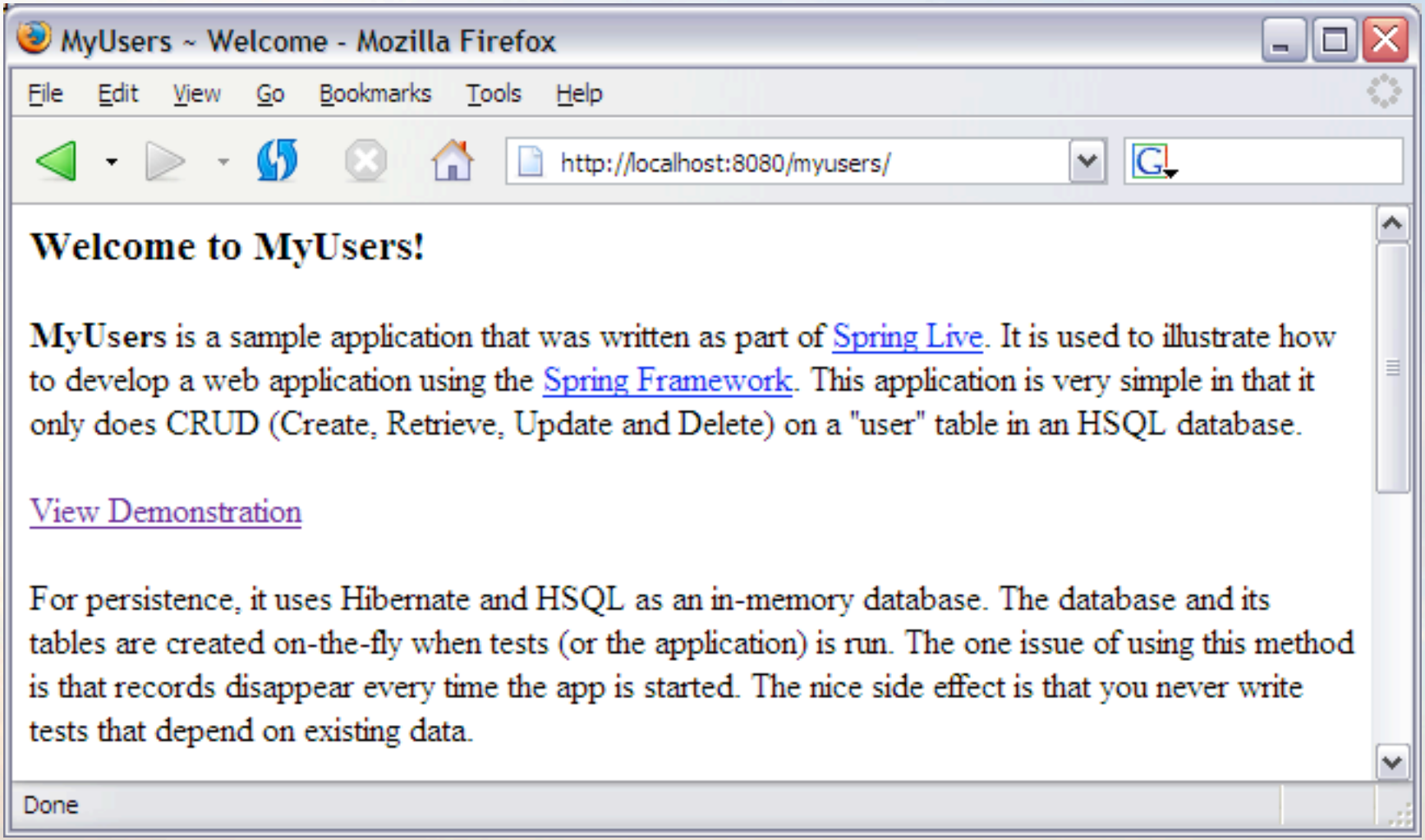
Sample Decorator

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

<%@ include file="/taglibs.jsp"%>

<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en">
<head>
    <title><decorator:title default="Equinox"/></title>
    <meta http-equiv="content-type" content="text/html; charset=utf-8"/>
    <link href="${ctx}/styles/global.css" type="text/css" rel="stylesheet"/>
    <link href="${ctx}/images/favicon.ico" rel="SHORTCUT ICON"/>
    <script type="text/javascript" src="${ctx}/scripts/global.js"></script>
    <decorator:head/>
</head>
<body<decorator:getProperty property="body.id" writeEntireProperty="true"/>>
<a name="top"></a>

    <div id="content">
        <%@ include file="/messages.jsp"%>
        <decorator:body/>
    </div>

</body>
```

Sample Decorator

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

<%@ include file="/taglibs.jsp"%>

<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en">
<head>
    <title><decorator:title default="Equinox"/></title>
    <meta http-equiv="content-type" content="text/html; charset=utf-8"/>
    <link href="${ctx}/styles/global.css" type="text/css" rel="stylesheet"/>
    <link href="${ctx}/images/favicon.ico" rel="SHORTCUT ICON"/>
    <script type="text/javascript" src="${ctx}/scripts/global.js"></script>
    <decorator:head/>
</head>
<body<decorator:getProperty property="body.id" writeEntireProperty="true"/>>
<a name="top"></a>

    <div id="content">
        <%@ include file="/messages.jsp"%>
        <decorator:body/>
    </div>

</body>
```

Before SiteMesh



VIRTUAS

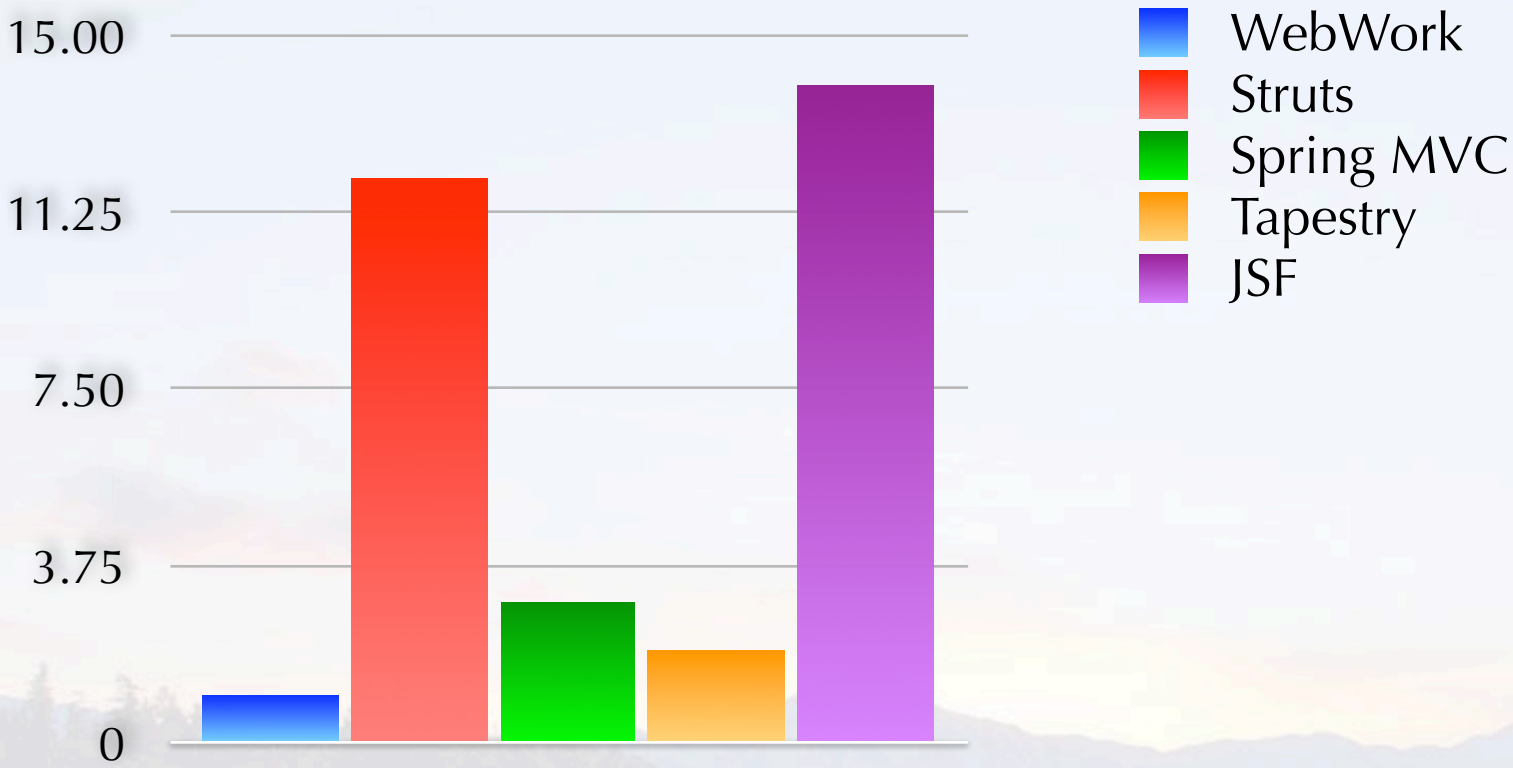
After SiteMesh

Tools

- Struts has a lot of IDE support and even has frameworks built on top of it (i.e. Beehive's PageFlow)
- Spring has Spring IDE - only does XML validation, not a UI/web tool
- WebWork has EclipseWork
- Tapestry has Spindle - great for coders
- JSF has many, and they're getting better and better

VIRTUAS

Tools Available



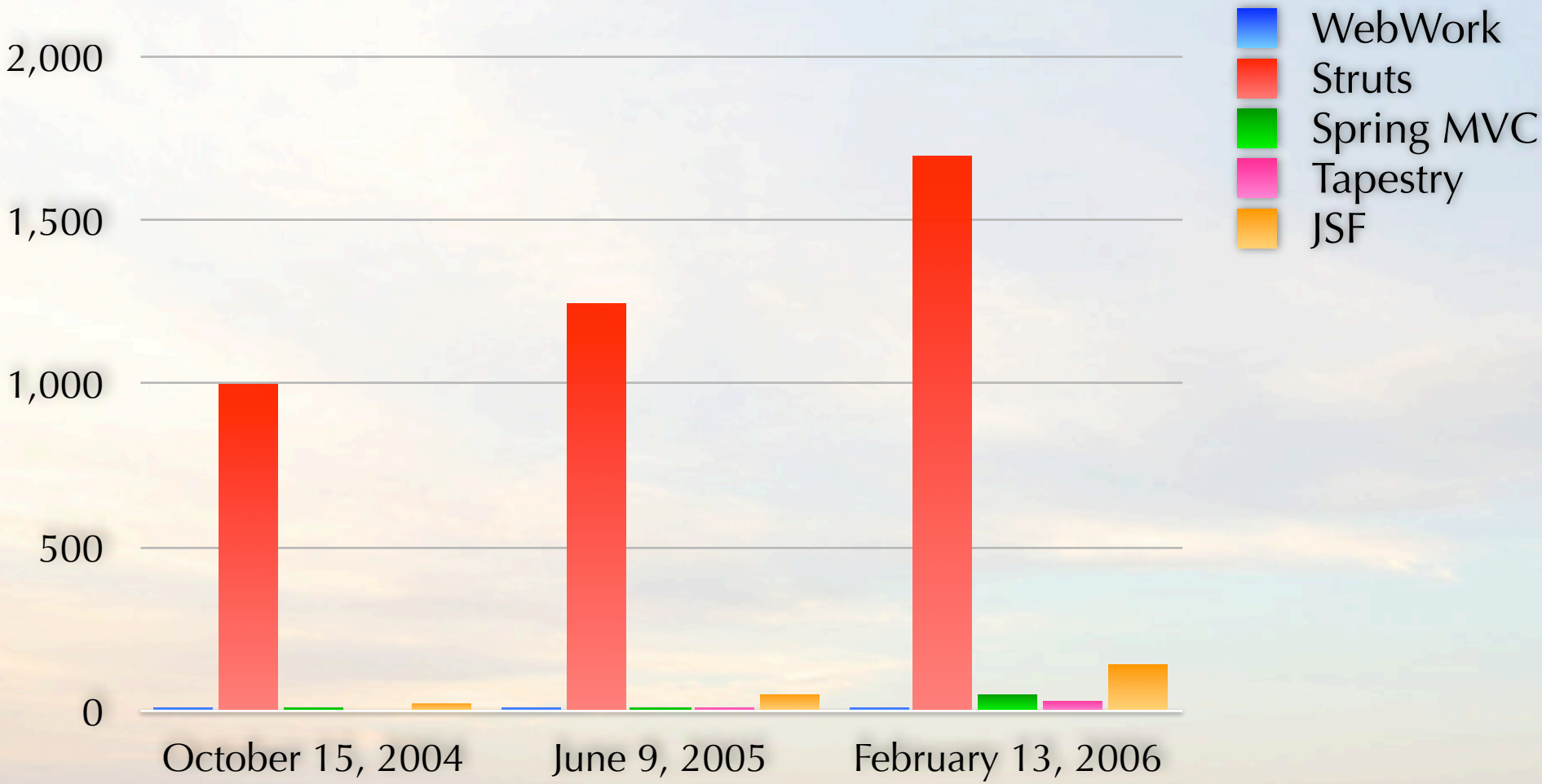
VIRTUAS

Marketability of Skills

- Struts is still in high-demand and widely-used
- Spring is getting more press, but mostly due to the framework's other features
- WebWork is gaining ground, but very scarce on job boards
- Tapestry is even more scarce - needs more marketing
- JSF is quickly becoming popular

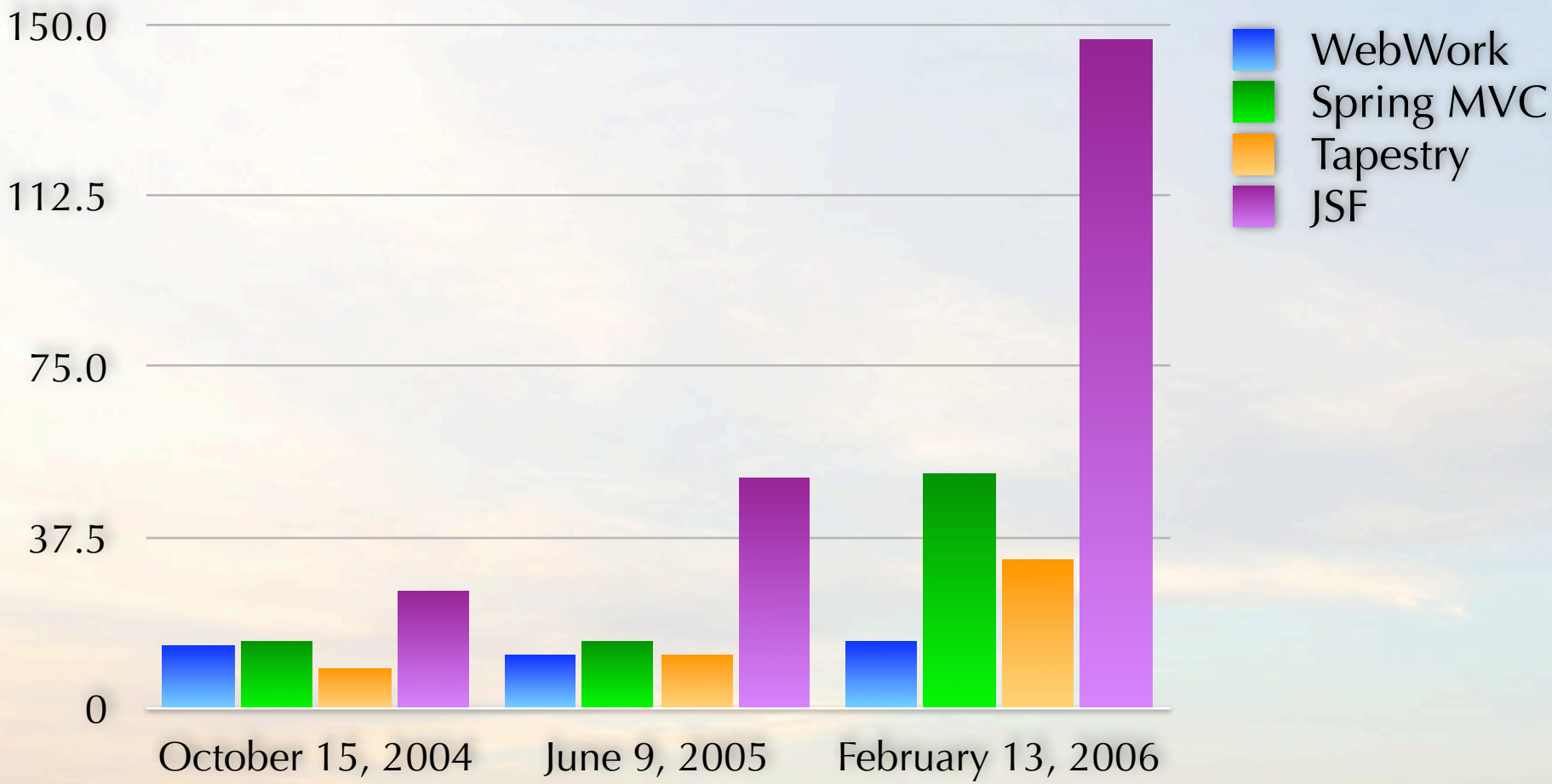
VIRTUAS

Dice Job Count



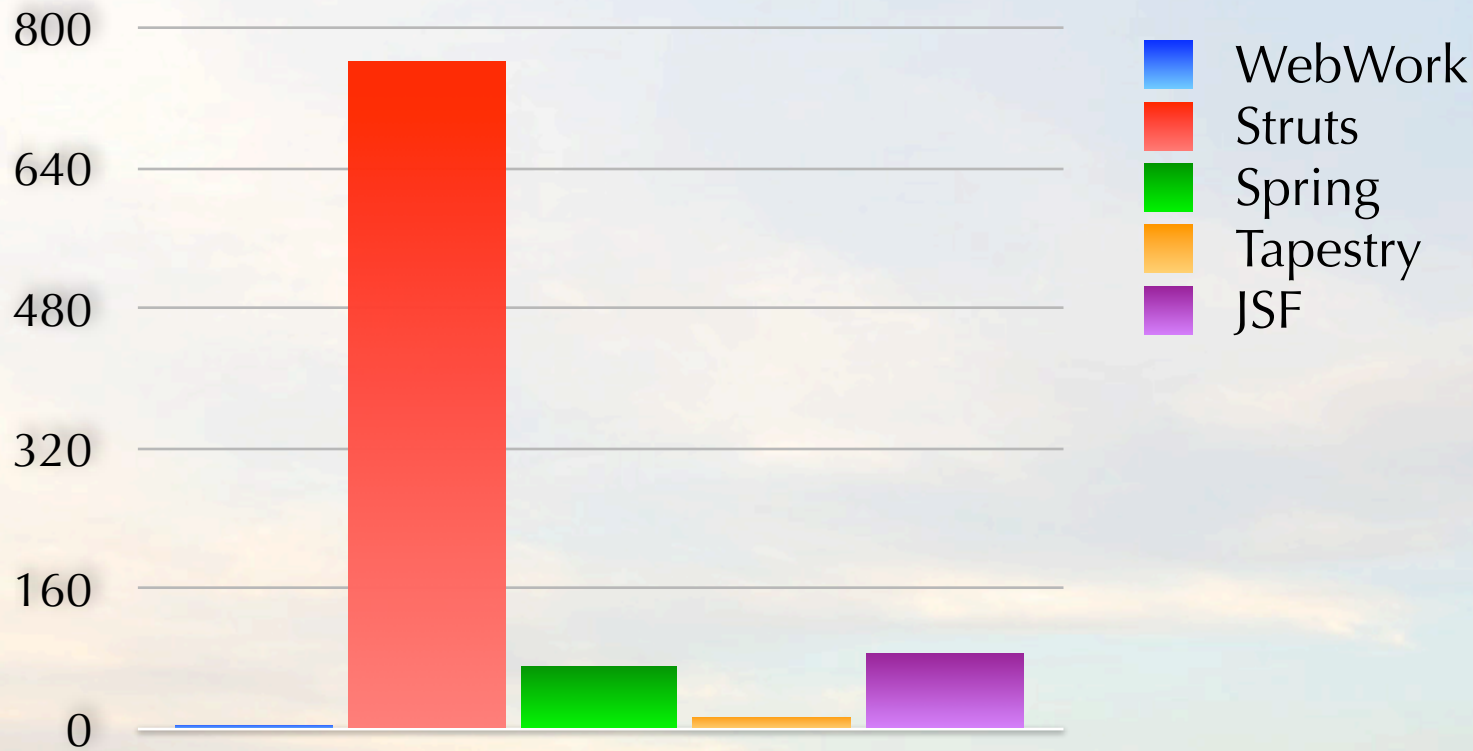
VIRTUAS

Jobs sans Struts



VIRTUAS

Employer Search on Monster.com
Resumes posted 2/11 - 2/13/2006



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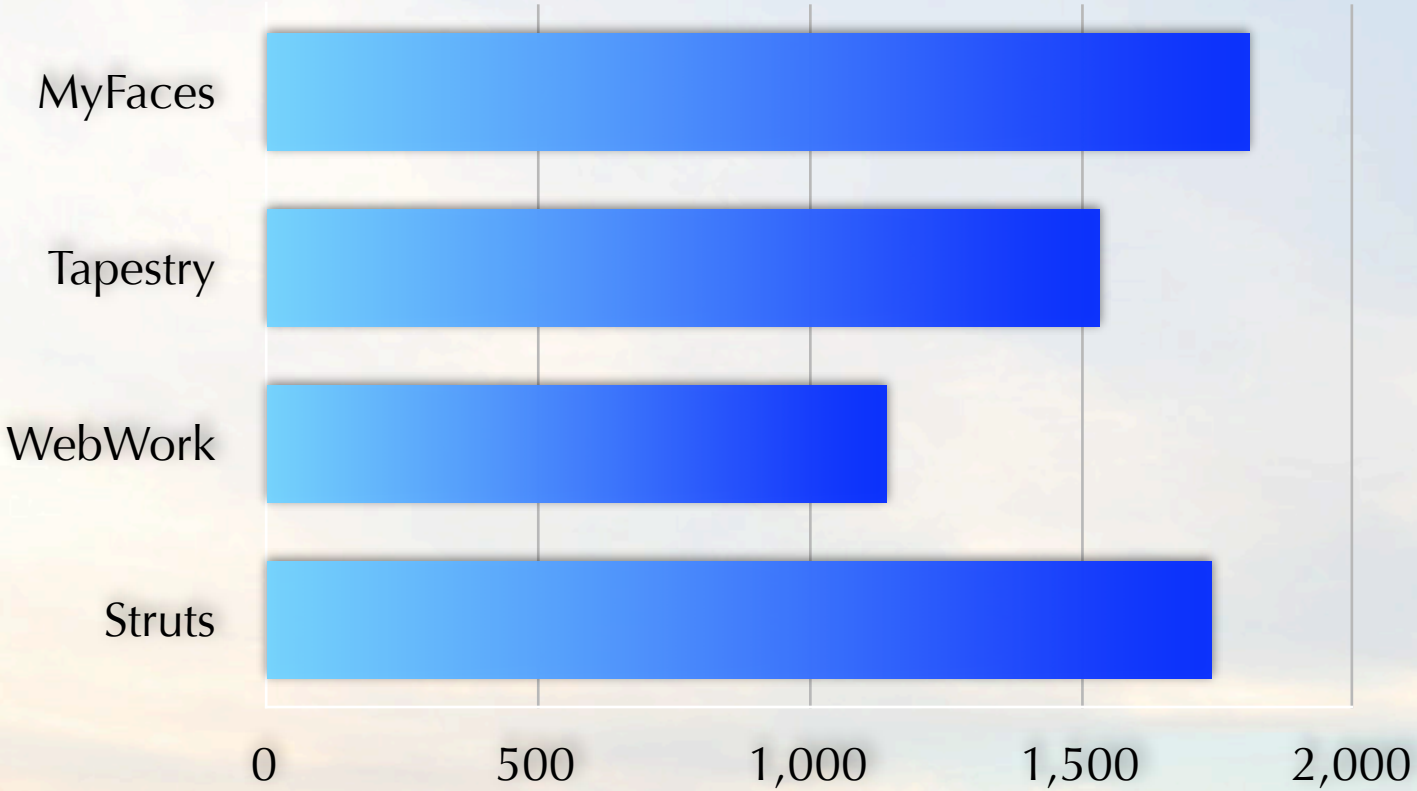
Mailing List Traffic



** Spring MVC is not listed here because they have a forum instead of a mailing list and I couldn't figure out a way to count the number of messages for each month.*

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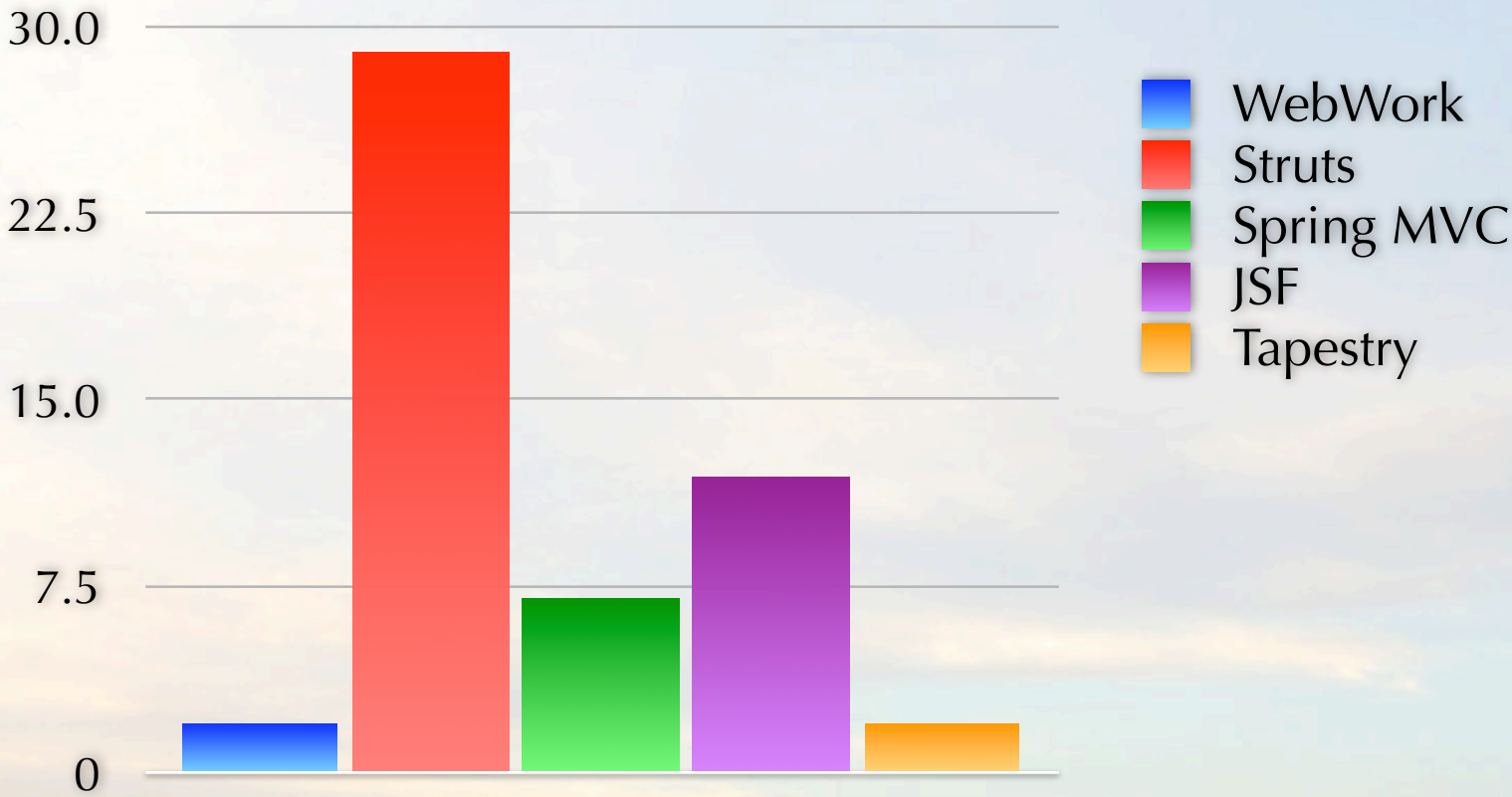
Books on Amazon



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Which would I choose?

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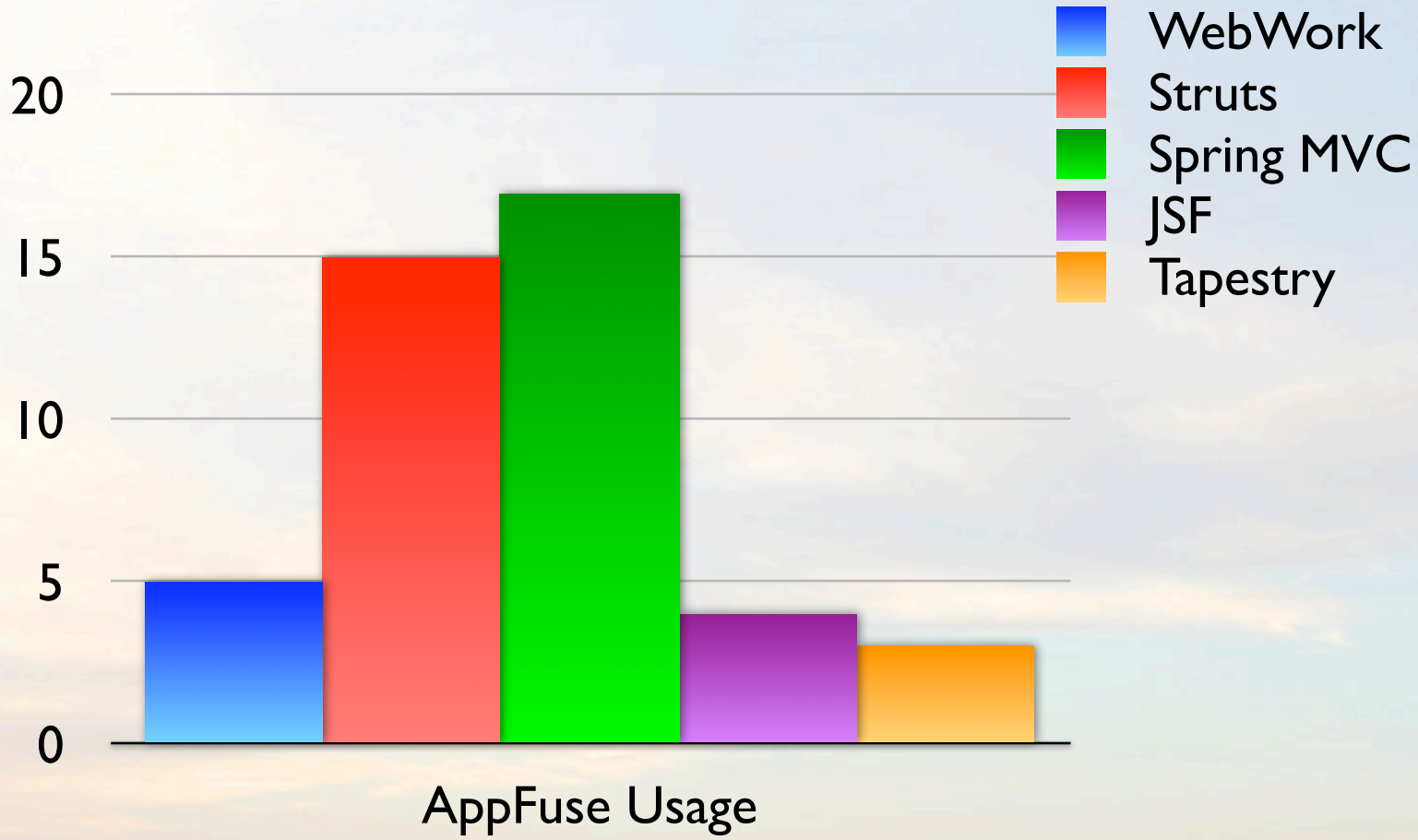
What do others think?



http://raibledesigns.com/page/rd?entry=spring_mvc_the_most_popular

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Resources

- Download sample apps from this presentation
  - http://equinox.dev.java.net/framework-comparison
- Struts - http://struts.apache.org
  - **StrutsTestCase**: http://strutstestcase.sf.net
- Spring MVC - http://www.springframework.org
  - **Spring IDE**: http://www.springide.org
  - **Gaijin Studio**: http://gaijin-studio.sf.net
- WebWork - http://opensymphony.org/webwork
  - **Eclipse Plugin**: http://sf.net/projects/eclipsework
  - **IDEA Plugin**: http://wiki.opensymphony.com/display/WW/IDEA+Plugin

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Resources, cont.

- Tapestry - http://jakarta.apache.org/tapestry
  - **Spindle**: http://spindle.sourceforge.net
- JSF - http://java.sun.com/j2ee/javaserverfaces and http://myfaces.apache.org
  - **Java Studio Creator**: http://sun.com/software/products/jscreator
  - **MyEclipse**: http://myeclipseide.com
- **IDEA**: http://www.jetbrains.com/idea
- **SiteMesh**: http://opensymphony.com/sitemesh

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Resources, cont.

- Testing Frameworks
  - **JUnit**: http://junit.org
  - **EasyMock**: http://easymock.org
  - **jMock**: http://jmock.org
  - **jWebUnit**: http://jwebunit.sourceforge.net
  - **Canoo WebTest**: http://webtest.canoo.com
  - **Tapestry Test Assist**: http://howardlewisship.com/blog/2004/05/tapestry-test-assist.html
- **XDoclet** - http://xdoclet.sourceforge.net
- **AppFuse** - http://appfuse.dev.java.net

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Books

- **Struts in Action**, Ted Husted and Team
- **Struts Live**, Rick Hightower and Jonathan Lehr
- **Spring Live**, Matt Raible
- **Pro Spring**, Rob Harrop and Jan Machacek
- **Spring in Action**, Craig Walls and Ryan Breidenbach
- **Professional Java Development with Spring**, Rod Johnson, Juergen Hoeller and Team

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Books, cont.

- **WebWork Live**, Matthew Porter
- **WebWork in Action**, Patrick Lightbody and Team
- **Tapestry Live**, Warner Onstine
- **Tapestry in Action**, Howard Lewis Ship
- **Core JSF**, David Geary and Cay Horstmann
- **JSF in Action**, Kito Mann

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What's Next?

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AJAX

What's Next?

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AJAX

Wicket

What's Next?

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AJAX

Wicket

Seam

What's Next?

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AJAX

Wicket

Seam

What's Next?

Trails

VIRTUAS

AJAX

Wicket

Seam

What's Next?

Clarity

Trails

VIRTUAS

AJAX

Wicket

Seam

What's Next?

Clarity

Trails

OpenLaszlo

VIRTUAS

AJAX

Wicket

Seam

What's Next?

Clarity

Ruby on Rails

Trails

OpenLaszlo

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Choose Wisely

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Questions?

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