

Evolving a Web Application with Seam

About Seam

- <http://labs.jboss.com/jbossseam/>
- **JSR 299: Web Beans**
- **Seam unifies the component models of JSF and EJB3 and letting the developer focus on the business problem**
-

Seam Integrations

- EJB 3
- JSF
- Facelets
- jBPM
- Quartz
- Spring
- GWT
- iText
- JBoss Rules
- JBoss Cache
- JMS
- JEE Application Servers
- Tomcat
- Hibernate
- Search/Lucene
- Groovy
- Email
- Web Services
- Client side JavaScript

Project Setup

- **JBoss Application Server 4.2**
- **Hypersonic DB (/data/db.sh)**
- **Seam-Gen**

Step 1 - Mockup

Facelets

- **JSF Centric**
- **Built in templating**
- **Full expression language support**
- **Easy**

Template Definition

/view/WEB-INF/templates/layout.xhtml

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2      "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/xhtml"
4      xmlns:ui="http://java.sun.com/jsf/facelets"
5      xmlns:h="http://java.sun.com/jsf/html"
6      xmlns:f="http://java.sun.com/jsf/core"
7      xmlns:s="http://jboss.com/products/seam/taglib">
8  <head>
9      <meta http-equiv="Content-Type" content="text/html; charset=UTF-8" />
10     <title>ICE: <ui:insert name="title" /></title>
11     <link href="/ice/styleSheet/theme.css" rel="stylesheet" type="text/css" />
12 </head>
13
14 <body>
15
16     <ui:include src="menu.xhtml" />
17
18     <div class="body">
19         <ui:insert name="body" />
20     </div>
21
22     <div class="footer">
23         Powered by <a href="http://jboss.com/products/seam">Seam</a>.
24     </div>
25
26 </body>
27 </html>
28
```

Template Usage

/view/home.xhtml

```
1  <!DOCTYPE composition PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
3  <ui:composition xmlns="http://www.w3.org/1999/xhtml"
4  xmlns:s="http://jboss.com/products/seam/taglib"
5  xmlns:ui="http://java.sun.com/jsf/facelets"
6  xmlns:f="http://java.sun.com/jsf/core"
7  xmlns:h="http://java.sun.com/jsf/html"
8  xmlns:rich="http://richfaces.org/rich"
9  template="/WEB-INF/templates/layout.xhtml">
10
11  <ui:define name="title">Home</ui:define>
12
13  <ui:define name="body">
14
15      <rich:panel>
16          <f:facet name="header">Welcome!</f:facet>
17          <p>
18              This application is an extension of the Seam Contact List
19              example application. It expands the Contact List application
20              to demonstrate additional features available with Seam.
21          </p>
22      </rich:panel>
23
24  </ui:define>
25 </ui:composition>
26
```


Creating a Seam Component

/src/action/ice/step1/Mock.java

```
9  @Name("mock")
10 public class Mock implements Serializable {
11
12     public List getList() {
13         List list = new ArrayList();
14
15         for (int i=0; i < 5; i++) {
16             list.add(new Object());
17         }
18
19         return list;
20     }
21 }
22
23
24 }
25
```

JSF/RichFaces Components

/view/step1/search.xhtml

```
35      <!-- search results -->
36      <rich:dataTable value="#{mock.list}"
37                    var="contact"
38                    width="100%">
39          <f:facet name="header">#{messages.search_results}: #{mock.list.size()}</f:facet>
40          <rich:column>
41              <f:facet name="header">#{messages.name}</f:facet>
42          </rich:column>
43          <rich:column>
44              <f:facet name="header">#{messages.email}</f:facet>
45          </rich:column>
46          <rich:column>
47              <f:facet name="header">#{messages.address}</f:facet>
48          </rich:column>
49          <rich:column>
50              <f:facet name="header">#{messages.city}</f:facet>
51          </rich:column>
52          <rich:column>
53              <f:facet name="header">#{messages.state}</f:facet>
54          </rich:column>
55          <rich:column>
56              <f:facet name="header">#{messages.zip}</f:facet>
57          </rich:column>
58          <rich:column>
59              <f:facet name="header">#{messages.country}</f:facet>
60          </rich:column>
61          <rich:column>
62              <f:facet name="header">
63                  <rich:spacer/>
64              </f:facet>
65              <s:button view="/step1/view.xhtml" value="#{messages.view}"/>
66          </rich:column>
67      </rich:dataTable>
68
```

Internationalization

/resources/messages_en.properties

```
1 # Search
2 search=Search
3 search_contacts=Search Contacts
4 search_results=Contact Search Results
5 first_page=First Page
6 previous_page=Previous Page
7 next_page=Next Page
8 last_page=Last Page
9 no_results=No Results
10
11 view=View
12 delete=Delete
13 cancel=Cancel
14
15 # Contact
16 create_contact=Create Contact
17 edit_contact=Edit Contact
18 view_contact=View Contact
19 update_contact=Update Contact
20 contact=Contact
21 name=Name
22 first_name=First Name
23 last_name=Last Name
24 email=E-Mail
25 home_phone=Home Phone
26 cell_phone=Cell Phone
27 address=Address
28 city=City
29 state=State
30 zip=Zip
31 country=Country
32
```

Creating a Custom Component

/view/WEB-INF/facelets/components/display.xhtml

```
1 <ui:composition xmlns="http://www.w3.org/1999/xhtml"
2                 xmlns:ui="http://java.sun.com/jsf/facelets"
3                 xmlns:h="http://java.sun.com/jsf/html"
4                 xmlns:f="http://java.sun.com/jsf/core"
5                 xmlns:s="http://jboss.com/products/seam/taglib">
6
7     <s:div styleClass="prop">
8         <div class="name">
9             #{label}
10        </div>
11        <div class="value">
12            <ui:insert/>
13        </div>
14    </s:div>
15
16 </ui:composition>
```

Configuration

/view/WEB-INF/facelets/ice.taglib.xml

```
1  <?xml version="1.0"?>
2  <!DOCTYPE facelet-taglib PUBLIC
3      "-//Sun Microsystems, Inc.//DTD Facelet Taglib 1.0//EN"
4      "http://java.sun.com/dtd/facelet-taglib_1_0.dtd">
5  <facelet-taglib>
6
7      <namespace>http://ice.org/component</namespace>
8
9      <tag>
10         <tag-name>display</tag-name>
11         <source>components/display.xhtml</source>
12     </tag>
13
14     <tag>
15         <tag-name>edit</tag-name>
16         <source>components/edit.xhtml</source>
17     </tag>
18
19 </facelet-taglib>
```

/resources/WEB-INF/web.xml

```
47  <context-param>
48     <param-name>facelets.LIBRARIES</param-name>
49     <param-value>/WEB-INF/facelets/ice.taglib.xml</param-value>
50 </context-param>
51
```


Using a Custom Component

/view/step3/view.xhtml

```
1  <!DOCTYPE composition PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
3  <ui:composition xmlns="http://www.w3.org/1999/xhtml"
4  xmlns:s="http://jboss.com/products/seam/taglib"
5  xmlns:ui="http://java.sun.com/jsf/facelets"
6  xmlns:f="http://java.sun.com/jsf/core"
7  xmlns:h="http://java.sun.com/jsf/html"
8  xmlns:rich="http://richfaces.org/rich"
9  xmlns:a="http://richfaces.org/a4j"
10 xmlns:i="http://ice.org/component"
11 template="/WEB-INF/templates/layout.xhtml">
12
13 <ui:define name="title">
14     #{messages.contact}: #{contactManager.instance.lastName}, #{contactManager.instance.firstName}
15 </ui:define>
16
17 <ui:define name="body">
18
19     <!-- fields -->
20     <rich:panel id="viewContact"
21         header="#{messages.contact}: #{contactManager.instance.lastName}, #{contactManager.instance.firstName}">
22         <h:panelGrid columns="3" width="100%">
23
24             <i:display label="#{messages.first_name}:">
25                 #{contactManager.instance.firstName}
26             </i:display>
27             <i:display label="#{messages.last_name}:">
28                 #{contactManager.instance.lastName}
29             </i:display>
30         <rich:spacer/>
```

Step 2 - Web Application

JPA Integration

- **EntityHome**
 - **Persistence Operations**

- **EntityQuery**
 - **Query Operations**

- **Usable by configuration or by extension**

Configuration

/resources/WEB-INF/components.xml

```
27 <factory name="contact" value="#{contactHome.instance}"/>
28 <fwk:entity-home name="contactHome"
29     entity-class="ice.model.Contact"/>
30
31
32 <factory name="comment" value="#{commentHome.instance}"/>
33 <fwk:entity-home name="commentHome"
34     entity-class="ice.model.Comment"
35     new-instance="#{newComment}"/>
36
37 <component name="newComment"
38     class="ice.model.Comment">
39     <property name="contact">#{contact}</property>
40     <property name="created">#{currentDatetime}</property>
41 </component>
42
43
44 <fwk:entity-query name="contacts"
45     max-results="5">
46     <fwk:ejbql>from Contact</fwk:ejbql>
47     <fwk:order>lastName</fwk:order>
48     <fwk:restrictions>
49         <value>lower(firstName) like lower( concat( #{exampleContact.firstName}, '%' ) )</value>
50         <value>lower(lastName) like lower( concat( #{exampleContact.lastName}, '%' ) )</value>
51     </fwk:restrictions>
52 </fwk:entity-query>
53
54 <component name="exampleContact"
55     class="ice.model.Contact"/>
56
```

Validation

- JSF Validation Framework
- Hibernate Validator
- http://www.hibernate.org/hib_docs/validator/reference/en/html/validator-defineconstraints.html#validator-defineconstraints-builtin

Validation Usage

/src/model/ice/model/Contact.java

```
12  @Entity
13  public class Contact {
14
15      @Id
16      @GeneratedValue
17      private Long id;
18
19      @NotEmpty
20      @Length(max = 50)
21      private String firstName;
22
23      @NotEmpty
24      @Capitalized
25      @Length(max = 50)
26      private String lastName;
27
28      @Length(max = 250)
29      private String address;
30
31      @Length(max = 50)
32      private String city;
33
34      @Length(max = 50)
35      private String state;
36
37      @Length(max = 6)
38      private String zip;
39
40      @Length(max = 50)
41      private String country;
42
43      @Email
44      private String email;
45
```

Validation Usage

/view/step2/edit.xhtml

```
21 <h:panelGrid columns="3" width="100%">
22   <s:decorate template="/WEB-INF/templates/edit.xhtml">
23     <ui:define name="label">#{messages.first_name}</ui:define>
24     <h:inputText value="#{contact.firstName}"/>
25   </s:decorate>
26   <s:decorate template="/WEB-INF/templates/edit.xhtml">
27     <ui:define name="label">#{messages.last_name}</ui:define>
28     <h:inputText value="#{contact.lastName}"/>
29   </s:decorate>
30   <rich:spacer/>
31
32   <s:decorate template="/WEB-INF/templates/edit.xhtml">
33     <ui:define name="label">#{messages.email}</ui:define>
34     <h:inputText value="#{contact.email}"/>
35   </s:decorate>
```

/view/WEB-INF/templates/edit.xhtml

```
9   <s:label styleClass="name #{invalid?'errors':''}">
10     <ui:insert name="label"/>
11     <s:span styleClass="required" rendered="#{required})*</s:span>
12   </s:label>
13
14   <div class="value #{invalid?'errors':''}">
15     <s:validateAll>
16       <ui:insert/>
17     </s:validateAll>
18   </div>
19
20   <s:message styleClass="error errors"/>
21
```

Custom Validation

/src/model/ice/model/validation/Capitalized.java

```
7  @ValidatorClass(CapitalizedValidator.class)
8  @Target(ElementType.FIELD)
9  @Retention(RetentionPolicy.RUNTIME)
10 @Documented
11 public @interface Capitalized {
12     Capitalize type() default Capitalize.FIRST;
13     String message() default "{validator.capitalized}";
14 }
```

/src/model/ice/model/validation/CapitalizedValidator.java

```
5  public class CapitalizedValidator
6      implements Validator<Capitalized> {
7
8      private Capitalize type;
9
10     public void initialize(Capitalized parameters) {
11         type = parameters.type();
12     }
13
14     public boolean isValid(Object value) {
15         if (value == null) return true;
16         if (!(value instanceof String)) return false;
17         String string = (String) value;
18
19         if (!"".equals(string)) {
20
21             if (type == Capitalize.ALL) {
22                 return string.equals(string.toUpperCase());
23             } else {
24                 String first = string.substring(0, 1);
25                 return first.equals(first.toUpperCase());
26             }
27         } else {
28             // empty string
29             return true;
30         }
31     }
32 }
```


Error Handling

/src/action/ice/Redbutton.java

```
5  @Name("redButton")
6  public class RedButton {
7
8      public void throwNPE() {
9          throw new NullPointerException();
10     }
11
12     public void throwRuntime() {
13         throw new RuntimeException();
14     }
15
16 }
17
```

/resources/WEB-INF/pages.xml

```
54  <exception class="java.lang.NullPointerException">
55      <http-error error-code="404"/>
56  </exception>
57
58  <exception class="java.lang.Throwable">
59      <end-conversation/>
60      <redirect view-id="/error.xhtml">
61          <message>Unexpected failure</message>
62      </redirect>
63  </exception>
64
```

Step 3 - Web 2.0 Application

Ajax Search

/view/step3/search.xhtml

```
86     <rich:toolBar id="scroller">
87         <rich:toolBarGroup location="left">
88             <a:commandButton action="#{contactList.first}"
89                 rendered="#{contactList.previousExists}"
90                 value="#{messages.left}#{messages.left} #{messages.first_page}"
91                 reRender="searchResults, scroller"/>
92             <a:commandButton action="#{contactList.previous}"
93                 rendered="#{contactList.previousExists}"
94                 value="#{messages.left} #{messages.previous_page}"
95                 reRender="searchResults, scroller"/>
96         </rich:toolBarGroup>
97         <rich:toolBarGroup location="right">
98             <a:commandButton action="#{contactList.next}" rendered="#{contactList.nextExists}"
99                 value="#{messages.next_page} #{messages.right}"
100                 reRender="searchResults, scroller"/>
101             <a:commandButton action="#{contactList.last}" rendered="#{contactList.nextExists}"
102                 value="#{messages.last_page} #{messages.right}#{messages.right}"
103                 reRender="searchResults, scroller"/>
104         </rich:toolBarGroup>
105     </rich:toolBar>
```


Ajax Search

/src/action/ice/step3/ContactList.java

```
10  @Name("contactList")
11  public class ContactList extends EntityQuery {
12
13      private static final String[] RESTRICTIONS = {
14          "lower(contact.firstName) like lower( concat( #{contactList.contact.firstName}, '%' ) )",
15          "lower(contact.lastName) like lower( concat( #{contactList.contact.lastName}, '%' ) )"
16      };
17
18      private Contact contact = new Contact();
19
20      @Override
21      public String getEjbql() {
22          return "select contact from Contact contact";
23      }
24
25      @Override
26      public Integer getMaxResults() {
27          return 5;
28      }
29
30      @Override
31      public String getOrder() {
32          return "lastName";
33      }
34
35      @Override
36      public List<String> getRestrictions() {
37          return Arrays.asList(RESTRICTIONS);
38      }
39
40      public void next() {
41          this.setFirstResult(this.getNextFirstResult());
42      }
43
44      public void previous() {
45          this.setFirstResult(this.getPreviousFirstResult());
46      }
47
```

Ajax Validation

/view/step3/edit.xhtml

```
22 <rich:panel>
23   <h:panelGrid columns="3" width="100%">
24     <i:edit field="firstName" label="{messages.first_name}:">
25       <h:inputText value="{contact.firstName}" required="true">
26         <a:support event="onblur" reRender="firstName" bypassUpdate="true"/>
27       </h:inputText>
28     </i:edit>
29     <i:edit field="lastName" label="{messages.last_name}:">
30       <h:inputText value="{contact.lastName}" required="true">
31         <a:support event="onblur" reRender="lastName" bypassUpdate="true"/>
32       </h:inputText>
33     </i:edit>
34   <rich:spacer/>
35
36
37   <i:edit field="email" label="{messages.email}:">
38     <h:inputText value="{contact.email}" required="true">
39       <a:support event="onblur" reRender="email" bypassUpdate="true"/>
40     </h:inputText>
41   </i:edit>
```

Toggle Panel

/view/step3/search.xhtml

```
19 <!-- search box -->
20 <rich:simpleTogglePanel label="#{messages.search_contacts}">
21   <h:form>
22     <h:panelGrid columns="2">
23       <i:display label="#{messages.first_name}:">
24         <h:inputText value="#{contactList.contact.firstName}">
25           <a:support event="onkeyup" reRender="searchResults, scroller"/>
26         </h:inputText>
27       </i:display>
28
29       <i:display label="#{messages.last_name}:">
30         <h:inputText value="#{contactList.contact.lastName}">
31           <a:support event="onkeyup" reRender="searchResults, scroller"/>
32         </h:inputText>
33       </i:display>
34       <h:commandButton value="#{messages.search}" action="/step3/search.xhtml"/>
35     </h:panelGrid>
36   </h:form>
37 </rich:simpleTogglePanel>
38
```

Wiki Text

/view/step3/view.xhtml

```
88 <rich:column>
89   <f:facet name="header">Posted</f:facet>
90   <h:outputText value="#{c.created}">
91     <s:convertDateTime type="both"/>
92   </h:outputText>
93 </rich:column>
94 <rich:column>
95   <f:facet name="header">Comment</f:facet>
96   <s:formattedText value="#{c.text}"/>
97 </rich:column>
```

<http://docs.jboss.com/seam/2.0.0.GA/reference/en/html/text.html>

Autocomplete

/src/action/ice/step3/Lookup.java

```
11 @Name("lookup")
12 public class Lookup implements Serializable {
13
14     private List<State> states = Arrays.asList(State.values());
15
16     public List getStates(Object event) {
17         List results = new ArrayList();
18
19         String key = event.toString();
20
21         for (State state : states) {
22             if (state.name().startsWith(key)) {
23                 results.add(state);
24             }
25         }
26
27         return results;
28     }
29
```

/view/step3/edit.xhtml

```
67 <i:edit field="stateList" label="#{messages.state}:">
68     <h:inputText id="state" value="#{contact.state}"/>
69     <rich:suggestionbox for="state"
70         suggestionAction="#{lookup.getStates}"
71         var="state"
72         fetchValue="#{state.code}">
73         <h:column>#{state.code}</h:column>
74         <h:column>#{state.name}</h:column>
75     </rich:suggestionbox>
76 </i:edit>
77 <i:edit field="zip" label="#{messages.zip}:">
78     <h:inputText value="#{contact.zip}">
79         <a:support event="onblur" reRender="zip" bypassUpdate="true"/>
80     </h:inputText>
81 </i:edit>
```


Why Use Seam

- **Standards Based**
- **Integrates different technologies into a common model**
- **Faster Development**