DZone Refcardz

CONTENTS INCLUDE:

RichFaces 4.0

A Next Generation JSF Framework

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INTRODUCTION

RichFaces 4.0 is an advanced JSF 2.0 based framework that provides a complete range of rich Ajax enabled UI components, as well as other features such as a component development kit, dynamic resource support, and skinning. The 4.0 version brings complete JSF 2.0 support to the project.

RichFaces is made up of two component tag libraries. "a4j:" represents core Ajax functionality, and page wide controls. While the "rich:" component set represent self contained and advanced UI components such as calendars, and trees.

JavaServer Faces 2.0

The second version of JSF added many features such as, core Ajax functionality, integrated Facelets support, annotations, view parameters, and more. RichFaces 4.0 has been specifically redesigned to not only work with these new features, but to extend them.

Hot Tip: JSF 2.0 is covered in detail in the DZone JavaServer Faces 2.0 Refcard.

GETTING STARTED

RichFaces can be used in any container that JSF 2.0 is compatible with. This means all servers compliant with the EE6 specification (JBoss AS6/7, Glassfish 3) and all major servlet containers (Tomcat, Jetty).

Hot Tip: Check the RichFaces project page for the latest information and downloads: http://richfaces.org

Installing RichFaces

Since RichFaces is build on top of JSF 2.0 its installation is as easy as adding a few jars to your project.

For Maven-based projects configure your repositories following the Maven Getting Started Guide here:
http://community.jboss.org/wiki/MavenGettingStarted-Users

Then simply add the following to you projects pom.xml.

```
<dependencyManagement>
  <dependencies>
    <dependency>
      <groupId>org.richfaces</groupId>
      <artifactId>richfaces-bom</artifactId>
      <version>${richfaces.version}</version>
      <scope>import</scope>
      <type>pom</type>
    </dependency>
  </dependencies>
</dependencyManagement>
…
<dependency>
  <groupId>org.richfaces.ui</groupId>
  <artifactId>richfaces-components-ui</artifactId>
</dependency>
<dependency>
   <groupId>org.richfaces.core</groupId>
   <artifactId>richfaces-core-impl</artifactId>
</dependency>
```

For other build systems such as Ant just add the following jars to your projects WEB-INF/lib directory: richfaces-core-api-<ver>.jar, richfaces-core-impl-<ver>.jar, richfaces-components-api-<ver>.jar, richfaces-components-ui-<ver>.jar, sac-1.3.jar, cssparser-0.9.5.jar, and google-guava-r08.jar.

Hot Tip: No filters or other updates to your web.xml are needed to install RichFaces 4.0.

Page Setup

To use RichFaces components in your views add:

```
xmlns:a4j="http://richfaces.org/a4j"
xmlns:rich="http://richfaces.org/rich"
```

Maven Archetypes

The project also contains several Maven archetypes to quickly create projects (including one for Google App Engine targeted project).

Simple project generation:

```
mvn archetype:generate
-DarchetypeGroupId=org.richfaces.archetypes
-DarchetypeArtifactId=richfaces-archetype-simpleapp
-DarchetypeVersion=<version> -DgroupId=<yourGroupId>
-DartifactId=<yourArtifactId> -Dversion=<yourVersion>
```

From the generated project directory you can build, and deploy as with any Maven project.

Hot Tip: Easily import in JBoss Tools using m2eclipse http://jboss.org/tools.

CORE JSF 2 EXTENSIONS

a4j:ajax

Upgrades the standard f:ajax tag/behavior with more features.

```
<h:inputText value="#{bean.input}">
  <a4j:ajax execute="#{bean.process}" render="#{bean.update}"/>
</h:inputText>
<h:panelGrid id="list1">...</h:panelGrid>
```

Execute & Render EL Resolution

JSF 2.0 determines the values for execute and render attributes when the current view is rendered. In the example above if #{bean.update} changes on the server the older value will be used. RichFaces processes attribute values on the server side so you will always be using the most current value.

Addition Common Enhancements

All RichFaces components that fire Ajax requests share the features above, and all of the ones from below:

Attribute	Description
limitRender	Turns off all auto-rendered panels (see Render Options section).
bypassUpdates	When set to true, skips Update Model and Invoke Application phases. Useful for form validation requests.
onbegin	JavaScript code to be invoked before Ajax request is sent.
onbeforedomupdate	JavaScript code to be invoked after response is received but before Ajax updates happen.
oncomplete	JavaScript code to be invoked after Ajax request processing is complete.
status	Name of status component to show during Ajax request.

a4j:commandButton, a4j:commandLink

Similar to standard h:commandButton and h:commandLink tags but with Ajax behavior built-in.

```
<a4j:commandButton value="Add"
  action="#{bean.add}" render="cities"/>
<h:panelGrid id="cities">...</h:panelGrid>
```

Hot Tip Default execute value for both controls is @form.

a4j:poll

Periodically fires an Ajax request based on polling interval defined via interval attribute and can be enabled/disabled via enabled attribute (true|false). For example, in the following code snippet, an Ajax request will be sent every 2 seconds and render the time component:

```
<a4j:poll interval="2000" enabled="#{bean.active}"
     action="#{bean.count}" render="time"/>
<h:outputText id="time" value="#{bean.time}"/>
```

a4j:jsFunction

Allows the sending of an Ajax request from any JavaScript function.

```
<a4j:jsFunction name="setdrink" render="drink">
  <a4j:param name="param1" assignTo="#{bean.drink}"/>
</a4j:jsFunction>
...
<td onmouseover="setdrink('Espresso')"
    onmouseout="setdrink('')">Espresso</td>
<h:outputText id="drink" value="I like #{bean.drink}" />
```

When the mouse hovers or leaves a drink, the setdrink() JavaScript function is called. The function is defined by an a4j:jsFunction tag which sets up standard Ajax call. You can also invoke an action. The drink parameter is passed to the server via a4j:param tag.

a4j:status

Displays Ajax request status. The component can display content based on Ajax start, stop, and error conditions. Status can be defined in the following three ways: status per view, status per form and named statuses. The following example shows named status:

```
<a4j:status name="ajaxStatus">
   <f:facet name="start">
      <h:graphicImage value="/ajax.gif" />
   </f:facet>
</a4j:status>
<a4j:commandButton value="Save" status="ajaxStatus"/>
```

All RichFaces controls which fire an Ajax request have status attribute available.

a4j:repeat

Works just like ui:repeat but also supports partial table update (see Data Iteration):

```
<ul>
  <a4j:repeat value="#{bean.list}" var="city">
   <li>#{city.name}</li>
  </a4j:repeat>
</ul>
```

a4j:push

"Push" server-side events to client using Comet or WebSockets. This is implemented using Atmosphere (http://atmosphere.java.net), and uses JMS for message processing (such as JBoss's HornetQ - http://www.jboss.org/hornetq). This provides excellent integration with EE containers, and advanced messaging services.

The <a4j:push> tag allows you to define named topics for messages delivery and actions to perform:

```
<a4j:push address="topic@chat"
     ondataavailable="alert(event.rf.data)" />
```

Server side messages are published and topics are created/configured using a class similar to this:

```
@PostConstruct
public void init() {
    topicsContext = TopicsContext.lookup();
}
private void say(String message) throws
    MessageException {
    TopicKey key = new TopicKey("chat","topic");
    topicsContext.publish(key, message);
}
private void onStart() {
    topicsContext.getOrCreateTopic(new
        TopicKey("chat"));
}
```

For more details on usage and setup, including examples please see the RichFaces Component Guide (http://docs.jboss.org/richfaces/latest_4_0_X/Component_Reference/en-US/html/).

a4j:param

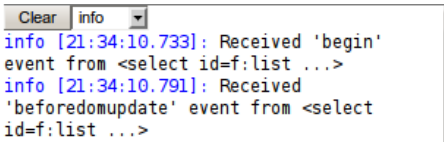
Works like <f:param> also allows client side parameters and will assign a value automatically to a bean property set in assignTo :

```
<a4j:commandButton value="Select">
  <a4j:param value="#{rowIndex}"
     assignTo="#{bean.row}"/>
</a4j:commandButton>
```

a4j:log

Client-side Ajax log and debugging.

```
<a4j:log/>
```



a4j:region

Provides declarative definition of components to be executed during Ajax request instead of using component ids. The following example wouldn't work without a4j:region as no execute ids are defined on the a4j:poll which defaults to execute="@this":

```
<a4j:region>
  <a4j:poll interval="10000"/>
  <h:inputText value="#{bean.name}"/>
  <h:inputText value="#{bean.email}"/>
</a4j:region>
```

If components are wrapped inside a4j:region without execute id defined, then the default value is execute="@region". You can also explicitly set execute="@region".

RENDER OPTIONS

In addition to supporting the standard render attribute in all controls which fire an Ajax request, RichFaces provides a number of advanced rendering options.

a4j:outputPanel

<a4j:outputPanel ajaxRendered="true"> is an auto-rendered panel. All child components within a4j:outputPanel will be rendered on any Ajax request. There is no need to point to the panel via the render attribute.

```
<a4j:outputPanel ajaxRendered="true">
   <h:outputText />
   <h:dataTable>...</h:dataTable>
<a4j:outputPanel>
```

In example above, all components within a4j:outputPanel will be always rendered. Note that ajaxRendered must be set to true.

Limiting Rendering

To limit rendering to only components set in current render list, set limitRender="true". In the following example, only components c1 and c2 will be rendered (a4j:outputPanel update is turned off):

```
<a4j:commandLink render="c1, c2" limitRender="true"/>
<h:outputText id="c1"/>
<h:panelGrid id="c2"></h:panelGrid>
<a4j:outputPanel ajaxRendered="true">
   <h:dataTable>...</h:dataTable>
</a4j:outputPanel>
```

limitRender=true turns off all auto-rendered containers (a4j:outputPanel, rich:message(s)).

QUEUE

JSF 2 provides a basic client request queue out-of the box. RichFaces extends the standard JSF queue, and provides additional features to improve usability.

The RichFaces queue is defined via the a4j:queue tag. Queues can be named or unnamed as described below.

Named Queue

Named queues are given a name and will only be used by components which reference them directly:

```
<a4j:queue name="ajaxQueue">
<h:form>
   <a4j:commandButton>
     <a4j:attachQueue name="ajaxQueue"/>
   </a4j:commandButton>
</h:form>
```

Unnamed Queue

Unnamed queues are used to avoid having to reference named queues for every component and come with the following scopes: global, view, form.

Global level

Global queue is available on all the views and defined in web.xml file:

```
<context-param>
  <param-name>
   org.richfaces.queue.enabled</param-name>
  <param-value>true</param-value>
</context-param>
```

View level

Placed outside any form. All Ajax control on the view will use this queue:

```
<a4j:queue/>
<h:form>...</h:form>
```

Form-level

Queue definition is placed inside a form. All controls inside the form will use this queue:

```
<h:form>
   <a4j:queue/>
</h:form>
```

Queue Attributes

Attribute	Description
requestDelay	Will delay sending the request by that number of millisecond. <a4j:queue requestDelay="3000"/> Used to "wait" to combine requests from the same request group
requestGroupingId	Combines two or more controls into the same request group. Requests from this group are treated as if coming from the same "logical" component. <a4j:attachQueue requestGroupingId="grp1"/>
ignoreDupResponses	Response processing for requests will not occur if a similar request is already waiting in the queue, saving the client side processing.

There are two ways to set queue options. Directly on a4j:queue tag:

```
<a4j:queue name="ajaxQueue" requestDelay="3000"/>
```

Or attaching a4j:attachQueue behavior to Ajax components:

```
<a4j:queue/>
<a4j:commandButton>
  <a4j:attachQueue requestDelay="3000"
    requestGroupingId="ajaxGroup">
</a4j:commandButton>
```

CLIENT-SIDE VALIDATION

Bean Validation

Bean Validation (JSR-303) provides a tier agnostic approach to define constraints on model objects. Every tier must then validate those constraints. There are a set of built in constraints, defined by the Bean Validation specification. JSF 2.0 has built in Bean Validation support, but only with server side validation.

rich:validator

RichFaces 4.0 provides true client side validation that seamlessly integrates into JSF 2.0 Bean Validation support. There is an Ajax server side fallback mechanism if client side validation is not possible.

Object constrained using Bean Validation

```
public class Foo{
   ...
   @NotNull
   @Pattern(regexp="^\d{5}(-\d{4})?$")
   private String zipcode;
   ...
}
```

Client side validation on a specific field

```
<h:inputText id="input" value="#{foo.zipcode}>
   <rich:validator event="keyup">
</h:inputText>
<rich:message for="input" ..../>
```

Hot Tip rich:message is required for client-side message updates.

The client side versions of constraints, converters, and messages must be implemented for this to work. All standard bean validation constraints are supported.

Hot Tip Additional constraints and features will be added in the future.

Object Validation

Validate complete objects allowing for complex validation such as cross-field validation **before** the model gets updated (i.e. in the validation phase). Supports bean validation, but does not support client side validations at this time.

New password validation

```
<rich:graphValidator "value="#{passwordBean}">
   <h:inputText "value="#{passwordBean.password}" />
   <h:inputText "value="#{passwordBean.retypePassword}" />
</rich:graphValidator>
```

PasswordBean Implementation

```
public class PasswordBean implements Cloneable {

@Size(min=6) @GoodPassword
private String password ;

@Size(min=6)
private String retypePassword ;

@AssertTrue(message="Passwords do not match")
public boolean match(){
   return password.equals(retypePassword);
}}
```

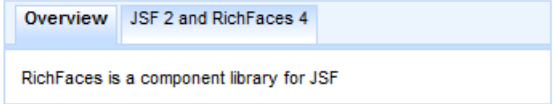
The password bean is cloned, updated, and validated all in the validation phase, allowing only clean data to move to the update model phase.

RICH:* TAGS

Inputs and Selects:

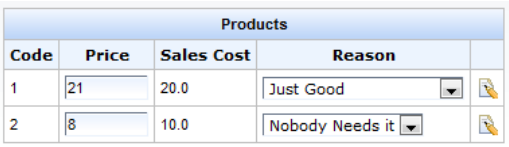
Component	Description
inplaceInput,inplaceSelect	Inplace editing components.
inputNumberSpinner, inputNumberSlider	UI controls for numerical input.
autocomplete	Input component with live suggestions.
select	Advanced select control. Provides skinning and direct typing feature.
calendar	Advanced Date and Time input with various customization options.
fileUpload	Asynchronous multiple files upload control.

Output



Component	Description
panel, popupPanel, collapsiblePanel	Simple panels with header. Expansion, collapse, modal and non modal popups.
tabPanel, accordion, togglePanel	Complex switchable panels.
tooltip, progressBar, message, messages	Various status/message/ indication components.

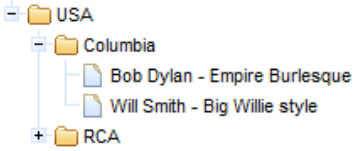
Data Iteration



Component	Description
dataTable	Customizable table with collapsible master-detail layouts, with sorting, filtering, partial Ajax updates.
extendedDataTable	Additional features of: ajax scrolling, frozen columns, rows selection, columns re-adjustment and switching visibility.
list	Allows dynamic rendering of any kind of HTML lists.
dataGrid	panelGrid analog with dynamic models support
dataScroller	paging support for any iteration component

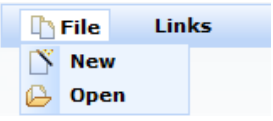
Child components: column, columnGroup, collapsibleSubTable.

Trees



Component	Description
tree	Rendering of hierarchical data in a tree control. Built in selection and nodes lazy loading.
treeNode	Defines representation for a node of a concrete type.
treeModelAdaptor, treeModelRecursiveAdaptor	Declarative definition of tree data model from various data structures.

Menus



Component	Description
panelMenu	Vertical page menu.
dropDownMenu	Drop-down menu for popup menus creation.
toolbar	Laying out drop-down menus or just menu items.

Child component for content definition: panelMenuItem, panelMenuGroup, menuItem, menuGroup, menuSeparator, toolbarGroup.

Drag and Drop

Component	Description
dragSource	Add dragging capabilities to the parent component.
dropTarget	Marks parent component as target for Ajax drop processing.
dragIndicator	Visualization for dragged element.

Misc

Component	Description
jQuery	Declarative jQuery calls definitions.
componentControl	Calling any RichFaces component client-side API.

CLIENT FUNCTIONS

RichFaces provides a number of client-side functions which make it easy to access elements in the browser.

Function	Description/Example
rich:clientId('id')	Returns client id. #{rich:client('id')} returns form:id
rich:element('id')	Shortcut for document.getElementById(#{rich:clientId('id')})
rich:component('id')	Used to invoke client-side component JavaScript API.
rich:findComponent('id')	Returns an instance of UIComponent taking the component id. <h:inputText id="in"> <a4j:ajax /> </h:inputText> <a4j:outputPanel ajaxRendered="true"> #{rich:findComponent('in') .value} </a4j:outputPanel>
rich:isUserInRole('role')	Returns true or false whether current user is in specified role.

RICH COMPONENTS JS API

Using rich:component('id')

Many rich components come with client-side JavaScript API. To use the API, get a reference to the client JavaScript object and invoke the available methods. Full description of each component API can be found in RichFaces Component Guide[1]. In the following example, show() and hide() method are used to show/hide panel:

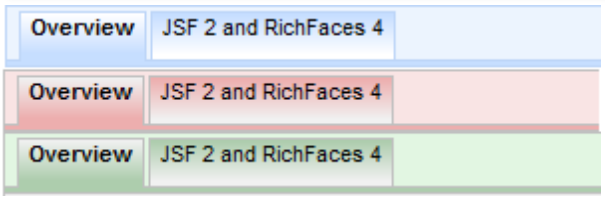
```
<h:outputLink onclick="#{rich:component('pnl')}.show();">
   Open
</h:outputLink>
<rich:popupPanel id="pnl">
 <h:outputLink onclick="#{rich:component('pnl')}.hide();">
   Hide
 </h:outputLink>
</rich:popupPanel>
```

Using rich:componentControl

An alternative and more declarative approach to call JavaScript API is to use rich:componentControl:

```
<h:outputLink value="#">
 <h:outputText value="Open" />
 <rich:componentControl operation="show"
    target="pnl" event="click"/>
</h:outputLink>
<rich:popupPanel id="pnl">
 <h:outputLink value="#">
   <h:outputText value="Close" />
    <rich:componentControl event="click"
      target="pnl" operation="hide"/>
  </h:outputLink>
</rich:popupPanel>
```

SKINNING



Basic Architecture

The same three-level hierarchy that is used for RF 3.3.X is used here:

Skin parameters: configure an application-wide look and feel using dozens of parameters.

rf-* classes: added to all the components to provide a default look and feel based on parameters. To be used for redefinitions.

***Class:** attributes on components.

New ECSS File Formats

Components use new *.ecss format of stylesheets:

```
.rf-pnl {
    color:'#{richSkin.panelBorderColor}';
}
```

1) Same CSS under the hood

2) Dynamic properties using EL expressions

Out-of-the-box Skins

Richfaces provides various skins out of the box:

blueSky, classic, deepMarine, emeraldTown, japanCherry, plain, ruby, wine.

Application Skin Parameter Definition

To have the ability to change skin at runtime use a context parameter in the web.xml:

```
<context-param>
   <param-name>org.richfaces.skin</param-name>
   <param-value>#{skinBean.skin}</param-value>
</context-param>
```

The param-value from listing below could be just static string name. (e.g. bluesky).

Skinning Standard Components and Elements

With org.richfaces.enableControlSkinning context parameter set to true all the standard and third-party components will become skinned.

Usage of Skin Parameters on the Page

You could use implicit richSkin object in order to access skin parameters on the pages:

```
<h:button style="background-color:'#{richSkin.tableBackgroundColor}'" .../>
```

The Same as CSS

It is the same as for usuall CSS:

```
<h:outputStylesheet name="panel.ecss"/>
```

or

```
@ResourceDependency(name = "panel.ecss")
```

Skinning using Static Resources

Finally you are able to serve our dynamic skins in a static way (E.g. using CDN):

1) Add org.richfaces.cdk:maven-resources-plugin to build.

2) Configure it. You should define directory which should be used to store generated recourses, skin names which should be processed, resources types to be included and so on… Refer to RichFaces GAE archetype or richfaces-showcase pom.xml files for getting complete code.

3) Define static resources location via org.richfaces.staticResourceLocation context parameter using implicit resourceLocation variable in web.xml

COMPONENT DEVELOPMENT KIT

RichFaces CDK has been developed to boost productivity by providing easy-to-use environment for simplifying common components development tasks. Main features are:

- Very easy creation and maintenance of classes such as component, converter, validator, etc.
- Generation of renderer classes from files with VDL-like syntax.
- Easy-to-use annotation—or XML-based configuration following Convention-over-Configuration principles.
- Generation of XML configuration files.

1. richfaces/latest_4_0_X/Component_Reference/en-US/html/

GOOGLE APPLICATION ENGINE SUPPORT

Google Application Engine deployments require specific changes to be done at the application level mostly because of GAE's restrictions and issues related to JSF deployment.

Archetype Usage

RichFaces provides a special archetype to generate an application skeleton for GAE deployments:

```
mvn archetype:generate -DarchetypeGroupId=org.richfaces.archetypes
-DarchetypeArtifactId=richfaces-archetype-gae -DarchetypeVersion=<archetyp
eVersion>
-DgroupId=<yourGroupId> -DartifactId=<yourArtifactId> -Dversion=1.0-
SNAPSHOT
```

Now you can run mvn install as usually to build application and use mvn gae:deploy for deployment.

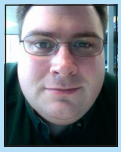
Deployment Requirements

Exploring the application generated by the archetype is the easiest way to check settings which are required to be done for deployment. It includes:

- **static resources** for skins has to be used as GAE not allows Java2D usage (see skinning section for details)
- GAE-specific web.xml settings added

ABOUT THE AUTHOR



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RECOMMENDED BOOK

RichFaces 4.0 is an advanced JSF 2.0 based framework that provides a complete range of rich Ajax enabled UI components, as well as other features such as a component development kit, dynamic resource support, and skinning. The 4.0 version brings complete JSF 2.0 support to the project.

Practical RichFaces 4 describes how the new RichFaces 4 upgrades and extends JSF 2 with new features, advanced functionality and customization. Learn how to use a4j:* tags, rich:* tags, component JavaScript API, skins, and client-side validation. Assuming some JSF background, it shows you how you can radically reduce programming time and effort to create rich enterprise Ajax based applications.

In this definitive RichFaces 4 book, the authors bases all examples on Maven so that any IDE can be used—whether it's NetBeans, Eclipse, IntelliJ or JBoss Tools.

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