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JBoss RichFaces

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WHAT IS RICHFACES?

RichFaces is a JSF component library that consists of two main parts: AJAX enabled JSF components and the CDK (Component Development Kit). RichFaces UI components are divided into two tag libraries `a4j:` and `rich:`. Both tag libraries offer out-of-the-box AJAX enabled JSF components. The CDK is a facility for creating, generating and testing you own rich JSF components (not covered in this card).

INSTALLING RICHFACES

See the RichFaces Project page for the latest version- <http://www.jboss.org/jbossrichfaces/>.

Add these jar files to your WEB-INF/lib directory: `richfaces-api.jar`, `richfaces-impl.jar`, `richfaces-ui.jar`, `commons-beanutils.jar`, `commons-collections.jar`, `commons-digester.jar`, `commons-logging.jar`

RichFaces Filter

Update the `web.xml` file with the RichFaces filter:

```
RichFaces Filter
<filter>
  <display-name>RichFaces Filter</display-name>
  <filter-name>richfaces</filter-name>
  <filter-class>org.ajax4jsf.Filter</filter-class>
</filter>
<filter-mapping>
  <filter-name>richfaces</filter-name>
  <servlet-name>Faces Servlet</servlet-name>
  <dispatcher>REQUEST</dispatcher>
  <dispatcher>FORWARD</dispatcher>
  <dispatcher>INCLUDE</dispatcher>
  <dispatcher>ERROR</dispatcher>
</filter-mapping>
```

Note The RichFaces Filter is not needed for applications that use Seam (<http://seamframework.org>)

Page setup

Configure RichFaces namespaces and taglibs in your XHTML and JSP pages.

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

```
JSP
<%@ taglib uri="http://richfaces.org/a4j" prefix="a4j"%>
<%@ taglib uri="http://richfaces.org/rich" prefix="rich"%>
```

Hot Tip Use JBoss Tools for rapid project setup - <http://www.jboss.org/tools>

BASIC CONCEPTS

Sending an AJAX request

a4j:support

Sends an AJAX request based on a DHTML event supported by the parent component. In this example, the AJAX request will be triggered after the user types a character in the text box:

```
a4j:support
<h:inputText value="#{echoBean.text}">
  <a4j:support event="onkeyup" action="#{echoBean.count}"
    reRender="echo, cnt"/>
</h:inputText>
<h:outputText id="echo" value="Echo: #{echoBean.text}"/>
<h:outputText id="cnt" value="Count: #{echoBean.textCount}"/>
```

`a4j:support` can be attached to any html tag that supports DHTML events, such as:

```
a4j:support
<h:selectOneRadio value="#{colorBean.color}">
  <f:selectItems value="#{colorBean.colorList}" />
  <a4j:support event="onClick" reRender="id" />
</h:selectOneRadio>
```

a4j:commandButton, a4j:commandLink

Similar to `h:commandButton` and `h:commandLink` but with two major differences. They trigger an AJAX request and allow partial JSF component tree rendering.

The request goes through the standard JSF life cycle. During the Render Response, only components whose client ids are listed in the `reRender` attribute (`echo`, `count`) are rendered back the the browser.

```
a4j:commandButton, a4j:commandLink
<h:inputText value="#{echoBean.text}"/>
<h:outputText id="echo" value="Echo: #{echoBean.text}"/>
<h:outputText id="cnt" value="Count: #{echoBean.textCount}"/>
<a4j:commandButton value="Submit" action="#{echoBean.count}"
  reRender="echo, cnt"/>
```



RichFaces for Java EE

100+ JSF AJAX components

- Works with JSF 1.2 and JSF 2.0 (2nd half 2009)
- Works with Seam, Spring Framework
- Developed by Exadel, the creators of RichFaces and Ajax4jsf
- Contact us today to learn how we can help you richfaces@exadel.com

Watch live demo at: livedemo.exadel.com/richfaces-demo
Download today: jboss.com/download

1.888.4EXADEL

Basic Concepts, continued

When the response is received, the browser DOM is updated with the new data i.e 'RichFaces is neat' and '17'.

Text:

Echo: RichFaces is neat

Count: 17

`a4j:commandLink` works exactly the same but renders a link instead of a button.

a4j:poll

Enables independent periodic polling of the server via an AJAX request. Polling interval is defined by the `interval` attribute and enable/disable polling is configured via `enabled` attribute (`true|false`).

```
<a4j:poll id="poll" interval="500" enabled="#{pollBean.enabled}"
reRender="now" />
<a4j:commandButton value="Start" reRender="poll"
action="#{pollBean.start}" />
<a4j:commandButton value="Stop" reRender="poll"
action="#{pollBean.stop}" />
<h:outputText id="now" value="#{pollBean.now}" />
```

a4j:poll

```
public class PollBean {
    private Boolean enabled=false; // setter and getter
    public void start () {enabled = true;}
    public void stop () {enabled = false;}
    public Date getNow () {return new Date();}
}
```

a4j:jsFunction

Allows sending an AJAX request directly from any JavaScript function (built-in or custom).

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

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 the AJAX call. It can call listeners and perform partial page rendering. The `drink` parameter is passed to the server via `a4j:actionparam` tag.

a4j:push

`a4j:push` works similarly to `a4j:poll`; however, in order to check the presence of a message in a queue, it only makes a minimal HEAD request (ping-like) to the server without invoking the JSF life cycle. If a message exists, a standard JSF request is sent to the server.

Partial view (page) rendering

There are two ways to perform partial view rendering when AJAX requests return.

ReRender attribute

Most RichFaces components support the `reRender` attribute to define the set of client ids to reRender.

Attribute	Can bind to
<code>reRender</code>	Set, Collection, Array, comma-delimited String

`ReRender` can be set statically as in the examples above or with EL:

```
<a4j:commandLink reRender="#{bean.renderControls}"/>
```

Basic Concepts, continued

It's also possible to point to parent components to re-render all child components:

```
<a4j:commandLink value="Submit" reRender="panel" />
<h:panelGrid id="panel">
<h:outputText />
<h:dataTable>...</h:dataTable>
</h:panelGrid>
```

In the example above the child components of the `outputPanel` will be re-rendered when the `commandLink` is submitted.

a4j:outputPanel

All child components of an `a4j:outputPanel` will be re-rendered automatically for any AJAX request.

```
<a4j:commandLink value="Submit" />
<a4j:outputPanel ajaxRendered="true">
<h:outputText />
<h:dataTable></h:dataTable>
</a4j:outputPanel>
```

In the example above the child components of the `outputPanel` will be re-rendered when the `commandLink` is submitted.

Note

If `ajaxRendered="false"` (default) the `a4j:outputPanel` behaves just like `h:panelGroup`.

To limit rendering to only components set in the `reRender` attribute, set `limitToList="true"`. In this example, only `h:panelGrid` will be rendered:

```
<a4j:commandLink reRender="panel" limitToList="true"/>
<h:panelGrid id="panel">
<h:dataTable>...</h:dataTable>
</h:panelGrid>
<a4j:outputPanel ajaxRendered="true">
<h:dataTable>...</h:dataTable>
</a4j:outputPanel>
```

Deciding what to process on the server

When an AJAX request is sent to the server, the full HTML form is always submitted. However, once on the server we can decide what components to decode or process during the Apply Request, Process Validations and Update Model phases. Selecting which components to process is important in validation. For example, when validating a component (field) via AJAX, we don't want to process other components in the form (in order not to display error messages for components where input hasn't been entered yet). Controlling what is processed will help us with that.

The simplest way to control what is processed on the server is to define an AJAX region using the `a4j:region` tag (by default the whole page is an AJAX region).

```
<h:inputText>
<a4j:support event="onblur" />
</h:inputText>
<a4j:region>
<h:inputText>
<a4j:support event="onblur" />
</h:inputText>
</a4j:region>
```

When the user leaves the 2nd input component (`onblur` event), an AJAX request will be sent where only this input field will be processed on the server. All other components outside this region will not be processed (no conversion/validation, update model, etc). It's also possible to nest regions:

```
<a4j:region>
...
<a4j:region>
...
</a4j:region>
</a4j:region>
```

Basic Concepts, continued

When the request is invoked from the inner region, only components in the inner region will be processed. When invoked from outer region, all components (including inner region) will be processed.

When sending a request from a region, processing is limited to components inside this region. To limit rendering to a region, the `renderRegionOnly` attribute can be used:

```
<a4j:region renderRegionOnly="true">
  <h:inputText />
  <a4j:commandButton reRender="panel"/>
  <h:panelGrid id="panel"></h:panelGrid>
</a4j:region>
<a4j:outputPanel ajaxRendered="true">
  <h:dataTable></h:dataTable>
</a4j:outputPanel>
```

When the AJAX request is sent from the region, rendering will be limited to components inside that region only because `renderRegionOnly="true"`. Otherwise, components inside `a4j:outputPanel` would be rendered as well.

To process a single input or action component, instead of wrapping inside `a4j:region`, it's possible to use the `ajaxSingle` attribute:

```
<h:inputText>
  <a4j:support event="onblur" ajaxSingle="true"/>
</h:inputText>
```

When using `ajaxSingle="true"` and a need arises to process additional components on a page, the `process` attribute is used to include id's of components to be processed.

```
<h:inputText>
  <a4j:support event="onblur" ajaxSingle="true" process="mobile"/>
</h:inputText>
<h:inputText id="mobile"/>
```

The `process` can also point to an EL expression or container component id in which case all components inside the container will be processed.

When just validating form fields, it is usually not necessary to go through the Update Model and Invoke Application phases. Setting `bypassUpdates="true"`, will skip these phases, improving response time, and allowing you to perform validation without changing the model's state.

```
<h:inputText>
  <a4j:support event="onblur" ajaxSingle="true"
  bypassUpdates="true"/>
</h:inputText>
```

JavaScript interactions

RichFaces components send an AJAX request and do partial page rendering without writing any direct JavaScript code. If you need to use custom JavaScript functions, the following attributes can be used to trigger them.

Tag	Attribute Description
<code>a4j:commandButton</code> , <code>a4j:commandLink</code> , <code>a4j:support</code> , <code>a4j:poll</code> , <code>a4j:jsFunction</code>	onbeforeDOMupdate: JavaScript code to be invoked after response is received but before browser DOM update oncomplete: JavaScript code to be invoked after browser DOM updatedata. Allows to get the additional data from the server during an AJAX call. Value is serialized in JSON format.
<code>a4j:commandButton</code> , <code>a4j:commandLink</code>	onclick: JavaScript code to be invoked before AJAX request is sent.
<code>a4j:support</code> , <code>a4j:poll</code>	onsubmit: JavaScript code to be invoked before AJAX request is sent.

CONTROLLING TRAFFIC

Flooding a server with small requests can cripple a web application, and any dependent services like databases.

Controlling Traffic, continued

Richfaces 3.3.0.GA and Higher

Queues can be defined using the `<a4j:queue ... />` component and are referred to as **Named** or **Unnamed** queues. Unnamed queues are also referred to as **Default** queues because components within a specified scope will use an unnamed queue by default.

<a4j:queue /> Notable Attributes

Attribute	Description
name	Optional Attribute that determines if this is a named or unnamed queue
sizeExceededBehavior	When the size limit reached: dropNext, DropNew, fireNext, fireNew
ignoreDupResponses	If true then responses from the server will be ignored if there are queued evens of the same type waiting.
requestDelay	Time in ms. events should wait in the queue incase more events of the same type are fired
Event Triggers	onRequestDequeue, onRequestQueue, onSizeExceeded, onSubmit

Other notable attributes include: `disabled`, `id`, `binding`, `status`, `size`, `timeout`.

Named Queues

Named queues will only be used by components that reference them by name as below:

```
<a4j:queue name="fooQueue" ... />
<h:inputText ... >
  <a4j:support eventsQueue="fooQueue" .../>
</h:inputText>
```

Unnamed Queues

Unnamed queues are used to avoid having to specifically reference named queues for every component.

Queue Scope	Description
Global	All views of the application will have a view scoped queue that does not need to be defined and that all components will use.
View	Components within the parent <code><f:view></code> will use this queue
Form	Component within the parent <code><h:form></code> or <code><a4j:form></code> will use this queue

Global Queue

To enable the global queue for an application you must add this to the web.xml file.

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

It is possible to disable or adjust the global queue's settings in a particular view by referencing it by its name.

```
<a4j:queue name="org.richfaces.global_queue" disabled="true" ... />
```

View Scoped Default Queues

Defined the `<a4j:queue>` as a child to the `<f:view>`.

```
<f:view>
  ...
  <a4j:queue ... />
```

Performance Tips:

- Control the number of requests sent to the server.
- Limit the size of regions that are updated per request using `<a4j:region />`
- Cache or optimize database access for AJAX requests
- Don't forget to refresh the page when needed

Controlling Traffic, continued

Form Scoped Default Queue

This can be useful for separating behavior and grouping requests in templates.

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

A4J:* TAGS

The a4j:* tags provide core AJAX components that allow developers to augment existing components and provide plumbing for custom AJAX behavior.

a4j:repeat

This component is just like ui:repeat from Facelets, but also allows AJAX updates for particular rows. In the example below the component is used to output a list of numbers together with controls to change (the value is updated for the clicked row only):

```
<a4j:repeat value="#{items}" var="item">
  <h:outputText value="#{item.value}" id="value"/>
  <a4j:commandLink action="#{item.inc}" value="+1"
    reRender="value"/>
</a4j:repeat>
```

#{items} could be any of the supported JSF data models. var identifies a request-scoped variable where the data for each iteration step is exposed. No markup is rendered by the component itself so a4j:repeat cannot serve as a target for reRender.

The component can be updated fully (by usual means) or partially. In order to get full control over partial updates you should use the ajaxKeys attribute. This attribute points to a set of model keys identifying the element sequence in iteration. The first element has Integer(0) key, the second – Integer(1) key, etc. Updates of nested components will be limited to these elements.

a4j:include

Defines page areas that can be updated by AJAX according to application navigation rules. It has a viewId attribute defining the identifier of the view to include:

```
<a4j:include viewId="/first.xhtml" />
```

One handy usage of a4j:include is for building multi-page wizards. Ajax4jsf command components put inside the included page (e.g. first.xhtml for our case) will navigate users to another wizard page via AJAX:

```
<a4j:commandButton action="next" value="To next page" />
```

(The "next" action should be defined in the faces-config.xml navigation rules for this to work). Setting ajaxRendered true will cause a4j:include content to be updated on every AJAX request, not only by navigation. Currently, a4j:include cannot be created dynamically using Java code.

a4j:keepAlive

Allows you to keep bean state (e.g. for request scoped beans) between requests:

```
<a4j:keepAlive beanName="searchBean" />
```

Standard JSF state saving is used so in order to be portable

a4j:* Components, continued

it is recommended that bean class implements either java.io.Serializable or javax.faces.component.StateHolder.

a4j:keepAlive cannot be created programmatically using Java. Mark managed bean classes using the org.ajax4jsf.model.KeepAlive annotation in order to keep their states. JBoss Seam's page scope provides a more powerful analog to this behavior.

a4j:loadXXX

RichFaces provides several ways to load bundles, scripts, and styles into your application.

Tag	Description
a4j:loadBundle	loads a resource bundle localized for the locale of the current view
a4j:loadScript	loads an external JavaScript file into the current view
a4j:loadStyle	loads an external .css file into the current view

a4j:status

Used to display the current status of AJAX requests such as "loading..." text and images. The component uses "start" and "stop" facets to define behavior. It is also possible to invoke Javascript or set styles based on status mode changes.

a4j:actionparam

Adds additional request parameters and behavior to command components (like a4j:commandLink or h:commandLink). This component can also add actionListeners that will be fired after the model has been updated.

RICH:* TAGS

The rich: tags are ready-made or self-contained components. They don't require any additional wiring or page control components to function.

Input Tags

Tag	Description
rich:calendar	Advanced Date and Time input with many options such as inline/popup, locale, and custom date and time patterns.
rich:editor	A complete WYSIWYG editor component that supports HTML and Seam Text
rich:inplaceInput	Inline inconspicuous input fields
rich:inputNumberSlider	min/max values slider

Components include: comboBox, fileUpload, inplaceSelect, inputNumberSpinner

Output Tags

Tag	Description
rich:modalPanel	Blocks interactions with the rest of the page while active
rich:panelMenu	Collapsible grouped panels with subgroup support
rich:progressBar	AJAX polling of server state
rich:tabPanel	Tabbed panel with client, server, or ajax switching
rich:toolBar	Complex content and settings

Components include: paint2D, panel, panelBar, simpleTogglePanel, togglePanel, toolTip

Data Grids, Lists, and Tables

RichFaces has support for AJAX-based data scrolling, complex cell content, grid/list/table formats, filtering, sorting, etc....

rich:* Tags, continued

Tag	Description
rich:dataTable	Supports complex content, AJAX updates, sortable, and filterable columns
rich:extendedDataTable	Adds scrollable data, row selection options, adjustable column locations, and row/column grouping
rich:dataGrid	Complex grid rendering of grouped data from a model

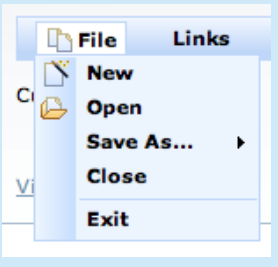
Complex Content Sample

Product Code	Proposed Price	Sales Cost	Reason	Proposed Gross Margin
1	4.0	20.0	Nobody Needs it	-\$4.000
2	5.0	10.0	Bad Quality	-\$1.000

Menus

Hierarchical menus available in RichFaces include:

Tag	Description
rich:contextMenu	Based on page location and can be attached to most components link images, labels, etc...
rich:dropDownMenu	Classic application style menu that supports icons and submenus.

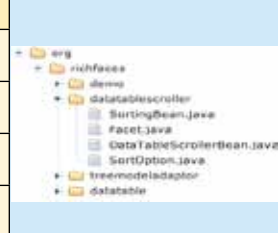


Components include: rich:menuItem, rich:menuGroup, rich:menuSeparator

Trees

RichFaces has tree displays that support many options such as switching (AJAX client or server), drag-drop and are dynamically generated from data models.


Tag	Description
rich:tree	Core parent component for a tree
rich:treeNode	Creates sets of tree elements
rich:treeNodeAdaptor	Defines data model sources for trees
rich:recursiveTreeNodeAdaptor	Adds recursive node definition from models



Selects

Provides visually appealing list manipulation options for the UI.

Tag	Description
rich:listShuttle	Advanced data list manipulation (figure x)
rich:orderingList	Visually manipulate a lists order



Validation Tags

AJAX enabled validation including hibernate validation.

Tag	Description
rich:ajaxValidator	Event triggered validation without updating the model- this skips all JSF phases except validation.
rich:beanValidator	Validate individual input fields using hibernate validators in your bean/model classes
rich:graphValidator	Validate whole subtree of components using hibernate validators. can also validate the whole bean after model updates.

Drag-Drop

Allows many component types to support drag and drop features.

rich:* Tags, continued

Tag	Description
rich:dragSupport	Add as a child to components you want to drag.
rich:dropSupport	Define components that support dropped items.
rich:dragIndicator	Allows for custom visualizations while dragging an item.
rich:dndParam	To pass parameters during a drag-n-drop action.

Miscellaneous

Tag	Description
rich:componentControl	Attach triggers to call JS API functions on the components after defined events.
rich:effect	Scriptaculous visual effect support
rich:gmap	Embed GoogleMaps with custom controls
rich:hotKey	Define events triggered by hot key (example: alt-z)
rich:insert	Display and format files from the file system
rich:virtualEarth	Embed Virtual Earth images and controls

Components include: rich:message, rich:messages, rich:jquery

SKINNING

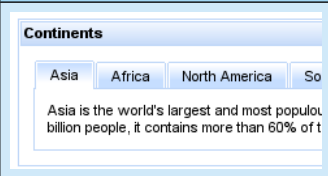
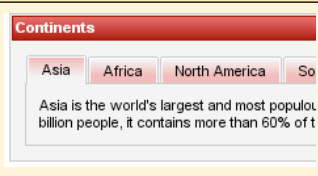
Using out-of-the-box skins

RichFaces ships with a number of built-in skins.

Out-of-the-box Skins
default, classic, emeraldTown, blueSky, ruby, wine, deepMarine, sakura, plain, default, laguna*, glassx*, darkx*
* Require a separate jar file to function

Add the org.richfaces.SKIN context parameter to web.xml and set the skin name.

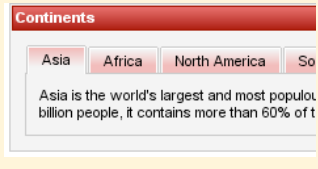
```
<context-param>
  <param-name>org.richfaces.SKIN</param-name>
  <param-value>blueSky</param-value>
</context-param>
```

Sample blueSky skin	Sample ruby skin
	

Using skin property values on the page

You can use skinBean implicit object to use any value from the skin file on your page.

```
<h:commandButton value="Next"
  style="background-color:#{skinBean.tabBackgroundColor}"/>
```



The button color is set according to the current skin[Ruby].s

Loading different skins at runtime

You can define an applications skin with EL expression like this:

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

Define a session scoped skinBean and manage its currentSkin property at runtime with your skin names values. Every

rich:* Tags, continued

time a page is rendered, RichFaces will resolve the value in `#{skinBean.currentSkin}` to get the current skin. Changing Skins should not be done via AJAX but with a full page refresh. A full page refresh will ensure that all CSS links are correctly updated based on the new skin

Advanced Skinning Features

- Create custom skins, or extend the default skins
- Override or extend styles per page as needed
- Automatically skin the standard JSF components
- Plug'n'Skin feature used to generate whole new skins using Maven archetypes

rich:* Tags, continued

Customizing redefined CSS classes

Under the hood all RichFaces components are equipped with a set of predefined rich-* CSS classes that can be extended to allow customization of a components style (see documentation for details). By modifying these CSS classes you can update all components that use them such as:

```
.rich-input-text {
    color: red;
}
```

Project links for more information or questions:

Project page (<http://www.jboss.org/jbossrichfaces>)
 Documentation (<http://jboss.org/jbossrichfaces/docs>)

ABOUT THE AUTHORS



Nick Belaevski

Nick Belaevski is the team leader of the RichFaces project working for Exadel Inc. He has more than four years of experience in development of middleware products including JBoss Tools and RichFaces.
 Projects: RichFaces

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Ilya Shaikovski is the Exadel product manager working on the RichFaces project since Exadel began ajax4jsf. He's responsible for requirements gathering, specification development, JSF related product analysis and supporting RichFaces and JSF related technologies for business applications. Prior to this he worked on the Exadel Studio Pro product.
 Projects: RichFaces



Jay Balunas

Jay Balunas works as the RichFaces Project Lead and core developer at JBoss, a division of Red Hat. He has been architecting and developing enterprise applications for over ten years specializing in web tier frameworks, UI design, and integration. Jay blogs about Seam, RichFaces, and other technologies at <http://in.relation.to/Bloggers/Jay>
 Projects: RichFaces, Seam Framework, and JBoss Tattletale

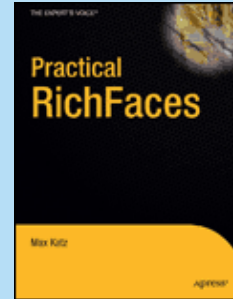


Max Katz

Max Katz is a senior system engineer at Exadel. He is the author of "Practical RichFaces" (Apress). He has been involved with RichFaces since its inception. He has written numerous articles, provided training, and presented at many conferences and webinars about RichFaces. Max blogs about RichFaces and RIA technologies at <http://mkblog.exadel.com>.
 Projects: RichFaces



RECOMMENDED BOOK



JBoss RichFaces is a rich JSF component library that helps developers quickly develop next-generation web applications. Practical RichFaces describes how to best take advantage of RichFaces, the integration of the Ajax4jsf and RichFaces libraries, to create a flexible and powerful programs. Assuming some JSF background, it shows you how you can radically reduce programming time and effort to create rich AJAX based applications.

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books.dzone.com/books/practicalrichfaces

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