JSF and Apache MyFaces in Action

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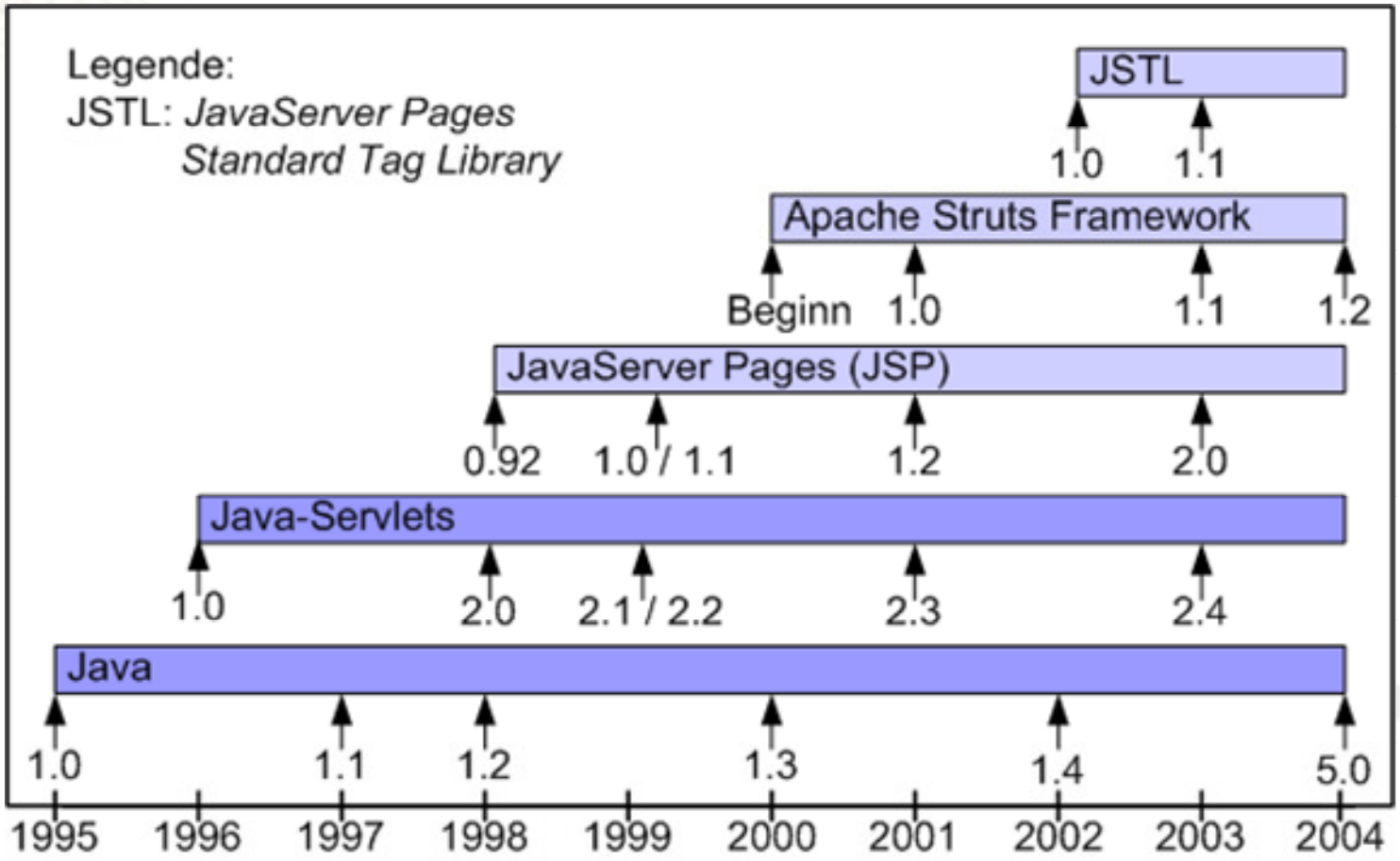
Agenda

- Introduction to JSF
- Introduction to Apache MyFaces
  - Building an Apache MyFaces Application
  - Get in touch with the JSF-Request-Lifecycle
  - Using and Writing Converters and Validators
- Some enhanced stuff (if time is there ☺)

Web-Development (generally)

- Web-Apps become more and more important
- More and more complexity
  - Ajax, validation (server vs. client), ...
- Higher customer requirement over the years
  - Rich user experience (easy to use)
  - Ergonomics vs. functionality
- There is always the time ...

Web development (Java)



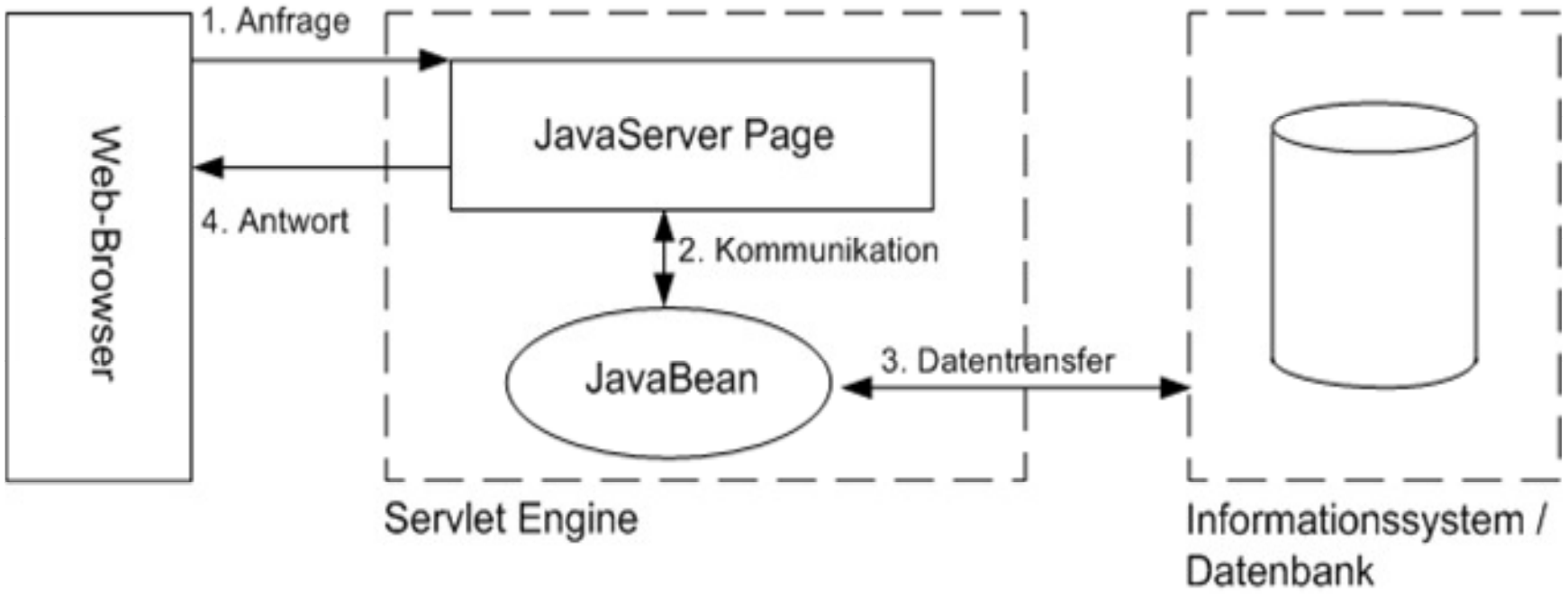
Servlets

```
...
  Collection customers = db.getCustomers();
  PrintWriter writer = response.getWriter();
  writer.println("<table border=\"1\">");
  Iterator it = customers.iterator();
  while(it.hasNext()) {
  writer.println("<tr>"); writer.println("<td>");
  writer.println(((Customer)customers.next()).getCus
  tomerNumber());
  writer.println("</td>"); writer.println("</tr>");
  }
  writer.println("</table>");
  ...
```

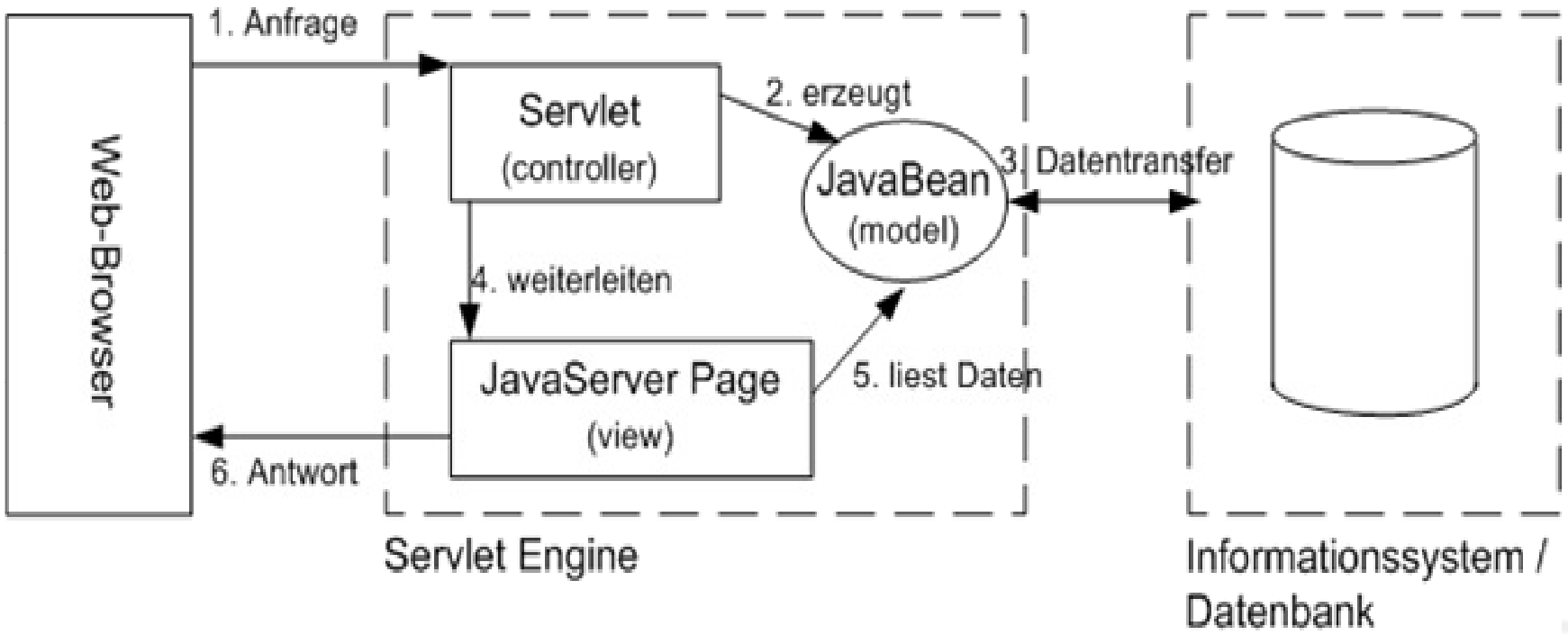
JavaServer Pages

```
<%
  Collection customers = db.getCustomers();
  Iterator it = customers.iterator();
%>
<table border="1">
<%   while(it.hasNext()) { %>
<tr>
<td> <%= ((Customer)
customers.next()).getCustomerNumber()%> </td>
</tr>
<% } %>
</table>
```

Model 1



Model 2


1. Anfrage
Web-Browser
Servlet
(controller)
2. erzeugt
JavaBean
(model)
3. Datentransfer
4. weiterleiten
JavaServer Page
(view)
5. liest Daten
6. Antwort
Servlet Engine
Informationssystem /
Datenbank

Java-Web-Frameworks

- Lot's of Model-2 based frameworks out there (too many)
- Apache Struts
- WebWork (soon Struts' Action2 Framework)
- Stripes
- Cocoon
- and many many more ...
  - still some „homegrown“

Problems

- Java delivers not enough for webapps.
- It is hard to integrate several frameworks (sometimes not possible)
  - Every framework has its special idea to solve the problem
    - Examples:
      - Struts vs. Cocoon
      - Struts vs. Tapestry
      - Struts vs. Stripes
      - Struts vs. ... (what's your first choice?)

What's up ... ?

- Standard is missing!
  - for a web framework
  - for an unified API to build Java Web Components
- SOLUTION:
  - JavaServer Faces ! ☺

JSF in a nutshel

- JSF is a ...
  - ... Java-Technology for Web-Apps
  - ... component-based framework
  - ... event-driven framework
  - ... RAD
  - ... industrial standard

Technology for Web-apps

- JSF supports:
  - the Web designer in creating **simple templates** for his application
  - the Java developer in writing **backend** code, which is simply **independent** from the Web server
  - Tool-vendors through its **standardized platform**

Technology for Web-apps

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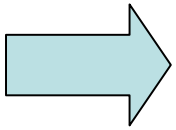
component driven framework

- JSF has building components
- define these components inside a JSP file, for instance
- the ‚**rendering**‘ transforms these components to markup like HTML 4.0.1

```
<h:inputText id="x" />
```

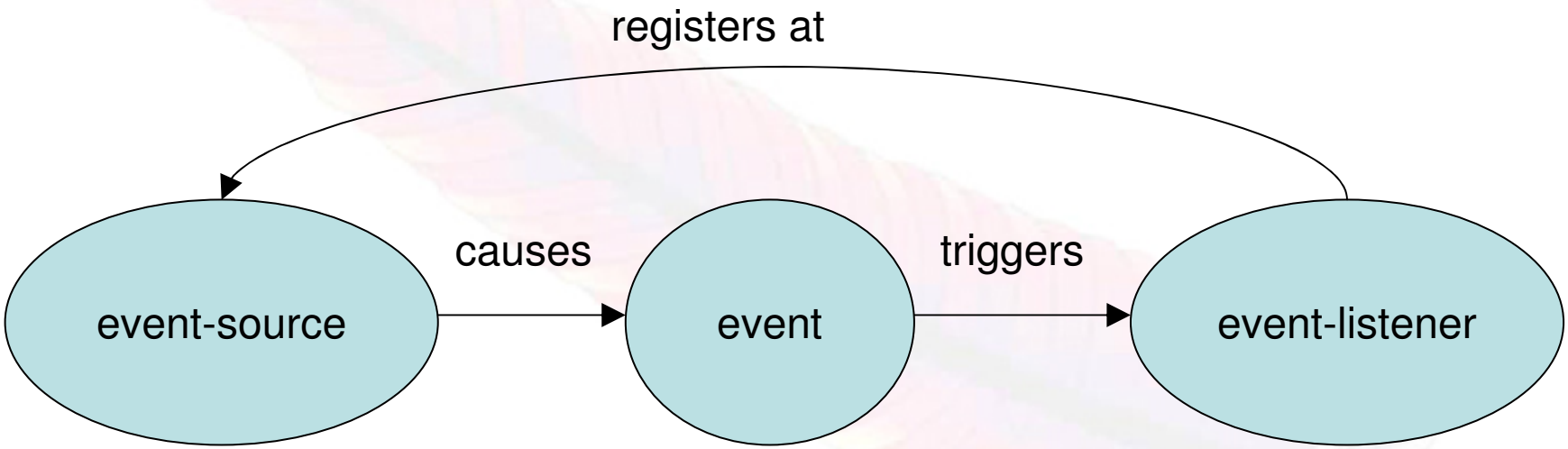


```
<input type="text" id="form:x"/>
```

event driven framework

- Events in JSF:
  - components generate **events**
  - enforces a **method call**
    ("action" and "event“ handler)
  - the **state** of the web app **changes** due to that caused event

event driven framework



Rapid Application Development

- 4 layers:
  - basic component architecture
  - set of standard components
  - application infrastructure
  - the RAD tool itself

⇨ JSF standardizes the first three points and allows the creation of RAD tools

Why JavaServer Faces?

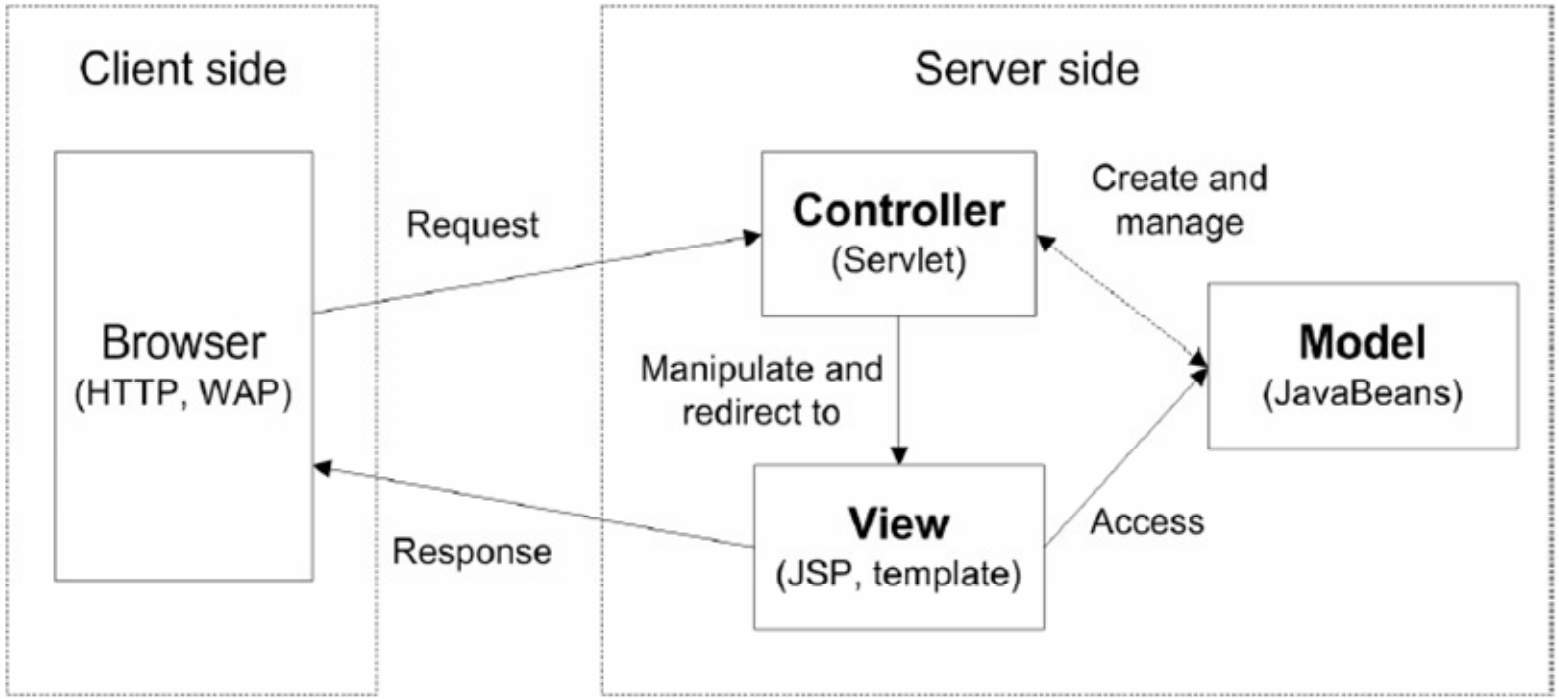
- industrial standard (backed by JCP)
  - JSR 127 (JSF 1.0 and JSF 1.1) 2004
  - JSR 252 (JSF 1.2) - 2006 (Java EE 5.0)
    - JSF 1.2 – better interaction with JSP 2.1 and bugfixes
  - JSF 2.0 (architecture, AJAX, more UI components, ..)

  Question is … when … 2006, 2007 ?
- Java EE 5.0
- BIG support
  - IDEs (Sun, Eclipse, Oracle, …)
  - 3rd party UI-components (Oracle, Apache MyFaces)

Implementation: Apache MyFaces

- First free open source implementation ☺
- Founders:
  - Manfred Geiler (OEKB)
  - Thomas Spiegl (irian.at - Austria)
- Biggest JSF user community

JSF – MVC Framework (1)



JSF – MVC Framework (2)

- **Model**: objects and properties of application (business tier bindings)
- **View**: Renderers take care of the view. That might be HTML (or XUL, or WML)
- **Controller**: FacesServlet / JSF – infrastructure defines the flow of the application

Reusability

- JSF allows the resuse of …
  - … components
    - Reuse of widgets, once created
  - … views
    - possible to to build a layout based on subviews
  - … your design
    - components support the design
    - Creation of a “Corporate Design”

    ✂→ Reuse for your next project

Integration (1)

- JSF is flexible; extensible and can be adopted
  - Fit's into several standards
  - Based upon JSPs and Servlets
  - Frameworks ontop of JSF...
    - Seam, Facelets, Shale, ...
- Part of a big spec. Java Enterprise Edition 5.0
  - Java EE 5 enforces app servers to ship a JSF implementation.
  - Today it is already shipped by JBoss and SUN

Integration (2)

- Integration with web portals (JSR 168) possible
  - Page contains several subapplications (portlets)
  - JSR-168 bridges (RI, MyFaces, Apache Portals)
- Supported by other web frameworks
  - Struts classic (Struts 1.2 and Struts 1.3)
    - Struts Integration Library (Craig McClanahan)
  - SAF2 (Struts Actions2 Framework)
    - special FacesInterceptors
    - Blog entry by Don Brown available
  - Cocoon has JSF support

Tools

- run time:
  - every servlet container
  - Every Java EE 5.0 compliant Application Server has JSF „out of the box“.
- design time:
  - Sun One Studio Creator
  - Eclipse and MyEclipse, Exadel Studio
  - Oracle JDeveloper

Development process

- with proper tools:
  - Drag&Drop:
    - Drag your components from a pallet to the page
  - wire the components to “backing beans”
  - create a persistence layer

References

- Companies using Apache MyFaces

  http://wiki.apache.org/myfaces/Companies_Using_MyFaces

- Austria (for instance):
  - OeKB: Roncalli, ADAS, QMS, Gruppenkalender, Zeiterfassung
  - Prisma Kreditversicherungen: Prismanet, PrismaCIS
  - IRIAN GesmbH: http://www.irian.at

Example

- Wake up again …

JSF – Hello World (JSP file)

```
<%@ taglib uri="http://java.sun.com/jsf/html" prefix="h" %>
<%@ taglib uri="http://java.sun.com/jsf/core" prefix="f" %>
<f:loadBundle basename="demo.bundle.Messages" var="Message"/>

<HTML>
    <HEAD> <title>Input Name Page</title> </HEAD>
    <body bgcolor="white">
<f:view>
<h1><h:outputText value="#{Message.inputname_header}"/></h1>
<h:messages style="color: red"/>
    <h:form id="helloForm">

    <h:outputText value="#{Message.prompt}"/>
    <h:inputText id="userName" value="#{GetNameBean.userName}" required="true">
    <f:validateLength minimum="2" maximum="20"/>
    </h:inputText>
    <h:commandButton id="submit" action="#{GetNameBean.sayHelloAction}"
          value="Say Hello" />
    </h:form>
</f:view>
    </body>
</HTML>
```

JSF and JSP

- JSF Spec describes the support of JSP
  - Alternatives possible (Facelets)
- JSP-Support via Taglibs
  - Core (the frameworks core)
    - like validation, conversion
  - HTML (renders “simple” markup (HTML 4.0.1)
    - <table/>, <input/>, ...

JSF – Hello World (JavaBean)

```
public class GetNameBean {
   String userName;
   public String getUserName() {
       return userName;  }
   public void setUserName(String name) {
       userName = name;  }
   public String sayHelloAction(){
   return "sayhello";    }
}
```

JSF - XML Config (1)

```
<managed-bean>
  <description>
    Input Value Holder
  </description>
  <managed-bean-name>GetNameBean</managed-bean-name>
  <managed-bean-class>demo.GetNameBean</managed-bean-class>
  <managed-bean-scope>session</managed-bean-scope>
  <managed-property>
    <property-name>userName</property-name>
    <property-class>java.lang.String</property-class>
    <value></value>
  </managed-property>
</managed-bean>
```

JSF - XML Config (2)

```
<navigation-rule>
    <from-view-id>/pages/inputname.jsp</from-view-id>
    <navigation-case>
      <to-view-id>/pages/greeting.jsp</to-view-id>
    </navigation-case>
</navigation-rule>
```

Practice – Hello World

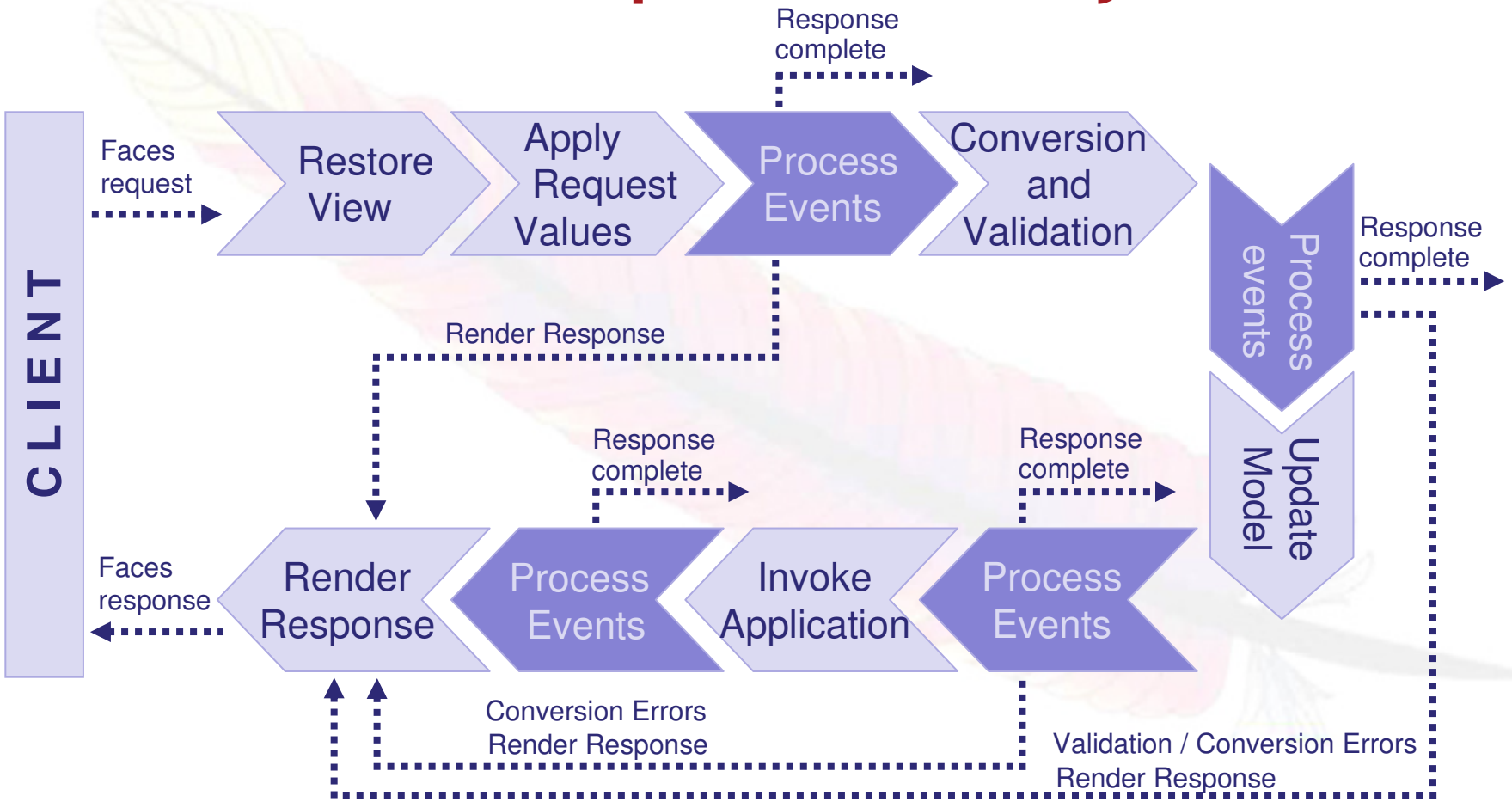
- Modify the Example to take firstName and sirName

- If you need help, SCREAM!

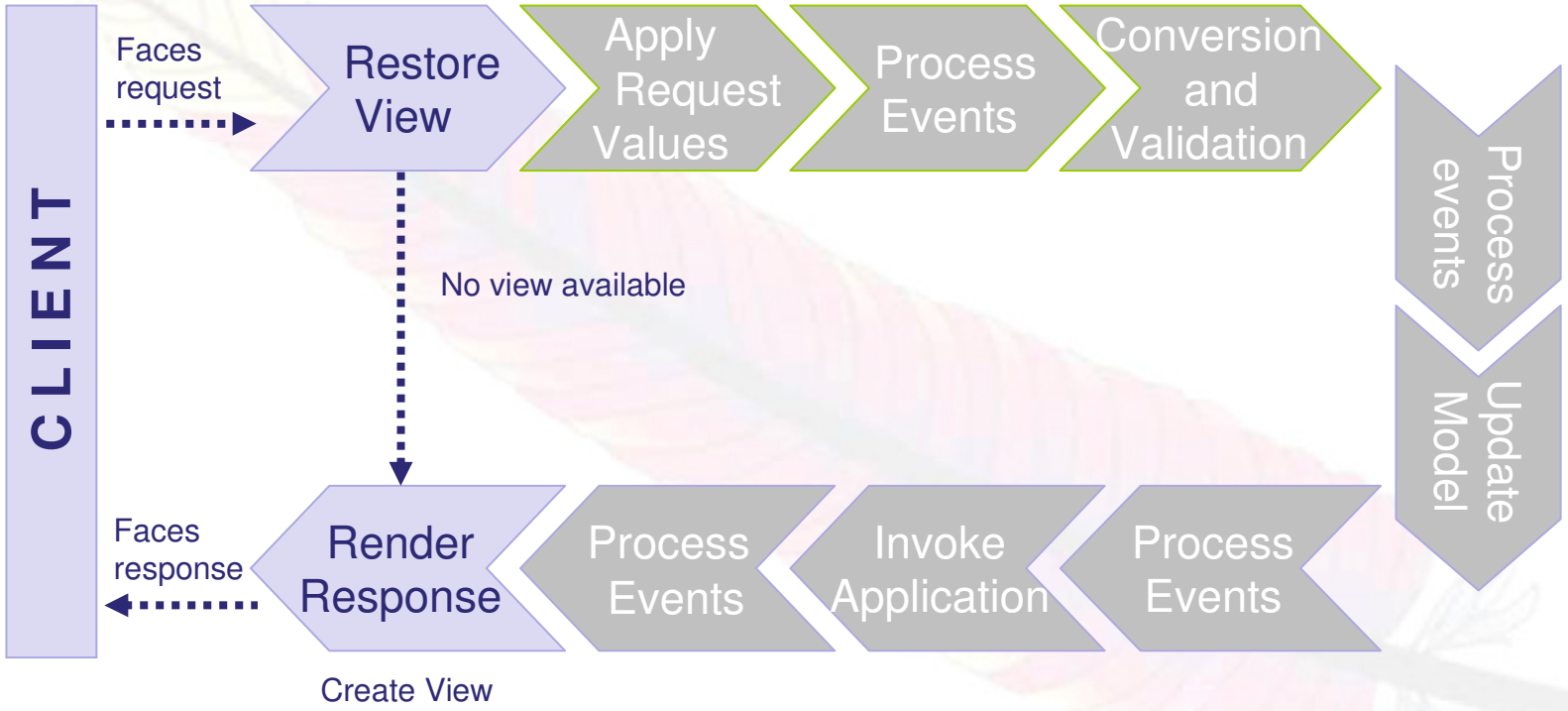
JSF Request Life-Cycle

- What's under the hood of a JSF request?

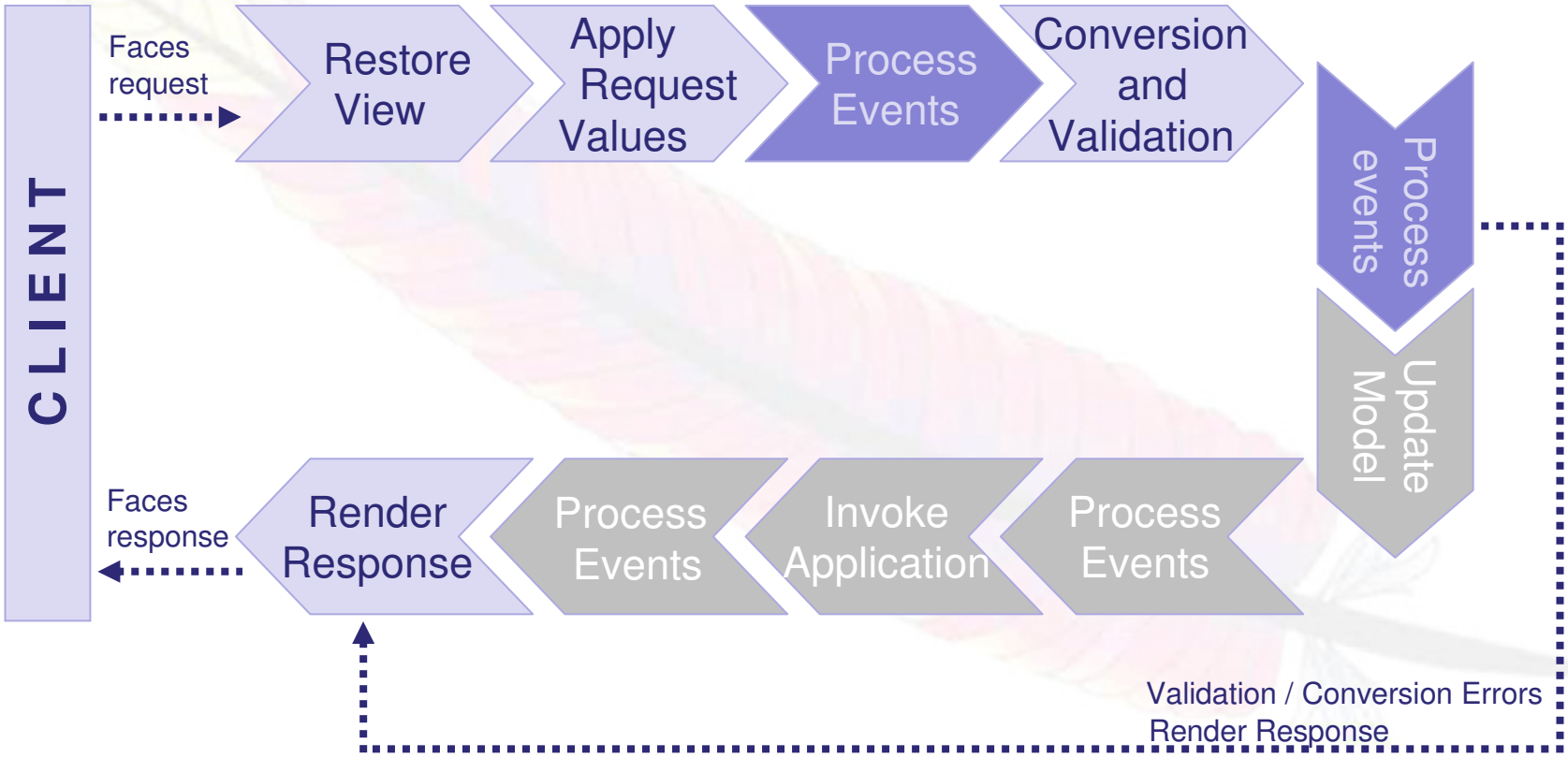
JSF Request Lifecyle



JSF Lifecycle – first request



JSF Lifecycle – Validation fails



Restore View – Phase 1

- building the component tree
- first request (non-postback):
  - go to „Render Response“-Phase (Phase 6)
  - Use the template; create the tree during parsing the template
  - save the tree in the „state“
- Postback:
  - Create the tree from the „state“
  - Execute the lifecycle

Apply Request Values – Phase 2

- decoding:
  - `processDecodes()` called recursively on each component in the tree (Starting at UIViewRoot)
  - every component takes care of it's value (reading HTTP-parameters, Cookies, Headers, etc.)
  - Saves the submitted value using `setSubmittedValue()`

Process Validations – Phase 3

- Calls listener for the **`ValueChangeEvent`**
- conversion (!) and validation
  - **`processValidators();`** called recursively, starts with UIViewRoot
  - **`getSubmittedValue();`** like "**`21.11.2005`**"
  - converts to an object of class **`java.util.Date`**
  - enforce validation by calling the registered validators
  - save the correct value (**`„local-value“`**) by calling **`setValue()`**
- Error occurs on conversion or validation:
  GO TO **`Render-Response`**-Phase

Update Model Values – Phase 4

- `processUpdates();` (again starting on UIViewRoot)
- component value is converted and valid; so it should be pushed to the model
- using the corresponding **`backing bean`**
  - `#{bean.property}`
- Calling the setter
  - `setProperty()`

Invoke Application - Phase 5

- **`processApplication()`** (UIViewRoot...)
- event handling for:
  - **`action`** / **`actionListener`**
  - executed
- sequence:
  - first **`actionListener(s)`**
  - calling **`action`** method

Render Response – Phase 6

- Navigation: **`NavigationHandler`** determinates the next „view“ (a JSP page for instance)
- **`ViewHandler`** takes over – in case of JSP the (JSP)ViewHandler enforces a forward
- JSP page gets parsed by the JSP container. Performing a lookup for each component’s
- **`Renderer`**. Calling several methods are called:
  - encodeBegin(); encodeChildren(); encodeEnd();
    - Starting at UIViewRoot

Changing the lifecycle (1)

- `immediate` property
- UICommand components:
  - action is called immediately. No validation or model update.
  - Use it for a cancel button
- UIInput components:
  - components value will be validated and converted in Apply Request Values
  - a ValueChangeEvent is generated and it's listener is called after"Apply Request Values"
  - calling facesContext.renderResponse() inside a ValueChangeListener → go to "RenderResponse"
  - No conversion and validation of other (non immediate) components!

Changing the lifecycle (2)

- Optional Validation Framework
  - for each request
  - optional switching validation on/off
  - **„required“**-attribute → own validator
  - many additional features
- Project: JSF-Comp at sourceforge.net

Changing the lifecycle (3)

- No usage of JSF validation facility
- Do it yourself inside the `action` method
- WARNING: converter is still needed
- Maybe: special converter, which doesn't generate a error message

Changing the lifecycle (4)

- Go to “Render-Response” by calling:

```
public void renderResponse();
```

- Stopping the JSF lifecycle by calling:

```
public void responseComplete();
```

PhaseListener - configuration

- JSF provides a special Listener for the lifecycle
- PhaseListener executed at the beginning and at the end of a phase.
- register in faces-config.xml:

```
<lifecycle>
   <phase-listener>
    org.apache.confs.eu.PhaseListener
   </phase-listener>
 </lifecycle>
```

PhaseListener - Sample

```
public class DebugPhaseListener
   implements PhaseListener
{
     public void beforePhase(PhaseEvent event){}

     public void afterPhase(PhaseEvent event){
       System.out.println("afterPhase");
     }
     public PhaseId getPhaseId(){
              return PhaseId.ANY_PHASE;
       //     return PhaseId.INVOKE_APPLICATION;
     }
}
```

Exercise - Phaselistener

- Create your own PhaseListener clazz.
- Use it to debug your JSF web app.
- Register it to your faces-config.
- Play with the application and look what‘s going on!
  - HElP? Ask!

terms ...

… from the JSF world

terms (1)

- Component
- Renderer
- Converter
- Validator
- Event / EventListener
- Message / FacesMessage
- Action Method
- Model Objects
- View
- Navigation System / NavigationHandler
- Backing Bean / Managed Bean
- Value Binding

Components

- interaction with the user
- server side (compared to Swing or SWT)
- support for IDEs b/c of JavaBean standard
- std. components: renderer independent
- know their state (StateHolder interface)
- stored in a tree structure (parent-client)
- unique id

Components

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Renderer

- called by the component
- renders a special markup (HTML or WML)
- all Renderers belong to a RenderKit
- Renderer takes care of:
  - Encoding and Decoding

digression: rendering

- Direct implementation model
  - Component -> encodeEnd -> HTML
- Delegated implementation model
  - Component -> encodeEnd-> Renderer->encodeEnd -> for instance HTML

Converters

- data type in HTTP, HTML is “String”
- JSF backing beans: **all** type are possible
- Due to this, converting mechanism needed
- used for i18n and l10n
- converter choice based on data type
- custom converters

connecting a converter

- as child element:

```
<h:outputText value="#{user.dateOfBirth}">
<f:convertDateTime type="both" dateStyle="full"/>
</h:outputText>
```

- build-in custom converter:

```
<h:outputText value="#{user.dateOfBirth}"
converter="#{converterProvider.dateConverter}"/>
```

standard DateTimeConverter

- for date / time values:

```
<f:convertDateTime
    type=„date“ /*time, both*/
    dateStyle=„default“
          /*short, medium, long, full */
    timeStyle=„default“ /*-“-*/
    pattern=„dd.MM.yyyy HH:mm“
    timeZone=„GMT“
    locale=„en_US“ /*oder Locale*/ />
```

standard NumberConverter

- <f:convertNumber
  type=„number“ /*currency, percentage*/
  currencyCode=„EUR“
  currencySymbol=„€“
  groupingUsed=„true“
  locale=„en_US“ /* oder Locale */
  minFractionDigits=„3“
  maxFractionDigits=„3“
  minIntegerDigits=“2“
  maxIntegerDigits=„2“
  pattern=„#.###,##“/>

Example - converters

- Using the standard converters
  - converting a date
    - your birthdate
      - convert the input and the output
  - converting a number
    - your salary ☺
      - use the NumberConverter
  - Need help? Scream!!

custom converter (1)

- implements `javax.faces.convert.Converter`
- optional (has arguments to save)
  `javax.faces.component.StateHolder`
- implements the methods:
  - `getAsString();`
  - `getAsObject();`
- on error:
  - `throw new ConverterException(`
    `FacesMessage msg)`

custom converter (2)

- JSP-Tag possible (`extends ConverterTag`)
  - not needed for Facelets...
- JavaBean constructor that calls inside `setConverterId()`
- only setter for its properties
- overwrite `createConverter()`
- register in `faces-config.xml / tag.tld`
- register in `tag.tld` (only JSP)

Overwriting a converter

- all converter are describe in **faces-config.xml**
- replace a standard convert with your custom:

```
<converter>
  <converter-for-class>
  java.util.Date
  </converter-for-class>
  <converter-class>
  org.apache.confs.eu.MyDateTimeConverter
  </converter-class>
</converter>
```

Exercise – custom converter

- Write your first custom converter
- Implement it inside your backing bean
- Converting a TelephonNumber.java object
  - String countryCode
  - String areaCode
  - String number

- Help needed ? ☺

validation

- Checks the converted value against a special rule
- standard: done on the server (client side is possible…)
- per component approach
- validation error generates a FacesMessage
  - diplayed with <h:message/> or <h:messages/>
- custom validators possible

connecting a validator

- validation for mandatory values:

```
<h:inputText required="true"/>
```

- validation agains a special scope (here a range):

```
<h:inputText>
   <f:validateLength minimum="2"
         maximum="10"/>
</h:inputText>
```

standard validators

- length:

```
<f:validateLength minimum=„3“ maximum=„7“/>
```

- range (long):

```
<f:validateLongRange minimum=„0“ maximum=„1000“/>
```

- range (double):

```
<f:validateDoubleRange minimum=„0.0“ maxiumum
=„0.5“/>
```

combining validators

- it’s possible to combine validators
- sample:

```
<h:inputText value="#{backingBean.wert}">
    <f:validateLength
        minimum="1" maximum="4"/>
    <f:validateLongRange
        minimum="0" maximum="1000"/>
</h:inputText>
```

Example – validator

- using the standards
  - declare a field you want as mandatory
    - required
  - check the length of your zip code
    - validateLength
- Ask if you need help!

custom validation (1)

- pretty easy to define a custom validator
- implement a method like

```
public void validate(FacesContext, UIComponent,
    Object) throws ValidatorException
```

- wire the validation to the component:

```
<h:inputText
  value="#{backingBean.wert}"
  validator="#{backingBean.validate}"/>
```

custom validation (2)

```
public void validate(
    FacesContext context,
    UIComponent component,
    Object value) throws ValidatorException
{
    if(value instanceof String)
    {
        String strValue = (String) value;

        if(!(strValue.equals("yes") &&
            !(strValue.equals("no"))
        {
            throw new ValidatorException(
                new FacesMessage(messageText, null));
        }
     }
}
```

custom validation(3)

- implement the interface
  `javax.faces.validator.validator`
- Optional (arguments?)
  `javax.faces.component.StateHolder`
  - overwrite method:
    - `validate();`
  - On error:
    - `throw new ValidatorException(`
      `FacesMessage msg)`

custom validation (4)

- JSP-Tag possible (`extends ValidatorTag`)
  - not needed when using Facelets
- JavaBean constructor
- setter for the properties
- overwrite `createValidator()` and call `setValidatorId()`
- register in `faces-config.xml`
- register in `tag.tld` (no need when using Facelets)

Hands-on: custom validation

- create a simple custom validator inside of your backing bean
- check if the submitted value is a email address
  - We don‘t want you to use that RegExpr. stuff, so simple check if „@“ is inside the submitted String.

- Questions ?

Events / EventListener

- fired due an event
- JSF defines four standard events:
  - FacesEvent (abstract)
  - ValueChangeEvent
  - ActionEvent
  - PhaseEvent
  - DataModelEvent (not a FacesEvent)

ValueChangeListener (1)

- UIInput's "**valueChangeListener**" attribut
- Usage:

```
<h:inputText
   valueChangeListener="#{myForm.processValueChange}"/>
```

- the backing bean:

```
public void processValueChange(ValueChangeEvent event)
{
   HtmlInputText sender =
        (HtmlInputText)event.getComponent();
   sender.setReadonly(true);
   changePanel.setRendered(true);
}
```

ValueChangeListener (2)

- Using the JSP-Tag:

```
<h:inputText>
   <f:valueChangeListener type=„example.TestListener“/>
</h:inputText>
```

- The **„example.TestListener“**:

```
public class TestListener implements ValueChangeListener
{
  public void processValueChange(ValueChangeEvent event)
    throws AbortProcessingException {
    HtmlInputText sender = (HtmlInputText)event.getComponent();
    sender.setReadonly(true);
    changePanel.setRendered(true);
  }
}
```

Example - ValueChangeEvent

- Let‘s check some submitted values
- use the valueChangeListener attribute
- Print old and new value by using System.out.println();

- HELP ?!?

ActionEvent

- UICommand's `"action"` attribut
- usage:
  - hard coded String (like "success")
  - use JSF' MethodBinding
    `"#{actionBean.newDetail}"`
- backing bean needs:

```
public String newDetail()
```

ActionListener

- UICommand's "`actionListener`" attribut
- usage:
  - MethodBinding.
    `"#{actionBean.newDetailListener}"`
- the method:

```
public void
newDetailListener(ActionEvent e)
```

Example – Action Events

- add the „actionListener“ attribute to your button/link component
- create the method and do some System.out.println();
- create the Method for the „action“ attribute
- add some System.out.println(); to your action method too
- What‘s happening?

return value from action method

- return value:
  - used to define the next view
  - described in faces-config.xml as
- a “Navigation-Rules”
  - from-view-id
  - or global
  - action source (method and outcome)
  - to-view-id

Messages

- created when conversion/validation fails
- standard messages defined:
  `javax.faces.Messages.properties`
- JSP-Tag used for displaying them:

```
<h:messages showSummary=„false“
showDetail=„true“/>
<h:message for=„componentId“/> !!!
```

Messages

- standard messages don’t fit to every use-case
  - validation message:
    - "{0}": Input required.
- overwrite them easily in your ResourceBundle
  - `javax.faces.component.UIInput.REQUIRED_detail = {0} please enter a value`

Messages

- providing custom messages (due to login error)
- **`FacesContext.getCurrentInstance()`**
  `.addMessage(clientId, FacesMessage)`
  - clientId = component's id (or null for global)
  - new FacesMessage(FacesMessage.Severity summary, detail)
    - **`WARN, INFO, FATAL, ERROR`**

backing beans / managed beans

- POJO – Plain Old Java Objects
- Java Beans
  - **„public“** constructor with no args
  - **„private“** properties
  - **„getter“/“setter“**
- declare them in **faces-config.xml**

backing beans / managed beans

- possible scopes
  - application (one instance per application)
  - session (one instance per session/user)
  - request (one instance per request)
  - none (bean created due to a reference)

ValueBinding / ValueExpression

- ValueBinding
  - Wire attribute to a backing bean
- usage

```
<h:outputText
  value="#{user.surName}"/>
```

  - property "surName" from the bean "user"

JSF Standard Components

- components, components, components ...

standard components - Text

- outputText

```
<h:outputText
value="#{user.userNameDescr}"/>
```

- inputText

```
 <h:inputText
value="#{user.userName}"/>
```

standard components - UICommand

- commandLink

```
<h:commandLink
action="#{actionBean.test}"/>
```

- commandButton

```
<h:commandButton
action="#{actionBean.test2}"/>
```

standard components - OutputLink

- HtmlCommandLink used for postbacks.
- Linking other websites:

```
<h:outputLink value=„url“ target=„_blank“/>
```

- Caution!: state get’s lost, since this is not a postback
- HTTP parameters:

```
<h:outputLink value=„url“>
    <f:param name=„allowCache“
     value=„true“/>
</h:outputLink>
```

standard components - UIForm

- ```
  <h:form title="Form">
     <h:outputText value=
         "Enter a value."/>
     <h:inputText/>
     <h:commandButton
  value="Submit"/>
  </h:form>
  ```
- JSF: every submit is a POST
  → Caution: **`commandLink`** needs a **`form`**
  ```

standard components - UIPanel

- Doing Layout with JSF
- renders a HTML span element:
  - `<h:panelGroup>…</h:panelGroup>`
- renders a HTML table:
  - `<h:panelGrid columns=„2“>…</h:panelGrid>`
  - amount of components must be a multiple of `„columns“`
    - If not use empty `<h:panelGroup/>`

standard components – UIData

- best for presenting structured data (like java.util.List)
- **horizontal:** every column is defined by a `UIColumn` component
- **vertical:** each row represents one item of the structured data
- Facets (`<f:facet/>`) allow defining header and footer

standard components - UIData

- Example:

```
<h:dataTable value="#{table.items}" var=„item">
  <h:column>
    <h:outputText value="#{item.column1}"/>
  </h:column>
  <h:column>
    <f:facet name="header">
        <h:outputText value="Header in column 2"/>
    </f:facet>
    <h:outputText value="#{item.column2}"/>
  </h:column>
</h:dataTable>
```

standard components - Image

- usage:

```
<h:graphicImage id="Grafik" url="/images/Grafik.jpg"
  alt="#{bundle.chooseLocale}" title="Grafikanzeige"
  width="149" height="160"/>
```

- No component for an “ImageMaps” defined inside the JSF Spec.

standard components - UIInput

- text input
  - `<h:inputText/>`
- password input
  - `<h:inputSecret/>`
- hidden field:
  - `<h:inputHidden/>`
- textareas
  - `<h:inputTextarea/>`

standard components - Label

- Label for a component

```
<h:outputLabel for=„myId“
    value=„#{bean.labelText}“/>
<h:selectOneRadio id=„myId“ value=„something“/>
```

- Apache MyFaces: label text can be used in FacesMessage

standard components - Format

- parameterised output:

```
<h:outputFormat value="Hello {0}. \
                       second value is {1}. \
                       Have a good one, {0}.">
    <f:param value="#{user.firstName}"/>
    <f:param value="hartcodiert"/>
</h:outputFormat>
```

- Important for i18n and l10n

standard components - UISelectBoolean

- input field for **`boolean/Boolean`** values
- like:

```
<h:selectBooleanCheckbox
     title=„yesOrNo“
     value=„#{bean.yesOrNo}“/>
```

standard components - UISelectMany

- Choose more than one input value
- JSP tags:
  - `<h:selectManyCheckbox>`
  - `<h:selectManyListbox/>`
  - `<h:selectManyMenu/>`
- rendered as
  - list of checkboxes,
  - html listbox,
  - or as a menu (not that good one…)

standard components - UISelectOne

- Choose one value
- components:
  - `<h:selectOneRadio>`
  - `<h:selectOneListbox/>`
  - `<h:selectOneMenu/>`
- rendered:
  - list of radio fields,
  - listbox,
  - or as a combobox

standard components – UISelectItem(s)

- use them in <h:selectManyXXX/> or <h:selectOneXX/>
- like:
  - `<f:selectItem itemValue=„…“ itemLabel=„…“/>`
  - `<f:selectItems value=„#{bean.itemsList}“/>`
    - `Array, Collection mit SelectItem`
    - `Map.put(String, SelectItem);`

standard components – UISelectItem(s)

- combine the <f:selectItem(s) />
- use **<f:selectItem/>** for an empty entry
- pick the real choices from a java.util.List
-
```
<h:selectOneMenu
id="betreuerWahl" value="#{bean.auswah}">

  <f:selectItem />
  <f:selectItems value=”#{bean.list} />

</h:selectOneMenu>
```

Creating JSF views

- All JSP-Tags of JSF must be inside the root:

  `<f:view/>`

  (UIViewRoot).
- If you need `<jsp:include/>` or `<c:import/>` wrap them with:

  `<f:subview/>` (UINamingContainer)

  - Needed for Tiles integration too!

MessageBundles

- i18n:

```
<f:loadBundle
  basename=„org.apache.conf.eu.messages“
  var=„messages"/>
```

- Usage
  - messages.properties: `test1=hallo`
  - your.jsp: `<h:outputText value=„#{messages['test1']}“/>`
- Caution:
  - values get only set when parsing the JSP (since this is a JSP tag, not a component)
    - problems with Facelets

JSF 1.1 workarounds - verbatim

- the “JSF and JSP” combination has problems, when using plain HTML inside your page
- embedded HTML output is rendered directly; JSF goes to a buffer…
- work around:
  - wrap all plain HTML inside a
  - `<f:verbatim>…</f:verbatim>`
  - simply adds a HtmlOutputText component
    - fixed in JSF 1.2 spec

Unified Expression Language

- Value- and Method-Expressions

Unified EL

- JSP EL
- JSF EL

  → JSF 1.2 Unified EL
- JSF EL Syntax refers to JSP EL
- but: JSF EL – expressions are evaluated deferred, JSP – EL immediate

Samples for the UL (1)

- `value="#{user.username}„`
- `value="#{person.address.street}"`
- `rendered="#{user.username != null}„`
- `value="#{bill.sum * 13.7603}"`
- `style="#{grid.displayed ? 'display:inline;' : 'display:none;'}"`
- `value="Hallo Benutzer #{user.username}"`

Samples for the UL (2)

- `action="#{user.storeUser}"`
- `actionListener="#{dtBean.deleteRow}"`
- `value="#{mapBean['index']}"`
- `value="#{mapBean[user.username]}"`
- `value="#{listBean[5]}"`

Configuration

- JSF configured in a proper way

configuration (1)

- required: copy JSF/MyFaces jar-files to WEB-INF/lib
- register FacesServlet inside web.xml
- edit your faces-config.xml file for further JSF configurations like
  - backing beans
  - components …

faces-config.xml – managed beans

- managed beans:

```
<managed-bean>
   <description>The one and only
       HelloBean.</description>
   <managed-bean-name>helloBean
   </managed-bean-name>
   <managed-bean-class>
       org.apache.hello.HelloBean
   </managed-bean-class>
   <managed-bean-scope> request
   </managed-bean-scope>
</managed-bean>
```

- Scope: application, session, request, none

faces-config.xml – navigation rules

- the navigation rules:

```
<navigation-rule>
   <from-view-id>
       /limit_list.jsp <!-- * ... global -->
   </from-view-id>
   <navigation-case>
       <from-outcome>show_item</from-outcome>
      <to-view-id>/limit_detail.jsp
       </to-view-id>
    </navigation-case>
</navigation-rule>
```

faces-config.xml - enhanced

- JSF is customisable
- inside **`<application/>`** element
- providing of custom **`ActionListener`**, **`ViewHandler`**, **`NavigationHandler`**, **`ELResolver`**, **`StateManager`** possible
- setting of l10n
- this is a central point!

web.xml – what is needed?

- FacesServlet:

```
<servlet>
   <servlet-name>Faces Servlet</servlet-name>
   <servlet-class>
        <!--MyFaces:
        org.apache.myfaces.webapp.MyFacesServlet-->
        javax.faces.webapp.FacesServlet
   </servlet-class>
   <load-on-startup>1</load-on-startup>
</servlet>
<servlet-mapping>
   <servlet-name>Faces Servlet</servlet-name>
   <url-pattern>
        /faces/*
        <!-- *.faces -->
</url-pattern>
</servlet-mapping>
```

web.xml - JSF config

```
<context-param>
        <param-name>
            javax.faces.CONFIG_FILES</param-name>
        <param-value>
            /WEB-INF/examples-config.xml
        </param-value>
        <description>
            Comma separated list of URIs of
            (additional) faces config files.
            (e.g. /WEB-INF/my-config.xml)
            See JSF 1.0 PRD2, 10.3.2
        </description>
</context-param>
```

web.xml – state saving

```
<context-param>
  <param-name>
     javax.faces.STATE_SAVING_METHOD
  </param-name>
  <param-value>client</param-value>
  <description>
     State saving method: "client" or
     "server" (= default)See JSF
     Specification 2.5.2
  </description>
</context-param>
```

Apache MyFaces

First Free Open Source JSF Implementation

JSF Implementations

- Sun (RI)
- IBM
- Apache MyFaces
- Simplica (based on Apache MyFaces)

  - additionally, there are several 3rd party UI components that *should* run with *any* implementation.

Apache MyFaces

- Founded in 2002 by Manfred Geiler and Thomas Spiegl, CEO of IRIAN.at
  - sourceforge and LGPL based
- In July 2004: move to Apache Software Foundation (Incubator)
- Since February 2005 TLP (myfaces.apache.org)
- 25 developers
- currently 1.1.1

MyFaces provides:

- Implementation of JSF-API
  - `javax.faces.**` Classes
- Implementation of JSF Spec
  - `org.apache.myfaces.**` Classes
- Custom Components
  - Scrollable Table, Validator, Tree components …
- Custom extensions
  - Built-in Tiles-Support, RenderKit for WML/WAP
- Support for Portlet Spec (JSR 168)
  - MyFaces apps runs in Pluto, JBoss Portal and some others.

JAR files of Apache MyFaces

- myfaces-impl.jar
- myfaces-jsf-api.jar
- tomahawk.jar
- sandbox.jar
- myfaces-all.jar (all in one jar file – except sandbox)

MyFaces compatibility (tested)

- Java 1.4 and Java5
- Tomcat (4.1.x, 5.0.x and 5.5.x)
- JBoss (3.2.x and 4.0.x)
- JRun4
- Bea Weblogic 8.1
- Jonas 3.3.6 w/ Tomcat
- Resin 2.1.x
- Jetty 4.2
- Websphere 5.1.2
- OC4J

MyFaces Internals I

- ExtensionsFilter
  - used during upload (parses Multipart requests)
  - adds resources (images, js,...) that are needed by components (easier to reuse components)
  - good performance

MyFaces Internals II

- special Servlet Context parameter
  - ALLOW_JAVASCRIPT
  - DETECT_JAVASCRIPT
  - AUTO_SCROLL
  - PRETTY_HTML
- dummy form for commandLinks

MyFaces in Action

- several custom components
- custom validator components
- custom extensions

Custom calendar component

- Renders as a form:

```
<x:inputCalendar ...
  value="#{travel.arrival}" />
```

- Renders as a popup:

```
<x:inputCalendar ...
   renderAsPopup="true"
   value="#{travel.depature}" />
```

- Sample

Custom Upload Component

- Upload is **not** part of JSF spec (currently)
- uses Servlet Filter (MyFaces' Extension Filter)
- special interface (`org.apache.myfaces.custom.fileupload.UploadedFile`)

```
<h:form enctype="multipart/form-data">
  <x:inputFileUpload
    value="#{backing.file}"
    required="true"/>
  …
</h:form>
```

- Sample

Tree Component (Tree2)

- MyFaces provides two tree components
- define your data inside a backing bean
  - TreeNode (Interface)
  - TreeNodeBase (Implementation class)
- define your layout in a JSF page via facets
- Navigation via CommandLink component
- client and server toggle

Tree Component Java code

```
private TreeNode tree;
tree = new
  TreeNodeBase(„folder“,“navi“,true);

tree.getChildren().add(
new TreeNodeBase(„doc“,“entry“,false)
)
```

Tree Component JSP

```
<x:tree2 value=„#{bean.tree}“ clientSideToggle=„true“ var=„node“
    varNodeToggle=„t“ ...>
<f:facet name=„doc">

<h:panelGroup>
   <h:commandLink styleClass="document" action=„nav">
   <h:graphicImage value="images/document.png„
                        border="0"/>
   <h:outputText value="#{node.description}"/>
  <f:param name=„reqVal" value="#{node.identifier}"/>
  </h:commandLink>
</h:panelGroup>

</f:facet>
...
</x:tree2>
```

Sample

Tabbed Pane

- Tab control as known from classic GUIs
- Contains two custom JSF tags
  - `<x:panelTabbedPane/>`
  - `<x:panelTab/>`
- reuses standard UI components
  - for instance `<h:inputText/>`
- click on a tab ends up in a request, but tab saves the state of the nested input fields

Tabbed Pane JSP code

```
<x:panelTabbedPane bgcolor=„#FFFFCC“>

 <x:panelTab id=„tab1“ label=„Main Menu“>
      <h:outputText .../>
     <h:inputText value=„#{bean.property}“/>
      ...
 </x:panelTab>
 <x:panelTab id=„tab2“ label=„second Menu“>
      ...
 </x:panelTab>
<h:commandButton value=„Submit it!“ />
</x:panelTabbedPane>
```

- Sample

custom Table component

- MyFaces contains a custom table component
- extends UIData (standard component)
  - preserveDataModel
  - preserveRowState
  - sortColumn
  - sortAscending
  - preserveSort
  - renderedIfEmpty
  - rowIndexVar

scrollable Table component

```
<x:dataTable id="data“ …>
...
</x:dataTable>

<x:dataScroller id="scroll_1“ for="data“ fastStep="10“
   pageCountVar="pageCount“ pageIndexVar="pageIndex“
   styleClass="scroller“ paginator="true“ paginatorMaxPages="9“
   paginatorTableClass="paginator“
   paginatorActiveColumnStyle="font-weight:bold;">

<f:facet name="first" >
<h:graphicImage url="images/arrow-first.gif" border="1" />
</f:facet>
...
</x:dataScroller>
```

Sample

sortable Table component

- needs MyFaces <x:dataTable/> attributes:
  - `sortColumn="#{sorter.sort}"`
  - `sortAscending="#{sorter.asc}"`
  - `preserveSort="true"`
- uses MyFaces <x:dataTable/> BackingBean needs method (`sort()`) that contains a `Comparator` impl.
- call `sort()` before return the data model.
  - here: call inside of `getWorkers();`
- Sample

Using *Legacy* JavaScript

- JSF Components using IDs:

```
<h:form id=„foo“>
<h:inputText id=„bar“ ... >
</h:form>
```

generates **foo:bar**

- document.getElementById();
- special forceId Attribute (JSF 1.2 contains a similar concept):

```
<h:form id=„foo“>
<x:inputText id=„bar“ forceId=„true“... >
</h:form>
```

generates **bar**

Custom Validators

- nest them inside Input Components

```
<h:inputText value=„...>
   <x:validateEmail/>
</h:inputText>
```

- ISBN (`<x:validateISBN/>`)
- CreditCard (`<x:validateCreditCard/>`)
- Regular Expression

```
<x:validateRegExpr pattern=„\d{5}“/>
```

- Equal

```
<h:inputText id=„password1“ ...>
<h:inputText id=„password2“ ...>
   <x:validateEqual for=„password1“/>
</h:inputText>
```

JSF – composing pages

- Standard provides a plain subview component
  - `<jsp:include />` or `<c:import />`
- realizes the Composite View Pattern
- bound to file names (e.g. `footer.jsp`)
- good framework for composing pages
  - Tiles (used in Struts, Velocity or plain JSP)

MyFaces Tiles integration

- custom ViewHandler for Tiles
  - must be registed in `faces-config.xml`
  - needs tiles configuration location as ContextParameter (`web.xml`)
  - looks up `*.tiles` mappings in tiles definition file
  - page definitions are described in `tiles.xml`
  - known issues
    - none-tiles pages must be wrapped inside of tiles config

MyFaces/Tiles - definitions

```
<tiles-definitions>
<definition name="layout.example"
   path="/template/template.jsp" >
  <put name="header" value="/common/header.jsp" />
  <put name="menu" value="/common/navigation.jsp" />
</definition>

<definition name="/page1.tiles" extends="layout.example" >
  <put name="body" value="/page1.jsp" />
</definition>

<!-- workaround for non-tiles JSF pages-->
<definition name="non.tiles1" path="/non-tile.jsp"/>

</tiles-definitions>
```

MyFaces/Tiles – master template

```
<table>
<tr><td>
<f:subview id="menu">
  <tiles:insert attribute="menu" flush="false"/>
</f:subview>
</td>

<td>
<f:subview id=„body">
  <tiles:insert attribute="body" flush="false"/>
</f:subview>
</td>
</tr>
</table>
```

MyFaces‘ WML RenderKit

- supports basic JSF components to render in WAP devices
- supports WML and **not** XHTML MP (WAP2.0)
- add WML RenderKit to `faces-config.xml`
- uses XDoclet to generate components, tag classes and tld file
- contribution from Jiri Zaloudek

WML RenderKit - code

```
<?xml version="1.0"?>
<!DOCTYPE wml PUBLIC "-//WAPFORUM//DTD WML 1.1//EN"
   "http://www.wapforum.org/DTD/wml_1.1.xml">

<%@ page contentType="text/vnd.wap.wml" %>
<%@ taglib uri="http://java.sun.com/jsf/core" prefix="f" %>
<%@ taglib uri="http://myfaces.apache.org/wap" prefix="wap" %>

<wml> <card id="helloId" title="Hello WML World">
<p> <f:view>

<wap:form id="form">
<wap:outputText id="label" value="Your name"/>
<wap:inputText id="name" value="#{hello.yourname}" />
<wap:commandButton id="submit" action="#{hello.send}“ value="submit it" />
</wap:form>
</f:view>
...
```

SAMPLE

MyFaces – Portlet support

- Built-in-support for JSR 168
- contribution by Stan Silvert (JBoss Group)
- what must a user do?
  - Make sure your JSF MyFaces application runs as a stand-alone servlet.
  - Remove any redirects from your faces-config.xml. Portlets can not handle these.
  - Create a Portlet WAR as per the instructions for your Portlet container. Make sure it contains everything that was included in step 1.
  - Update your portlet.xml

MyFaces - portlet.xml

```
<portletclass>
org.apache.myfaces.portlet.MyFacesGenericPortlet
</portlet-class>

<init-param>
 <name>default-view</name>
 <value>/some_view_id_from_faces-config</value>
</init-param>

<init-param>
 <name>default-view-selector</name>
  <value>com.foo.MyViewSelector</value>
</init-param>
```

Long term visions for MyFaces

- Big TLP for JSF in general
  - Apache Faces
- MyFaces provides only API and impl
  - MyFaces should be a subproject of Apache Faces
    - more a dream, currently :-)
- JSF 1.2 compliant implementation
- WML RenderKit integration ... :-)

Writing Custom Components

If the standard doesn‘t solve your Problems

…

Preparations

- What is your super class ?
  `UIOutput, UIInput, UISelectOne, UISelectMany, UICommand, UIPanel`
- classification: component family, component type and renderer type to be defined

Examples:

- `org.apache.myfaces.HtmlInputText`
  - component type: `org.apache.myfaces.HtmlInputText`
  - component family: `javax.faces.Input`
  - renderer type: `org.apache.myfaces.Text`
- `javax.faces.component.html.HtmlInputText`
  - component type: `javax.faces.HtmlInputText`
  - component family: `javax.faces.Input`
  - renderer type: `javax.faces.Text`

Examples

- `org.apache.myfaces.custom.tabbedpane.HtmlPanelTabbedPane`
  - component type: `org.apache.myfaces.HtmlPanelTabbedPane`
  - component family: `javax.faces.Panel`
  - Renderertyp: `org.apache.myfaces.TabbedPane`
- `org.apache.myfaces.custom.navmenu.UINavigationMenuItem`
  - Komponententyp: `org.apache.myfaces.NavigationMenuItem`
  - Komponentenfamilie: `javax.faces.SelectItem`
  - Renderertyp: `null`

classification by:

- component class:
  - `UIComponent.getComponentType();`
  - `UIComponent.getComponentFamily();`
  - in constructor: `super.setDefaultRendererType(DEFAULT_RENDERER_TYPE);`
- JSP-Tag class
  - `UIComponentTag.getComponentType();`
  - `UIComponentTag.getRendererType();`

Tag-Library-Definition TLD

- standard JSP taglib file:

```
<!-- commandButton -->
    <tag>
        <name>commandButton</name>
        <tag-class>
          org.apache.myfaces.taglib.html.ext.HtmlCommandButtonTag
        </tag-class>
        <body-content>JSP</body-content>
        <description>
            Extended standard commandButton
        </description>
        <attribute>
            <name>action</name>
            <required>false</required>
            <rtexprvalue>false</rtexprvalue>
            <type>java.lang.String</type>
        </attribute>
          …
     </tag>
```

A JSP-Tag class for JSF components

- setXXX() for each propety
- release() method:

  set every property back to “null”
- implement the setProperties(); method

A JSF/JSP-Tag class

```
protected void setProperties(UIComponent component)
 {
  super.setProperties(component);
  setStringProperty(component,
      HTML.TABINDEX_ATTR, _tabindex);
  setStringProperty(component,
      HTML.TYPE_ATTR, _type);
  setActionProperty(component, _action);
  setActionListenerProperty(component,
      _actionListener);
  setBooleanProperty(component,
      JSFAttr.IMMEDIATE_ATTR, _immediate);
  setStringProperty(component, JSFAttr.IMAGE_ATTR,
      _image);
  }
```

component class

- JavaBean std. (getter/setter for property)
  - Caution! Take care of JSF's ValueBinding
- Overwrite restoreState() and saveState() to be able to save the component state
- if needed methods for EventListener (like JavaBean std.)

the getter / setter

```
public void setValue(Object value)
{
  _value = value;
}

 public Object getValue()
 {
   if (_value != null) return _value;
   ValueBinding vb = getValueBinding("value");
   return vb != null ?
      (Object)vb.getValue(getFacesContext()) : null;
 }
```

StateHolder's saveState

```
public Object saveState(FacesContext context)
    {

        Object values[] = new Object[6];
        values[0] = super.saveState(context);
        values[1] = saveAttachedState(context,
            methodBindingActionListener);
        values[2] = saveAttachedState(context,
         actionExpression);
        values[3] = immediate ? Boolean.TRUE :
         Boolean.FALSE;
        values[4] = immediateSet ? Boolean.TRUE :
         Boolean.FALSE;
        values[5] = value;

        return (values);

    }
```

StateHolder's restoreState

```
public void restoreState(FacesContext context,
        Object state)
    {
        //Die Variable "state" speichert den Zustand
        //der Komponente als Feld von Objekten
        Object values[] = (Object[]) state;

        //Rücksichern des vererbten Status
        super.restoreState(context, values[0]);

        //Rücksichern der Attribute der Komponente
        methodBindingActionListener = (MethodBinding)
            restoreAttachedState(context, values[1]);
        actionExpression =
        (MethodExpression) restoreAttachedState(context, values[2]);
        immediate = ((Boolean) values[3]).booleanValue();
        immediateSet = ((Boolean) values[4]).booleanValue();
        value = values[5];

    }
```

Renderer

```
public abstract class Renderer {

    public void decode(FacesContext context,
                UIComponent component{}

    public void encodeBegin(FacesContext context,
                UIComponent component)
        throws IOException {}

    public void encodeChildren(FacesContext context,
                UIComponent component)
        throws IOException {}


    public void encodeEnd(FacesContext context,
                UIComponent component)
        throws IOException {}
```

Renderer

```
public String convertClientId(FacesContext
     context, String clientId) {}

public boolean getRendersChildren() {}

public Object getConvertedValue(FacesContext
     context, UIComponent  component,
     Object submittedValue)
          throws ConverterException {}
}
```

Renderer - encodeEnd

```
RendererUtils.checkParamValidity(facesContext,
        uiComponent, UICommand.class);

String clientId = uiComponent.getClientId(facesContext);

ResponseWriter writer = facesContext.getResponseWriter();

writer.startElement(HTML.INPUT_ELEM, uiComponent);

writer.writeAttribute(HTML.ID_ATTR, clientId,
   JSFAttr.ID_ATTR);
writer.writeAttribute(HTML.NAME_ATTR, clientId,
   JSFAttr.ID_ATTR);

…
```

Alternatives

Instead of custom components ...

substitute the renderer

- a renderer implements
  - encoding (encodeXXX())
  - decoding (decode())
  - converting process
- You can substitute a renderer. Often this helps!

substitute the renderer

- this is done global
  - for each objects of a component
    - the new renderer will be used every time!
  - with the used RenderKit
    - a RenderKit contains all used renderers.
    - Only one RenderKit per JSF app
      - possible to change …

substitute the renderer

- faces-config.xml:

```
<render-kit>
      <render-kit-id>HTML_BASIC</render-kit-id>
      <renderer>
          <component-family>
            javax.faces.Output</component-family>
          <renderer-type>
            javax.faces.Label</renderer-type>
          <renderer-class>
            mypackage.RequiredLabelRenderer
          </renderer-class>
      </renderer>
</render-kit>
```

the renderer class

```
public class RequiredLabelRenderer extends HtmlLabelRenderer {
    protected void encodeBeforeEnd( FacesContext facesContext,        ResponseWriter
    writer, UIComponent uiComponent) throws                          IOException {
        String forAttr = getFor(uiComponent);
        if(forAttr!=null) {
            UIComponent forComponent =
                uiComponent.findComponent(forAttr);

            if(forComponent instanceof UIInput &&
                    ((UIInput) forComponent).isRequired()) {
                writer.startElement(HTML.SPAN_ELEM, null);
                writer.writeAttribute(HTML.ID_ATTR,
                    uiComponent.getClientId(facesContext)+
                    "RequiredLabel",null);
                writer.writeAttribute(HTML.CLASS_ATTR,
                    "requiredLabel",null);
                writer.writeText("*",null);
                writer.endElement(HTML.SPAN_ELEM);
            }}}}
```

provide a JSP-Tag

- without a new Tag every <h:outputLabel uses the new renderer
- maybe confusing to the users
- change the renderer type

```
public String getComponentType() {
return ("javax.faces.HtmlOutputLabel");
}
public String getRendererType() {
return ("de.jax.RequiredLabel");
}
```

substitute component class

- component contains properties
- encoding, decoding and conversion is also included into a component!
- validation customisable
- You can replace a component globally, means for all JSP-Tags (like the renderer).

substitute component class

- faces-config.xml:

```
<component>
   <component-type>
    javax.faces.HtmlInputText</component-
type>
   <component-class>
    mypackage.SpecialHtmlInputText
   </component-class>
</component>
```

the component class

```
public class SpecialHtmlInputText extends
  HtmlInputText {
    public SpecialHtmlInputText()
    {
        super();

        setConverter(ConverterFactory.
          getSpecialConverter());
    }
}
```

component binding

- ValueBinding != component binding
- uses JSF EL:
  - „binding=„#{bean.myComponent}“
- return of special / own components, which fit the desired type, is possible

component binding

- JSP:

```
<h:outputText
   value="#{limitDetail.limitView.comment}„
   binding="#{componentBean.
                              outputWithBreaks}"/>
```

- backing bean:

```
UIComponent getOutputWithBreaks()
{
     return new OutputTextWithBreaks();
}
```

component binding

```
public static final class OutputTextWithBreaks extends HtmlOutputText
 {
        public OutputTextWithBreaks()
        {
            super();
        }

        public void encodeEnd(FacesContext context) throws
                                                    IOException
        {
            String text = RendererUtils.getStringValue(
                          context, this);
            text = HTMLEncoder.encode(text, true, true);

            //Erstellen aller Zeilenumbrüche
            text = text.replaceAll("\r","<br/>");
            renderOutputText(context, this, text, false);
        }
}
```

Tips & Tricks

That should be helpful ...

dynamic relies not on a JSP

adding components to the component tree:

```
public void addControls(ActionEvent actionEvent)
{
    Application application =
    FacesContext.getCurrentInstance().getApplication();
    List children = controlPanel.getChildren();
    children.clear();
    for (int count = 0; count < numControls; count++)
    {
          HtmlOutputText output = (HtmlOutputText)application.
          createComponent(HtmlOutputText.COMPONENT_TYPE);
          output.setValue(" " + count + " ");
          output.setStyle("color: blue");
          children.add(output);
    }
}
```

ActionListener for Navigation

- inside the ActionListener:

```
FacesContext.getCurrentInstance().
    getApplication().getNavigationHandler().
        handleNavigation(
            FacesContext.getCurrentInstance(),
            null, outcome);
```

- Needs:
  - global **`navigation-rule`** for the String **`outcome`**

Using HTML inside OutputText

- the tag:
  - `<h:outputText value=„#{bean.htmlText}“/>`
- Problem: HTML will be „escaped“
- like: `<br/>` → `<br/>`
- work around:
  - `<h:outputText value=„#{bean.htmlText}“ escape=„false“/>`

passing arguments with the EL

- EL expressions are powerful, but …

  … don't take arguments

- work around:
  - backing bean implements Map interface
  - On a `Map.get(„key")` call, the method get's called and a argument is passed throuhg (`„key"`)
  - usage: `#{mapBean[,key`]}`

Master Detail (1)

- Liste:

```
<h:dataTable var="bean" value=...>
...
<h:commandLink actionListener=„#{bean.editItem}“ />
...
</h:dataTable>
```

- using commandLink for editing the details
- actionListener instead of action

Master Detail (2)

- backing bean:

```
public void editItem(ActionEvent ev)
{
    UIData datatable =
        findParentHtmlDataTable(
            ev.getComponent());
    Item item = (Item)
        datatable.getRowData()
    //edit the item...
}
```

Master Detail (3)

- helper method:

```
private HtmlDataTable findParentHtmlDataTable(
                                        UIComponent component)
{
     if (component == null)
     {
          return null;
     }
     if (component instanceof HtmlDataTable)
     {
          return (HtmlDataTable) component;
     }
     return findParentHtmlDataTable(
                              component.getParent());
}
```

Master Detail (4)

- other possibilities:
  - `<f:param … />` (well, ok…)
  - Apache MyFaces: `<t:updateActionListener />`
- `<t:updateActionListener />`
  - When an action is called the “value” is set to a backing bean’s property
  - ```
    <t:updateActionListener
     property="#{countryForm.id}"
     value="#{country.id}" />
    ```
    ```

showing/ hiding components

- „**rendered**“ attribute:
  - should a component be rendered ?
  - JSP: `<h:inputText rendered=„#{bean.showMe}“/>`
- replacement for „**c:if**“ or ugly Java code (scriptlets)
- Warning:
  - **rendered** evaluated during each phase
  - also on a postback (no decoding for not rendered components)

Links

- MyFaces AJAX examples
  - http://www.irian.at/open_source.jsf (sandbox components)
- AJAX web resources
  - http://www.adaptivepath.com
  - http://www.ajaxinfo.com/
  - http://www.ajaxpatterns.org/Ajax_Frameworks
  - http://www.ajaxdeveloper.org

Literature

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