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Advanced Web Technologi
5) Facelets in JSF

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Using Facelets

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Motivation

JSTL, a template language for

JSTL, a template Laguage for JSF

- **Template for JSF**
  - Similar to Smarty for PHP
  - Used for the creation of the JSF Component tree
- **Include pages in pages**
  - Part of pages may be similar
  - Header / footers for instance
- **Loop inside a page**
  - For or while loops can visit a structure
- **Conditional Branching**
  - If / then /else

First Example : The Modules Directory

First Example : The Modules Directory

- **We need to create a simple directory of Modules**
- **We create various xhtml files**
  - `template.xhtml` for storing the main design for the site
  - `index.xhtml` the welcome file
  - `awt.xhtml` file presenting the Advanced Web Technology Module
  - `webProg.xhtml` file presenting the webProgramming
  - `menu.xhtml` contains just the menu. It is included in the other files

The template

- **We include the name spaces corresponding to jsf and facelets tags**
  - JSF tags are prefixed with `h` or `f`
  - Facelets specific tags are prefixed with `ui`

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 ↘
→Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.↘
  →dtd">
<html xmlns="http://www.w3.org/1999/xhtml"
        xmlns:h="http://java.sun.com/jsf/html"
        xmlns:f="http://java.sun.com/jsf/core"
        xmlns:ui="http://java.sun.com/jsf/facelets">
<head>
```

The template (Cont.)

- **We define the basic layout.**
  - We insert CSS and Javascript in such a file

```
<title>Facelets−Test</title>
<style type="text/css">
<!−−
    .box {
        float: right;
        width: 50%;
        border: black dotted 1px;
        padding: 5px
     }
    −−>
</style>
</head>
<body>
```

The template (Cont.)

- **Template contains placeholders that can be overwritten**
  - We use `ui:insert` to define areas that can be overwritten
  - each `insert` receives a `name` and a default value (the content of the tag).

```
<h:form>
<h1>Facelets−Template</h1>
<div class="box">
  <ui:insert name="navigation" />
</div>
<ui:insert name="content">
   Default Text for content (only if no content has been defined)
</ui:insert>
</h:form>
</body>
</html>
```

The home page

- **The `index.xhtml` file greets a user**
  - Must be a valid xhtml document, so includes all the xhtml "stuff"
  - Everything that is outside the `ui:composition` tag is ignored.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//↘
→EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml"
        xmlns:h="http://java.sun.com/jsf/html"
        xmlns:f="http://java.sun.com/jsf/core"
        xmlns:ui="http://java.sun.com/jsf/facelets">
<body>
This text will never be displayed
(text before composition is ignored)
<ui:composition template="template.xhtml">
```

The home page (Cont.)

- **We are using new facelets tags:**
  - `ui:composition` used to reference the template for this page
  - `ui:define` (its name must match the one of the `ui:insert` in the template).
  - `ui:include` to include the content from another document

```
<ui:composition template="template.xhtml">
  <ui:define name="navigation">
    <ui:include src="menu.xhtml" />
  </ui:define>
</ui:composition>
This text will neither be used
(text after composition is ignored too)
</body>
</html>
```

A menu page

- **This page in included in all the other pages**
- **It must contain the same “xhtml” stuff (like definitions of name spaces).**

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
...
<ui:composition>
<h3>Content table</h3>
<hr />
<h:panelGrid column="1">
<h:commandLink value="Home" action="index" />
<h:commandLink value="Web Programming" action ="webProg" />
<h:commandLink value="Advanced Web Technology" action ="awt" />
</h:panelGrid>
</ui:composition>
This text will neither be used
(text after composition is ignored too)
</body>
</html>
```

Facelets TagLibs

Facelets support the following tag libraries

- **Templating library** The one we have already seen (with the `ui:...` tags.)
- **JSF libraries** core and html jsf libraries are supported by Facelets.
- **JSTL** facelets provides partial support for JSTL tags. Function library is fully supported, Core is only partially:
  - `c:if` for conditional branching
  - `c:forEach` for looping in a collection
  - `c:catch` For emulating a try catch
  - `c:set` For defining manualy some attribute variables

JSP Standard Template Library JSTL

JSP Standard Template Library: JSTL

- **Introduces some programming in the view part**
  - Not used as a template language
  - JSTL is not fully supported

JSTL : Loops

- **Looping with explicit numeric values**

```
<c:forEach var="name" begin="x" end="y" step="z">
  Blah, blah <h:outputText value="#{name}" />
</c:forEach>
```

- **Looping over data structures**
  - Can loop down arrays, strings, collections, maps

```
<c:forEach var="name"
           items="array-or-collection">
  Blah, blah <h:outputText value="#{name}" />
</c:forEach>
```

The “if” Tag

The "if" Tag

```
<html xmlns="http://www.w3.org/1999/xhtml"
          xmlns:h="http://java.sun.com/jsf/html"
          xmlns:f="http://java.sun.com/jsf/core"
          xmlns:ui="http://java.sun.com/jsf/facelets"
          xmlns:c="http://java.sun.com/jsp/jstl/core"
>
...
<ul>
<c:forEach var="i" begin="1" end="10">
   <li><h:outputText value="#{i}" />
         <c:if test="#{i > 7}">
         (greater than 7)
         </c:if></li>
</c:forEach>
</ul>
```

The "choose" Tag

```
<ul>
<c:forEach var="i" begin="1" end="10">
  <li>#{i}
      <c:choose>
        <c:when test="#{i le 4}"> (small)
        </c:when>
        <c:when test="#{i le 8}"> (medium)
        </c:when>
        <c:otherwise> (large)
        </c:otherwise>
      </c:choose>
</li>
</c:forEach>
</ul>
```

Reusable Composite Componer

Reusable Composite Components

- **Facelets allows to create lightweight composition components**
  Two basic steps
  - Create a tag source file, which will contain the XHTML code that defines your component
  - Register the tag in your custom tag library, so it can be used in your Facelets applications.
- **You can reuse this component as much as possible**

Example: Custom "inputTextLabeled" Component

- **We need a component that can be used like this:**

  ```
  <custom:inputTextLabeled
          label="Name"
          value="#{module.name} />
  ```

- **What it does:**
  - Is a combination of a label and an input text

Creating a tag source file

In the directory: `web/resources/components/mylib/` we write the following file:

input.xhtml

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" xmlns:h="http://java.sun.com/jsf/html"
      xmlns:f="http://java.sun.com/jsf/core" xmlns:composite="http://java.sun.com/jsf/composite">
 <composite:interface>
    <composite:attribute name="label" />
    <composite:attribute name="value" />
  </composite:interface>
<composite:implementation>
  <h:outputLabel value="#{cc.attrs.label}: ">
    <h:inputText value="#{cc.attrs.value}" />
  </h:outputLabel>
</composite:implementation> </html>
```

Let's use the new component / tag

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" xmlns:h="http://java.sun.com/jsf/html"
      xmlns:f="http://java.sun.com/jsf/core" xmlns:ui="http://java.sun.com/jsf/facelets"
      xmlns:mylib="http://java.sun.com/jsf/composite/components/mylib">
<head><title>head</title></head>
<body>
<f:view> <h:form>
  <h:panelGrid columns="1">
    <mylib:input label="Name" value="#{mod.name}" />
    <mylib:input label="Nb" value="#{mod.number}" />
   <h:commandButton value="Add module"
          actionListener="#{moduleDictionary.addModule}" />
   </h:panelGrid>
 </h:form> </f:view> </body> </html>
```

Icon component

- We want to design a component icon on which one can click
- Example of use:

```
<html xmlns="http://www.w3.org/1999/xhtml"
      xmlns:mylib="http://java.sun.com/jsf/composite/↘
      →components/mylib">

  <mylib:icon actionMethod="#{places.logout}"
                              image="#{resource['images:back-↘
                              →arrow.jpg']}" />
  ...
</html>
```

- Action method is executed when the icon is clicked on.

The icon component

The file `/web/resources/components/mylib/icon.xhtml`

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
<html xmlns="http://www.w3.org/1999/xhtml"
      xmlns:h="http://java.sun.com/jsf/html"
    xmlns:composite="http://java.sun.com/jsf/composite">
  <composite:interface>
    <composite:attribute name="image" />
    <composite:attribute name="actionMethod"
        method-signature="java.lang.String action()" />
  </composite:interface>
    <composite:implementation>
    <h:form>
      <h:commandLink action="#{cc.attrs.actionMethod}" immediate="true">
      <h:graphicImage value="#{cc.attrs.image}"
          styleClass="icon" />
      </h:commandLink>
    </h:form> </composite:implementation></html>
```

Add an optional parameter

- We want to add an optional style parameter
- Example of use:

```
<util:icon actionMethod="#{places.logout}"
                        image="#{resource['images:back-arrow↘
                        →.jpg']}"
                styleClass="customIconClass" />
```

- We need to add the line in the interface

```
<composite:attribute name="styleClass" default="icon" ↘
→required="false" />
```

- So we can change the implementation to:

```
<h:graphicImage value="#{cc.attrs.image}"
                        styleClass="#{cc.attrs.styleClass}" />
```

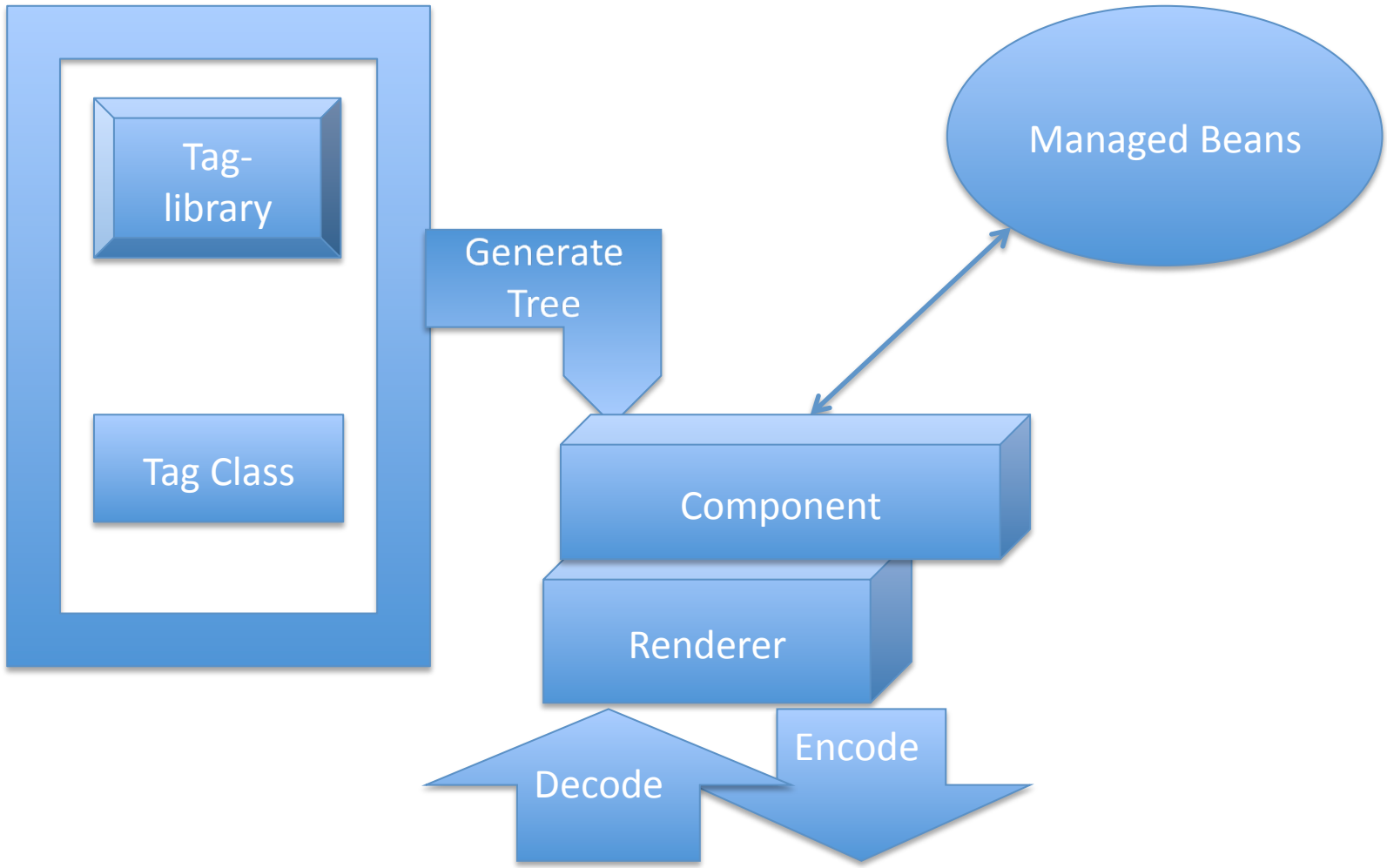
JSF Component Model

- **Much like Swing's component model**
  - It has events and properties
  - also has containers that contain components,
  - and that also are components that can be contained by other containers.
  - In theory, the JSF component model is divorced from HTML and JSP.
  - The standard set of components that ships with JSF has JSP bindings and generates HTML renderings.
- **Component functionality typically centers around two actions: decoding and encoding data.**
  - *Decoding* is the process of converting incoming request parameters to the values of the component.
  - *Encoding* is converting the current values of the component into the corresponding markup, that is, HTML.

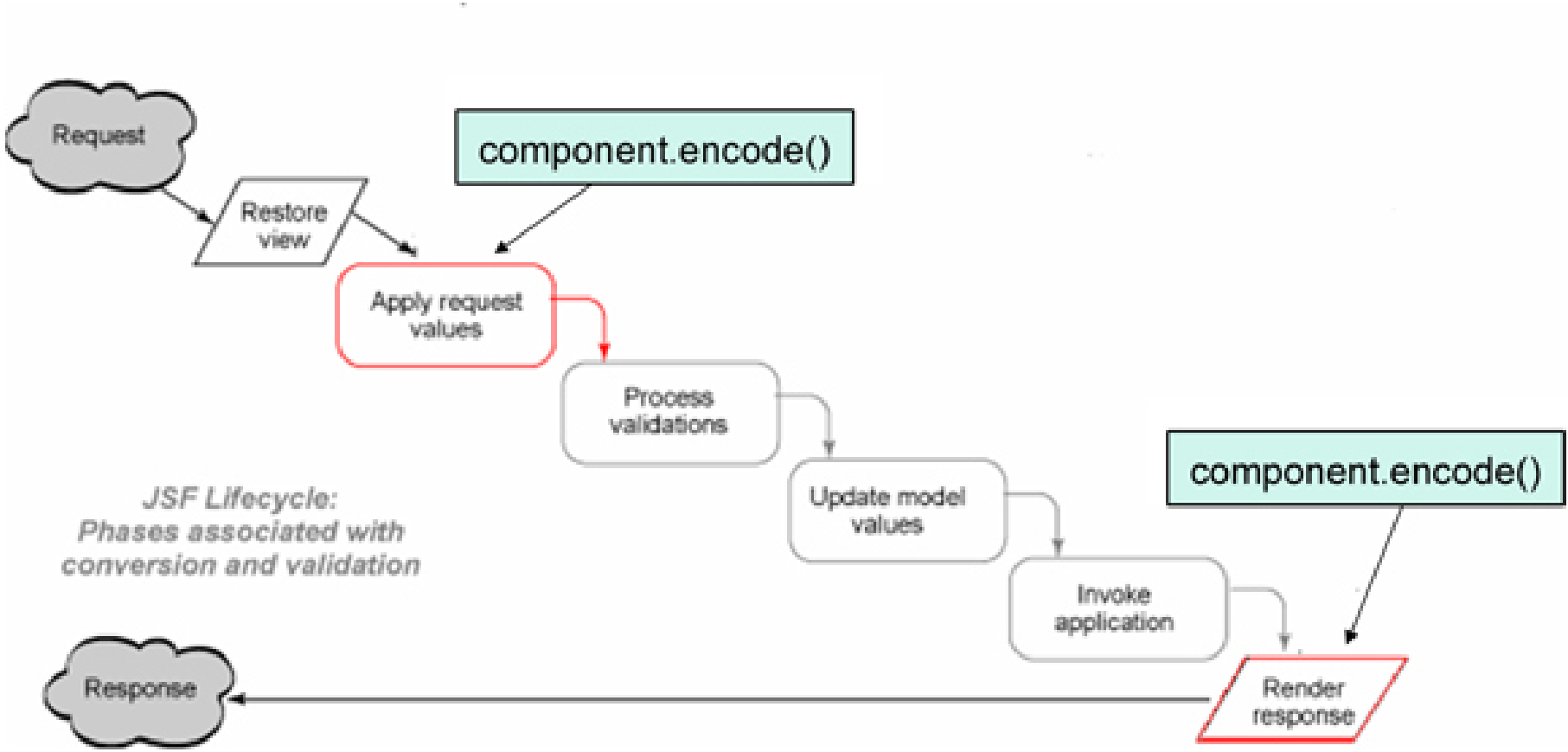
Component and Renderer

- **Two implementation approach**
  - *direct implementation*, the component itself implements decoding and encoding.
  - *delegated implementation*, the component delegates to a renderer that does the encoding and decoding.
  - delegated implementation: you can associate your component with different renderers that will represent it in different ways on the page; for example a multi-select list box versus a list of check boxes.
- **JSF components consist of two parts: the component and the renderer.**
  - The JSF Component class defines the state and behavior of a UI component;
  - a renderer defines how the component will be read from the request and how it will be displayed – usually through HTML.

Actors


Tag-
library
Tag Class
Generate
Tree
Managed Beans
Component
Renderer
Decode
Encode

JSF life-cycle and JSF components



Further component concepts

- `UIComponent` **is the base class for all JSF components.**
  - When you develop your own components you will subclass `UIComponentBase`,
  - it extends `UIComponent`,
  - default implementations for the abstract methods in `UIComponent`.
- **Components:**
  - have parents and identifiers.
  - They are associated with a component type, (for registring in `faces-config.xml`)
  - You can use the JSF-EL (expression language) to bind JSF components to managed bean properties.
- **A component can be a** `ValueHolder` **or an** `EditableValueHolder`**.**
- **Components like form field components have a ValueExpression that is a evaluated as a EL expression.**

Create a new Component

We create a new component

- **Define what we realy want to have**
  - Design a prototyp of how your component should look like
  - Design a prototyp of how your component should be used
- **Define a Component and its Renderer**
  - Component has in charge the relation with the backing bean
  - The Renderer is specific for HTML (in our case)
- **Integrate the Component in a JSP Tag Lib**
  - Define a new Tag class
  - Define a new tag lib
- **Integrate everything in JSF**
  - Integrate your Component and Renderer in the faces-config.xml

Conclusion

- **Facelets are the standard**
  - JSF 2.0 will only support facelets for its view part
  - Until JSF 1.2 JSP were the standard for writing pages
- **Facelets allow easy creation of components**
  - Custom composition components are much easier to write than with custom componets
- **Facelets allow to enrich view part of JSF**
  - You can use a part of JSTL (if / foreach / try catch)
  - You can use the Unified Expression Language

References

- **The definitive Guide to Apache MyFaces and Facelets, Z. Wadia, M. Marinschek, H. Saleh and D. Byrne, Apress, 2008**
- `http://www.ibm.com/developerworks/java/library/j-facelets/`
- `http://www.ibm.com/developerworks/java/library/j-jsf2fu2/index.html`