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AWT
4) JSF Lifecycle, Event handling, data binding, i18

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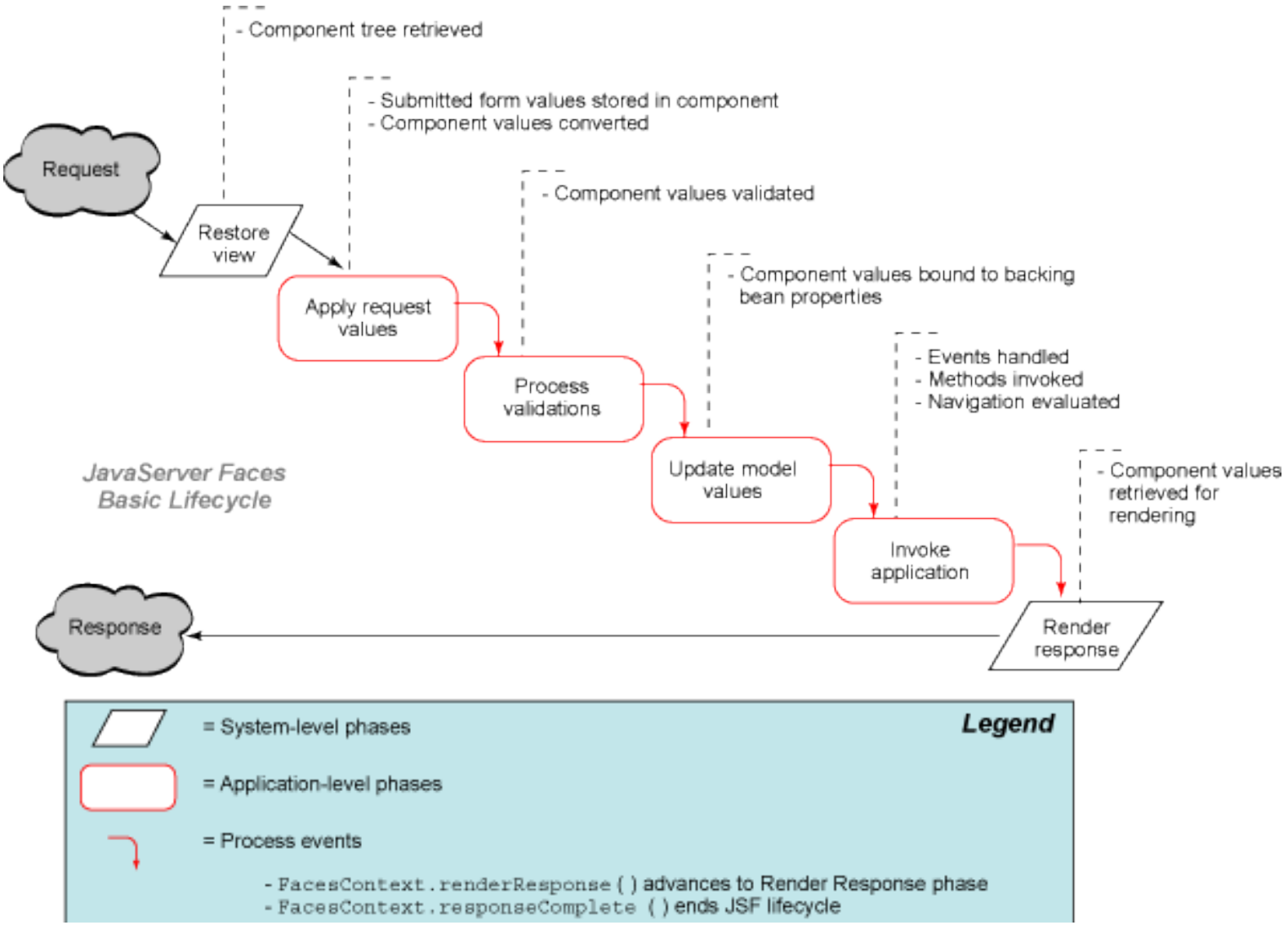
Basic JSF Lifecycle



Life-cycle

- **Create the component tree**
- **Map values to the component nodes (corresponding to request parameters)**
  - Request parameters are stored in the component themselves
- **Process validations** Validate each of the obtained values
- **Update Model Values** Value is copied inside the corresponding backing beans.
- **Invoke Application** : Event handling and actions are executed.
- **Render Response**
  - A new component tree is created (if needed by navigation)
  - Backing beans values are transferred back to Components
  - Components are rendered

Conversion and validation

Apply Request Value

- **Submitted form values are stored inside the component**
- **Value is converted**
  - The component contains one type of input
  - Input is always sent as a “String”
  - JSF must convert the value into the right type
  - Conversion may be implicit or explicit

Apply Request Value (Cont.)
Use Converters

- **Can be the default JSF converters**

```
<!-- UserRegistration.xhtml -->
<h:inputText id="age" value="#{UserRegistration.user.↘
→age}">
    <f:converter id="javax.faces.Short" />
</h:inputText>
```

- **Or a Date default converter**

```
<!-- UserRegistration.xhtml -->
<h:inputText id="birthDate"
        value="#{UserRegistration.user.birthDate}">
    <f:convertDateTime pattern="MM/yyyy" />
</h:inputText>
```

Define your own converter

- **Create a Converter class**

```
import javax.faces.convert.Converter;
public class PhoneConverter implements Converter {
    public Object getAsObject(FacesContext context,
                UIComponent component, String value) { ... }
    public String getAsString(FacesContext context,
                UIComponent component, Object value) { ... }
}
```

- **Declare its use in the `faces-config.xml` file**
- **Use the declared name in the XHTML File**

```
<h:inputText id="phone"
                value="#{UserRegistration.user.phone}">
    <f:converter converterId="arcmind.PhoneConverter" />
</h:inputText>
```

Validation

- **Once the value is inside each component, it is validated**

```
<h:inputText id="age" value="#{UserRegistration.user.↘
→age}">
            <f:validateLongRange maximum="150"
                                 minimum="0" />
</h:inputText>
```

- **If conversion or validation fails:**
  - A message is generated (printed in the `message` tag)
  - The life-cycle goes directly to the rendering step
  - The page is rendered directly (other steps are not executed)
  - Values are never transferred to the backing beans in this case.
- **If conversion and validation succeed:**
  - Value is transferred to the corresponding Backing bean.
  - Backing beans "getter" methods are executed using values stored in the components

Invoke Application

Invoke Application: Event handling and actions

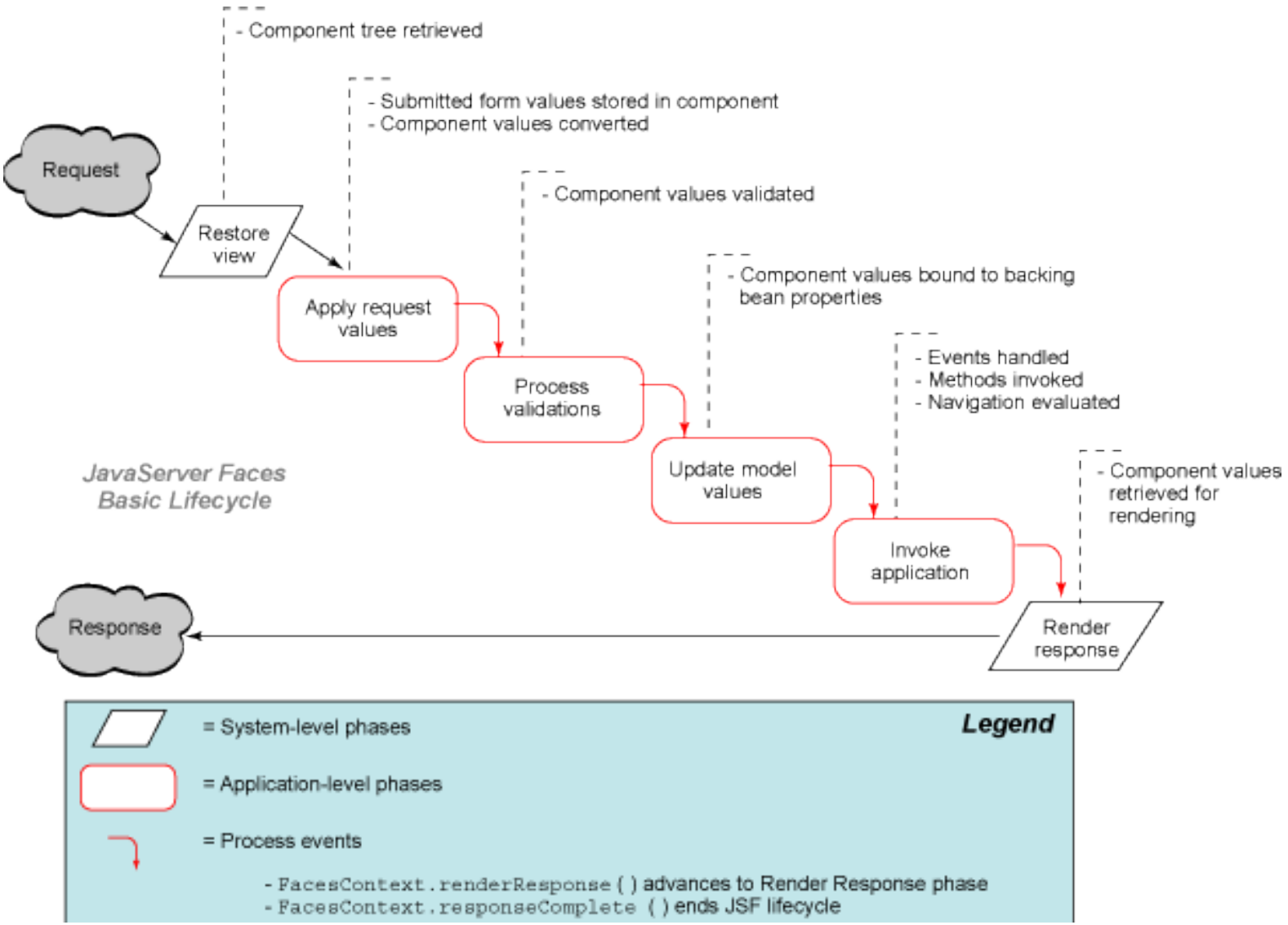
- **After the value is transferred to ALL backing beans**
- **Events are fired by the component**
  - Value Changed Events : for input fields
  - Action Event : for command components
- **EL expressions corresponding to actions are computed**
  - They can use all the information stored inside the backing beans
- **Action values are used to fire a navigation rule**
  - The View page is computed according to the returned value

Rendering

- **The values in the beans are stored back in the tree**
  - The component accesses the getter method of the bean
- **Each component know how it should be rendered**
- **Some render themselves directly**
  - Using the encoding functions: **encodeBegin(...)**, **encodeChildren(...)** and **encodeEnd(...)**
- **Some use an external renderer (or many depending on the application)**
  - The encoding and decoding functionalities are delegated to a "Renderer" Class.

```
public class FieldRenderer extends Renderer {
```

Basic JSF Life-cycle
(the same picture)



Actors in the JSF process

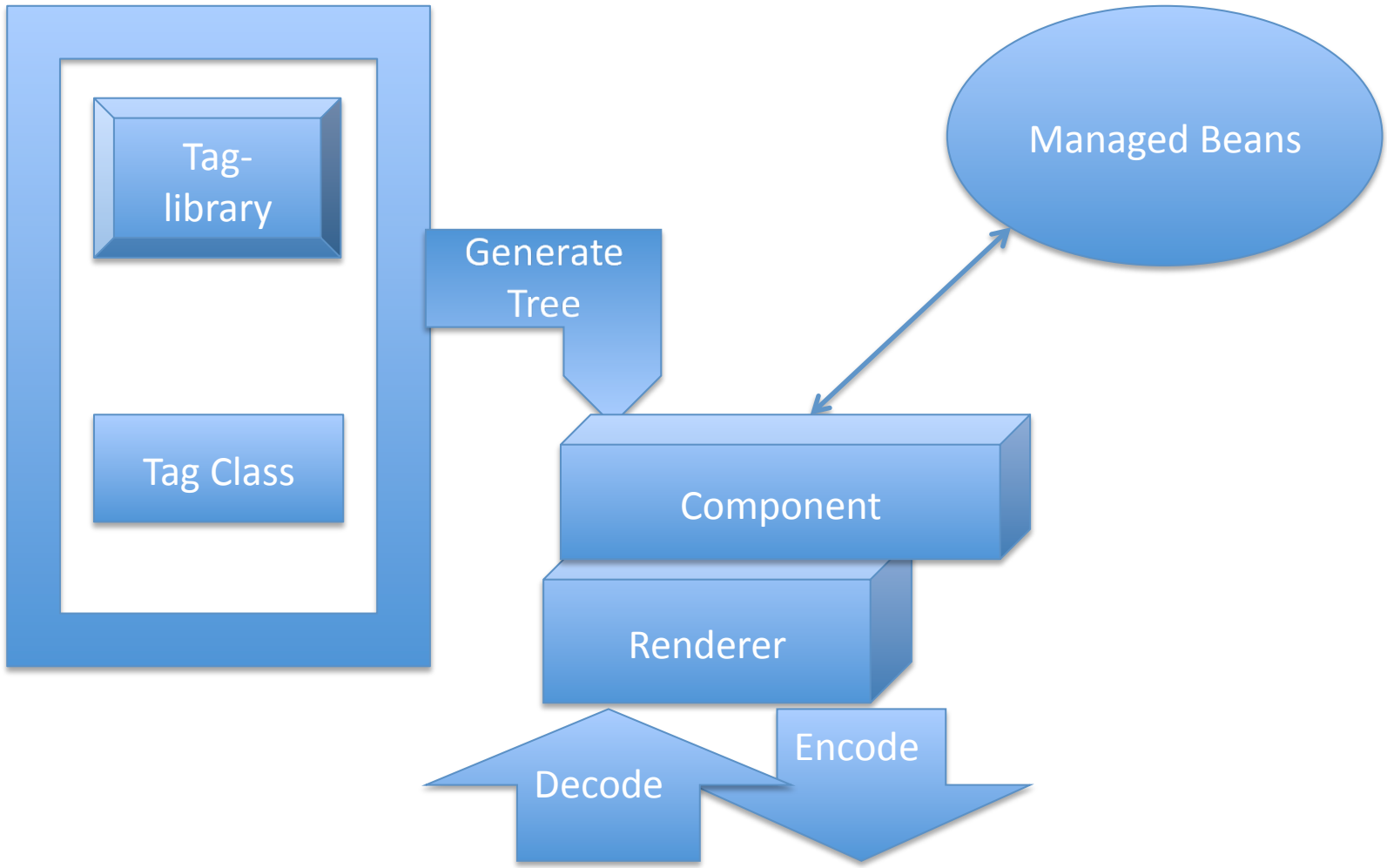
Actors in the JSF process

- **Components :**
  - Compose the component tree (nodes have one parent and can have many children)
  - Are the center piece of our puzzle
- **Managed Beans**
  - Contain the values stored by the application
  - Contain the link with the business layer
- **Renderer**
  - “decode” the form input
  - “encode” the component

Actors in the JSF process (Cont.)

- **Tag-lib**
  - xml definition of the tag and its arguments
- **Tag class**
  - The class instanciated by the tag lib.

Actors


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

Internationalization - I18n

Motivations

Internationalization ?

- **Multilingual web applications**
  - Work of programmers should be used anywhere in the world
  - Translation should not require any informatics knowledge
- **Structure**
  - Web application without any text,
  - Data Base designed to handle multilingual texts,
  - Static texts are stored in resource bundles.
- **Language**
  - Automatically recognized from the browser,
  - Comparison between the site and the browser,
  - The user can also change the desired language.
- **Priority**
  - browser identification (lowest)
  - Locale in the session
  - Change using an event (highest)

I18n in Java (very short presen

I18n in Java

- **A `Locale` object contains i18n configurations**

```
public Locale(String language)
public Locale(String lang, String country)
public Locale(String lang, String ctry, String variant)
```

- **Resource bundles:**
  - Provide facilities for storage and retrieval of all locale-specific information, independently from the application logic
  - Allow to support multiple locales in a single application
  - Allow to extend internationalization easily
- **The Java Resource bundles classes are:**
  - `ResourceBundle` contains locale-specific objects.
  - `ListResourceBundle` abstract subclass of ResourceBundle
  - `PropertyResourceBundle` is a concrete subclass of ResourceBundle (property files).

Resource Bundle (Example)

```
public class MyResourceBundle extends ResourceBundle {
  private String keys = "Msg1 Msg2 Msg3";
  public Object handleGetObject(String key) {
    if (key.equals("Msg1") return "Hello world!";
    if (key.equals("Msg2") return "Hello i18n!";
    ...;
    return null;
  }
  public Enumeration getKeys() {
    return new StringTokenizer(keys);
  }
}
```

Change Language

Resource Bundle

- **Retrieve localized information**
  To retrieve a localized value for a given key, you should use one the methods
  - getObject,
  - getString or
  - getStringArray

  from the class ResourceBundle:
- `public Object getObject(String key)`
  - first tries to obtain the value using handleGetObject.
  - If not successful, it calls the getObject method of the parent resource bundle, assuming it is not null.
  - The other two methods are convenience methods that casts the object returned.

Property Resource Bundles

- **A Property Resource Bundle is a collection of text elements stored in a property file.**
  - A property file is a text file containing properties. Therein:
  - A property is specified as "key = value" or "key : value"
  - Line beginning with "!" or "#" are comments
  - "\" is used to indicate line continuation

```
# File name: I_Classes.properties
ApplicationTitle=Classes in dept. I
DisplayButtonText=Display
EndButtonText=Exit
I1=I1a, I1b, I1c, \
   I1p, I1q, I1r
I2=I2a, I2b, I2c, \
   I2p, I2q, I2r
I3=I3SE, I3TM, I3WI, I3p, I3q
I4=I4t, I4v, I4w
```

I18n in JSF

Language selection in HTTP

- **Browser sends its preference in the HTTP Header**
  - Which languages are supported
  - Which formats are supported
  - ...

GET http://*cms.hta−bi.bfh.ch/typo3/index.php HTTP/1.1*
Host: cms.hta−bi.bfh.ch
...
Accept−Language: fr, fr−ch;q=0.83, en;q=0.66, en−us;q=0.50,↘
→de;q=0.33, de−ch;q=0.16
Accept−Encoding: gzip, deflate, compress;q=0.9
Accept−Charset: ISO−8859−1, utf−8;q=0.66, ∗;q=0.66
Keep−Alive: 300
Proxy−Connection: keep−alive

I18n in JSF

- **Declare the supported Locales**
  - In the `faces-config.xml` file
- **Create for each supported language a Property file**
  - `project/src/ch/bfh/toto/Toto.properites`
- **Replace any output string in the XHTML files with a message**

  <h:outputText value="#{bundle.title}" />
  or simply
  #{*bundle.title*}

- **Give the possibility for the user to change language**

Declare locales in `faces-config.xml`

```
<faces-config>
  <application>
    <locale-config>
      <default-locale>en</default-locale>
      <supported-locale>fr</supported-locale>
      <supported-locale>de</supported-locale>
      <supported-locale>es</supported-locale>
    </locale-config>
  </application>

...
```

Create a property file

- **Create files in your src arborescence**
  - Example
    `project/src/ch/bfh/jsf/Resources.properties`
  - `project/src/ch/bfh/jsf/Resources_fr.properties`

```
#
# This file is used to store localized expressions
# Autor: E.Benoist
#
title=Hello world
message=Try to find out what I think
congratulation=Congratulation
```

Change Expressions in the XHTML files

- **Load the bundle, according to the Locale**

```
<f:loadBundle basename="carstore.bundles.Resources"
              var="bundle" />
```

- **Write a message**

```
<h:outputText styleClass="maintitle"
   value="#{bundle.chooseLocale}" />
```

Messages can contain a variable part

- **Some messages need to include a variable part**
  - *Félicitation, vous avez trouvé que le numéro était le 10.*
  - *Gratulation, Sie haben gefunden, dass die Nummer die 10 war.*

- **We can write such a sentence in the `messages.properties` file**

  felicitation=Gratulation, ... , dass die Nummer die {0} war.

Messages can contain a variable part (Cont.)

- **Reference in the XHTML:**

```
<h:outputFormat value="#{msg.success_text}">
  <f:param value="#{numberBean.userNumber}" />
</h:outputFormat>
```

Change the Locale

- **Reacting to an event**
  - Generate an ActionEvent in a form (works also with a button):

    ```
    <d:map id="worldMap" current="Europe" immediate="↘
    →true" action="storeFront"
        actionListener="#{carstore.chooseLocaleFromMap}">
    ```

  - Or

    ```
    <h:commandLink id="NAmerica" action="storeFront"
        actionListener="#{carstore.chooseLocaleFromLink}">
    ```

  - In the Bean

```
public void chooseLocaleFromMap(ActionEvent actionEvent) {
  AreaSelectedEvent event = (AreaSelectedEvent) actionEvent;
  String current = event.getMapComponent().getCurrent();
  FacesContext context = FacesContext.getCurrentInstance();
  context.getViewRoot().setLocale((Locale) locales.get(current));
  resetMaps();
}
```

Return a Localized message

- **Messages can be returned by a bean**
  - Manged beans are used for this purpose
  - They should be internationalized
- **Idea**
  - Write all messages in a MessageBundle (with a property file)
  - Load this class in your program
  - Answer to getXXX with a localized message.

Example of Localized Message

- **In the constructor of the bean**

```
FacesContext context = FacesContext.getCurrentInstance↘
→();
ResourceBundle data = null;
Enumeration keys = null;
components = new HashMap();

// load the labels
resources =
   ResourceBundle.getBundle(CarStore.↘
   →CARSTORE_PREFIX +
                          ".bundles.Resources",
                          context.getViewRoot().getLocale());
```

- **When a message is requested**

```
optionLabel = resources.getString(optionKey);
```

Conclusion

Conclusion

- **JSF Lifecycle**
  - Creation of components in the component tree
  - Population of the tree
  - THEN transfer to the managed beans
  - And finaly event handling and navigation
  - Different actors: Components, Managed Beans, Converters and Validators, Taglib and Tag class, ...
- **i18n**
  - Straightforward for a JSF application
  - Support out of the box
  - Should never include a string inside any programm

References

- `http://www-128.ibm.com/developerworks/java/library/j-jsf3/`