SAP NetWeaver
How-To Guide

How To... Convert And Validate Data

Applicable Releases:

SAP NetWeaver Composition Environment 7.1

Topic Area:

User Productivity

Development and Composition

Capability:

User Interface Technology

Java

Version 1.0

October 2008

Document History

Document Version	Description
1.00	First official release of this guide

Typographic Conventions

Type Style	Description
Example Text	Words or characters quoted from the screen. These include field names, screen titles, pushbuttons labels, menu names, menu paths, and menu options. Cross-references to other documentation
Example text	Emphasized words or phrases in body text, graphic titles, and table titles
`Example text`	File and directory names and their paths, messages, names of variables and parameters, source text, and names of installation, upgrade and database tools.
`Example text`	User entry texts. These are words or characters that you enter in the system exactly as they appear in the documentation.
`<Example text>`	Variable user entry. Angle brackets indicate that you replace these words and characters with appropriate entries to make entries in the system.
`EXAMPLE TEXT`	Keys on the keyboard, for example, F2 or ENTER.

Icons

Icon	Description
	Caution
	Note or Important
	Example
	Recommendation or Tip

Table of Contents

1. Business Scenario

The following guide will explain how input data is converted to Java objects and how the data is validated against some application-specific constraints before the model is updated, so invalid inputs won't affect the model integrity.

The user interface for this Web application will allow you to create special offers for a company. The user will need to provide the following information:

- The product short description
- The product price
- The offer expiration date
- The stock availability

JSF will convert and validate all user input. If there are any errors, the page is redisplayed with the values entered by the user in order to correct them. If all validations are successful, the application will continue with the creation process.

2. Background Information

The execution of a JavaServer Faces page follows the Web request/response paradigm. When a client makes a request to a JSF page, the server side JSF runtime processes the request and delivers back a response. One of the distinguished features possessed by JSF is the division of the request processing into multiple phases. Those phases deal with common problems which any modern Web application solves either in a proprietary way or with a help of an additional framework. Among those problems are the conversion of the client request data into application depended model and ensuring the validity of the data before executing any back-end business logic. To learn more about the JSF request processing lifecycle you can visit Sun's java website for JSF .

You will now be familiarized with the phase of the lifecycle that deal with conversion and validation and how the conversion and validation process protect the business logic from invalid data.

3. Prerequisites

The following is a list of all you need for developing JSF applications.

- AS Java 7.1 (CE 7.1 or NW 7.1)
- NWDS 7.1 (SP3 or higher with latest patch level).

  Note

  While this tutorial is geared towards to the SAP AS Java (the build/deploy steps of the guide), it wouldn't be hard to replace the build/deploy portions with similar steps for any other Java EE 5 platform

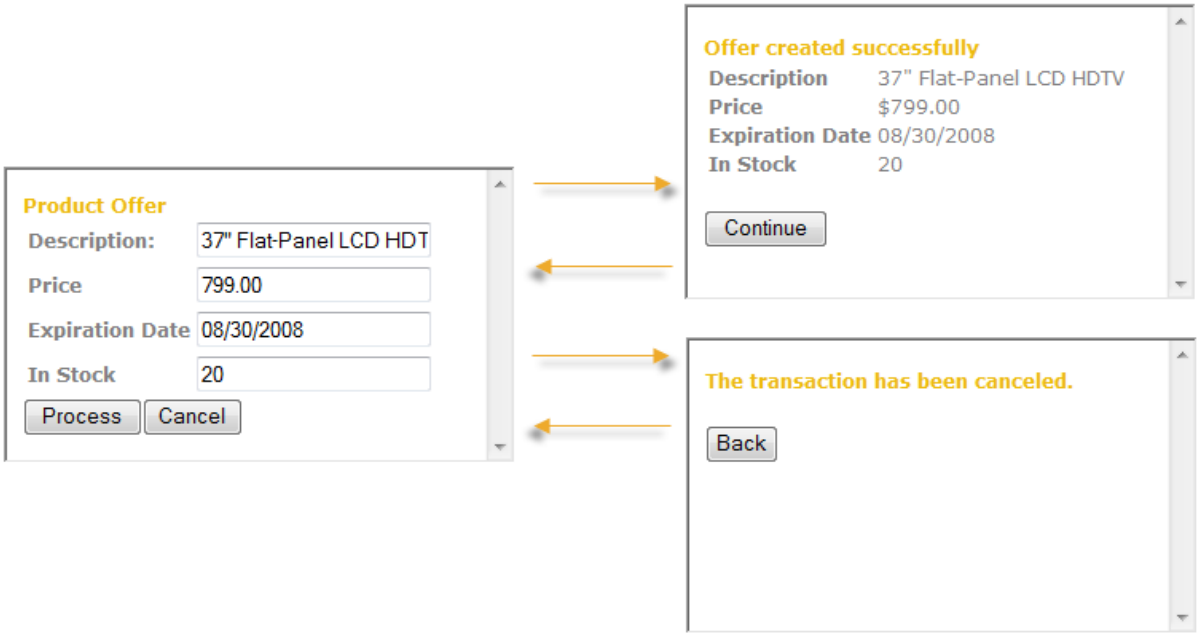
Knowledge

- You have a basic knowledge of Java Enterprise Edition
- You have acquired some basic experience with JSF applications, for example by working through the JSF tutorials (Create a Hello World Application using JavaServer Faces [Extern] and Create Your First JSF Application [Extern])

4. Step-by-Step Procedure

In the following sections, you will create a Web Module Development component and an Enterprise Application needed to deploy the web module. You will get to know how to convert data types and how to ensure that the correct values are entered by a user.

This Web application will consist of three views. In the first view, using the *Process* button, the user can navigate to a second view in which the information can be reviewed. This navigation button should only be followed up by the JSF framework if the entries for all the input fields are correct. If this is not the case, a corresponding error message is displayed. Using the *Cancel* button, the user can navigate to a third view and bypass the data validation.



4.1 Tutorial Setup

1. Create a Web Module Development Component named **`converterjsf/web`** as indicated in the Hello World JSF tutorial (Create a Hello World Application using JavaServer Faces [Extern]).
2. Create an Enterprise Application Development Component named **`converterjsf/ear`** as indicated in the Hello World JSF tutorial (Create a Hello World Application using JavaServer Faces [Extern]).

4.2 Create a Java Class

1. From the context menu of the *Java Resources: source* folder in the *Web Module* project create a Java class as indicated in the Navigation tutorial (Create Your First JSF Tutorial [Extern]). Enter **`Product`** in the *Name* field, **`com.sap.tutorial.jsf.conv.beans`** in the *Package* field, declare the attributes and generate the corresponding *Getters* and *Setters* methods shown in the following code.

```
public class Product {

      private String description = new String();
```

```
    private double price;
    private Date expirationDate = new Date();
    private int stock;

  public String getDescription() {
    return description;
  }
  public void setDescription(String description) {
    this.description = description;
  }
  public double getPrice() {
    return price;
  }
  public void setPrice(double price) {
    this.price = price;
  }
  public Date getExpirationDate() {
    return expirationDate;
  }
  public void setExpirationDate(Date expirationDate) {
    this.expirationDate = expirationDate;
  }
  public int getStock() {
    return stock;
  }
  public void setStock(int stock) {
    this.stock = stock;
  }

}
```

2. Configure the *Product* Java class in the application configuration resource file faces-config.xml using the managed-bean XML element as indicated in the Navigation tutorial (Create Your First JSF Tutorial [Extern]). Enter **`product`** in the *Name* field to reference the *Product* java class and select **`session`** in the *Scope* field.

```
<managed-bean>
    <managed-bean-name>product</managed-bean-name>
```

```
      <managed-bean-class>
         com.sap.tutorial.jsf.conv.beans.Product
      </managed-bean-class>
      <managed-bean-scope>session</managed-bean-scope>
   </managed-bean>
```

4.3 Create a Style file

Instead of using a hardwired style, it is better to use a style sheet.

1. Drill into the Web Module project and right click on the *WebContent* folder and in the context menu select *New* → *Other…*- In the popup window select *Web* → *CSS* and click the *Next* button.
2. Enter **`styles.css`** in the *File Name* field and click the *Finish* button.
3. Define the following CSS classes:

```
.errorMessage {
   font-family: Verdana, Arial, Sans-Serif;
    font-size: 10px;
    color: red;
    font-style: normal;
 }

.title {
   font-family: Verdana, Arial, Sans-Serif;
    font-weight: bold;
    font-size: 12px;
    color: #edbb10;
    font-style: normal;
}

.label {
   font-family: Verdana, Arial, Sans-Serif;
    font-weight: bold;
    font-size: 12px;
    color: #808080;
    font-style: normal;
}
```

```
.text {
   font-family: Verdana, Arial, Sans-Serif;
    font-size: 12px;
    color: #808080;
    font-style: normal;
}
```

4. Save the changes you made.

4.4 Create the JSP Pages

1. Drill into the Web Module project and right click on the *WebContent* folder and in the context menu select *New → JSP.*
2. Enter the file name **`index.jsp`** and click the *Finish* button. The JSP page will be created. The *index.jsp* page should be opened in the *Web Page Editor*
3. Include the style sheet by adding a *link* element inside the *head* element as shown in the following code

```
<head>
    <link href="styles.css" rel="stylesheet" type="text/css"/>
    …
</head>
```

4. Drag and drop a *Form* element (found in the *JSF HTML* elements) to the *Web Page Editor*
5. Place an *Output Text* UI element between the <h:view>…</h:view> tags and select the *Properties* view in the bottom window pane. Click in the *Attributes* tag on your left and enter the following values in the corresponding properties

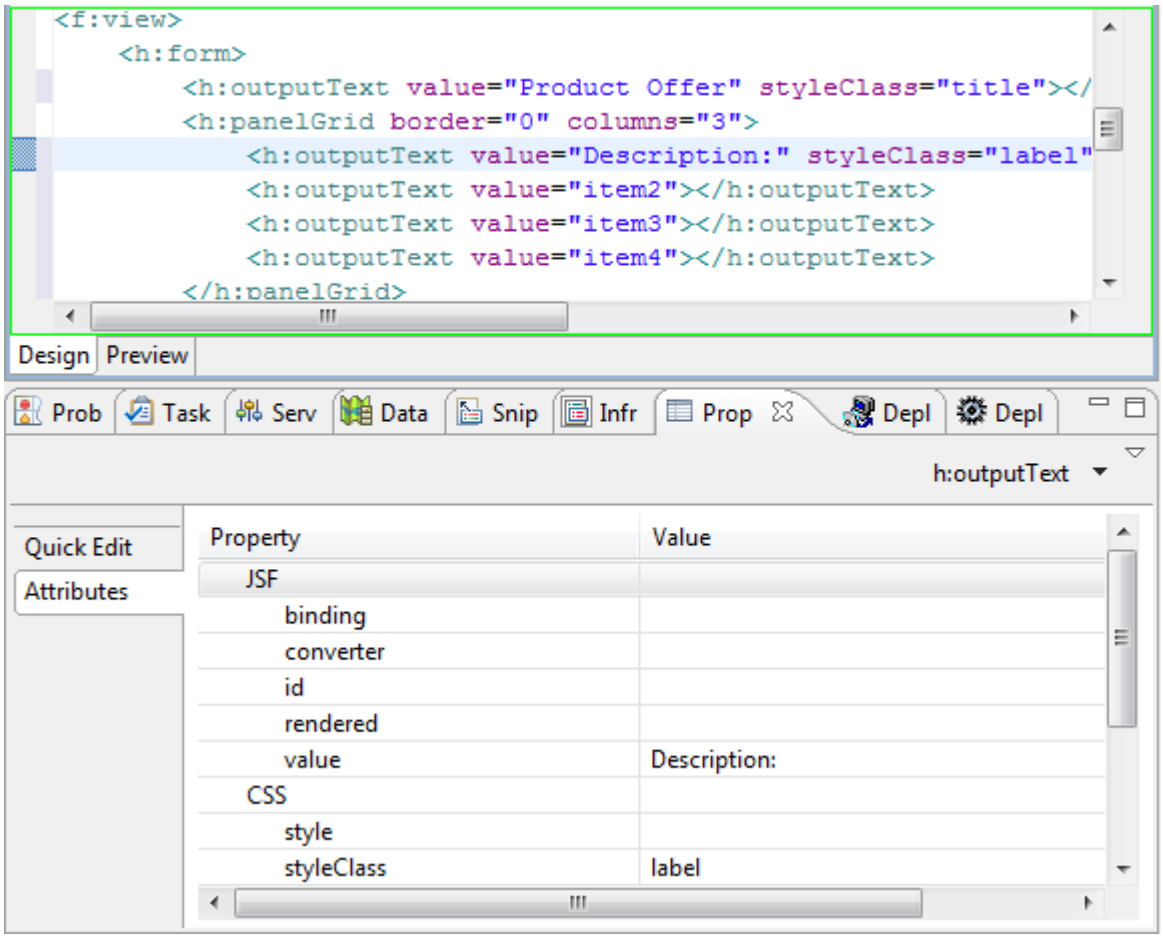
Property	Value
value	Product Offer
styleClass	title

Important

The *value* property is the component's value
The *styleClass* property is the CSS class name included in step 3

6. Place a *Panel Grid* element between the <h:form>… </h:form> tag. You are going to need an extra column to show the error messages next to the components that reported them. Set the *Columns* property to 3 in the Properties view (bottom window pane).
7. Take a look at the tags that were inserted into the JSP page. Put the cursor on the first *Output Text* UI element and then select the *Properties* view in the bottom window pane. click in the *Attributes* tag on your left and enter the following values in the corresponding properties:

Property	Value
value	Description
styleClass	label



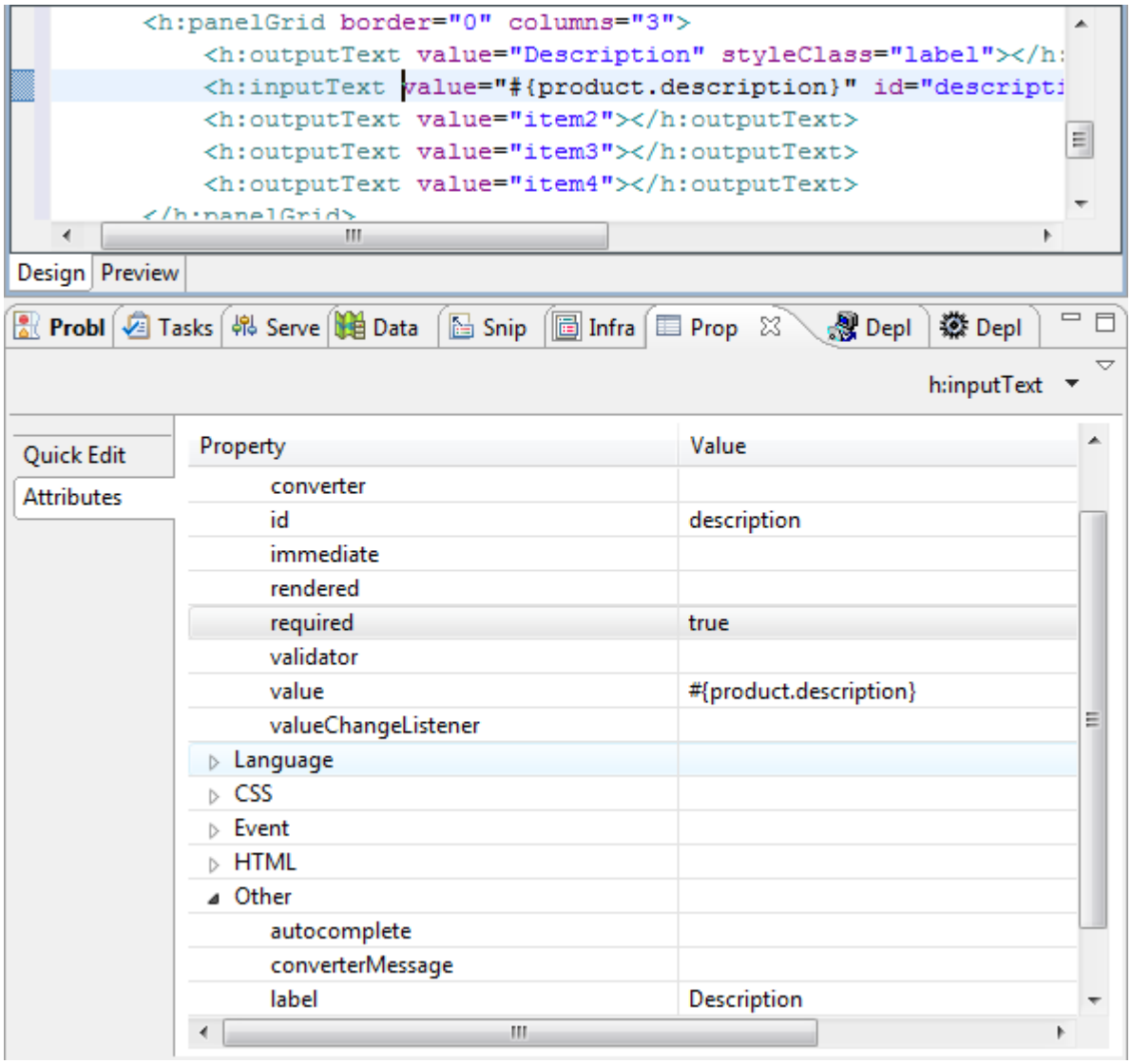
8. Drag and drop a *Text Input* UI element in the second column. In the Properties view in the bottom window pane, click in the *Attributes* tag on your left and enter the following values in the corresponding properties:

Property	Value
id	description
value	#{product.description}
label	Description
required	true

Important

The *id* property is the identifier for the component and allows other JSF tags to access it.
The *value* property bounds to properties of the *Product* java class.
The *label* property is the description of the component for use in error messages.

The *required* property specifies if requires a value to be entered.

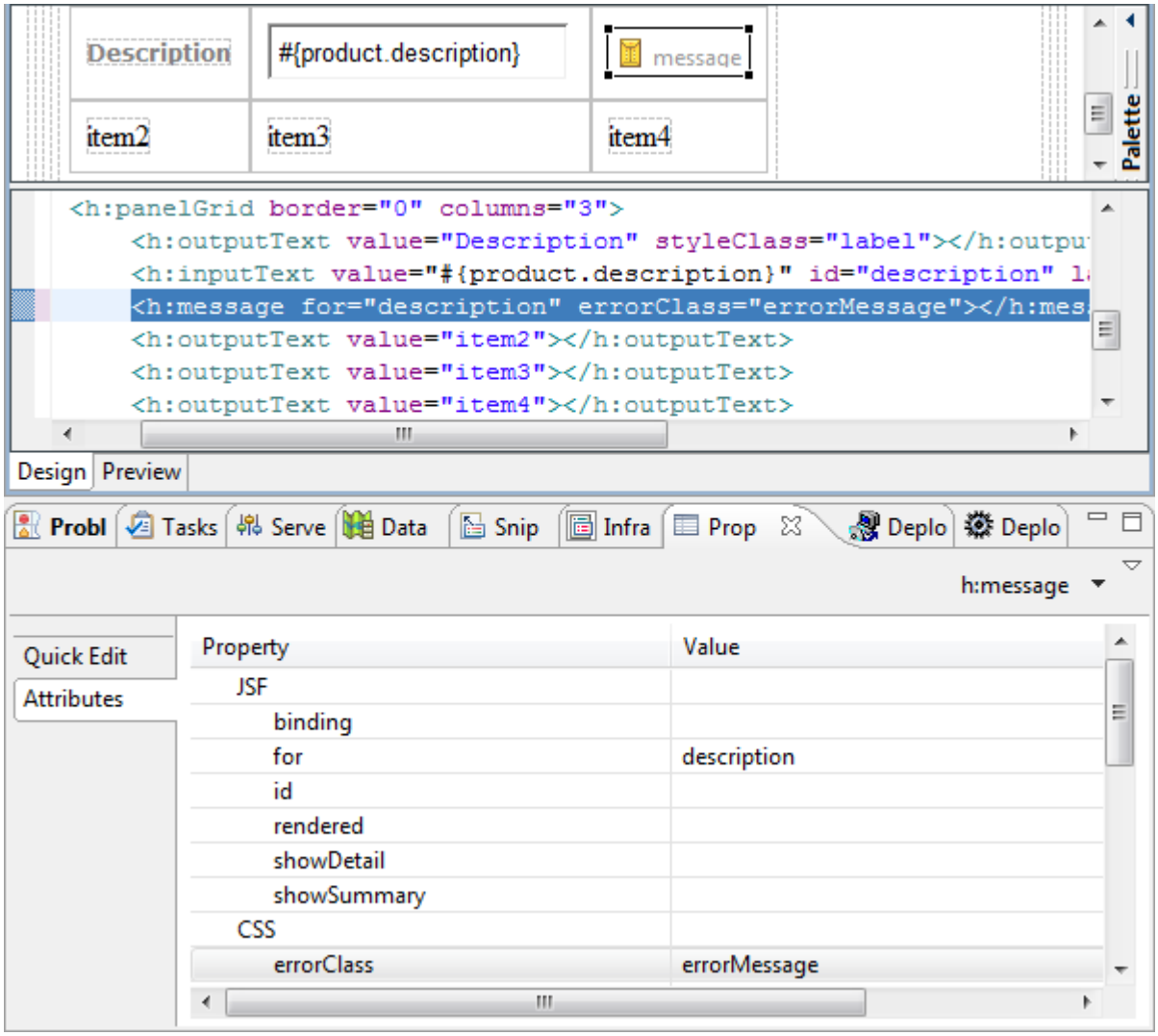


9. Drag and drop a *Message* element to the Web Page Editor. In the Properties view in the bottom window pane, click in the *Attributes* tag on your left and enter the following values to the corresponding properties:

Property	Value
for	description
errorClass	errorMessage

Important

The *for* property is the component id for which to display the message.
The *errorClass* property is the CSS class applied to error messages.



10. Repeat steps 7-9 to incorporate the following UI elements:

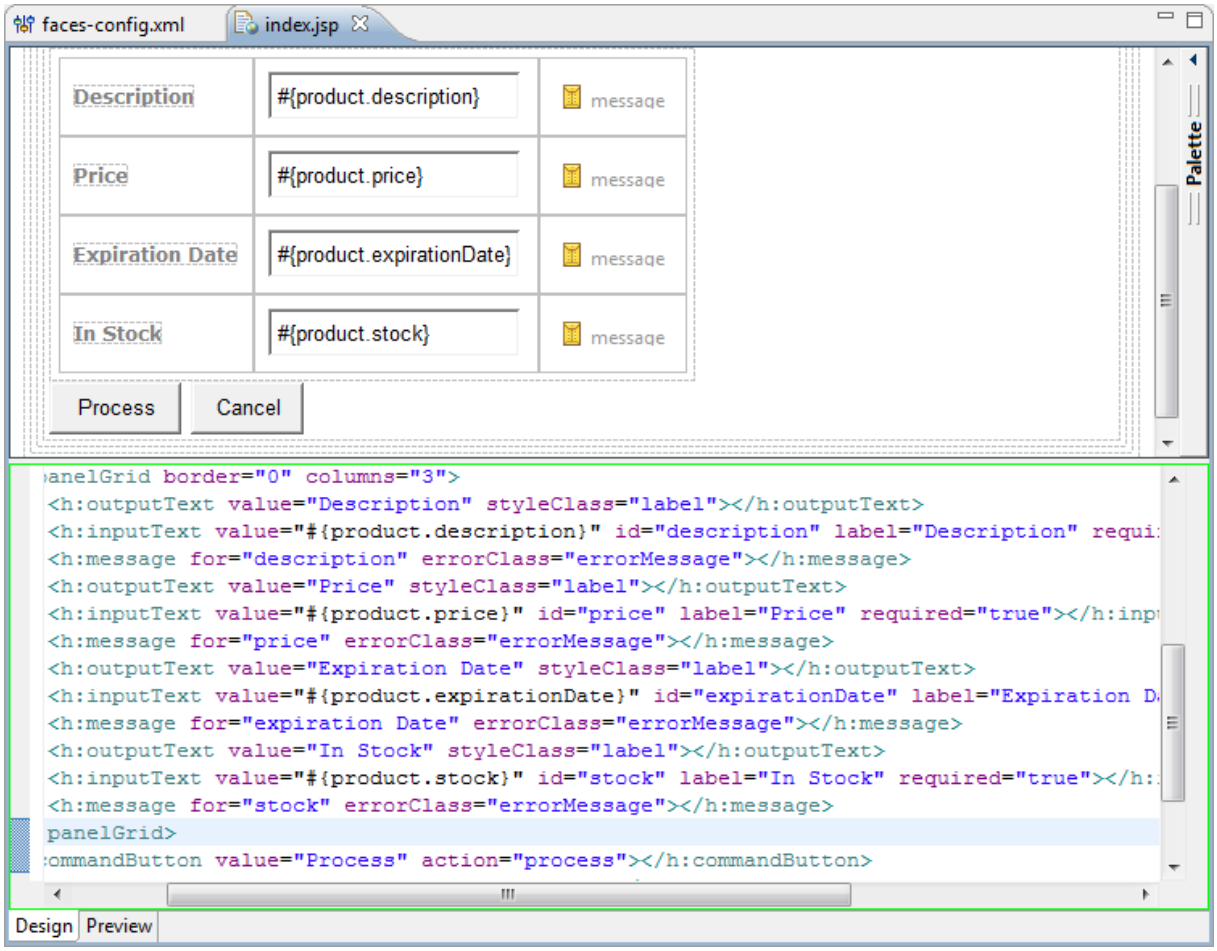
Property	Value
OutputText UI element in the UI-element *PanelGrid*	
value	Price
styleClass	label
InputText UI element	
Id	price
value	#{product.price}
label	Price
required	true
Message UI element	
for	price
errorClass	errorMessage

OutputText UI element in the UI-element *PanelGrid*	
value	Expiration Date
styleClass	label
InputText UI element	
Id	expirationDate
value	#{product.expirationDate}
label	Expiration Date
required	true
Message UI element	
for	expirationDate
errorClass	errorMessage
OutputText UI element in the UI-element *PanelGrid*	
value	In Stock
styleClass	label
InputText UI element	
Id	stock
value	#{product.stock}
label	In Stock
required	true
Message UI element	
for	stock
errorClass	errorMessage

11. Drag and drop two (2) *CommandButton* elements to the Web Page Editor. Enter the following values on the corresponding properties:

Property	Value
CommandButton1 UI element	
value	Process
action	process
CommandButton2 UI element	
value	Cancel
action	cancel

12. Result of *index.jsp*



13. Save the changes you made.

14. Create the second view result.jsp. This page will show the inputs that the user provided, using a different converter for the price amount. Right click on the WebContent folder and in the context menu and select *New* → *JSP*.

15. Include the style sheet by adding a *link* element inside the *head* element as shown in the following code:

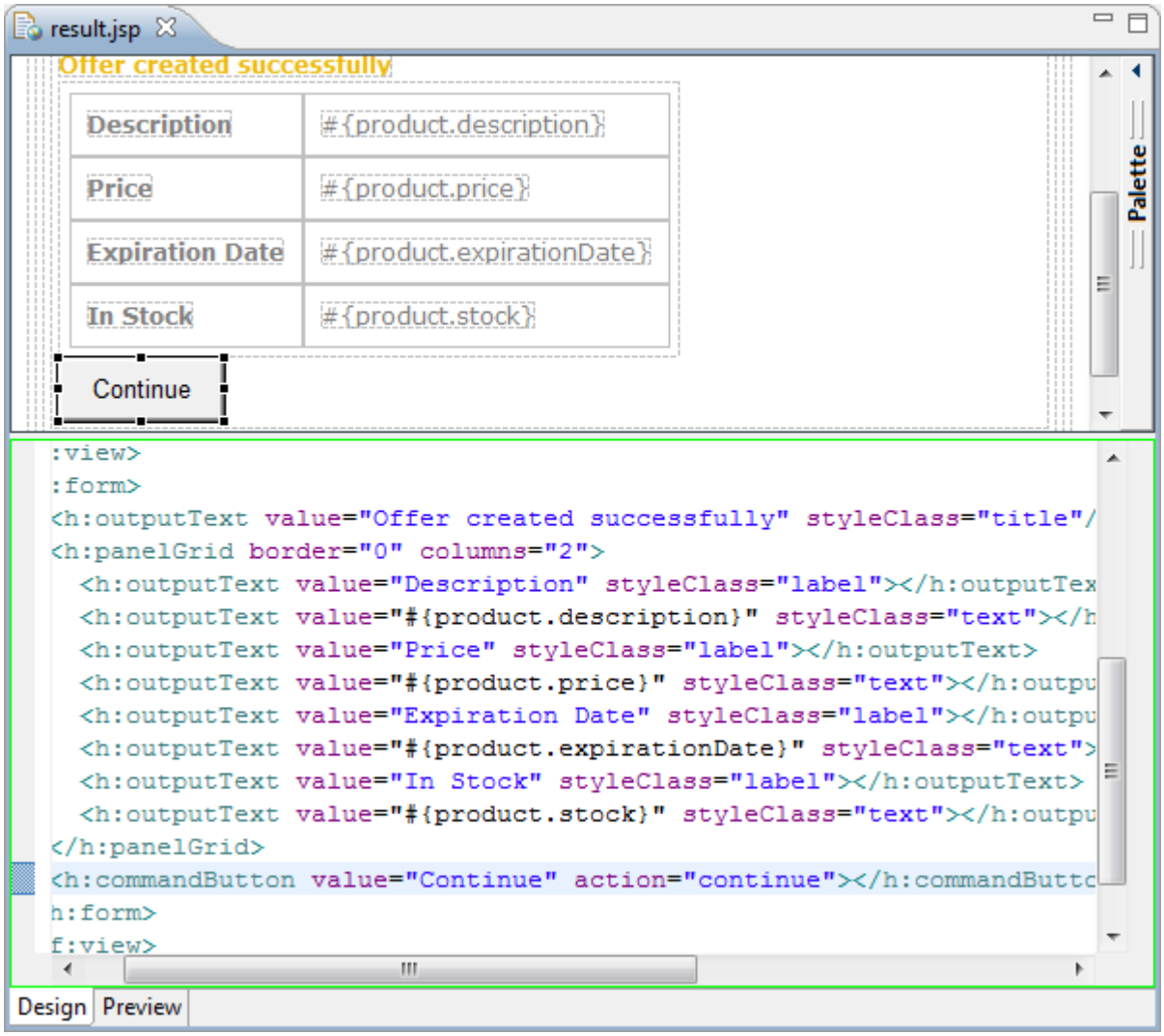
```
<link href="styles.css" rel="stylesheet" type="text/css"/>
```

16. The following table contains the hierarchy of the UI elements contained in the *result* view:

Property	Value
***ViewRoot* UI element**	
Form* UI element in the UI-element *ViewRoot	
OutputText* UI element in the UI-element *Form	
value	Offer created successfully
styleClass	title
PanelGrid* UI element in the UI-element *Form	
Border	0

Columns	2
OutputText UI element in the UI-element *PanelGrid*	
value	Description
styleClass	label
OutputText UI element in the UI-element *PanelGrid*	
value	#{product.description}
styleClass	text
OutputText UI element in the UI-element *PanelGrid*	
value	Price
styleClass	label
OutputText UI element in the UI-element *PanelGrid*	
value	#{product.price}
styleClass	text
OutputText UI element in the UI-element *PanelGrid*	
value	Expiration Date
styleClass	label
OutputText UI element in the UI-element *PanelGrid*	
value	#{product.expirationDate}
styleClass	text
OutputText UI element in the UI-element *PanelGrid*	
value	In Stock
styleClass	label
OutputText UI element in the UI-element *PanelGrid*	
value	#{product.stock}
styleClass	text
CommandButton UI element	
value	Continue
action	continue

17. Result of *result.jsp*



18. Save the changes you made.

19. Create the third view *canceled.jsp*. This page will allow the user to bypass the validation and cancel the transaction. Right click on the *WebContent* folder and in the context menu and select *New* → *JSP*.

20. Include the style sheet by adding a *link* element inside the *head* element as shown in the following code:

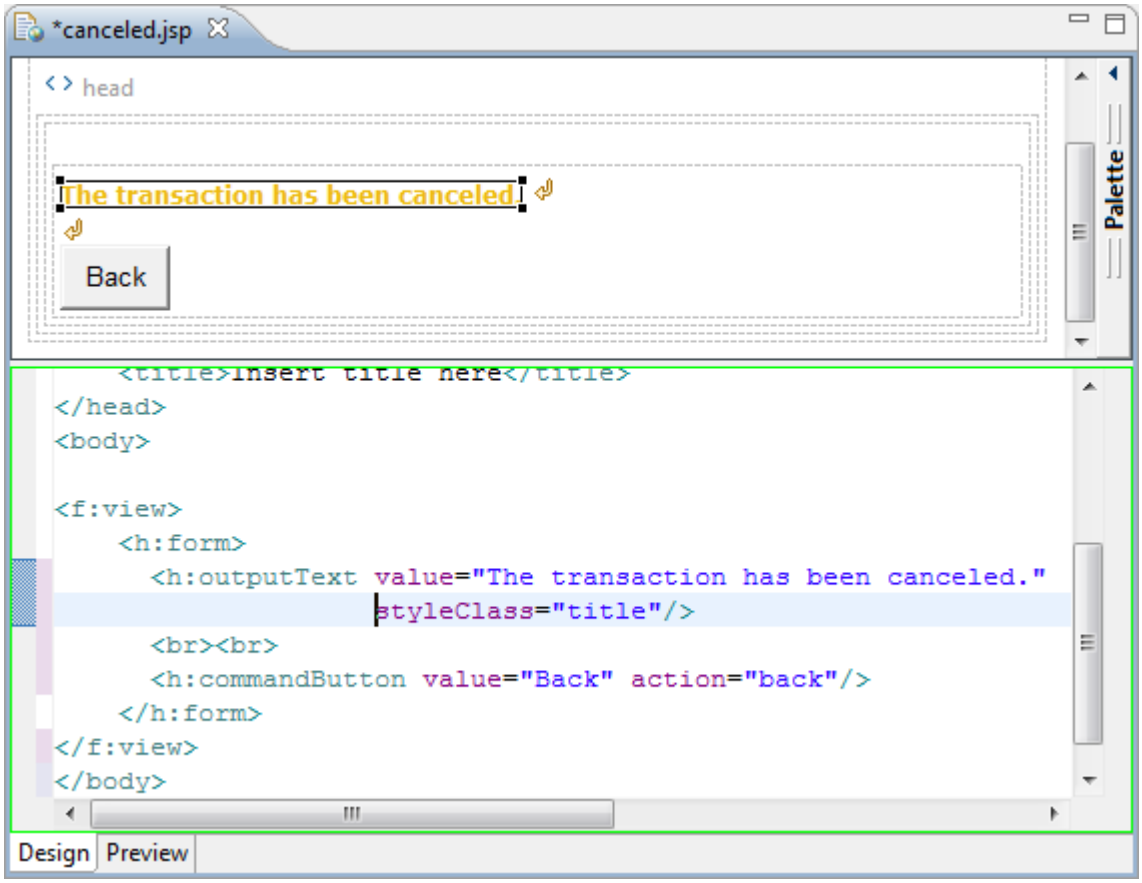
```
<link href="styles.css" rel="stylesheet" type="text/css"/>
```

21. The following table contains the hierarchy of the UI elements contained in the *canceled* view:

Property	Value
***ViewRoot* UI element**	
Form* UI element in the UI-element *ViewRoot	
OutputText* UI element in the UI-element *Form	
value	The transaction has been canceled.
styleClass	title

CommandButton UI element	
value	Back
action	back

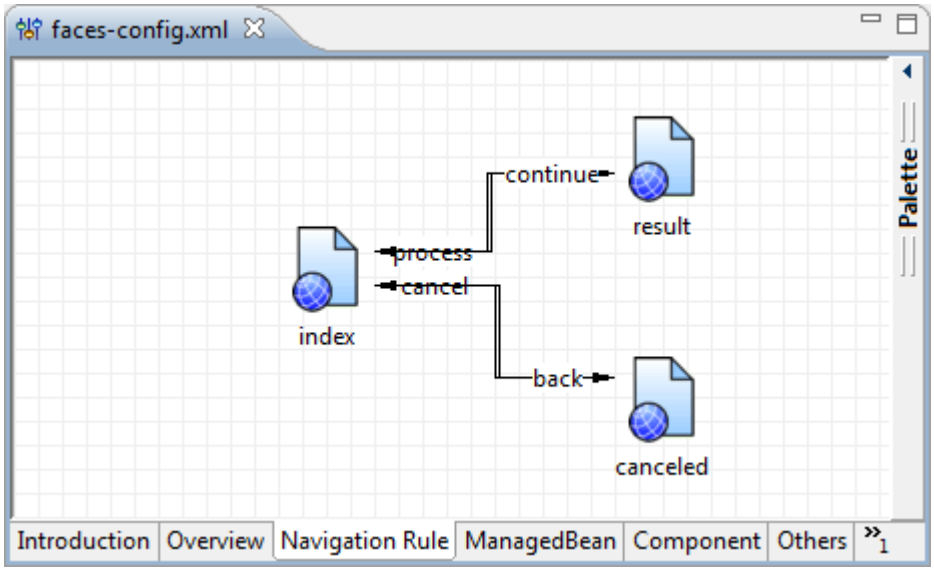
22. Result of *canceled.jsp*



23. Save the changes you made.

24. To complete the JSF application, we need to specify the navigation rules, drill into the Web Module project, in the *WebContent* → *WEB-INF* folder and open the *faces-config.xml* file.

25. Go to the Navigation Rule tab and define the navigation as indicated in the Navigation tutorial (Create Your First JSF Tutorial [Extern]). The navigation flow should look like the following image:



26. Select the *Source* tab. The following XML code should be added automatically between the <faces-config … > </faces-config> tags

```
<navigation-rule>
   <display-name>index</display-name>
   <from-view-id>/index.jsp</from-view-id>
   <navigation-case>
      <from-outcome>process</from-outcome>
      <to-view-id>/result.jsp</to-view-id>
   </navigation-case>
</navigation-rule>
<navigation-rule>
   <display-name>index</display-name>
   <from-view-id>/index.jsp</from-view-id>
   <navigation-case>
      <from-outcome>cancel</from-outcome>
      <to-view-id>/canceled.jsp</to-view-id>
   </navigation-case>
</navigation-rule>
<navigation-rule>
   <display-name>result</display-name>
   <from-view-id>/result.jsp</from-view-id>
   <navigation-case>
      <from-outcome>continue</from-outcome>
      <to-view-id>/index.jsp</to-view-id>
```

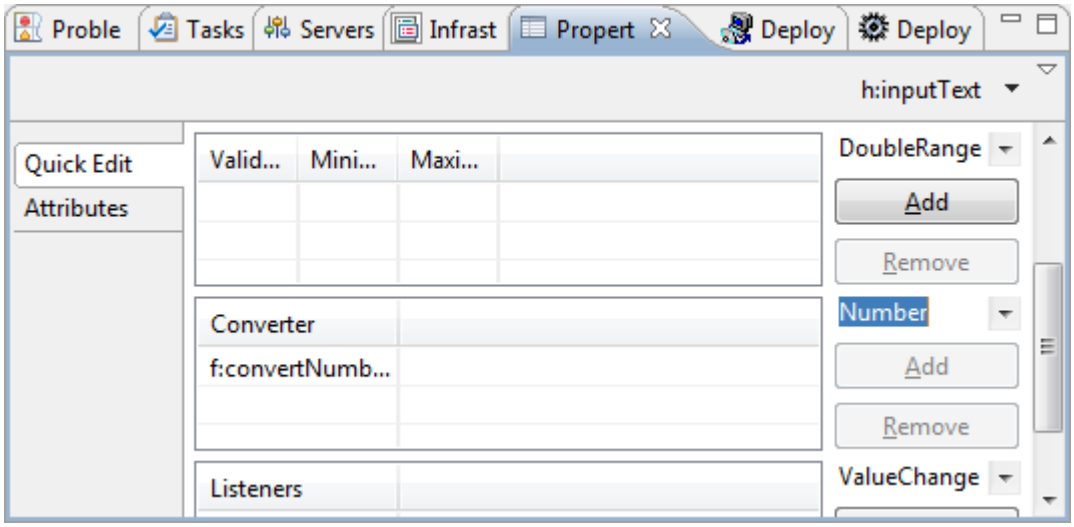
```
      </navigation-case>
   </navigation-rule>
   <navigation-rule>
      <display-name>canceled</display-name>
      <from-view-id>/canceled.jsp</from-view-id>
      <navigation-case>
         <from-outcome>back</from-outcome>
         <to-view-id>/index.jsp</to-view-id>
      </navigation-case>
</navigation-rule>
```

27. Save the changes you made.

4.5 Converters

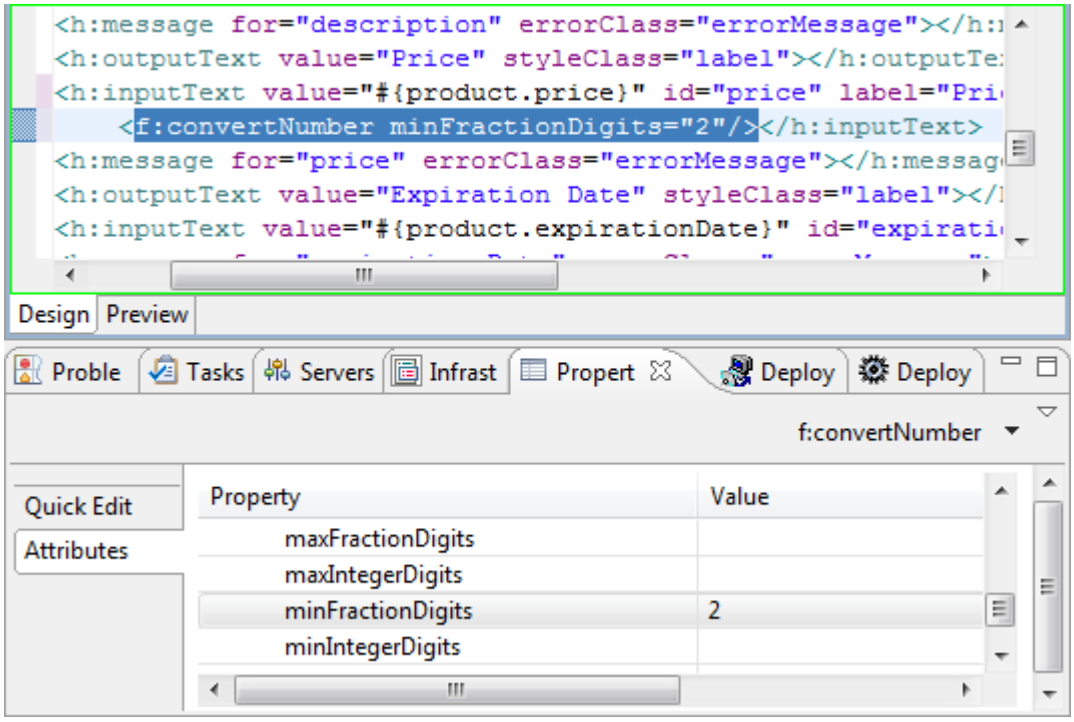
Conversion is a two-way process by which data is converted from the String-based representation of the user interface to the Object-based representation demanded by the web application and back again.

1. In the index.jsp page select the *Price* InputText UI element, in the *Properties* view in the bottom window pane, click the *Quick Edit* tab and go to the *Converter* section. In the drop down list, select the *Number* option and click the *Add* button

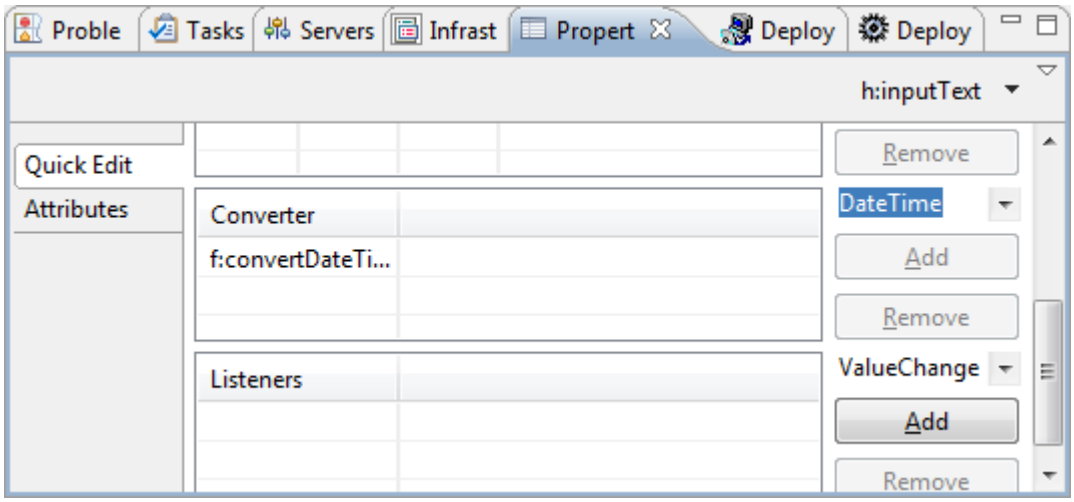


2. Double click the *ConvertNumber* you just added, click the *Attributes* tab and set the *minFractionDigits* property to 2.

> **Note**
>
> This converter will format the current value of the *Price* UI element with at least two digits after the decimal point.

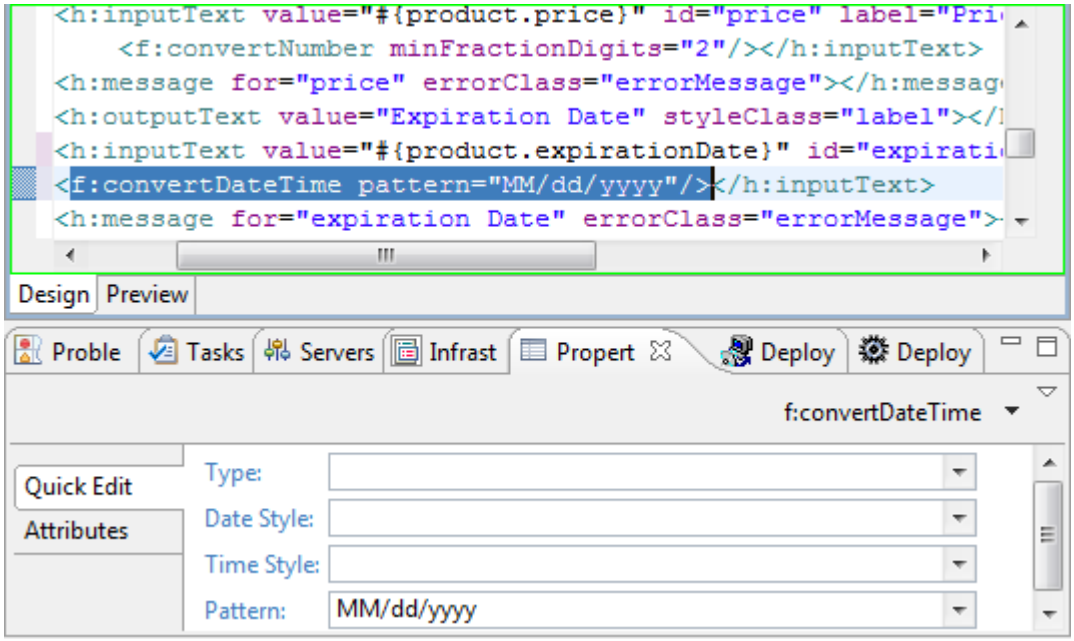


3. In the *index.jsp* page select the *expirationDate* InputText, in the *Properties* view click the *Quick Edit* tab and go to the *Converter* section. In the drop down list, select the *DateTime* option and click the *Add* button.



4. Double click *ConvertDateTime* you just added and set the *Pattern* property to **`MM/dd/yyyy.`**

> **Note**
>
> This converter will format the current value of the *expirationDate* UI element with the MM/dd/yyyy pattern.

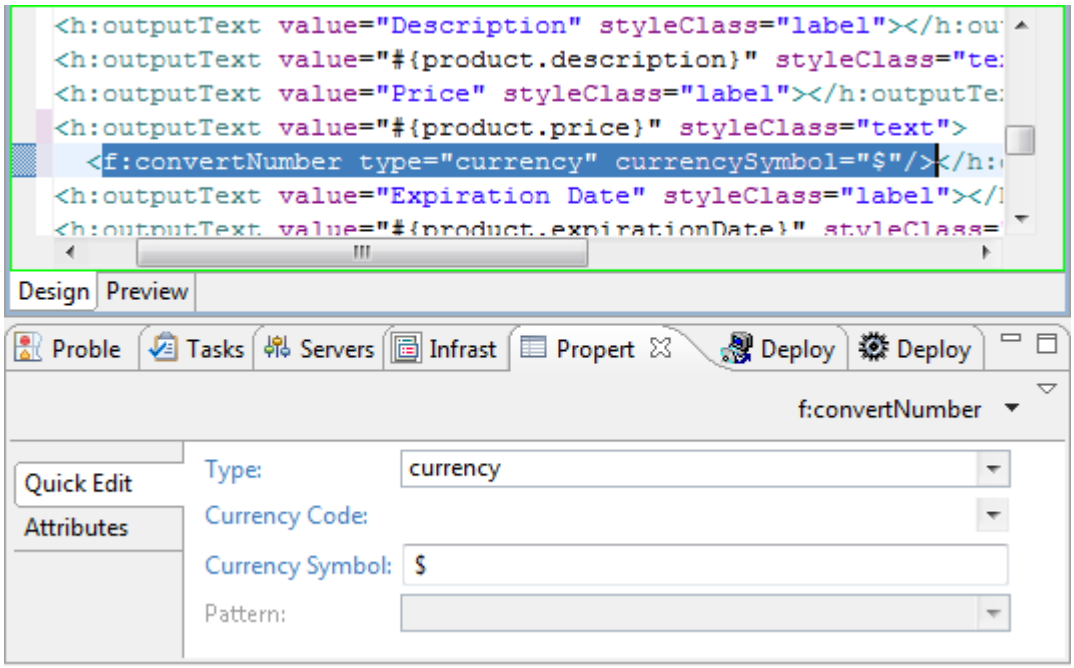


5. In the *result.jsp* page, follow steps 1-2 to attach a ConvertNumber converter to the *Price* OutputText UI element and enter the following values in the corresponding properties:

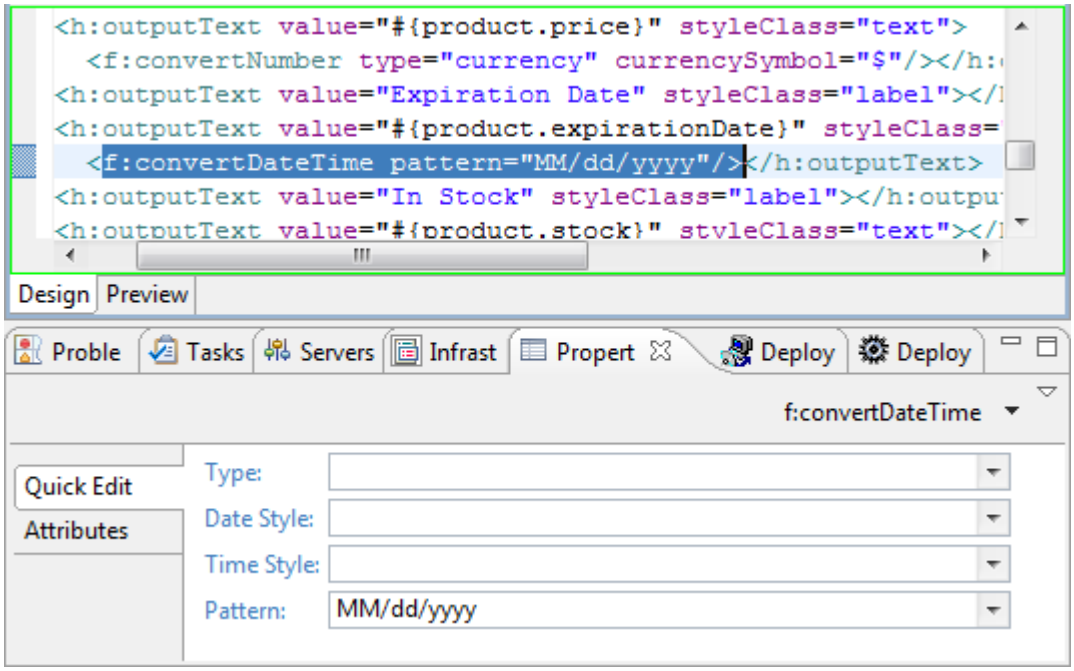
Property	Value
Type	currency
Currency Symbol	$

Note

This converter automatically supplies a currency symbol and decimal separators.



6. In the *result.jsp* page, follow steps 3-4 to attach a ConvertDateTime to the *expirationDate* OutputText UI element and set the *Pattern* property to **`MM/dd/yyyy.`**

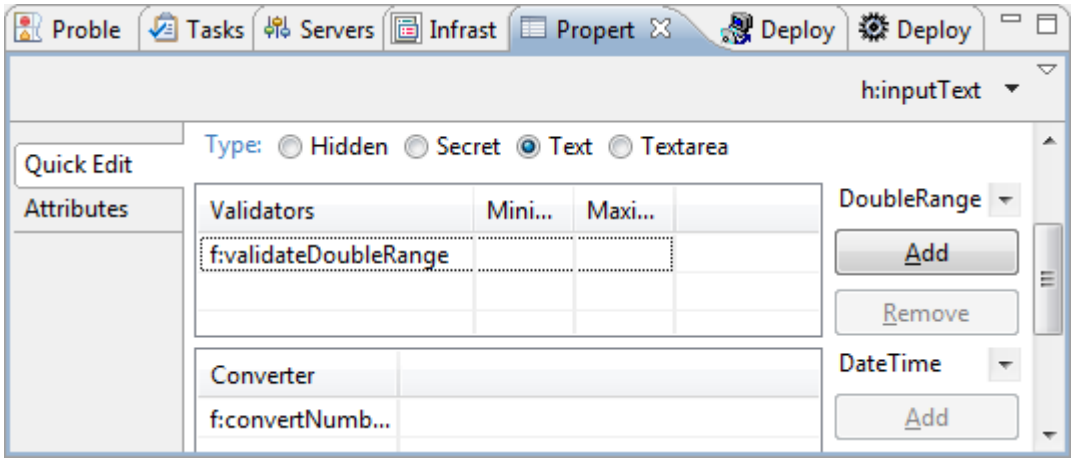


7. Save the changes you made.

4.6 Validators

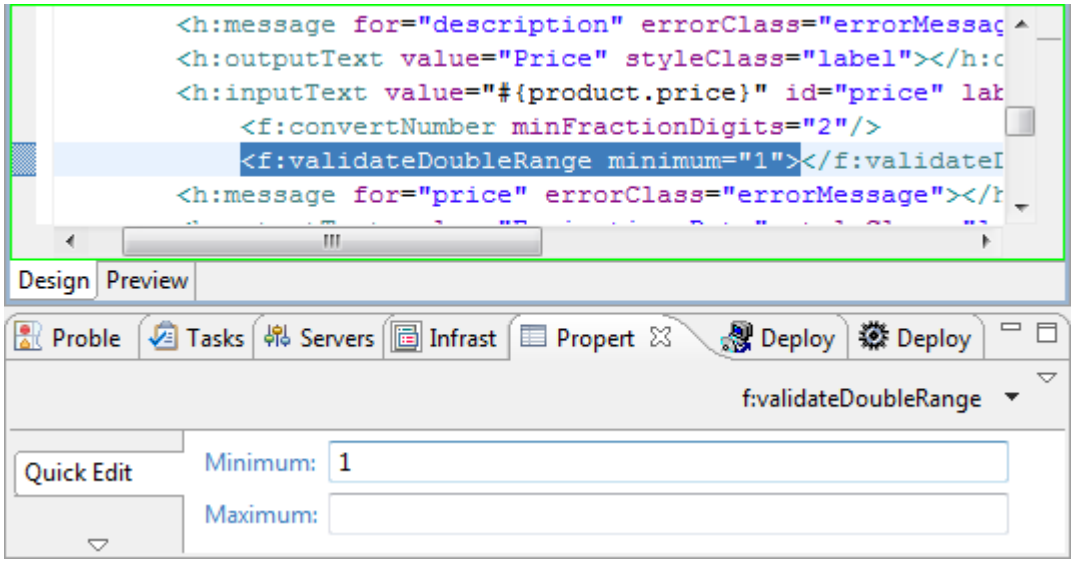
Validation is the process by which a piece of converted data has one or more correctness checks applied to it.

1. In the *index.jsp* page select the *Price* InputText UI element, in the *Properties* view in the bottom window pane, click the *Quick Edit* tab and go to the *Validators* section. In the drop down list, select the *DoubleRange* option and click the *Add* button



2. Double click *validateDoubleRange* you just added and set the *Minimum* property to **`1.`**

> **Note**
>
> This validator will check limits for a numerical value (for example, >1). All the standard validator tags have minimum and maximum properties. You need to supply one or both values.

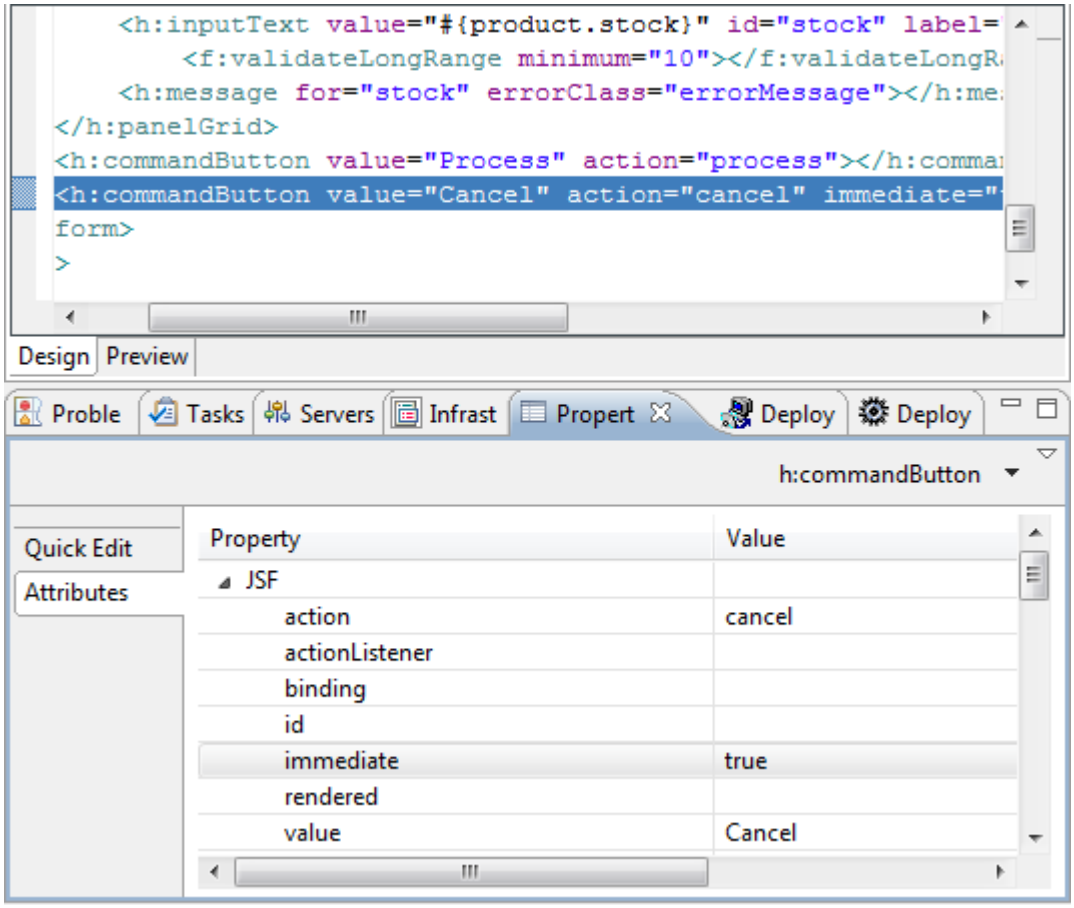


3. (Optional) Attach a validateLongRange validator to the *stock* InputText UI element and set the *Minimum* property to **`10.`**
4. Save the changes you made

4.7 Bypassing Validation

Validation errors force a redisplay of the current page, but this behavior can be problematic with certain navigation actions, for example, a *Cancel* button. When a command has the *immediate* attribute set, it is executed during the *Apply Request Vaues* phase and bypass the validation

1. In the *index.jsp* page select the *Cancel* commandButton UI element, go to the *Properties* view, click the *Attributes* tab and set the *Immediate* property to **`true`**.

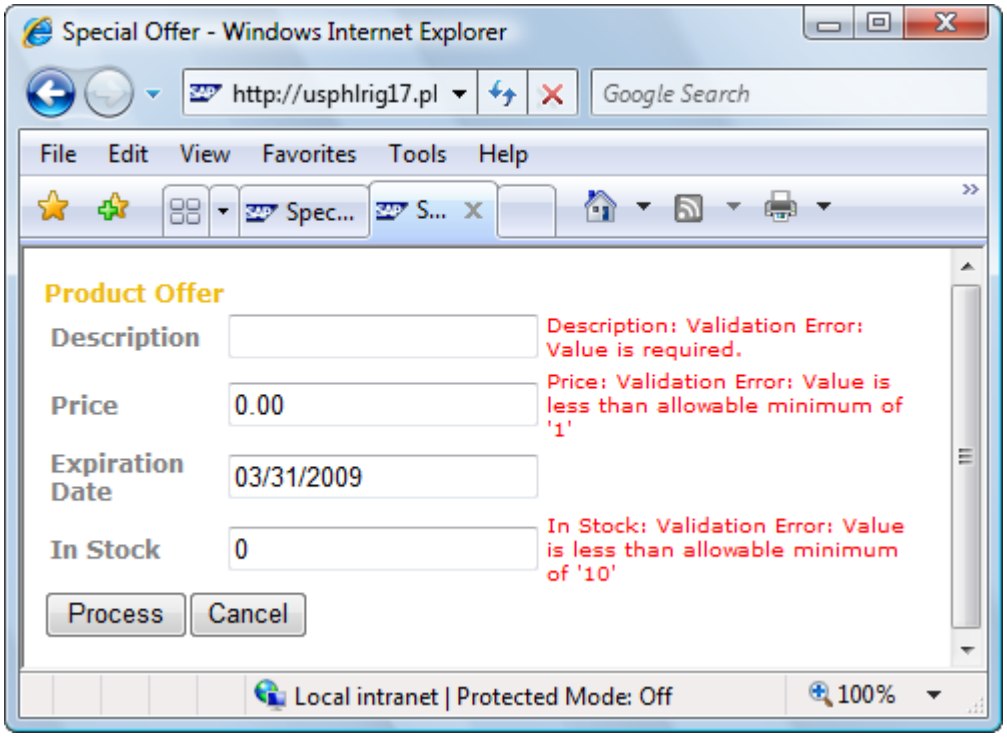


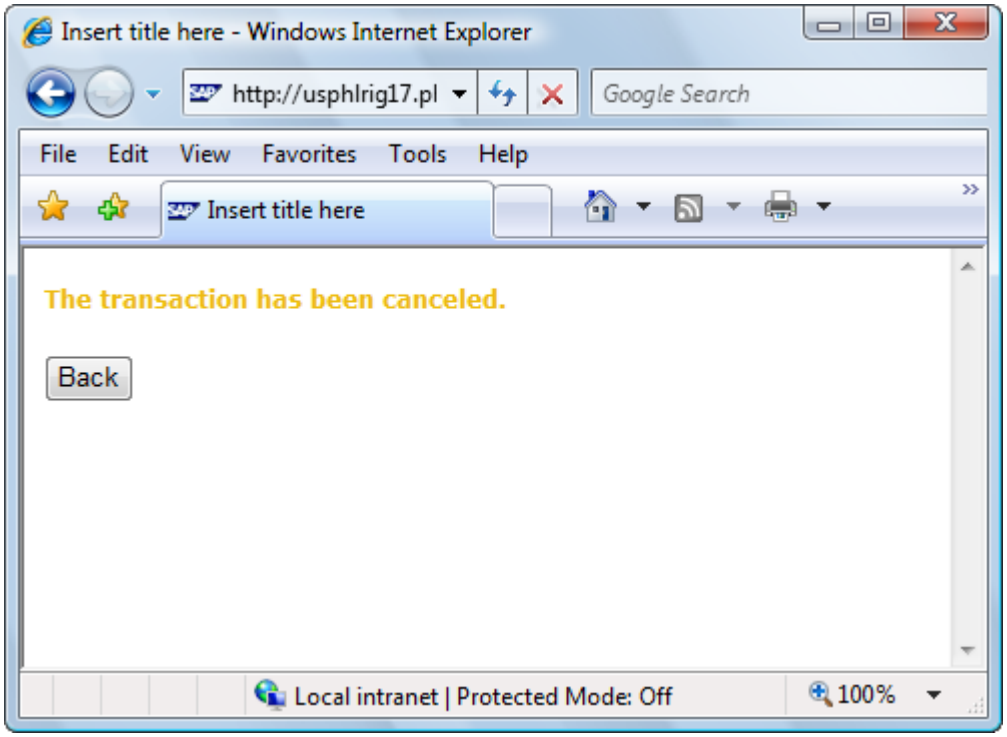
2. Save the changes you made.

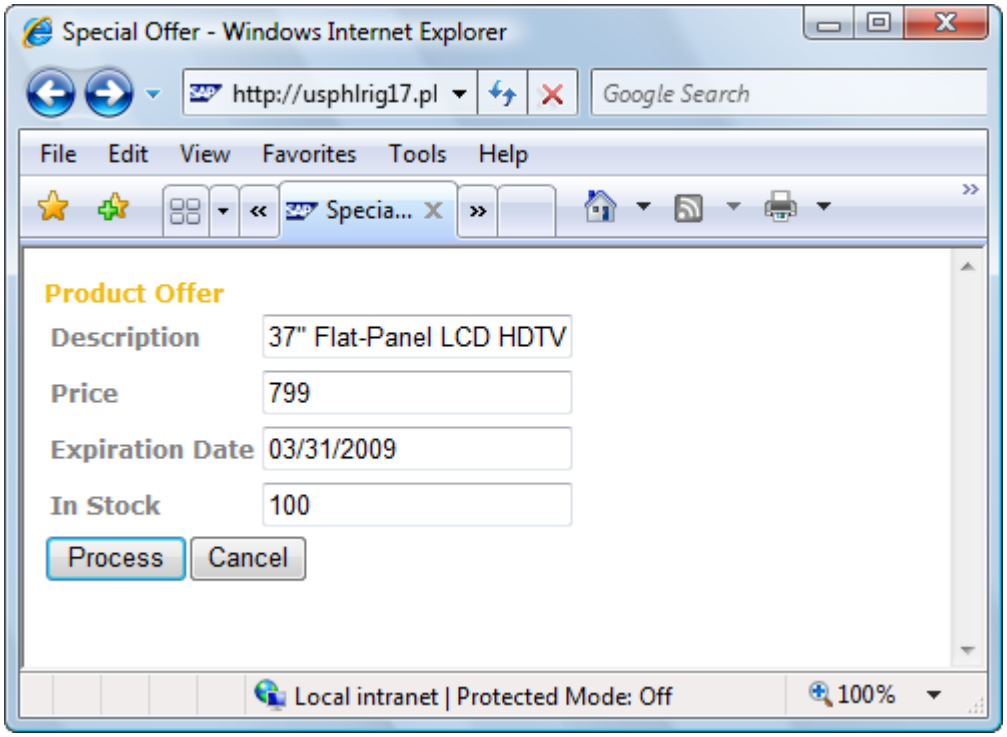
4.8 Build, Deploy and Run your application

1. Create the application.xml deployment descriptor, sets the WAR file to “demo.sap.com~converterjsf~web.war” and the context root to “converter” as indicated in the Hello World JSF tutorial (Create a Hello World Application using JavaServer Faces [Extern]).
2. Save changes.
3. Build and deploy the application.
4. Run the application using the following simplified URL:

   http://<servername>:<httpport>/converterjsf/faces/index.jsp
5. Results:


Special Offer - Windows Internet Explorer
http://usphlrig17.pl
Google Search
File Edit View Favorites Tools Help
Spec...
S...
Product Offer
Description
Description: Validation Error: Value is required.
Price
0.00
Price: Validation Error: Value is less than allowable minimum of '1'
Expiration Date
03/31/2009
In Stock
0
In Stock: Validation Error: Value is less than allowable minimum of '10'
Process
Cancel
Local intranet | Protected Mode: Off
100%


Insert title here - Windows Internet Explorer
http://usphlrig17.pl
Google Search
File Edit View Favorites Tools Help
Insert title here
The transaction has been canceled.
Back
Local intranet | Protected Mode: Off
100%


Special Offer - Windows Internet Explorer
http://usphlrig17.pl
Google Search
File Edit View Favorites Tools Help
Specia...
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Expiration Date 03/31/2009
In Stock 100
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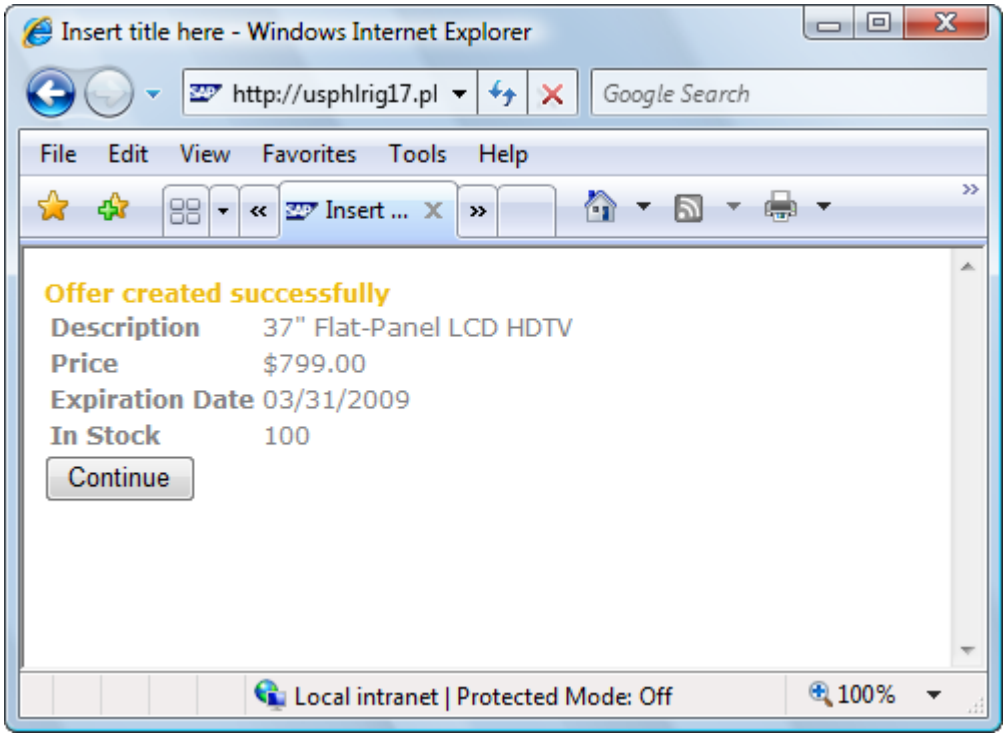
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