SAP DEVELOPER NETWORK

BSP Model – Data Binding Made Easy

SDN Community Contribution

(This is not an official SAP document.)

SAP DEVELOPER NETWORK

Applies To:

ABAP stack of SAP NetWeaver starting from R6.20.

Summary

With more and more focus being put on BSP development, developers are beginning to explore more and more of the capabilities and features available within the systems. Described within this document are some of the main advantages of using model data binding within a BSP application.

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Date: 20 July 2005

With the cooperation of Mr. Thomas Jung (Kimball International) regarding the chapter “Dynamic Model Binding”

Introduction

Craig[1] having finally completed his second series[2] on “Exploring BSP Development”[3], Sergio[4] decided it was time to approach Craig and discuss the topic of “Data Binding”, something that Craig had left out of his two series. Sergio, being a fan of the topic and wanting to see it more visible proposed the two of them collaborate on weblog or article concerning the topic.

It was quite a funny meeting actually, it occurred right after Craig gave a presentation[5] in Walldorf, during the “SDN Meets Labs”[6]. Sergio caught up to Craig and told him “I think you left something out of your tutorial, it's very good but you left something out that *needs* to be in”, Craig of course wondering “Uh?!” and thus began the discussion.

SAP has a done a wonderful job documenting “Data Binding”, the standard documentation[7] located on http://help.sap.com explains the concept, theory and use behind the topic. However, we feel that it is not visible enough nor used enough and therefore what you will find contained within this document is our attempt to make the subject a bit more friendly and certainly more visible.

Participating in SDN since the beginning we have the feeling that this technique is not commonly used and in fact performing a search for the term **binding** up to now only 17 messages are found:

Searching Binding: SDN 9,297 messaggi 1,606 Topics - Results: 17 Search Terms: binding

A few weblogs contain information about “Data Binding” and the special aspects of the technique but none really simplify the life of a beginner. Even after analyzing the delivered BSP applications contained in the system we can find just 2 views using the data binding :

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1 Craig Cmehil - https://www.sdn.sap.com/irj/servlet/prt/portal/prtroot/com.sap.sdn.businesscard.SDNBusinessCard?u=rXr63bYDR6oXx0YFZhCX3w%3D%3D

2 “BSP / HowTo: Exploring BSP Development with MVC” - https://www.sdn.sap.com/sdn/weblogs.sdn?blog=/pub/wlg/1435

3 “BSP / HowTo: Exploring BSP Development and the MiniWAS 6.20” - https://www.sdn.sap.com/sdn/weblogs.sdn?blog=/pub/wlg/785

4 Sergio Ferrari - https://www.sdn.sap.com/irj/servlet/prt/portal/prtroot/com.sap.sdn.businesscard.SDNBusinessCard?u=gpLTsZHMilgDbwR8d43B3Q%3D%3D

5 “Integrated Web Content” - https://www.sdn.sap.com/sdn/weblogs.sdn?blog=/pub/wlg/1582

6 “SDN Meets Labs” - https://www.sdn.sap.com/sdn/weblogs.sdn?blog=/pub/wlg/1544

7 Standard “Data Binding” documentation, http://help.sap.com/saphelp_nw04/helpdata/en/fb/fbb84c20df274aa52a0b0833769057/content.htm

- CRM_BSP_FRAME/tree.htm
- CRM_BSP_FRAME/tree.htm_m

Hardly what one would expect for such a great technique.

Let’s introduce a practical example (basic setup)

As usual we need a sample in order to explain the technique. So let's go ahead and get our example underway. To keep it simple we'll go ahead and play around with the whole “Flights” data.

First of all verify via SE16 if you have any records table SCARR. If not create some new entries via SE16 via the following steps:

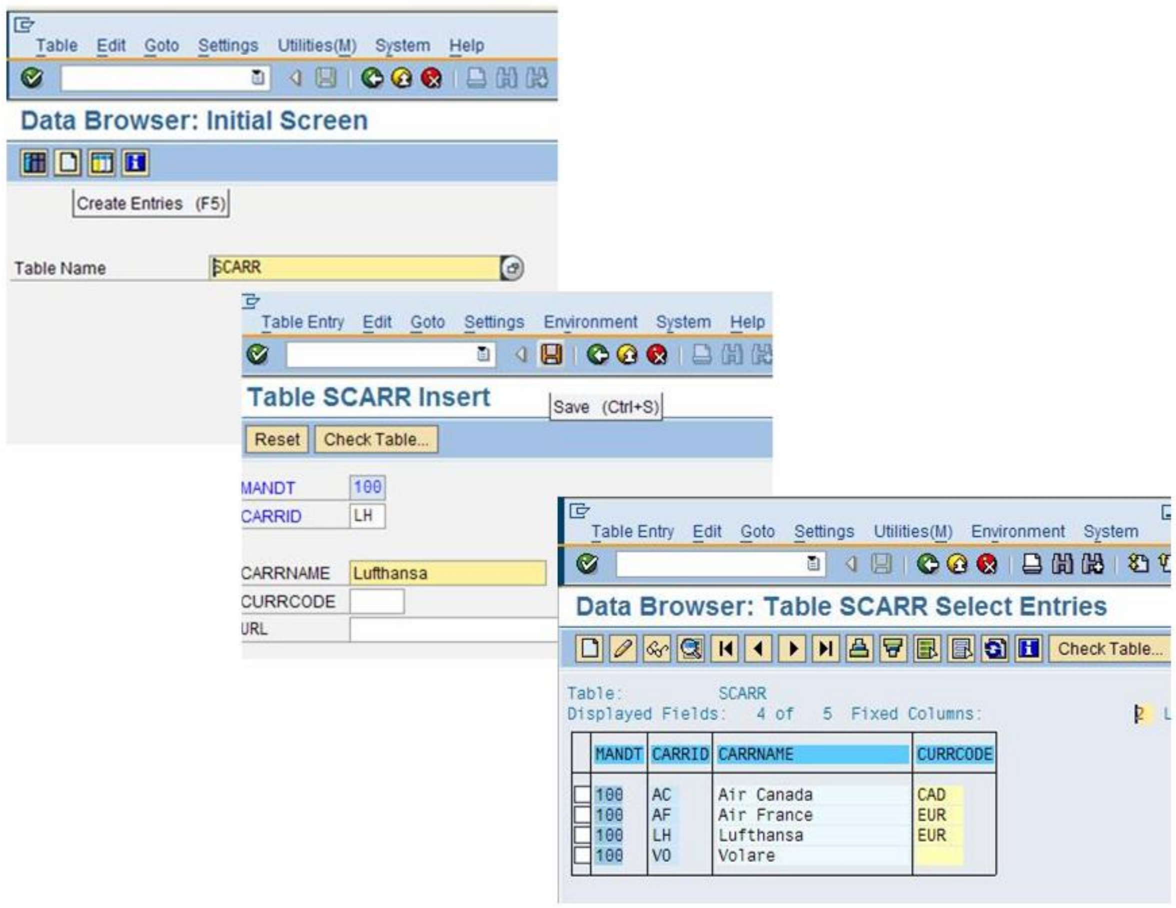


Table Edit Goto Settings Utilities(M) System Help
Data Browser: Initial Screen
Create Entries (F5)
Table Entry Edit Goto Settings Environment System Help
Table SCARR Insert
Save (Ctrl+S)
Reset
Check Table...
Table Entry Edit Goto Settings Utilities(M) Environment System
Data Browser: Table SCARR Select Entries
Check Table...

Table Name	SCARR

MANDT	100
CARRID	LH
CARRNAME	Lufthansa
CURRCODE	
URL	

```
Table:            SCARR
Displayed Fields:   4 of   5  Fixed Columns:
```

MANDT	CARRID	CARRNAME	CURRCODE
100	AC	Air Canada	CAD
100	AF	Air France	EUR
100	LH	Lufthansa	EUR
100	VO	Volare	

Note that it is not important to define the CURRCODE.

To get started please go ahead and login to your test system and start transaction SE80. Select “Package” from the menu and type in a new package name. The reason for doing this is to keep all of your pieces together so you can easily see them and work with them.

Our package name is “ZTUT_MODELBINDING”, but you can use whatever you like.

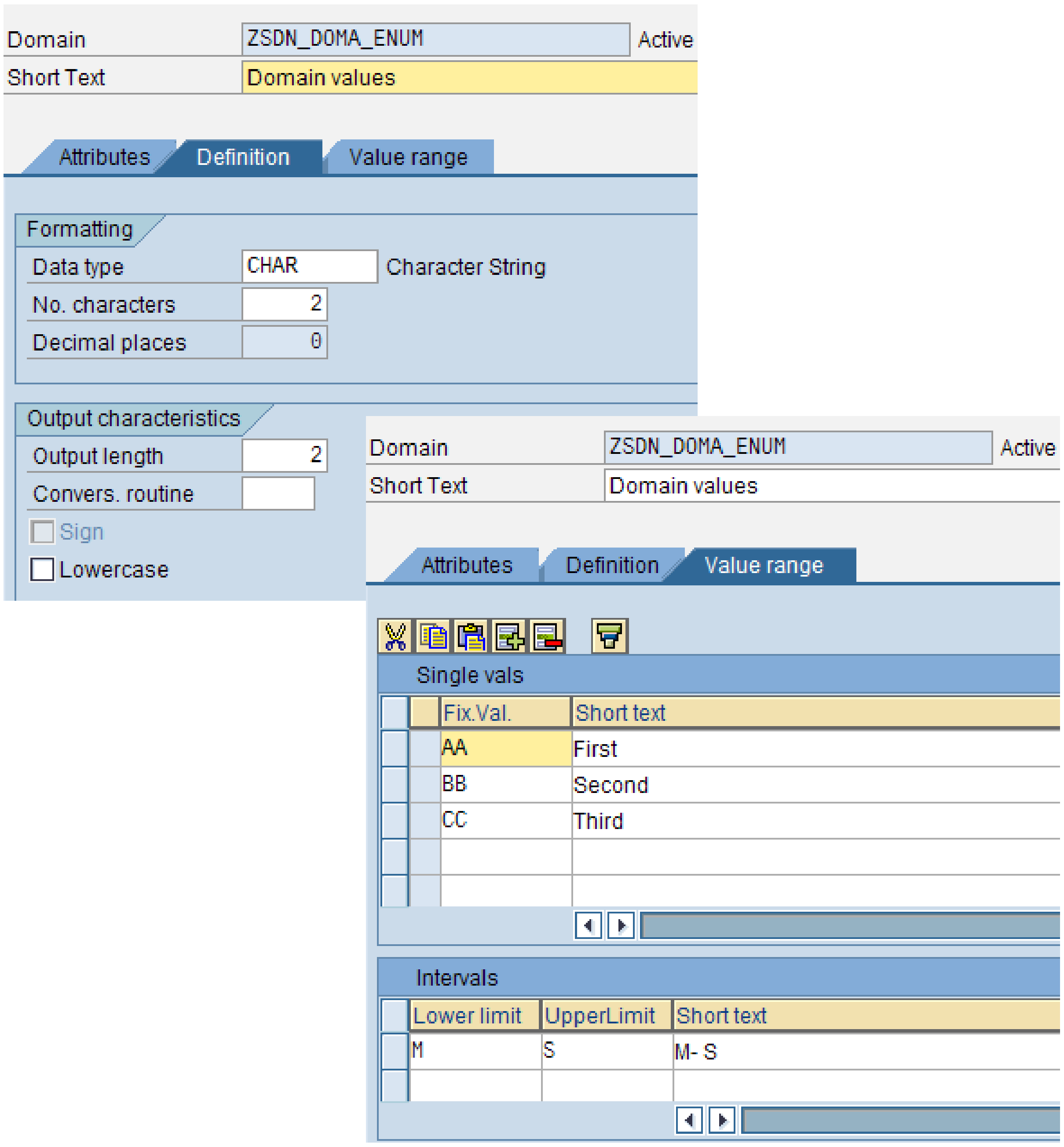
The example will now consist of several individual items that in the end will work together in harmony.

- DOMAINS
- DATA ELEMENTS
- STRUCTURES
- CLASSES
- BSP Application

Domains

Domains are part of the “Dictionary Objects”, simply right click there and “Create” - “Domain”.

- ZSDN_DOMA_ENUM



Domain	ZSDN_DOMA_ENUM	Active
Short Text	Domain values	

Formatting

Data type	CHAR	Character String
No. characters	2	
Decimal places	0	

Output characteristics

Output length	2
Convers. routine	

☐ Sign
☐ Lowercase

Domain	ZSDN_DOMA_ENUM	Active
Short Text	Domain values	

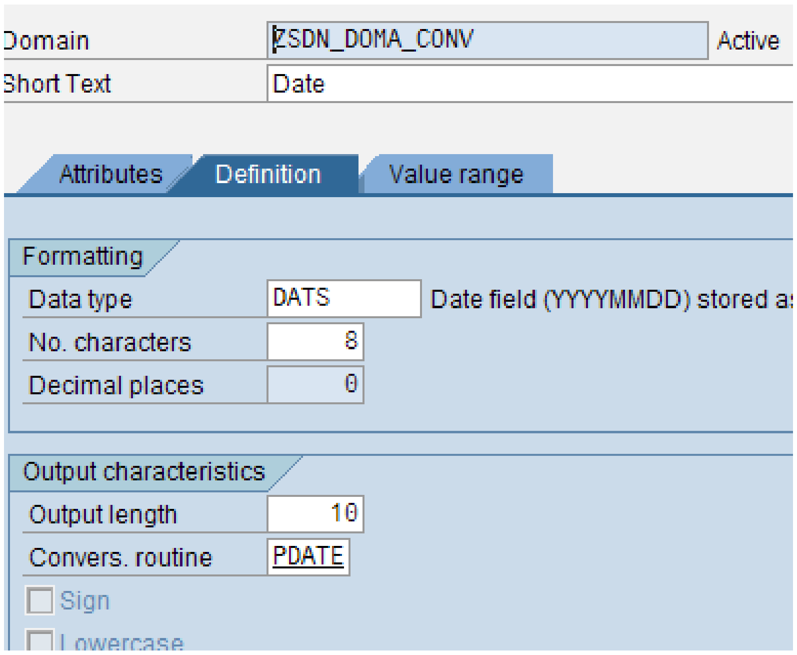
Single vals

Fix.Val.	Short text
AA	First
BB	Second
CC	Third

Intervals

Lower limit	UpperLimit	Short text
M	S	M- S

- ZSDN_DOMA_CONV



Domain	ZSDN_DOMA_CONV	Active
Short Text	Date	

Formatting

Data type	DATS	Date field (YYYYMMDD) stored a
No. characters	8	
Decimal places	0	

Output characteristics

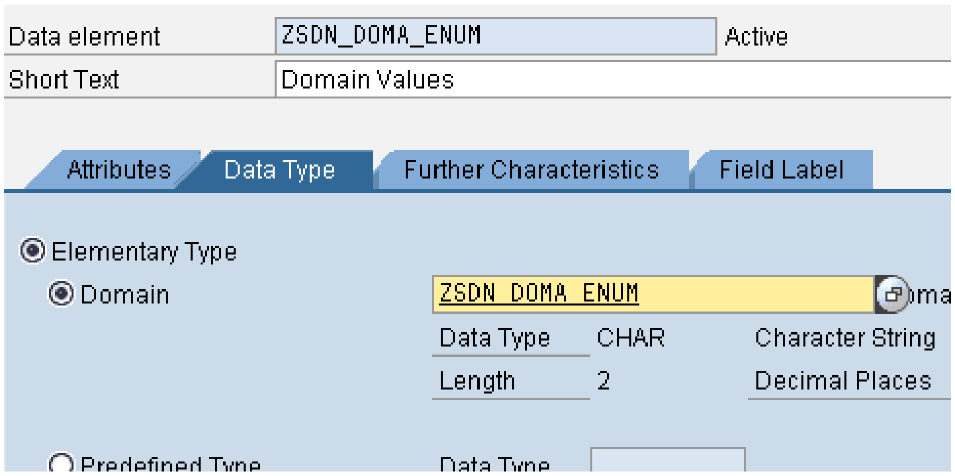
Output length	10
Convers. routine	PDATE

- [ ] Sign
- [ ] Lowercase

Data Elements

Data Elements are part of the “Dictionary Objects”, simply right click there and “Create” - “Data Element”.

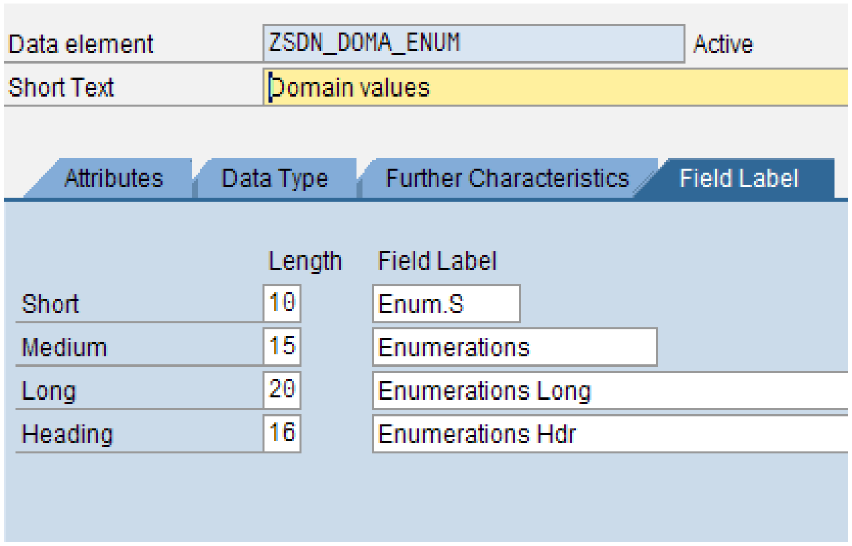
- ZSDN_DOMA_ENUM



Data element	ZSDN_DOMA_ENUM	Active
Short Text	Domain Values	

(● Elementary Type)

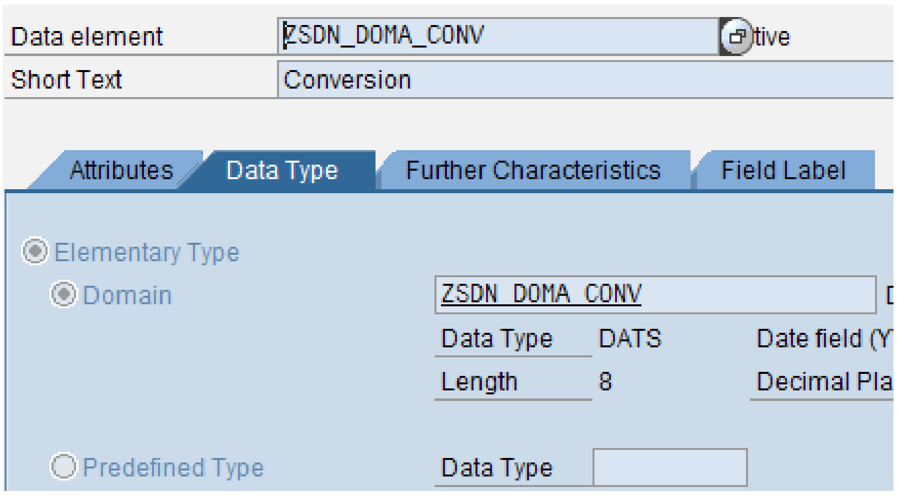
● Domain	ZSDN_DOMA_ENUM			
	Data Type	CHAR	Character String	
	Length	2	Decimal Places	
○ Predefined Type	Data Type			



Data element	ZSDN_DOMA_ENUM	Active
Short Text	Domain values	

	Length	Field Label
Short	10	Enum.S
Medium	15	Enumerations
Long	20	Enumerations Long
Heading	16	Enumerations Hdr

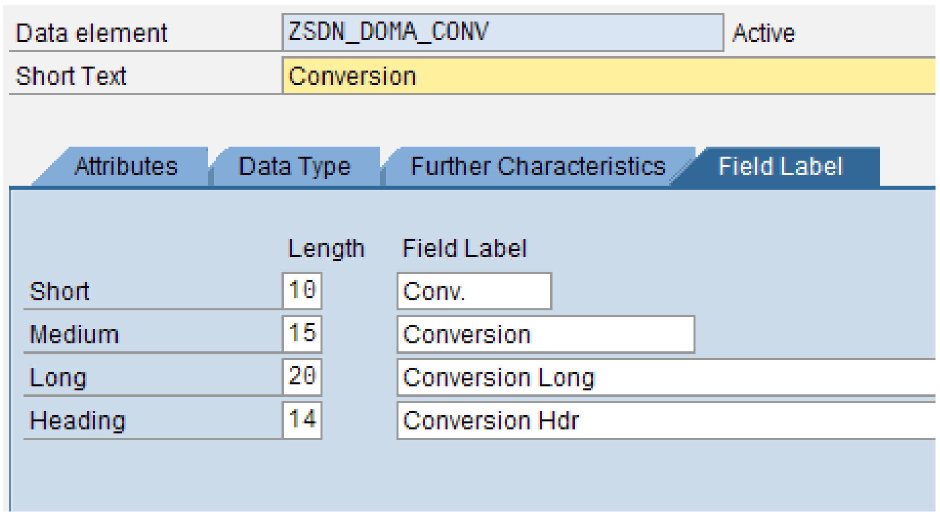
- ZSDN_DOMA_CONV



Data element: ZSDN_DOMA_CONV tive

Short Text: Conversion

Elementary Type			
Domain	ZSDN_DOMA_CONV		D
	Data Type	DATS	Date field (Y
	Length	8	Decimal Pla
Predefined Type	Data Type		



Data element: ZSDN_DOMA_CONV Active

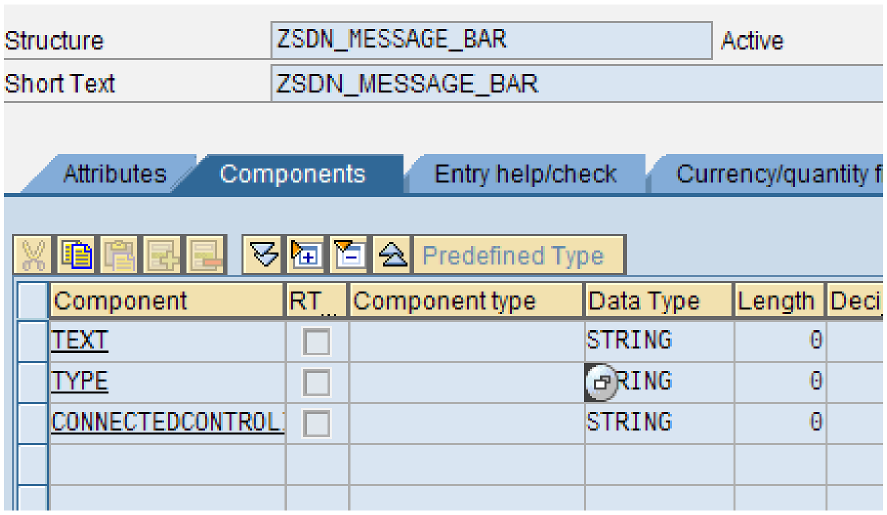
Short Text: Conversion

	Length	Field Label
Short	10	Conv.
Medium	15	Conversion
Long	20	Conversion Long
Heading	14	Conversion Hdr

Structures

Structures are part of the “Dictionary Objects”, simply right click there and “Create” - “Structure”.

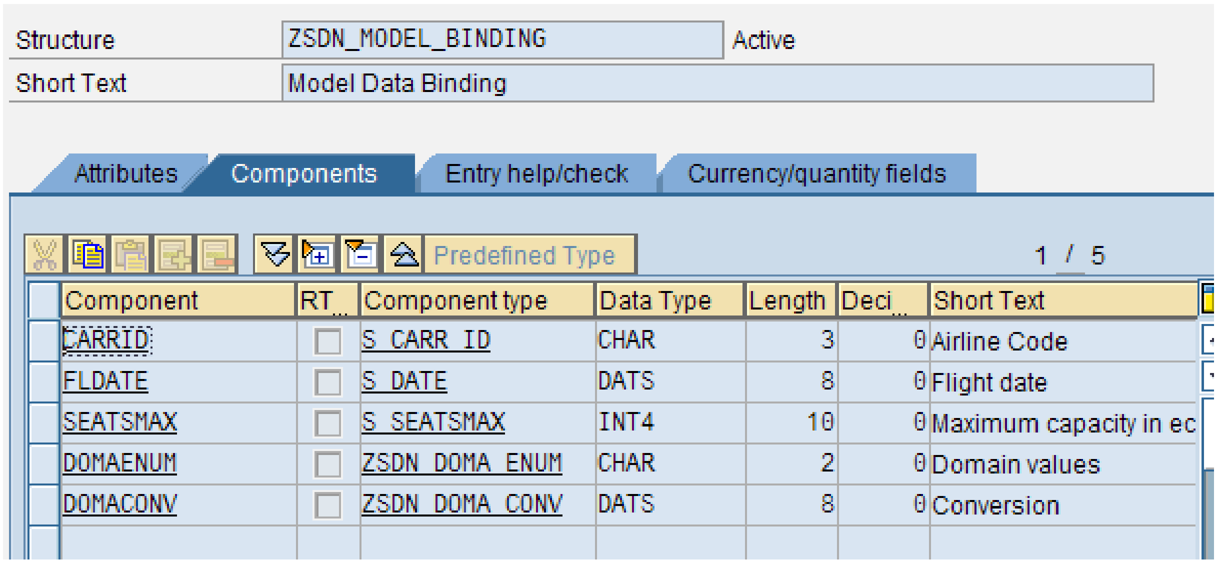
- ZSDN_MESSAGE_BAR



Structure	ZSDN_MESSAGE_BAR	Active
Short Text	ZSDN_MESSAGE_BAR	

Component	RT...	Component type	Data Type	Length	Deci
TEXT	☐		STRING	0	
TYPE	☐		RING	0	
CONNECTEDCONTROL	☐		STRING	0	

- ZSDN_MODEL_BINDING

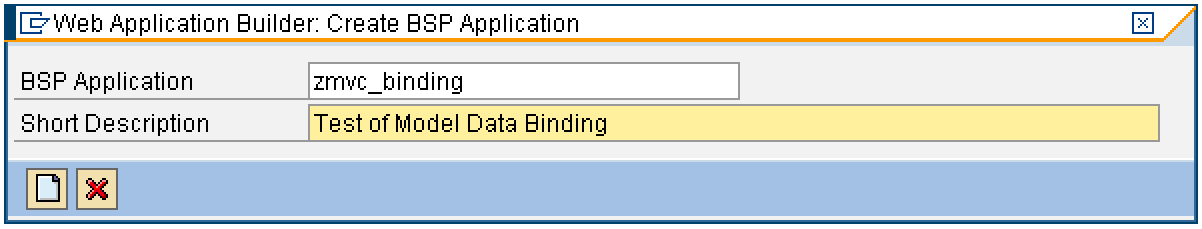


Structure	ZSDN_MODEL_BINDING	Active
Short Text	Model Data Binding	

Component	RT...	Component type	Data Type	Length	Deci...	Short Text
CARRID	☐	S_CARR_ID	CHAR	3	0	Airline Code
FLDATE	☐	S_DATE	DATS	8	0	Flight date
SEATSMAX	☐	S_SEATSMAX	INT4	10	0	Maximum capacity in ec
DOMAENUM	☐	ZSDN_DOMA_ENUM	CHAR	2	0	Domain values
DOMACONV	☐	ZSDN_DOMA_CONV	DATS	8	0	Conversion

BSP Application

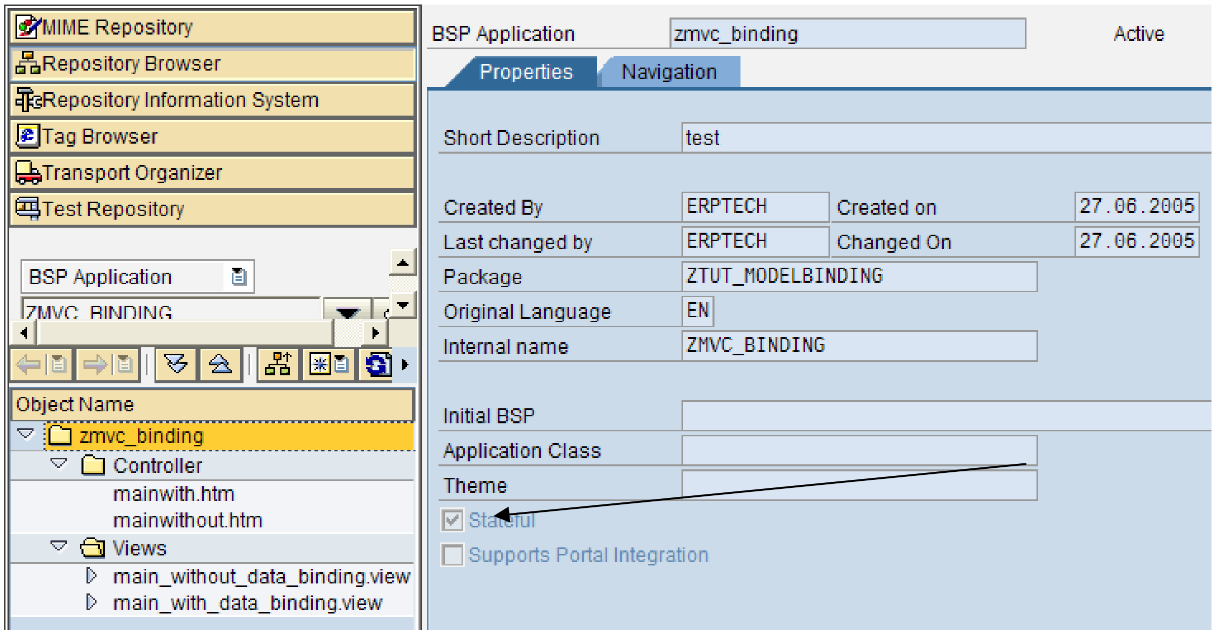
The BSP Application is of course the main component which brings everything together under one roof so to speak.



Web Application Builder: Create BSP Application

BSP Application	zmvc_binding
Short Description	Test of Model Data Binding

In our example, the BSP application must be set statefull, so do not forget to flag it.



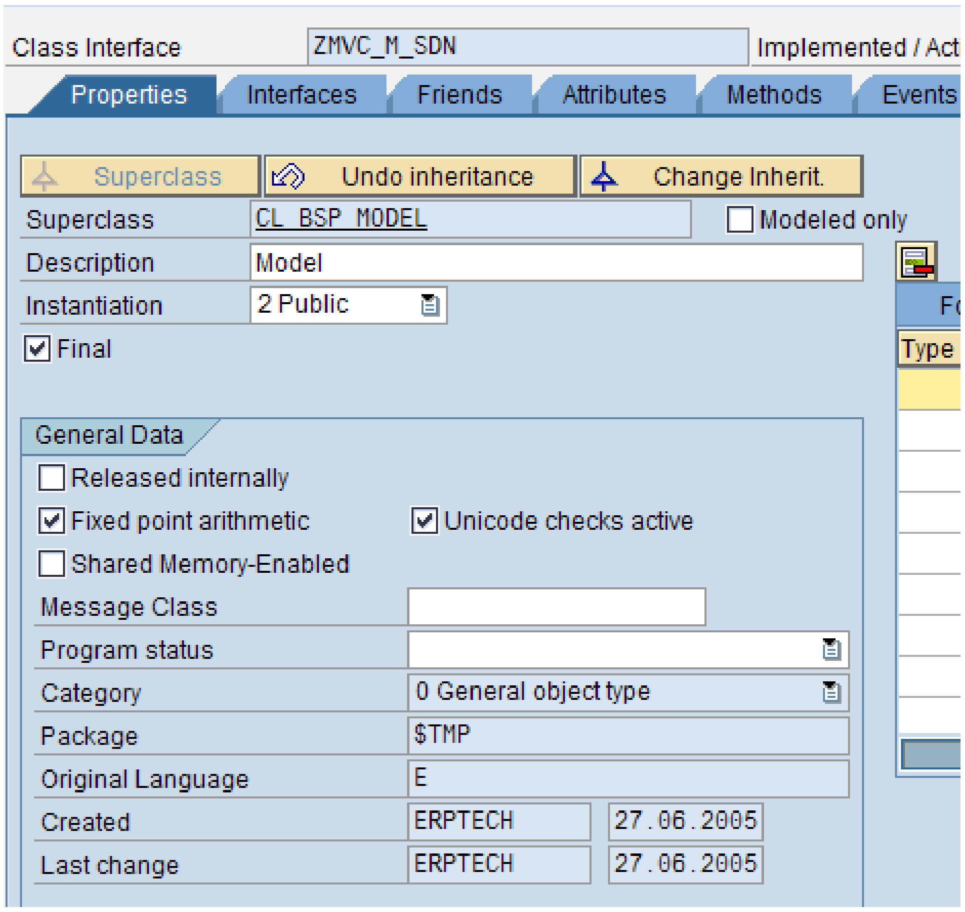
BSP Application	zmvc_binding	Active	
Short Description	test		
Created By	ERPTECH	Created on	27.06.2005
Last changed by	ERPTECH	Changed On	27.06.2005
Package	ZTUT_MODELBINDING		
Original Language	EN		
Internal name	ZMVC_BINDING		
Initial BSP			
Application Class			
Theme			

[✓] Stateful
[ ] Supports Portal Integration

Now that the application is there and in place, we will need to go back one step and build our MODEL class for the entire application. In terms of tutorials it is always difficult to determine which to build first so in this case we have decided to build our application, leave it empty and then build our MODEL class, then return to the application components.

Model

The MODEL is a class we will created based on the class CL_BSP_MODEL, this will act as the connection between our views and our logic.



Class Interface	ZMVC_M_SDN	Implemented / Act
Superclass	CL_BSP_MODEL	☐ Modeled only
Description	Model	
Instantiation	2 Public	
☑ Final		

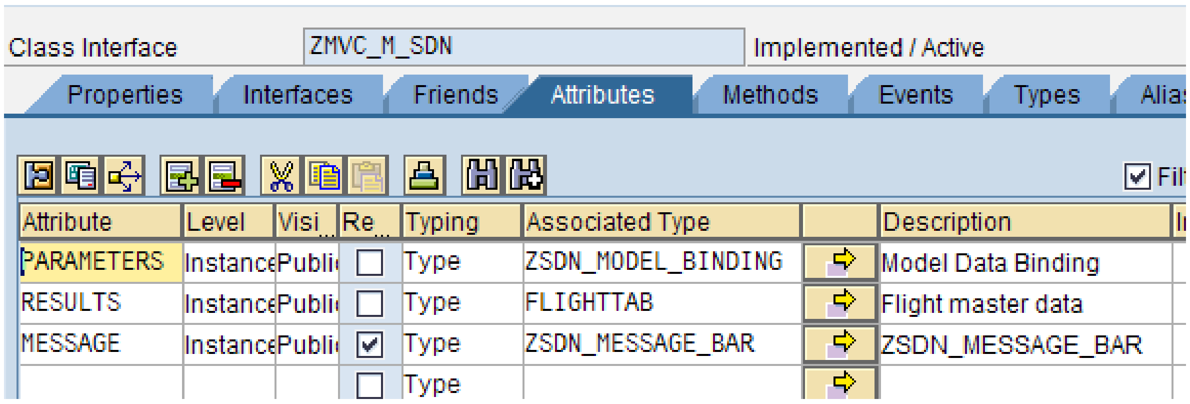
General Data

☐ Released internally
☑ Fixed point arithmetic ☑ Unicode checks active
☐ Shared Memory-Enabled

Message Class		
Program status		
Category	0 General object type	
Package	$TMP	
Original Language	E	
Created	ERPTECH	27.06.2005
Last change	ERPTECH	27.06.2005

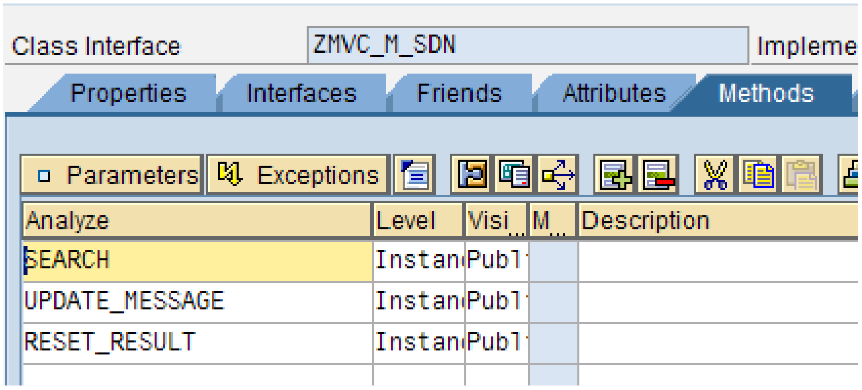
Inside of our MODEL, we will then create some ATTRIBUTES to handle our data.

- PARAMETERS
- RESULTS
- MESSAGE



Attribute	Level	Visi...	Re...	Typing	Associated Type		Description	I
PARAMETERS	Instance	Publi	☐	Type	ZSDN_MODEL_BINDING	⇨	Model Data Binding	
RESULTS	Instance	Publi	☐	Type	FLIGHTTAB	⇨	Flight master data	
MESSAGE	Instance	Publi	✓	Type	ZSDN_MESSAGE_BAR	⇨	ZSDN_MESSAGE_BAR	
			☐	Type		⇨		

Then we create our METHODS.



Analyze	Level	Visi...	M...	Description
SEARCH	Instan	Publ		
UPDATE_MESSAGE	Instan	Publ		
RESET_RESULT	Instan	Publ		

Once our METHODS are in place we of course need add the coding for each method.

Method: SEARCH

METHOD search.

```
*
  SELECT        * FROM  sflight INTO CORRESPONDING FIELDS OF TABLE me->results
         WHERE  carrid    = me->parameters-carrid.
*         AND    fldate    = me->parameters-fldate
*         AND    seatsmax  = me->parameters-seatsmax.
*

ENDMETHOD.
```

Method: UPDATE_MESSAGE

```
METHOD update_message .
*
  CLEAR: me->message.

  DATA: o_message                TYPE REF TO cl_bsp_messages.
  DATA: l_messages_severity_int  TYPE i.
*
  me->errors->get_message( EXPORTING index     = 1
                           IMPORTING message   = me->message-text
                                     condition = me->message-connectedcontrol
                                     severity  = l_messages_severity_int ).

  CHECK me->message-text IS NOT INITIAL.

  CASE l_messages_severity_int.
    WHEN cl_bsp_messages=>co_severity_fatal_error.
      me->message-type = 'STOP'.
    WHEN cl_bsp_messages=>co_severity_error.
      me->message-type = 'ERROR'.
    WHEN cl_bsp_messages=>co_severity_info.
      me->message-type = 'OK'.                "<-- con NONE non esce il messaggio
    WHEN cl_bsp_messages=>co_severity_warning.
      me->message-type = 'WARNING'.
    WHEN cl_bsp_messages=>co_severity_success.
      me->message-type = 'OK'.
  ENDCASE.
*
ENDMETHOD.
```

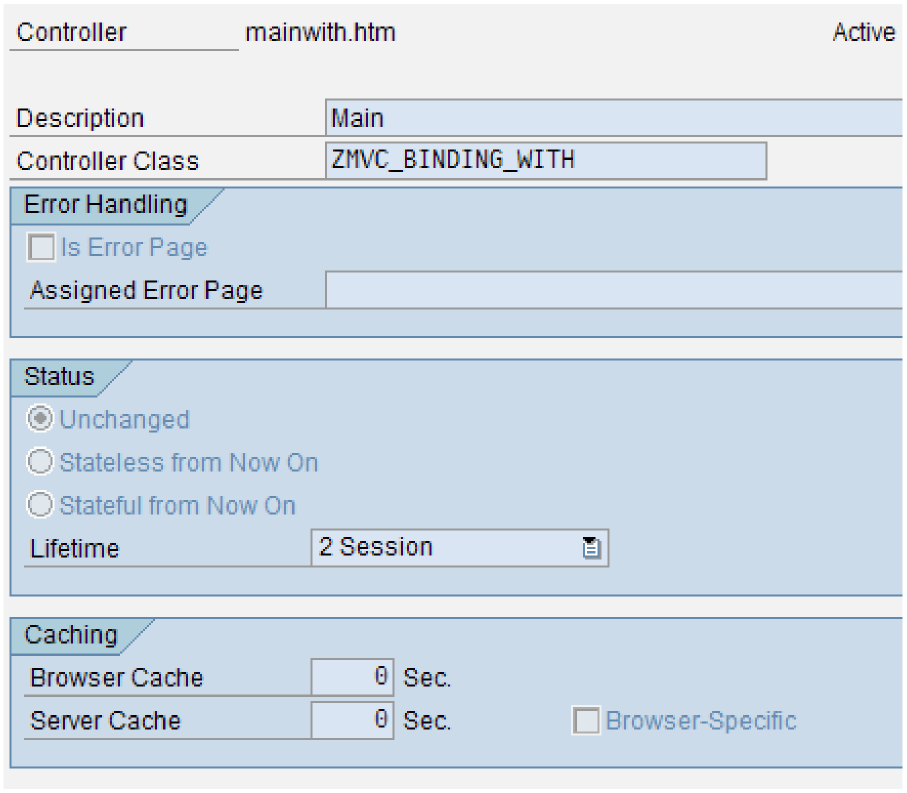
Method: RESET_RESULT

```
METHOD reset_result.
*
  CLEAR: me->results.
*

ENDMETHOD.
```

Returning to our BSP application itself, it is now possible to create the VIEWS and CONTROLLER CLASSES necessary to complete our example.

View: MAINWITH.HTM



Controller	mainwith.htm	Active
Description	Main	
Controller Class	ZMVC_BINDING_WITH	

Error Handling

- [ ] Is Error Page
- Assigned Error Page:

Status

- [✓ Unchanged]
- Stateless from Now On
- Stateful from Now On
- Lifetime: 2 Session

Caching

Browser Cache	0 Sec.	
Server Cache	0 Sec.	☐ Browser-Specific

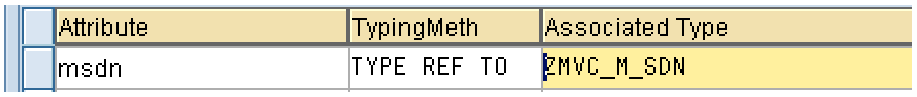
This of course is connected to a CONTROLLER CLASS called ZMVC_BINDING_WITH and has the following content in the PAGE LAYOUT.

PAGE LAYOUT

```
<%@page language="abap" %>
<%@extension name="bsp" prefix="bsp" %>
<%@extension name="htmlb" prefix="htmlb" %>
<%@extension name="phtmlb" prefix="phtmlb" %>
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
<htmlb:content design    = "DESIGN2003"
               themeRoot = "sap_standard" >
  <htmlb:document>
    <htmlb:documentHead title="SDN - Data binding" >
      <script language=JavaScript>history.forward()</script>
    </htmlb:documentHead>
    <htmlb:documentBody marginBottom = "0"
                        marginLeft   = "0"
                        marginRight  = "0"
                        marginTop    = "0" >
      <htmlb:form id     = "f"
                  method = "POST" >
        <htmlb:tray id                = "tray"
                    width             = "100%"
                    hasMargin         = "false"
                    title             = "With Data Binding"
                    hasContentPadding = "true" >
          <phtmlb:formLayout labelAlignment         = "LEFT"
                             design                 = "TRANSPARENT"
                             verticalLineSeparation = "TRUE"
                             fieldToLabelFactor     = "2.5"
                             customizationKey       = "SDN" >
            <phtmlb:formLayoutColumnHeader text="Labels" />
            <phtmlb:formLayoutInputField id       = "CarrId"
                                         value    = "//msdn/parameters.fldate"
                                         required = "true" />
            <phtmlb:formLayoutColumnHeader text="Enumerations" />
            <phtmlb:formLayoutItem idOfItem = "PDomaEnumDDLBCarrid"
                                   label    = "CARRID (Value Table)" >
              <htmlb:dropdownListBox id         = "DomaEnumDDLBCarrid"
                                     selection  = "//msdn/parameters.carrid"
                                     helpValues = "//msdn/parameters.carrid" />
            </phtmlb:formLayoutItem>
            <phtmlb:formLayoutItem idOfItem = "PDomaEnumDDLB"
                                   label    = "EnumerationDomain" >
              <htmlb:dropdownListBox id         = "DomaEnumDDLB"
                                     selection  = "//msdn/parameters.domaenum"
                                     helpValues = "//msdn/parameters.domaenum" />
            </phtmlb:formLayoutItem>
            <phtmlb:formLayoutInputField id    = "Seatsmax"
                                         value = "//msdn/parameters.seatsmax" />
            <phtmlb:formLayoutInputField id    = "domaconv"
                                         value = "//msdn/parameters.domaconv" />
          </phtmlb:formLayout>
          <htmlb:button id      = "Search"
                        onClick = "Search"
                        text    = "Search" />
        </htmlb:tray>
        <%
  msdn->update_message( ).
  if msdn->message is not initial.
        %>
        <phtmlb:messageBar id                 = "messageBar"
                           text               = "<%= msdn->message-text %>"
                           type               = "<%= msdn->message-type %>"
                           rulerDisplay       = "BOTTOM"
                           connectedControlId = "<%= msdn->message-connectedControl
%>" />
        <%
  endif.
        %>
        <%
  if msdn->results is not initial.
        %>
        <htmlb:tray id                 = "tray"
                    width              = "100%"
                    hasMargin          = "false"
                    title              = "Results"
                    hasContentPadding  = "true" >
          <htmlb:tableView id    = "results"
                           table = "//msdn/results" />
        </htmlb:tray>
        <%
  endif.
        %>
      </htmlb:form>
    </htmlb:documentBody>
  </htmlb:document>
</htmlb:content>
```

Followed by having one PAGE ATTRIBUTE.

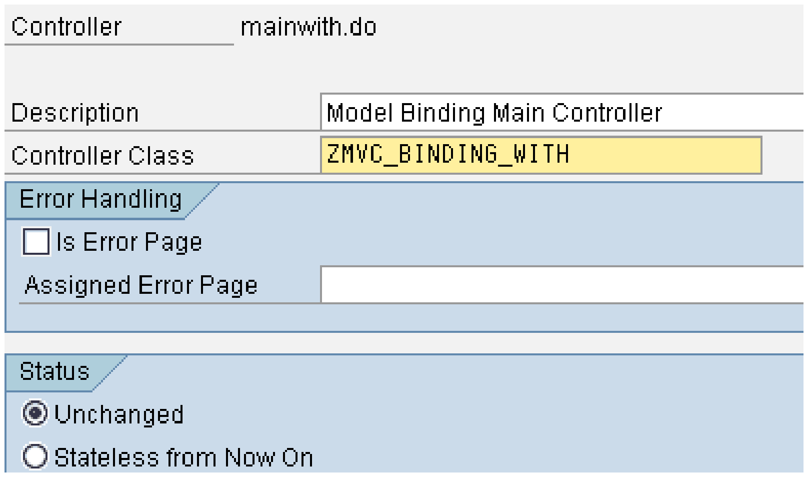
- MSDN



Attribute	TypingMeth	Associated Type
msdn	TYPE REF TO	ZMVC_M_SDN

With the VIEW now completed, the CONTROLLER CLASS needs to be created and modified to meet our needs.

This can be done by first creating a CONTROLLER.



Controller	mainwith.do
Description	Model Binding Main Controller
Controller Class	ZMVC_BINDING_WITH

Error Handling

☐ Is Error Page

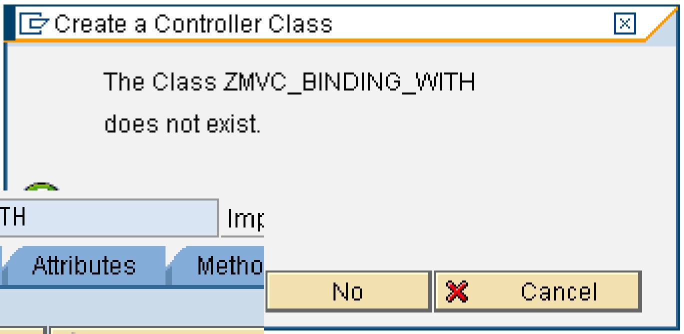
Assigned Error Page

Status

● Unchanged

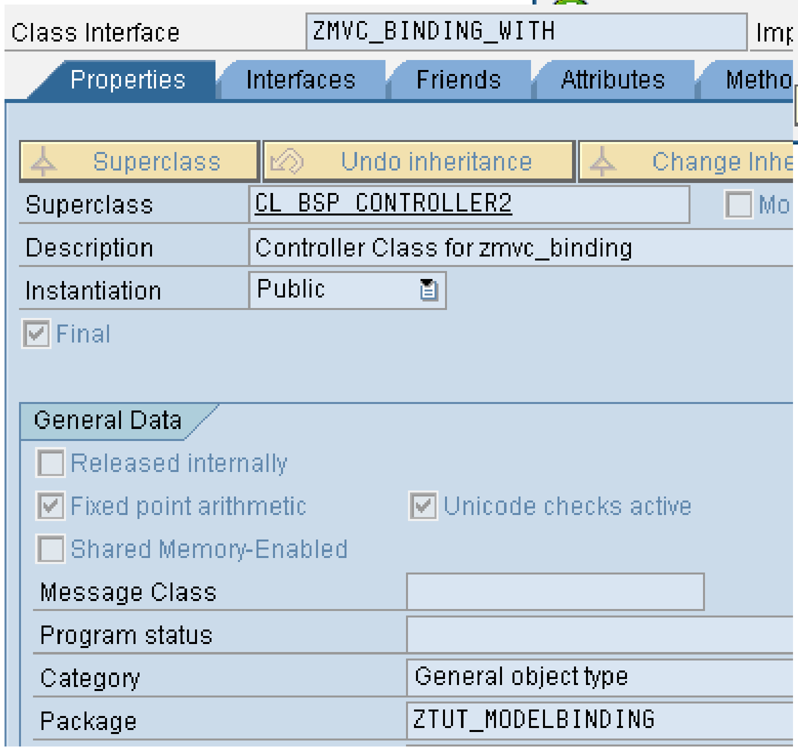
○ Stateless from Now On

Then simply double clicking on the CONTROLLER CLASS name you typed in, the system will prompt to create the class if it is not found.



Create a Controller Class

The Class ZMVC_BINDING_WITH does not exist.



Class Interface ZMVC_BINDING_WITH

Superclass	CL_BSP_CONTROLLER2
Description	Controller Class for zmvc_binding
Instantiation	Public

☑ Final

General Data

☐ Released internally

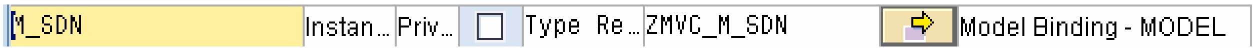
☑ Fixed point arithmetic ☑ Unicode checks active

☐ Shared Memory-Enabled

Message Class	
Program status	
Category	General object type
Package	ZTUT_MODELBINDING

Within this new CONTROLLER CLASS we need to add a single attribute:

- M_SDN



M_SDN | Instan… | Priv… | ☐ | Type Re… | ZMVC_M_SDN | Model Binding - MODEL

Then the following METHODS need to be redefined:

- DO_REQUEST

```
METHOD do_request .
      * Init models
        IF me->m_sdn IS NOT BOUND.
          me->m_sdn ?= create_model( class_name ='zmvc_m_sdn' model_id =
      'msdnid' ).
        ENDIF.
      *
        dispatch_input( ).

      * if any of the controllers has requested a navigation, do not try to
      display, but leave current processing
        IF is_navigation_requested( ) IS NOT INITIAL.
          RETURN.
        ENDIF.

        DATA: o_view   TYPE REF TO if_bsp_page.

        o_view = create_view( view_name = 'main_with_data_binding.view' ).
        o_view->set_attribute( name = 'msdn'  value = me->m_sdn ).
                     call_view( o_view ).
ENDMETHOD.
```

- DO_HANDLE_EVENT

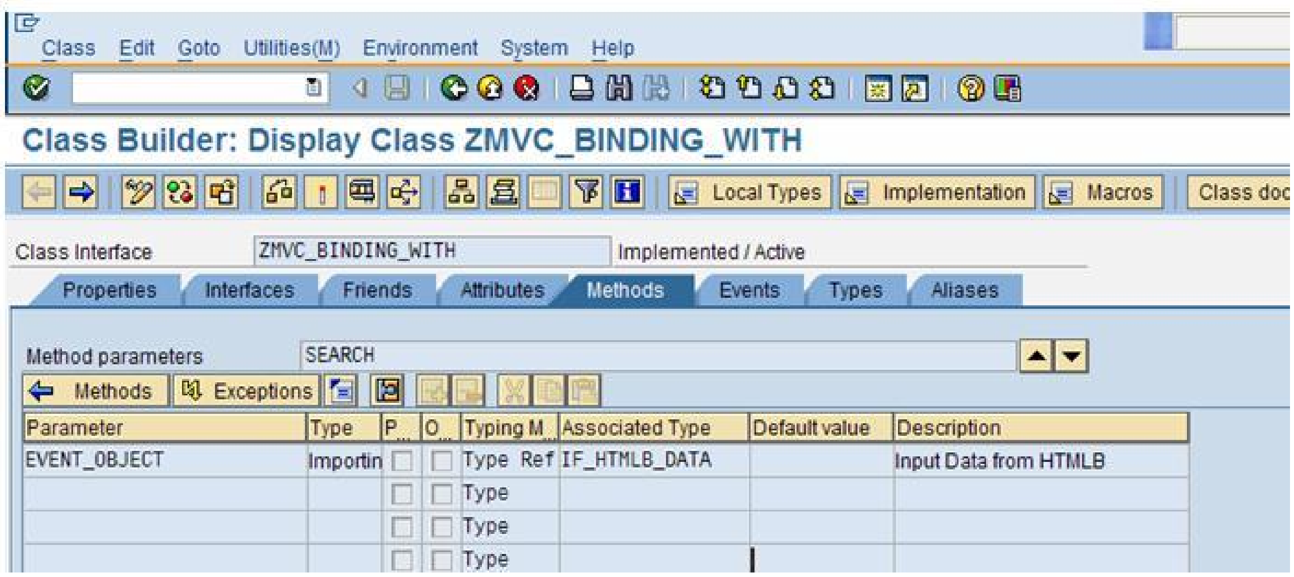
```
        METHOD do_handle_event .
                 *
                   me->m_sdn->update_message( ).

                   IF      me->m_sdn->message-type = 'STOP'
                      OR   me->m_sdn->message-type = 'ERROR'.
                     me->m_sdn->reset_result( ).
                     RETURN.
                   ENDIF.
                 *
                   DATA: o_page_context TYPE REF TO if_bsp_page_context.
                   o_page_context = me->get_page_context( ).

                   cl_htmlb_manager=>dispatch_event_ex( request = request
                                                        page_context =
                 o_page_context
                                                        event_handler = me ).
                 *
                 * In case the Search does not work, try to uncomment the following
                 * statement.
                 *  IF htmlb_event->server_event = 'search'.
                 *    me->m_sdn->search( ).
                 *  ENDIF.
                 *
        ENDMETHOD.
```

Then a new method called SEARCH needs to be created.

Define the EVENT_OBJECT parameter:



Class Interface ZMVC_BINDING_WITH Implemented / Active

Method parameters SEARCH

Parameter	Type	P...	O...	Typing M	Associated Type	Default value	Description
EVENT_OBJECT	Importin	☐	☐	Type Ref	IF_HTMLB_DATA		Input Data from HTMLB
		☐	☐	Type			
		☐	☐	Type			
		☐	☐	Type			

And fill the source with:

```
METHOD search .
*
  me->m_sdn->search( ).
*

ENDMETHOD.
```

With all of the pieces to the BSP application now in place, a simply test of the CONTROLLER mainwith.do will result in the application loading.

How to receive user input from the HTTP request

In the SEARCH method of the controller class the selected CARRID (e.g. LH for Lufthansa) is automatically available in the model attribute MSDN->PARAMETERS-CARRID.

Note that we are making use of one approach described in the weblog “BSP Programming: Event Handling in Composite Elements” (https://weblogs.sdn.sap.com/pub/wlg/663).

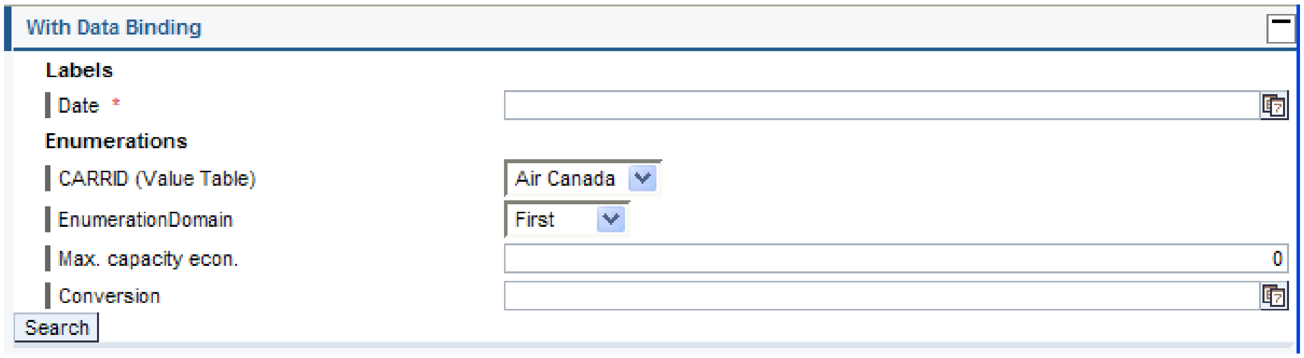
Please note that without Data Binding it will be necessary retrieve from the HTTP Request the user inputs.

Data dictionary integration

"Data Binding" provides nice features, which leads one to sometimes think of the "Elves"[8] lurking around the halls of the SAP Labs.

Data types - validations and visualization

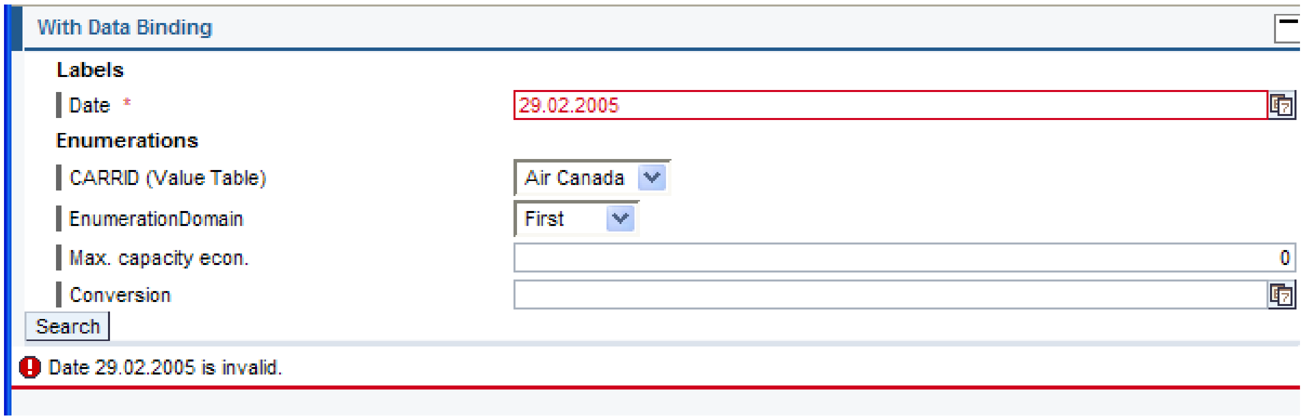
In the first picture of our example:



As you can see the fields are automatically formatted depending on the data type, max capacity is aligned to right, date fields are provided with the "Help" icons and of course a calendar that pops up.

Error handling is also taken care of, if a user enters invalid data for any of the types the MODEL will report the error by highlighting the incorrect field. Later on we will go into more detail on the error management.

Can you imagine what will happen when typing 29.02.2005 in the first field (Date *) and pressing the Search button? If not have a look to the following picture:



Date 29.02.2005 is invalid.

Enumeration validation

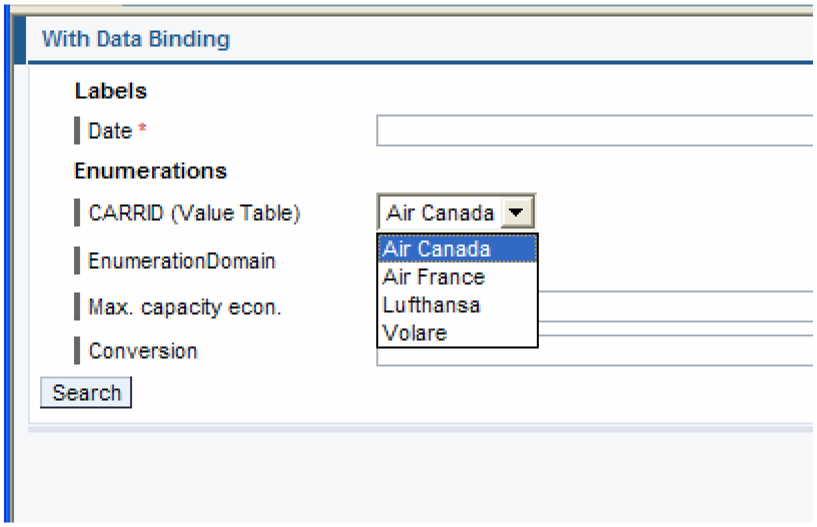
The following htmlb extension:

```
<htmlb:dropdownListBox id         = "DomaEnumDDLB"
                                     selection  = "//msdn/parameters.domaenum"
                                     helpValues = "//msdn/parameters.domaenum" />
```

knows Data Dictionary very well. It will generate the list of values from the Domain definition of the binded attribute.

Both fixed values and check tables are managed obviously taking into consideration the login language for text tables.

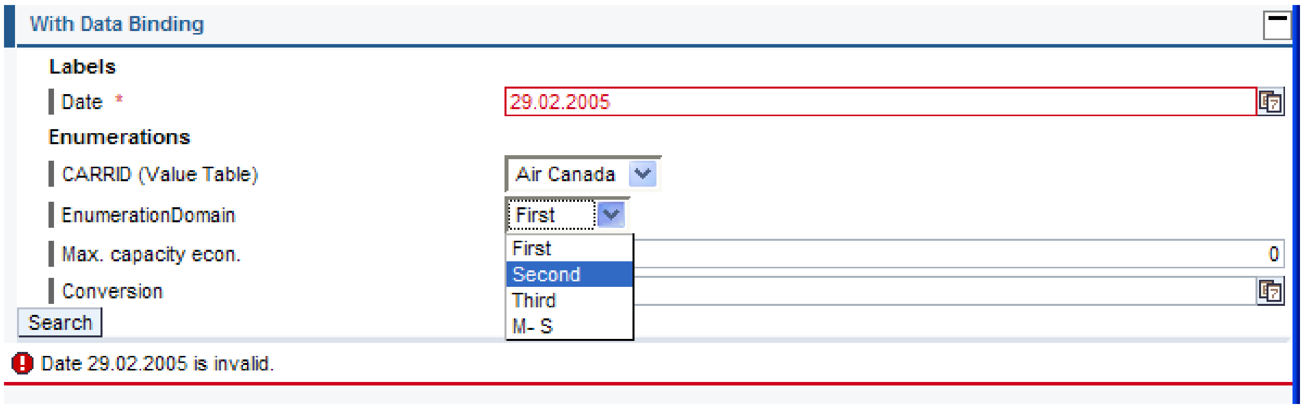
You can see the list of airlines that comes directly from the table SCARR defined as Value table of the domain S_CARR_ID.



8 “Magic of SAP” - https://www.sdn.sap.com/sdn/weblogs.sdn?blog=/pub/wlg/1325

Note that in case of fixed values if you specify intervals you will get the lower limit key in the selection field.

Have a look in the example what is generated for the Enumeration Domain:



With Data Binding

Labels

Date *	29.02.2005

Enumerations

CARRID (Value Table)	Air Canada
EnumerationDomain	First
Max. capacity econ.	0
Conversion	

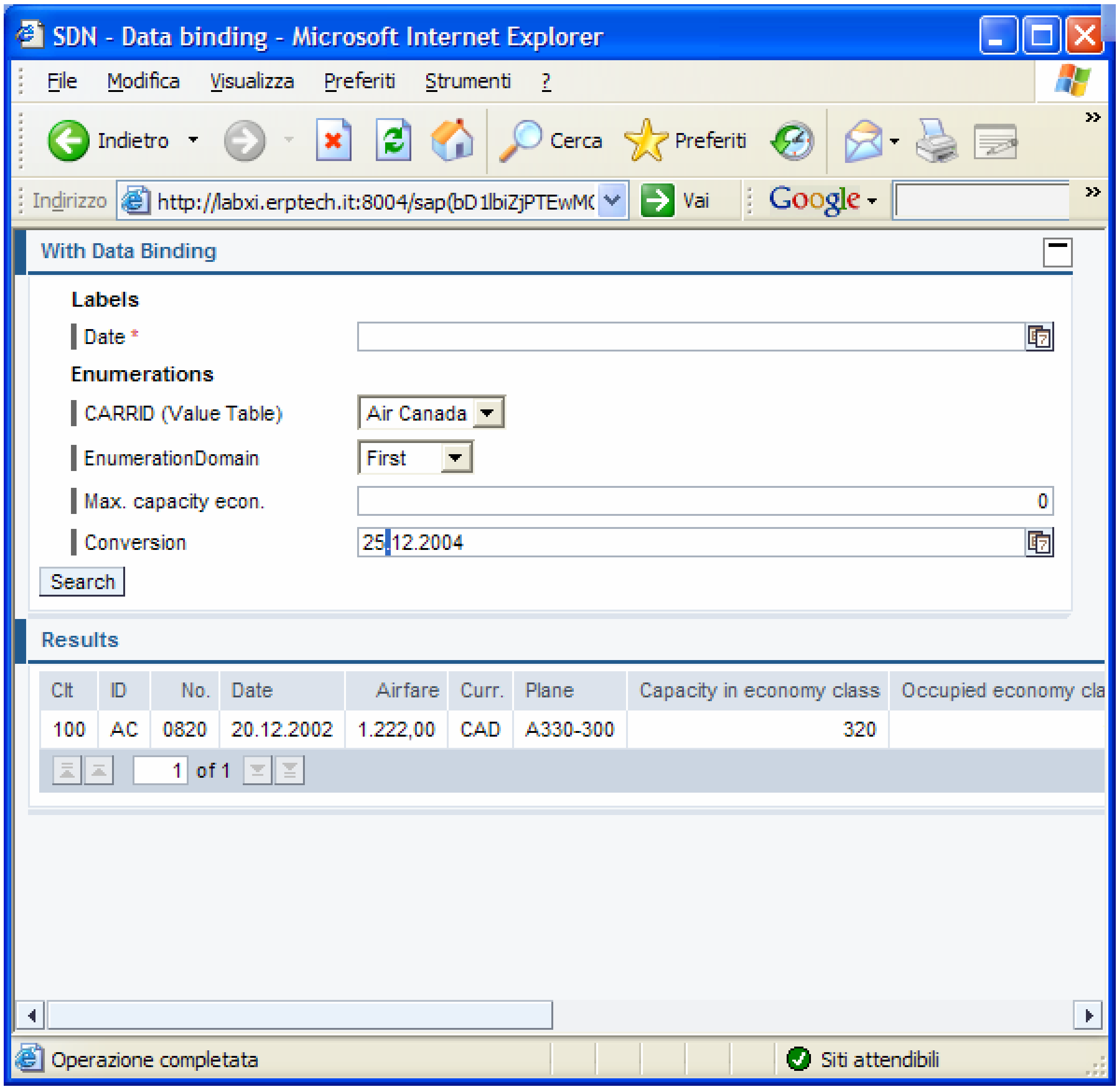
Date 29.02.2005 is invalid.

Unfortunately the limits declared at domain levels are not managed by other htmlb objects. It would be nice to have the same check performed against input fields.

conversion at domain level

Every SAP R/3 user knows that a material code can be written omitting leading zeros. If you want to provide the same functionality Data Binding do it. It calls the Conversion Exit defined at domain level.

Let's have look to the conversion field of our sample: we type 25-12-2004 (please note the separator)


SDN - Data binding - Microsoft Internet Explorer
File Modifica Visualizza Preferiti Strumenti ?
Indietro Cerca Preferiti
Indirizzo http://labxi.erptech.it:8004/sap(bD1lbiZjPTEwMC
Vai
Google
With Data Binding
Search
Results
Operazione completata
Siti attendibili

Labels

Date *	

Enumerations

CARRID (Value Table)	Air Canada
EnumerationDomain	First
Max. capacity econ.	0
Conversion	25.12.2004

Clt	ID	No.	Date	Airfare	Curr.	Plane	Capacity in economy class	Occupied economy cla
100	AC	0820	20.12.2002	1.222,00	CAD	A330-300	320	

1 of 1

Try also with 25/12/2004 (please note the separator).

Please note that the conversion exit associated at domain level calls the Function Module: CONVERSION_EXIT_PDATE_INPUT. In this case it will not accept dates in the future.

Try with 25/12/2005.

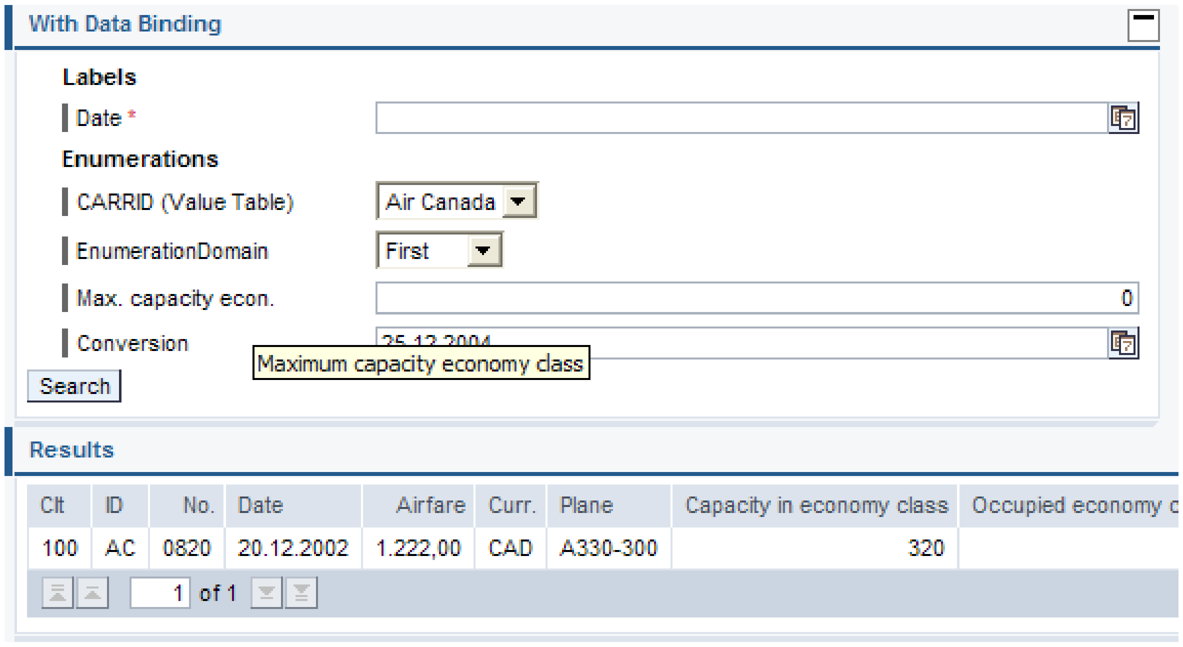
We think that conversion exits can play an important role in developing BSP Web Applications.

Labels and tooltips

You may have already noticed that labels and column headers are filled automatically from the data element texts. As well as the tooltips.

> *Note: it is important to maintain the DDIC descriptions in the same language used when logging on to the BSP application. Remember that usually the language depends on how your browser is set.*

Example



With Data Binding

Labels

Date *	

Enumerations

CARRID (Value Table)	Air Canada
EnumerationDomain	First
Max. capacity econ.	0
Conversion	25.12.2004

Maximum capacity economy class

Search

Results

Clt	ID	No.	Date	Airfare	Curr.	Plane	Capacity in economy class	Occupied economy c
100	AC	0820	20.12.2002	1.222,00	CAD	A330-300	320	

1 of 1

How to react to formal errors?

The MODEL class fills in its ERRORS attribute (that is PROTECTED) when it recognizes a formal error.

In the DO_HANLDE_EVENT we suggest to invoke a method (we called it UPDATE_MESSAGE) that copies the ERRORS attribute into a MESSAGE attribute (PUBLIC).

Therefore stopping the event processing if there are any error in your models.

Have a look at what takes place in the example.

How to react to application errors in the same way as formal ones?

In case of errors, a field is highlighted (red borders).

If you want to highlight a field that has no formal error but maybe application errors you will have to insert into the ERROR attribute of your model an error message (TYPE) and build the right value for the CONDITION field (it’s the name of the field to be highlighted)

How to verify required fields?

Here we discovered an unresolved issue. HTMLB tags usually provide the attribute **required** but the Data binding do not take it into consideration.

So you should verify them for example via a method of your model called in the DO_HANLDE_EVENT. If a required field is initial you should generate a new entry in the ERROR attribute

1 Dynamic Model Binding

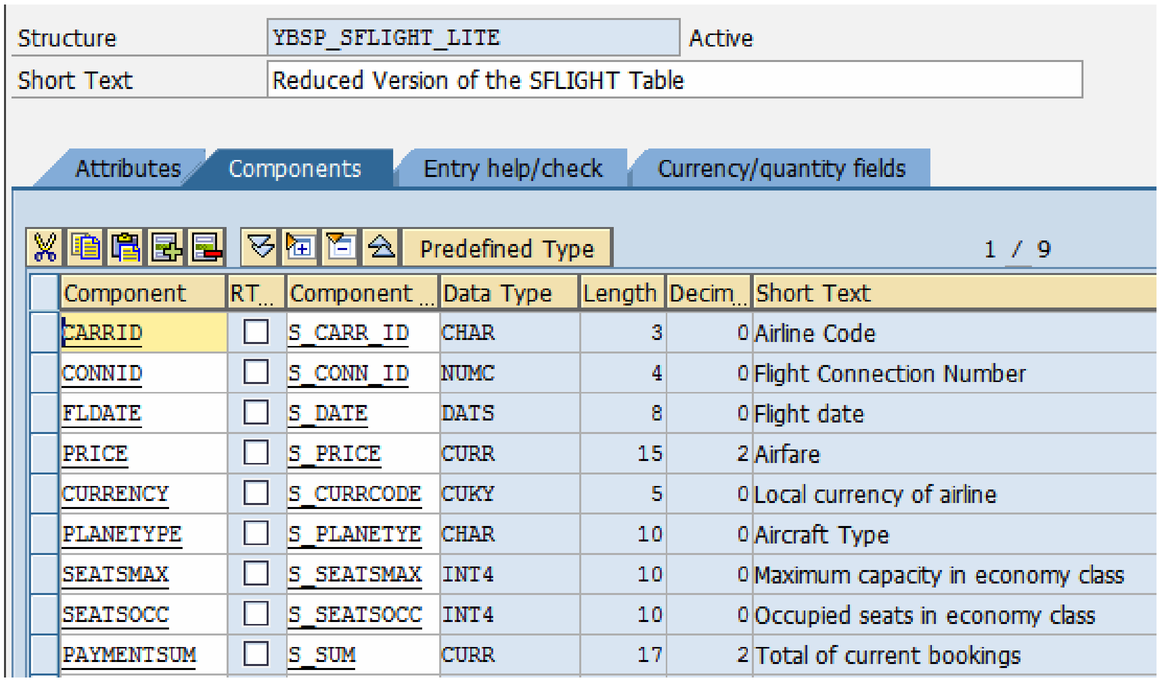
We have already seen how powerful data binding can be. Besides all the benefits already put forward for using it, data binding really shines when it comes to creating dynamic UI elements.

For an example of the power of the dynamic model binding, let us examine a situation that would be very difficult to reproduce in classic ABAP Dynpro. We will start with a structure that represents a reduced number of fields in a database table. We want to expose each one of these fields as individual input fields with their own labels.

Of course we could manually design the UI for our structure, creating each individual element by hand. This could become time consuming depending upon the size of the structure at question. Also every time we add or remove fields from the structure, we have to return to the user interface and adjust it as well.

Would it not be much simpler if we could just supply the data object for the structure to the user interface and let it dynamically build all the necessary input fields, with Meta data pulled from the structure and automatic field input retrieval? Well that is exactly what model binding makes possible.

We will start this example by creating a structure that is a sub set of the fields in the table SFLIGHT. For now we will throw out MANDT and all the fields that break down first and business class. Our structure leaves us with about ¾ of the original fields.



Structure YBSP_SFLIGHT_LITE Active

Short Text Reduced Version of the SFLIGHT Table

Component	RT...	Component ...	Data Type	Length	Decim...	Short Text
CARRID	☐	S_CARR_ID	CHAR	3	0	Airline Code
CONNID	☐	S_CONN_ID	NUMC	4	0	Flight Connection Number
FLDATE	☐	S_DATE	DATS	8	0	Flight date
PRICE	☐	S_PRICE	CURR	15	2	Airfare
CURRENCY	☐	S_CURRCODE	CUKY	5	0	Local currency of airline
PLANETYPE	☐	S_PLANETYE	CHAR	10	0	Aircraft Type
SEATSMAX	☐	S_SEATSMAX	INT4	10	0	Maximum capacity in economy class
SEATSOCC	☐	S_SEATSOCC	INT4	10	0	Occupied seats in economy class
PAYMENTSUM	☐	S_SUM	CURR	17	2	Total of current bookings

Figure 1.1: Reduced SFLIGHT Structure

We will keep everything from this point forward as dynamic as possible so that if we want to extend our user interface, all we have to do is add or remove fields from this YBSP_SFLIGHT_LITE structure. Our model class will have a public attribute of type of the structure we just created. It will also have the logic to select a single record from the database table SFLIGHT into the corresponding fields of this attribute.

Inside of our view we are ready to start our dynamic element creation. The first thing we will need to do is retrieve a listing of the fields in our structure using the ABAP RunTime Type Services or RTTS.

```
data: descriptor type ref to CL_ABAP_STRUCTDESCR.
descriptor ?= CL_ABAP_STRUCTDESCR=>describe_by_data(
              model->isflight ).
data: flddescr type DDFIELDS.
flddescr = descriptor->GET_DDIC_FIELD_LIST( ).
```

Now we are going to be able to loop through our field listing and create a label and input field for each entry. What we would like to do is just build our binding string into a variable and give that variable to the BSP elements. However when working with BSP elements within pages or views, they do not expose separate attributes for the bound and unbound values. Therefore if we send a dynamic binding string into BSP element attribute as a variable, it will incorrectly interpret that. The element will assume that we are taking the value directly from the variable instead of trying to read it as a binding string.

One might also think that completing the binding string dynamically like in the following example would be possible as well.

```
<htmlb:label
       for="//model.isflight.<%= <wa_field>-fieldname %>" />
```

Unfortunetely the BSP runtime also incorrect identifies this example as a direct value assignment as well.

Luckily there is a solution that works. If you create the BSP element directly via the ABAP class, separate attributes are exposed for bound and unbound values. For instance in the <htmlb:label> the implementing class, CL_HTMLB_LABEL, has two attributes – **for** and **_for**. The attribute that will expect a binding string always beings with the underscore.

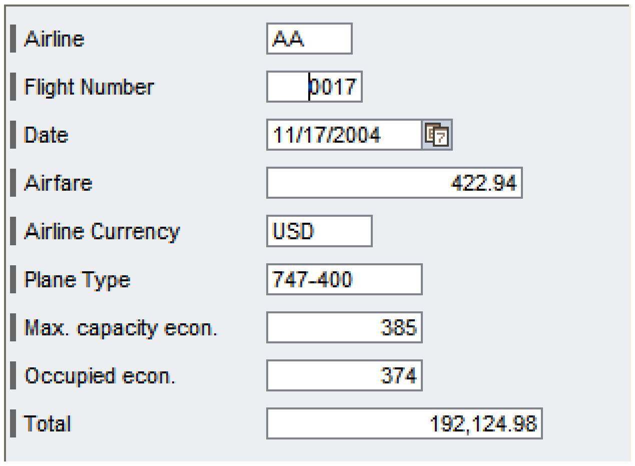
So now within our view we will generate the BSP elements directly via code much like when creating a composite BSP element. We can then render the BSP element into a string and output that string within our view.

```
field-symbols: <wa_field> like line of flddescr.
data: label type ref to cl_htmlb_label.
data: input type ref to CL_HTMLB_INPUTFIELD.
data: binding_string type string,
      label_string type string,
      input_string type string.
"Loop through each field in the structure Definition
loop at flddescr assigning <Wa_field>.
clear: label, input.
concatenate '//model/isflight.' <wa_field>-FIELDNAME
       into binding_string.
create object label.
label->_for = binding_string.
label_string = label->IF_BSP_BEE~RENDER_TO_STRING(
               page_context ).
create object input.
input->_value = binding_string.
input_string = input->IF_BSP_BEE~RENDER_TO_STRING(
               page_context ).
```

We will use the flexibility of the <phtmlb:matrix> to support our dynamic UI.

```
  <phtmlb:matrixCell row    = "+1"
                     vAlign = "TOP" />
    <%= label_string %>
  <phtmlb:matrixCell col    = "+1"
                     vAlign = "TOP" />
    <%= input_string %>
```

With only a handful of lines of code, we have generated our 9 fields from our simplified SFLIGHT structure. However the same number of lines of code could have just as easily created 90 input fields and their labels.



Airline	AA
Flight Number	0017
Date	11/17/2004
Airfare	422.94
Airline Currency	USD
Plane Type	747-400
Max. capacity econ.	385
Occupied econ.	374
Total	192,124.98

Figure 1.2: Dynamic Model Binding Output

Here is the whole code:

Model: YCL_BSP_MODEL_DYN_BIND

```
Attribute: ISFLIGHT Instance Public Type SFLIGHT.

method init.  (Instance Public)

  select single * from sflight into corresponding fields of isflight.

endmethod.
```

Controller: ZMVC_BSP_DYNAMIC

```
Attribute: MODEL Instance Private Type Ref To YCL_BSP_MODEL_DYN_BIND.

method do_init.

  if model is initial.
```

```
      model ?= create_model( model_id = 'MD'
                             class_name = 'YCL_BSP_MODEL_DYN_BIND' ).
    endif.
    model->init( ).
  endmethod.

  method do_request.
    data: view type ref to if_bsp_page.

  * if input is available, dispatch this input to subcomponent.
  * this call is only necessary for toplevel controllers.
  * ( if this is not a toplevel controller or no input is present,
  *   this call returns without any action)
    dispatch_input( ).

  * if any of the controllers has requested a navigation,
  * do not try to display, but leave current processing
    if is_navigation_requested( ) is not initial.
      return.
    endif.

    view = create_view( view_name = 'mvc_dynamic.htm' ).
    view->set_attribute( name = 'MODEL'
                         value = me->model ).
    call_view( view ).
  endmethod.
```

View: mvc_dynamic.htm

```
Attribute: MODEL Type Ref To YCL_BSP_MODEL_DYN_BIND.

Layout:

      <%@page language="abap" %>
      <%@extension name="htmlb" prefix="htmlb" %>
      <%@extension name="phtmlb" prefix="phtmlb" %>
      <htmlb:content design="design2003" >
        <htmlb:page title=" " >
          <htmlb:form>
            <phtmlb:matrix width="100%" >
              <%
        data: descriptor type ref to CL_ABAP_STRUCTDESCR.
        descriptor ?= CL_ABAP_STRUCTDESCR=>describe_by_data( model->isflight ).
        data: flddescr type DDFIELDS.
        flddescr = descriptor->GET_DDIC_FIELD_LIST( ).
        field-symbols: <wa_field> like line of flddescr.
        data: label type ref to cl_htmlb_label.
        data: input type ref to CL_HTMLB_INPUTFIELD.
        data: binding_string type string,
        label_string type string,
        input_string type string.
        "Loop through each field in the structure Definition
        loop at flddescr assigning <Wa_field>.
        clear label.
        clear input.
        concatenate '//model/isflight.'
        <wa_field>-FIELDNAME
        into binding_string.
        create object label.
        label->_for = binding_string.
        label_string = label->IF_BSP_BEE~RENDER_TO_STRING( page_context ).
        create object input.
        input->_value = binding_string.
        input_string = input->IF_BSP_BEE~RENDER_TO_STRING( page_context ).
              %>
              <phtmlb:matrixCell row    = "+1"
                                 vAlign = "TOP" />
              <%= label_string %>
              <phtmlb:matrixCell col    = "+1"
                                 vAlign = "TOP" />
              <%= input_string %>
              <%
        endloop.
              %>
            </phtmlb:matrix>
          </htmlb:form>
        </htmlb:page>
      </htmlb:content>
```

Conclusions

Hopefully after all that typing, your example worked as well as ours and our extreme hope is that we have shed some light onto “Data Binding” and it's benefits!

Author Bio

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