SAP NetWeaver
How-To Guide

How to... Log Changes in Plan Data Using DataStore Object

Applicable Releases:

SAP NetWeaver 7.01, SP6 and higher

IT Practice:

Business Information Management

IT Scenario:

Business Planning and Analytical Services

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THE BEST-RUN BUSINESSES RUN SAP™

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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. Scenario

In many planning project it is not only necessary to create new plan data but also to keep track how this new data originated. Thus a mechanism is necessary that logs all changes done in the plans data – either when new data is created or existing data is changed. Usually the logging information contains information about the user who has done the changes and the date and time when these changes where performed. In an existing How to Paper we have described and approach how such a log can be achieved by the use of derivations. Unfortunately there are some problems with this approach:

1. The derivation is called any time when data is written into the delta buffer. Thus if a record is changed several times in one planning session then several records will be created all bearing different time stamps. But usually a log entry should rather only be written when data is saved.
2. As the tracking information is kept in the InfoCube it is not possible anymore to compress the InfoCube as records with identical characteristic values (which could be compressed) have different values in the user/time stamp. Thus the read performance can be influenced very negatively.

With the new Logging BAdI introduced with SAP NetWeaver 7.0 EHP 1, SP6, it is possible to create log information when data is saved to the InfoCube. In the BAdI all necessary information about the changes is provided and it is up to the BAdI implementation to write the logging information to a suitable data target. This data target could be a normal data base table or a DataStore Object. Thus the logging information can be kept separately from the plan data in the InfoCube.

In this how to paper we will give a very generic example how this logging information can be written into a DataStore Objects. Except for the name of the DataStore Object and of the characteristics carrying the user name, the date, the time, and the so-called save-id all further necessary information is retrieved dynamically. Thus the coding can be easily adapted for a given customer situation.

By using a DataStore Object reporting the logging information is made very easy and it is also possible to use the logging information to erase wrong records using data warehousing methods.

2. Background Information

As already described above the new logging BAdI allows you to write into a data base table of your choice. This data base has most likely a different structure from the InfoCube itself. Thus the information from the changed data records must be filled into the structure of the target data base table (be it a standard data base table or a table underlying a DataStore Object). As the system needs to put the record information from one data structure to another anyway the BAdI is designed in such a way, that you provide the system with information about your target structure and the system will return the logging information already filled into your structure. This makes it very easy for you to update your data base table and is also better for performance.

The BAdI will return you the logging data filled with the DELTA values created by the user in the plan session. Using the BAdI you do not track the absolute value the user has entered or created by a planning function but the changes done to the data. Thus it is also possible to roll back changes done by the user by creating a suitable DTP (with reversed signs for the deltas) writing into the InfoCube.

It is important to note that the BAdI only tracks changes done in BW Integrated Planning. Data changes done via a DTP will not be tracked.

The BAdI gives you the opportunity to also write the request number, under which the changed record will be stored in the InfoCube, into the log as well as a so-called save-id. The save-id allows you to track changes in a consistent way even when you are writing back to several InfoCubes simultaneously: as usually the InfoCubes will have differing data structures you will have a DataStore Object for tracing the changes done to each individual InfoCube. Thus when you store data on multiple InfoCubes you will also distribute the log information over several DataStore Objects. The system will provide you with an identification number that is unique in each save event. Thus all log entries created in one save event will receive the same save-id and it is possible to consolidate the log information even if it is kept in several DataStore Objects. Note that you do not need the save-id when you are saving to one InfoCube only.

Please note that in the BAdI you use the InfoCube name as a filter. That means that you can have several BAdI implementations at the same time. The system will decide by the InfoCube name which implementation (and thus which underlying class) will be used. The sample implementation that we give here is very generic. Just at the beginning of the methods in the implementing class we use a number of constants for the additional characteristics necessary for the tracking and set the name of the DataStore Object depending on the InfoCube name. You can easily adopt this coding in such a way that the same implementing class can be used for all InfoCubes where you want to log change information in a corresponding DataStore Object.

3. Prerequisites

The BAdI is delivered with EHP1, SP6. You can also have a look at SAP Note 1382767.

If you need more information about the BAdI technology in general please have a look at the documentation.

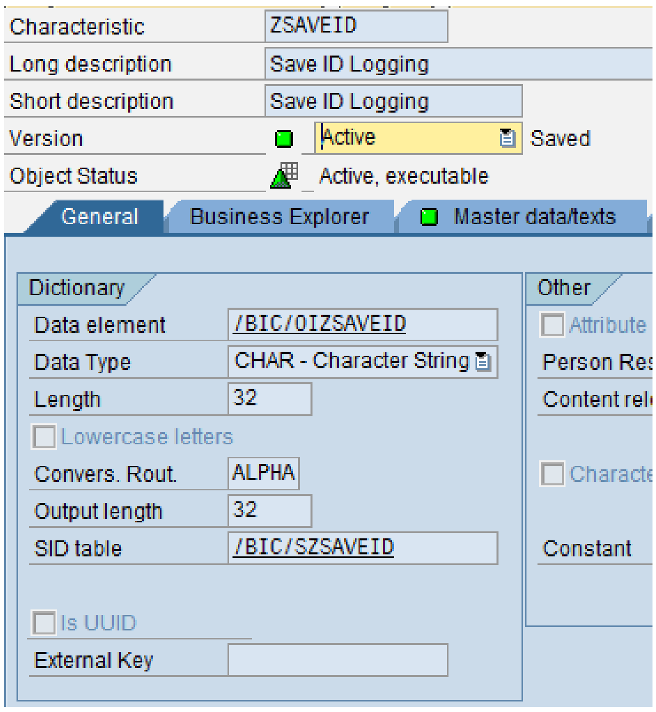
4. Step-by-Step Procedure

In our scenario we will use the full InfoCube information for the tracking of the changes. In addition we need fields in our DataStore Object that carry the information about the user, the data, the time, and the save-id. We only use one InfoCube and one DataStore Object in our scenario but want to show how to properly use the save-id in our example as well.

4.1 Create the Characteristics and the DataStore Object

1. Create a Save-ID

   Go to the transaction RSA1 and create a new characteristic. Have a look at the screen shot for the basic settings.



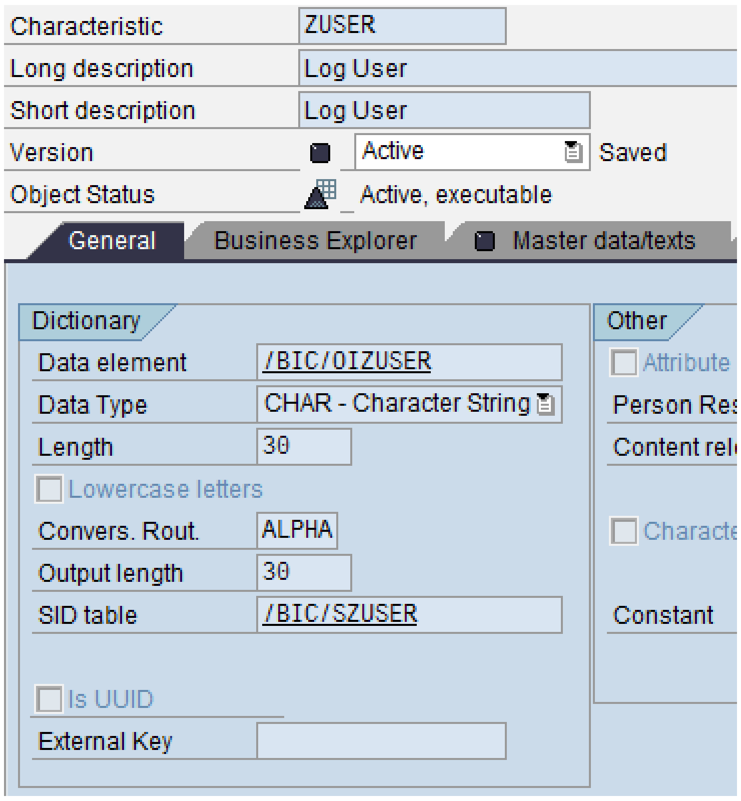
Characteristic	ZSAVEID
Long description	Save ID Logging
Short description	Save ID Logging
Version	🟩 Active Saved
Object Status	Active, executable

Data element	/BIC/OIZSAVEID
Data Type	CHAR - Character String
Length	32
☐ Lowercase letters	
Convers. Rout.	ALPHA
Output length	32
SID table	/BIC/SZSAVEID
☐ Is UUID	
External Key	

   The characteristic can be set to *'with texts'* on the master data tab strip.

2. Create a Characteristic for the User

   Still in transaction RSA1 create a new characteristic for the user. Alternatively you can use a characteristic from the content.



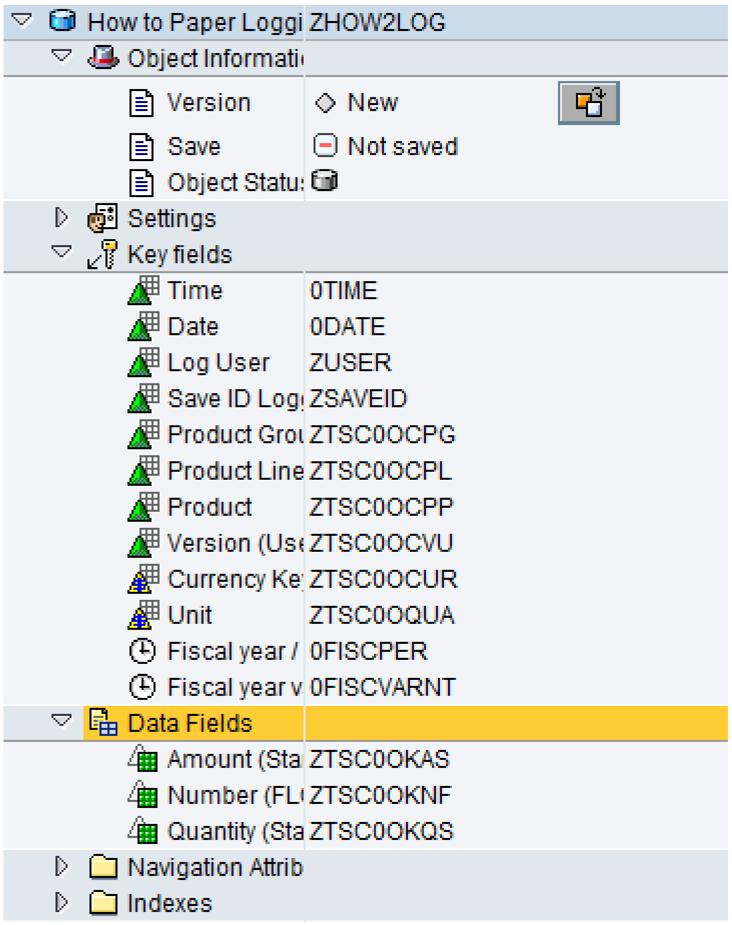
Characteristic	ZUSER	
Long description	Log User	
Short description	Log User	
Version	Active	Saved
Object Status	Active, executable	

Data element	/BIC/OIZUSER
Data Type	CHAR - Character String
Length	30
Lowercase letters	☐
Convers. Rout.	ALPHA
Output length	30
SID table	/BIC/SZUSER
Is UUID	☐
External Key	

3. Create a DataStore Object

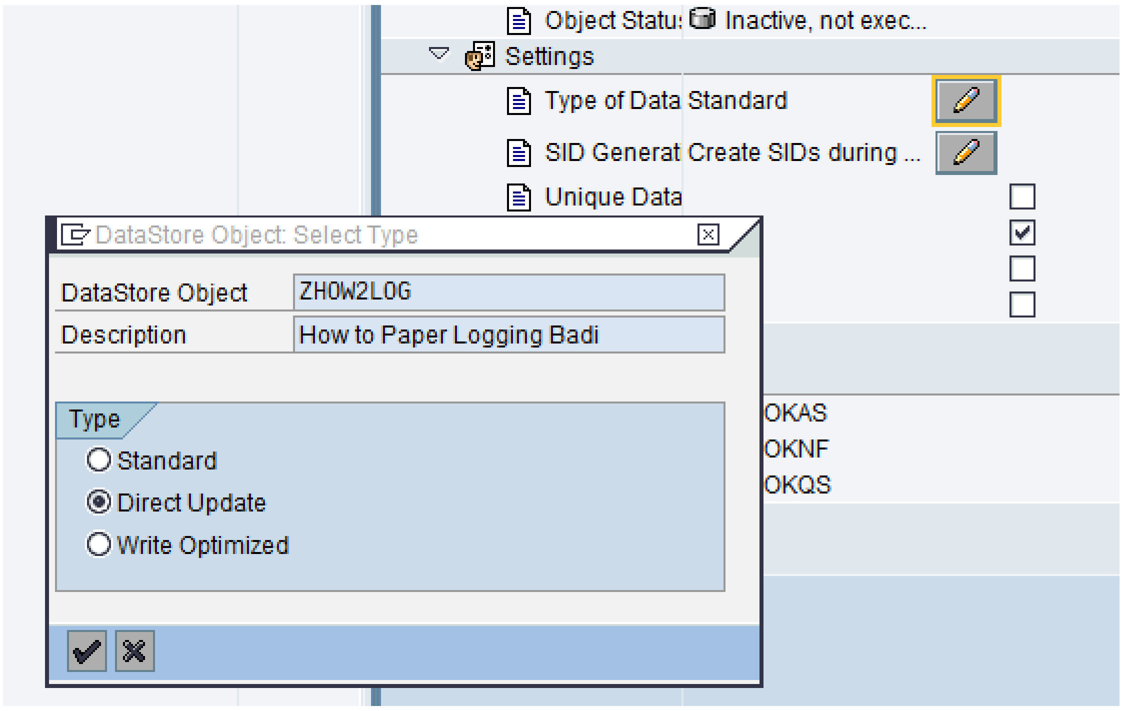
   Still in RSA1 go to the 'InfoProvider' section and create a new DataStore Object. As the key of the DataStore Object include all characteristics of the InfoCube for which you want to track the changes. If you like you can also choose a subset of the characteristics. Also add the characteristic for the user and the save-id as well as a characteristic for time (we use 0TIME) and the date (we use 0DATE).

   As data field in the DataStore Object use the key figures of your InfoCube.



How to Paper Loggi	ZHOW2LOG
Object Informati	
Version	New
Save	Not saved
Object Statu:	
Settings	
Key fields	
Time	0TIME
Date	0DATE
Log User	ZUSER
Save ID Log	ZSAVEID
Product Grou	ZTSC0OCPG
Product Line	ZTSC0OCPL
Product	ZTSC0OCPP
Version (Use	ZTSC0OCVU
Currency Ke	ZTSC0OCUR
Unit	ZTSC0OQUA
Fiscal year /	0FISCPER
Fiscal year v	0FISCVARNT
Data Fields	
Amount (Sta	ZTSC0OKAS
Number (FL	ZTSC0OKNF
Quantity (Sta	ZTSC0OKQS
Navigation Attrib	
Indexes	

Now go to the entry *'Settings'* and expand the node. Click on the button to change the type of the DataStore Object and select the option *'Direct Update'*.



Object Statu:	Inactive, not exec...
Settings	
Type of Data	Standard
SID Generat	Create SIDs during ...
Unique Data	☐
	☑
	☐
	☐

DataStore Object: Select Type

DataStore Object	ZHOW2LOG
Description	How to Paper Logging Badi

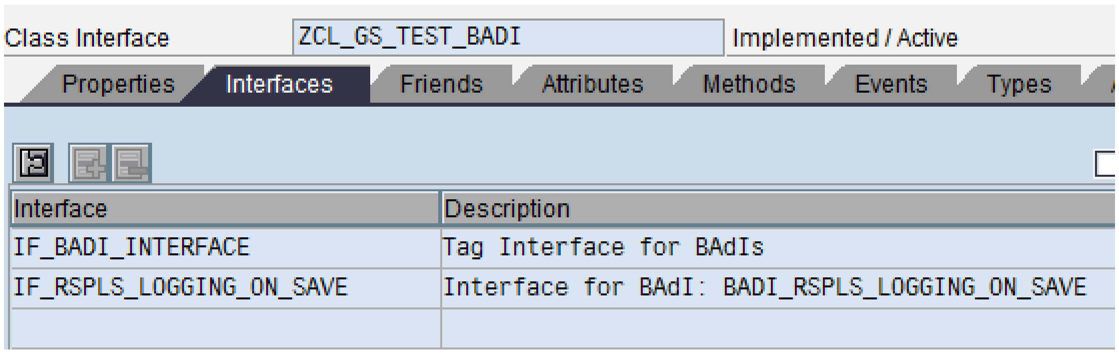
Type
- ○ Standard
- ◉ Direct Update
- ○ Write Optimized

You can now save and activate the DataStore Object.

4.2 Create the Class Implementing the BAdI Logic

1. Create the Implementing Class

   Go to the transaction se80 and create a new class. Choose an appropriate development class. Go to the tab ‘Interfaces’. Enter the following interface: `IF_BADI_INTERFACE` and `IF_RSPLS_LOGGING_ON_SAVE`.



Class Interface ZCL_GS_TEST_BADI Implemented / Active

Interface	Description
IF_BADI_INTERFACE	Tag Interface for BAdIs
IF_RSPLS_LOGGING_ON_SAVE	Interface for BAdI: BADI_RSPLS_LOGGING_ON_SAVE

2. Implement the Method `‘IF_RSPLS_LOGGING_ON_SAVE~LOG_DEFINED’`

   Go to the tab ’Methods’. You will see three methods here.

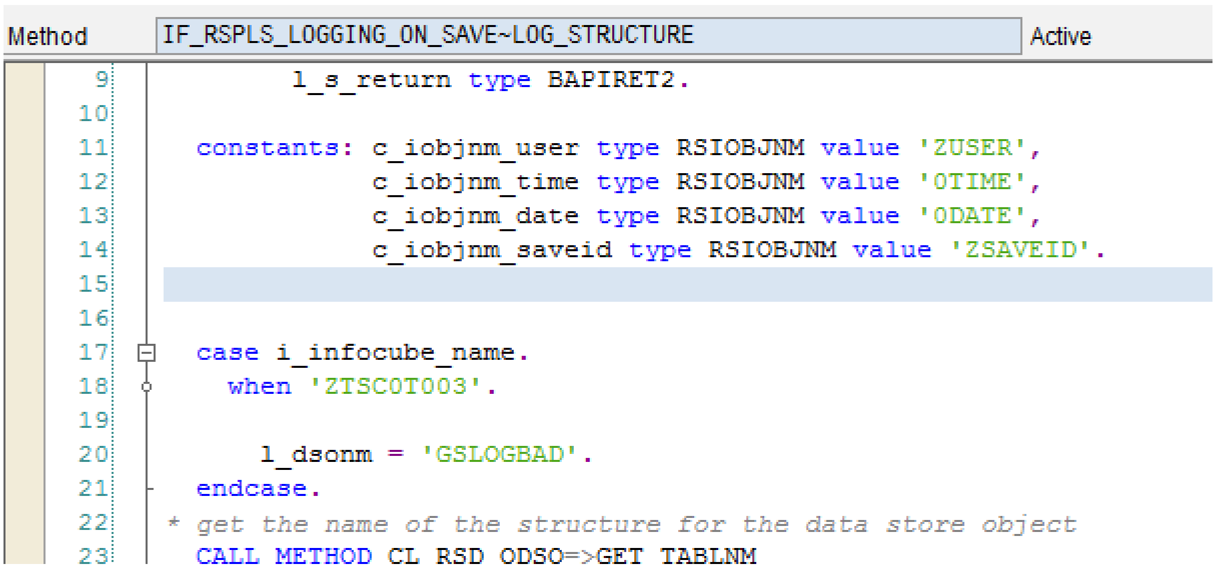
   The first method `‘IF_RSPLS_LOGGING_ON_SAVE~LOG_DEFINED’` is used to define whether for a given situation the logging should be switched on. Please note that in the definition of the enhancement implementation (see below) you have to specify whether for which InfoCube a given BAdI implementation should be called. Thus a BAdI implementation is called if and only if the InfoCube name is in the specified selection.

   In the given method you can specify whether say at the given moment or for the actual user a logging should be done. If the logging should be executed the method has to return a value for the exporting parameter `r_log_defined`. See the Appendix for a demo implementation of the method. Copy the demo implementation into your class and adapt it according to your needs.

3. Implement Method `‘IF_RSPLS_LOGGING_ON_SAVE~LOG_STRUCTURE’`

   Now implement the second method `‘IF_RSPLS_LOGGING_ON_SAVE~LOG_STRUCTURE’`. As already described above the idea of this method is that you tell the system how your target structure looks like at later the system will return you the data in this structure. In our case we want to write the data to our DataStore Object and will return information about its structure. Note that the method will be called for each InfoCube. In the method implementation we just rely on the name of the DataStore Object and of some of the used characteristics and retrieve all further necessary information dynamically.

   In order to adapt the coding to your needs you might have to replace the names of the characteristics at the beginning of the coding (see screen shot). Also you will have to adapt the case statement at the beginning of the coding to your InfoCube and DataStore Object name and then can reuse the rest of the coding as it is.



Method IF_RSPLS_LOGGING_ON_SAVE~LOG_STRUCTURE Active

```
         l_s_return type BAPIRET2.

  constants: c_iobjnm_user type RSIOBJNM value 'ZUSER',
             c_iobjnm_time type RSIOBJNM value '0TIME',
             c_iobjnm_date type RSIOBJNM value '0DATE',
             c_iobjnm_saveid type RSIOBJNM value 'ZSAVEID'.


  case i_infocube_name.
    when 'ZTSC0T003'.

      l_dsonm = 'GSLOGBAD'.
  endcase.
* get the name of the structure for the data store object
  CALL METHOD CL RSD ODSO=>GET TABLNM
```

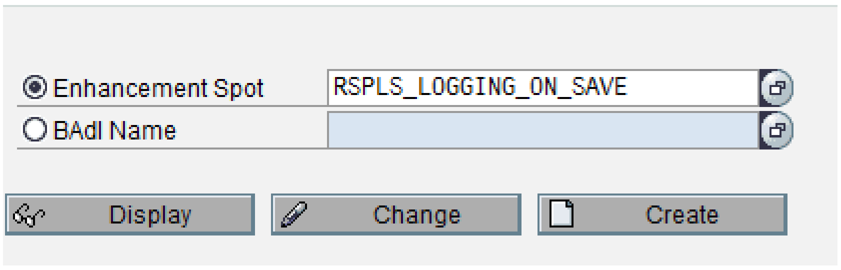
4. Implement Method `'IF_RSPLS_LOGGING_ON_SAVE~LOG_WRITE'`

   In the last method we implement the actual writing to the DataStore Object. As most of the work is done by the system this method is quite simple to implement. Again just use the copy from the Appendix. Again you will have to adapt the name of the InfoCube(s) and the DataStore Object(s).

4.3 Create and Test the Enhancement Spot Implementation

1. Create a New Enhancement Implementation

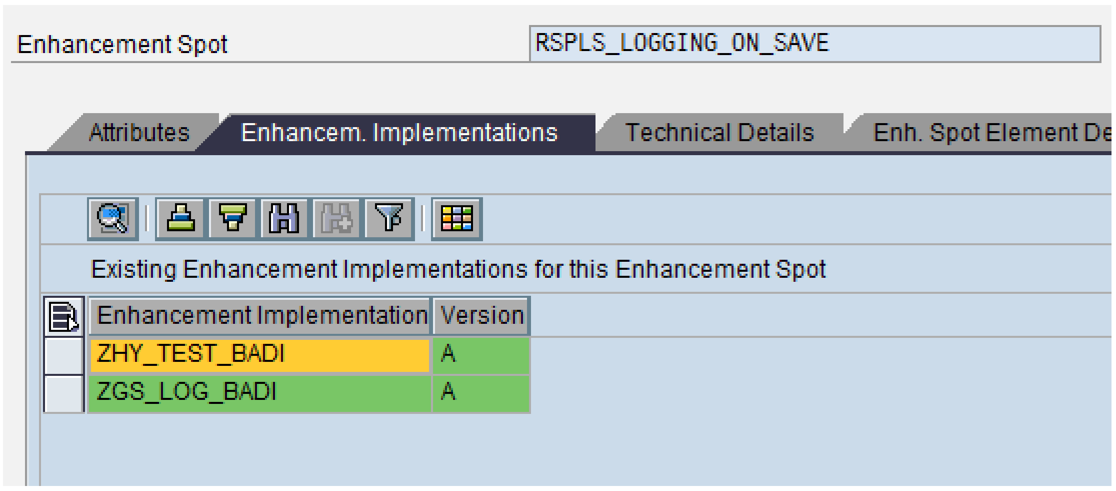
   Go to the transaction se18. Enter the name of the enhancement spot (`RSPLS_LOGGING_ON_SAVE`) and press the button *'Change'*.



[✓ Enhancement Spot] RSPLS_LOGGING_ON_SAVE

BAdI Name

In the next screen choose the tab *'Enhancement Implementations'*. If there are already some implementations for the BAdI you will find them here.

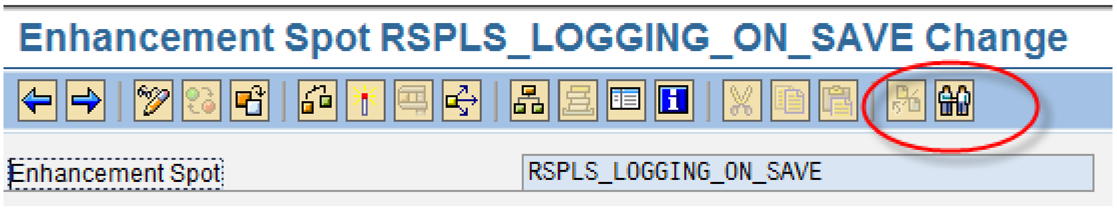


Enhancement Spot RSPLS_LOGGING_ON_SAVE

Existing Enhancement Implementations for this Enhancement Spot

Enhancement Implementation	Version
ZHY_TEST_BADI	A
ZGS_LOG_BADI	A

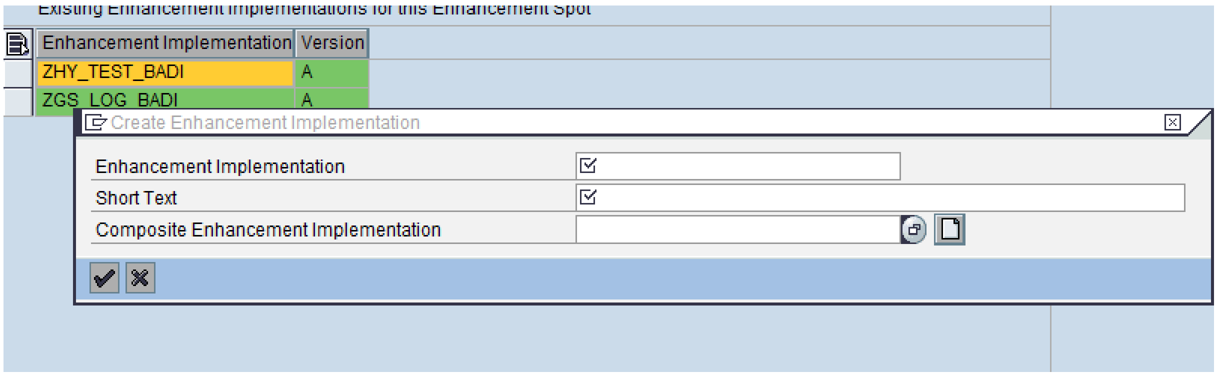
From the menu choose the button for creating a new enhancement spot implementation.



Enhancement Spot RSPLS_LOGGING_ON_SAVE Change

Enhancement Spot RSPLS_LOGGING_ON_SAVE

On the next screen enter a name and a description of your BAdI implementation.



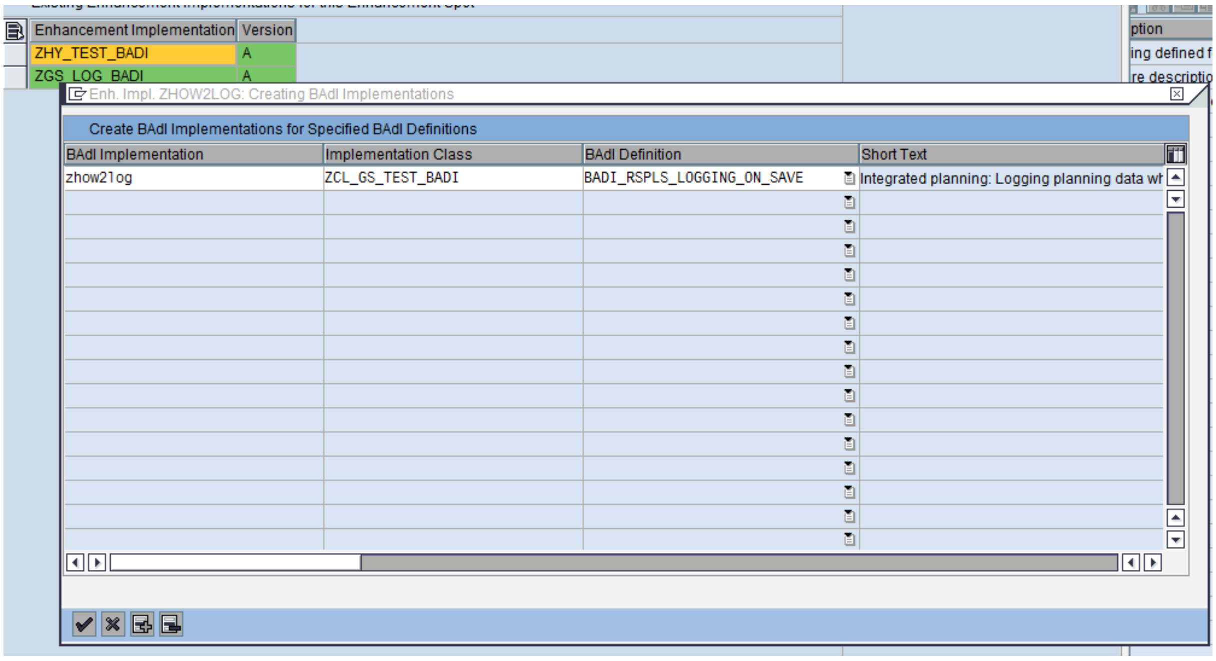
Existing Enhancement Implementations for this Enhancement Spot

Enhancement Implementation	Version
ZHY_TEST_BADI	A
ZGS_LOG_BADI	A

Create Enhancement Implementation

Enhancement Implementation	
Short Text	
Composite Enhancement Implementation	

Now enter the name of the implementation and the name of the class containing your implementation.



Enhancement Implementation	Version
ZHY_TEST_BADI	A
ZGS_LOG_BADI	A

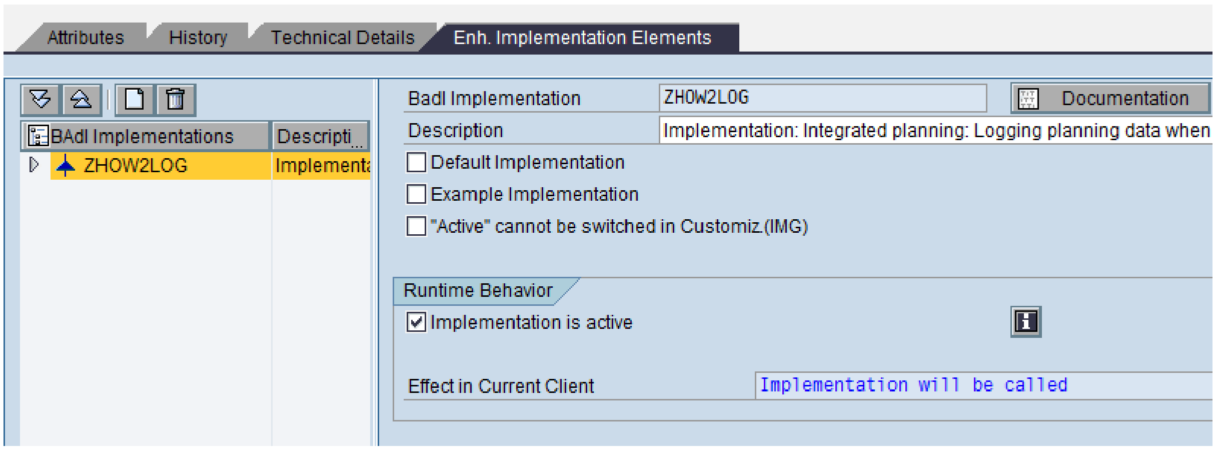
Enh. Impl. ZHOW2LOG: Creating BAdI Implementations

Create BAdI Implementations for Specified BAdI Definitions

BAdI Implementation	Implementation Class	BAdI Definition	Short Text
zhow2log	ZCL_GS_TEST_BADI	BADI_RSPLS_LOGGING_ON_SAVE	Integrated planning: Logging planning data wh

2. Set the properties of the implementation

   In the next screen you can set the properties of your implementation. Please check that your implementation is set to active.



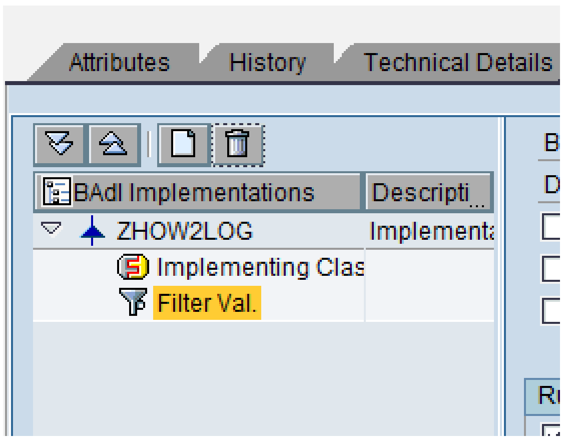
BAdI Implementations	Descripti...
ZHOW2LOG	Implementa

Badl Implementation	ZHOW2LOG
Description	Implementation: Integrated planning: Logging planning data when

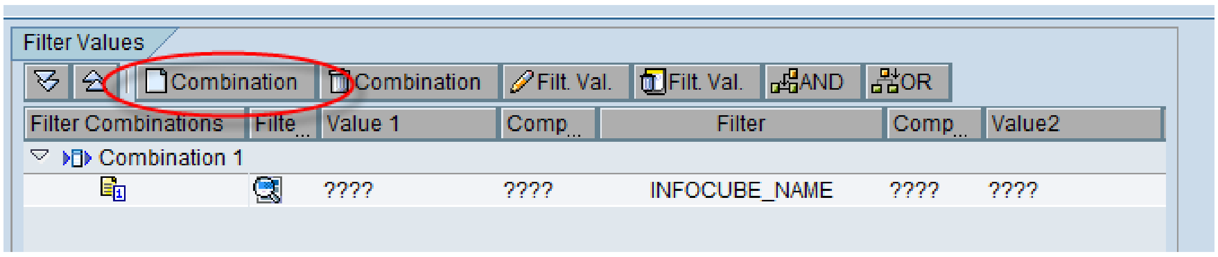
☐ Default Implementation
☐ Example Implementation
☐ "Active" cannot be switched in Customiz.(IMG)

Runtime Behavior
☑ Implementation is active
Effect in Current Client: Implementation will be called

Now expand the node with for your BAdI implementation and click on *'Filter Values'*.

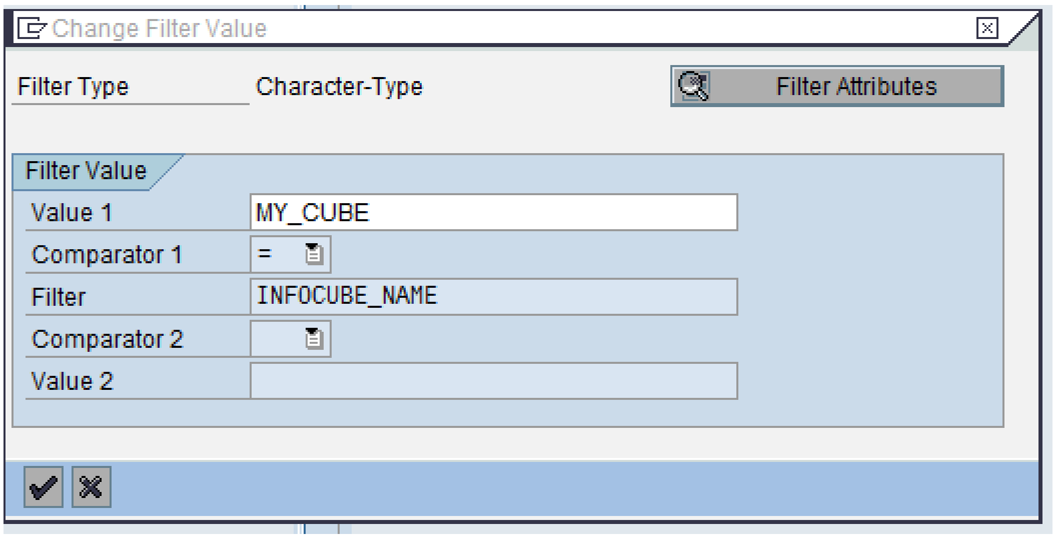


Now you can specify for which InfoCube your current BAdI implementation is called. For a new combination please press the button *'Combination'*.



Filter Combinations	Filte...	Value 1	Comp...	Filter	Comp...	Value2
Combination 1						
		????	????	INFOCUBE_NAME	????	????

By double clicking on the *'????'* in the line you will get a popup where you can enter the selection for the InfoCube (use the name of your InfoCube).



Filter Type	Character-Type

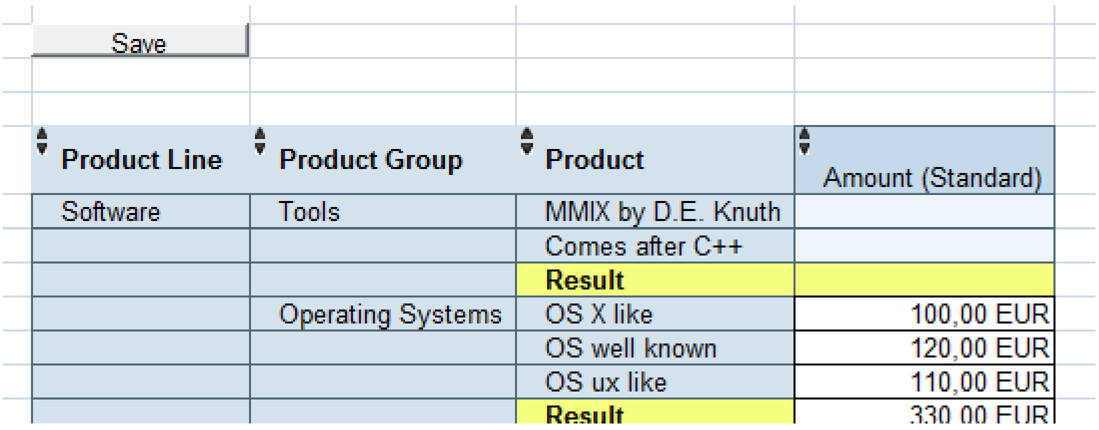
Filter Value

Value 1	MY_CUBE
Comparator 1	=
Filter	INFOCUBE_NAME
Comparator 2	
Value 2	

Now save and activate your new implementation.

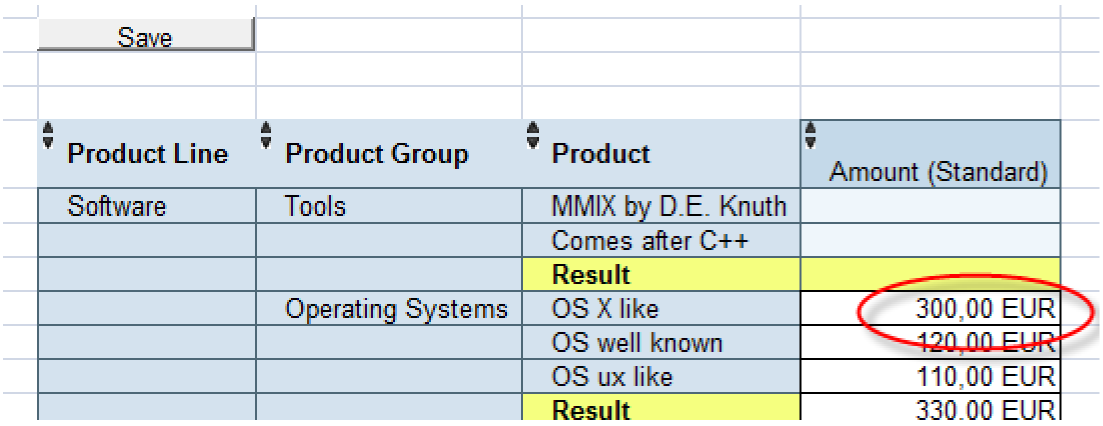
4.4 Test your Scenario

You can now test your scenario. Open a Web Layout or a BEx Analyzer Workbook.



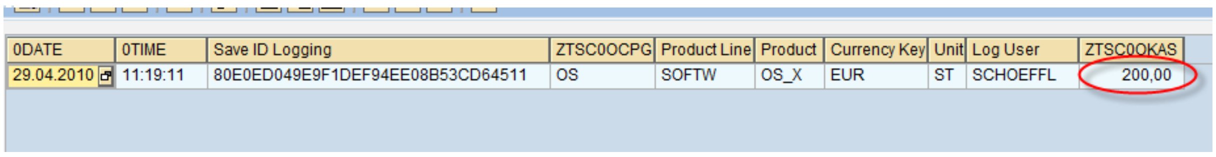
Product Line	Product Group	Product	Amount (Standard)
Software	Tools	MMIX by D.E. Knuth	
		Comes after C++	
		Result	
	Operating Systems	OS X like	100,00 EUR
		OS well known	120,00 EUR
		OS ux like	110,00 EUR
		Result	330,00 EUR

Enter some new data. In our example we change the amount from 100 € to 300 €.



Product Line	Product Group	Product	Amount (Standard)
Software	Tools	MMIX by D.E. Knuth	
		Comes after C++	
		Result	
	Operating Systems	OS X like	300,00 EUR
		OS well known	120,00 EUR
		OS ux like	110,00 EUR
		Result	330,00 EUR

We press save and see a change with a delta of 200 € being tracked in our DataStore Object.



0DATE	0TIME	Save ID Logging	ZTSC0OCPG	Product Line	Product	Currency Key	Unit	Log User	ZTSC0OKAS
29.04.2010	11:19:11	80E0ED049E9F1DEF94EE08B53CD64511	OS	SOFTW	OS_X	EUR	ST	SCHOEFFL	200,00

5. Appendix

This appendix contains a sample implementation of the three methods necessary for implementing the BAdI.

IF_RSPLS_LOGGING_ON_SAVE~LOG_DEFINED

```
method IF_RSPLS_LOGGING_ON_SAVE~LOG_DEFINED.
  check
   sy-uname = 'TESTUSER' .

  r_log_defined = rs_c_true.
endmethod.
```

IF_RSPLS_LOGGING_ON_SAVE~LOG_STRUCTURE

```
method IF_RSPLS_LOGGING_ON_SAVE~LOG_STRUCTURE.
  data: l_s_map          like LINE OF e_t_map,
        l_s_map_proposal type IF_RSPLS_LOGGING_ON_SAVE=>TN_S_MAP_PROPO
SAL.
  data: l_dsonm type rsdodsobject,
        l_t_iobj TYPE STANDARD TABLE OF BAPI6116IO,
        l_s_iobj like line of l_t_iobj,
        l_struc_name type TABNAME,
        l_s_details type BAPI6108,
        l_s_return type BAPIRET2.

* Please adapt the names of the characteristics to your situation
  constants: c_iobjnm_user type RSIOBJNM value 'ZUSER',
             c_iobjnm_time type RSIOBJNM value '0TIME',
             c_iobjnm_date type RSIOBJNM value '0DATE',
             c_iobjnm_saveid type RSIOBJNM value 'ZSAVEID'.

* please enter the name of your InfoCube(s) and DataStore Object(s)
  case i_infocube_name.
    when 'ZTSC0T003'.

      l_dsonm = 'ZHOW2LOG'.
  endcase.
* get the name of the structure for the DataStore object
  CALL METHOD CL_RSD_ODSO=>GET_TABLNM
    EXPORTING
      I_ODSOBJECT    = l_dsonm
    IMPORTING
      E_TABLNM       = l_struc_name
    EXCEPTIONS
      NAME_ERROR     = 1
      INPUT_INVALID  = 2
      others         = 3.
  IF SY-SUBRC <> 0.
    MESSAGE ID SY-MSGID TYPE SY-MSGTY NUMBER SY-MSGNO
               WITH SY-MSGV1 SY-MSGV2 SY-MSGV3 SY-MSGV4.
  ENDIF.

  e_structure_name = l_struc_name.
  clear e_t_map.

* get the structure from the dso
* get the list of info objects in the DataStore object
  CALL FUNCTION 'BAPI_ODSO_GETDETAIL'
    EXPORTING
      OBJVERS     = RS_C_OBJVERS-ACTIVE
      ODSOBJECT   = l_dsonm
    TABLES
      INFOOBJECTS = l_t_iobj.


* we do not need the record mode (usually 0RECORDMODE)...
  delete l_t_iobj where iobjtp = 'DPA'.
* also name, date, time, saveid, and requid come from the proposal
  delete l_t_iobj where infoobject = c_iobjnm_user.
  delete l_t_iobj where infoobject = c_iobjnm_date.
  delete l_t_iobj where infoobject = c_iobjnm_time.
  delete l_t_iobj where infoobject = c_iobjnm_saveid.


  loop at l_t_iobj into l_s_iobj.
    l_s_map-iobj_name = l_s_iobj-infoobject.

* get the field name in the dso structure
    CALL FUNCTION 'BAPI_IOBJ_GETDETAIL'
      EXPORTING
        VERSION    = RS_C_OBJVERS-ACTIVE
        INFOOBJECT = l_s_iobj-infoobject
      IMPORTING
        DETAILS    = l_s_details
        RETURN     = l_s_return.
    if l_s_return is initial.
      l_s_map-field_name = l_s_details-fieldnm.
      append l_s_map to e_t_map.
    endif.
  endloop.

* get the user name
  read table i_t_map_proposal into l_s_map_proposal
       with key field_type = IF_RSPLS_LOGGING_ON_SAVE=>N_C_FIELD_TYPE-
user.
  if sy-subrc is initial.
    l_s_map-iobj_name  = l_s_map_proposal-iobj_name.

    CALL FUNCTION 'BAPI_IOBJ_GETDETAIL'
      EXPORTING
        VERSION    = RS_C_OBJVERS-ACTIVE
        INFOOBJECT = c_iobjnm_user
      IMPORTING
        DETAILS    = l_s_details
        RETURN     = l_s_return.

    if l_s_return is initial.
      l_s_map-field_name = l_s_details-fieldnm.
      append l_s_map to e_t_map.
    endif.
  endif.

* get the date
  read table i_t_map_proposal into l_s_map_proposal
        with key field_type = IF_RSPLS_LOGGING_ON_SAVE=>N_C_FIELD_TYPE
-date.
  if sy-subrc is initial.
    l_s_map-iobj_name  = l_s_map_proposal-iobj_name.

    CALL FUNCTION 'BAPI_IOBJ_GETDETAIL'
      EXPORTING
        VERSION    = RS_C_OBJVERS-ACTIVE
        INFOOBJECT = c_iobjnm_date
      IMPORTING
        DETAILS    = l_s_details
        RETURN     = l_s_return.

    if l_s_return is initial.
      l_s_map-field_name = l_s_details-fieldnm.
      append l_s_map to e_t_map.
    endif.
  endif.

* get the time
  read table i_t_map_proposal into l_s_map_proposal
      with key field_type = IF_RSPLS_LOGGING_ON_SAVE=>N_C_FIELD_TYPE-
time.
  if sy-subrc is initial.
    l_s_map-iobj_name  = l_s_map_proposal-iobj_name.
    CALL FUNCTION 'BAPI_IOBJ_GETDETAIL'
      EXPORTING
        VERSION    = RS_C_OBJVERS-ACTIVE
        INFOOBJECT = c_iobjnm_time
      IMPORTING
        DETAILS    = l_s_details
        RETURN     = l_s_return.

    if l_s_return is initial.
      l_s_map-field_name = l_s_details-fieldnm.
      append l_s_map to e_t_map.
    endif.
  endif.

* The save id is important if you are using MultiCubes. All records sa
```

```
ved in
* one step (in different InfoCubes) will get the same saveid. If you a
re using
* only one InfoCube you do not need the save id
* get the save id
  read table i_t_map_proposal into l_s_map_proposal
       with key field_type = IF_RSPLS_LOGGING_ON_SAVE=>N_C_FIELD_TYPE-
saveid.
  if sy-subrc is initial.
    l_s_map-iobj_name  = l_s_map_proposal-iobj_name.
    CALL FUNCTION 'BAPI_IOBJ_GETDETAIL'
      EXPORTING
        VERSION    = RS_C_OBJVERS-ACTIVE
        INFOOBJECT = c_iobjnm_saveid
      IMPORTING
        DETAILS    = l_s_details
        RETURN     = l_s_return.

    if l_s_return is initial.
      l_s_map-field_name = l_s_details-fieldnm.
      append l_s_map to e_t_map.
    endif.
  endif.

endmethod.
```

IF_RSPLS_LOGGING_ON_SAVE~LOG_WRITE

```
method IF_RSPLS_LOGGING_ON_SAVE~LOG_WRITE.
* the log table has the same structure as the dso - insert
* it directly
  data: l_dsonm type RSDODSOBJECT.

  case i_infocube_name.
    when 'ZTSC0T003'.
      l_dsonm = 'ZHOW2LOG'.
  endcase.

  CALL FUNCTION 'RSDRI_ODSO_INSERT'
    EXPORTING
      I_ODSOBJECT                     = l_dsonm
      I_T_INSERT                      = i_t_logging_data
* IMPORTING
*   E_RECORDS                       =
   EXCEPTIONS
     DATA_TARGET_NOT_ODS             = 1
     ODS_TYPE_NOT_TRANSACTIONAL      = 2
     ACTIVE_TABLE_NAME_NOT_FOUND     = 3
     RECORD_KEY_ALREADY_EXISTS       = 4
     ARRAY_INSERT_FAILED             = 5
     INTERNAL_ERROR                  = 6
     OTHERS                          = 7
```

```
              .
  IF SY-SUBRC <> 0.
        MESSAGE ID SY-MSGID TYPE sy-msgty NUMBER SY-MSGNO
                   WITH SY-MSGV1 SY-MSGV2 SY-MSGV3 SY-MSGV4.
  ENDIF.
* The request ID is not written into the log table. If
* the request ID should be saved as well we recommend to
* do that in an additional data base table. The table
* should be built up with the following structure:
* request id (type rsrequnr)
* save id (char 32)
* infocube name (type tn_infocube_name).
* When using MultiProviders with more than one Realtime
* InfoCube then all records that are saved simultaneously
* hold the same save id. Via the table, the names of
* the corresponding InfoCubes can be found as well as
* the request into which the data was written.
endmethod.
```