Extracting SAP ECC Compounding Hierarchies into SAP BI using Custom Datasource

Applies to:
SAP ECC 6.0, SAP BI 7.0. For more information, visit the EDW homepage

Summary
Standard Business Content extractors support main hierarchies (e.g., cost center, general ledger [G/L] account, material, plant, work center), but they do not support all hierarchies in the SAP ECC source system, such as Vendor Hierarchy (MKH1). In this case, SAP does not provide a standard Datasource to link ECC hierarchies to BW. This document guides you to extract compounding hierarchy such as Vendor compounded with Purchasing Organization.

Author: Srinivasa Raju B
Company: Deloitte Consulting India Private Ltd.
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Author Bio
Srinivasa Raju B is currently working in Deloitte Consulting India Private Ltd. He is experienced in SAP BI, BO and ABAP.
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Overview

While standard business content extractors support main hierarchies (e.g., cost center, general ledger [G/L] account, material, plant, work center), there are several other hierarchies in the ECC source system, such as vendor hierarchy (MKH1), that these extractors do not support. In this case, SAP does not provide a standard Datasource to link ECC hierarchies to the BW. This becomes even more complicated when there is a compounding to the hierarchy, (e.g., if vendor compounded with purchasing organization).

Scenario

The vendor hierarchy is maintained with transaction LFMH in ECC. This vendor hierarchy is based on the combination of vendor and purchasing organization. This example demonstrates the idea of compounding. Below, a small vendor hierarchy in transaction MKH1 is shown with a category called C for the sample data used in this article (Figure 1).

In the vendor hierarchy example, the hierarchy node data is stored in the table LFMH (Figure 2). In this table, each node of the hierarchy is stored in fields LIFNR and EKORG. Links to child nodes are available in the fields HLIFNR and HEKORG. For example, in Figure 2, Vendor 1000/0008000001 has a parent node 1000/0008000000. Those records are the tabular representation of the Hierarchy Category C created with MKH1 in Figure 1.

We need to load this hierarchy into 0VEN_PURORG info object in SAP BI.
**Configure the Extractor in ECC**

The following steps illustrate how the aforementioned workaround can be utilized. These steps include creating an empty hierarchy, generating the Datasource, and populating the Datasource with data from the LFMH table via EXIT_SAPLRSAP_004.

**Step 1: Enter transaction GS01 to create an empty set**

While any set name can be entered, the Table Name must be LFMH. Set type as basic set, and then press enter. In the pop-up window, select field name as LIFNR, press enter, and then click on the save icon.

**Step 2: Use transaction BW07 to generate the Datasource for Customer Reference Set hierarchies**

Enter LFMH in the table for set field and LIFNR in the field name. Because the hierarchy is being loaded to the compounded Info Object 0VEN_PURORG, the Datasource must be created by providing the data element for compounding which is EKORG in this example. Enter the Datasource name or you can also allow the system to generate the Datasource name. In this example, a custom name ZDS_VEN_PURORG_HIER is entered for the Datasource (refer the Figure 3 below). Then generate the Datasource by executing F8.

To ensure that a Datasource is generated correctly, use the Datasource browser (transaction code RSA6) to display it. As shown below, ZSD_VEN_PURORG_HIER is found via menu path SAP-R/3>FI>FI-SL>FI-SL-IO.
Step 3: Add ABAP code in the user exit EXIT_SAPLRSAP_004

This coding allows the user to populate the Datasource created in step 2. If this exit is not active, transaction CMOD can be used to make it active. This process is well documented on the website, help.sap.com. The document is titled, “Enhancements to the SAP Business Information Warehouse.”

To access the user exit to enter the ABAP code, go into transaction SE38 and enter ZXRSAU04 in the Program field. Click on the Change button to enter the ABAP code given below:

```abap
CASE i_datasource.
  WHEN 'ZDS_VEN_PURORG_HIER'.
    CALL FUNCTION 'ZFM_VEN_PURORG_HIER_TRANSFER'
      EXPORTING
        I_S_HIEBAS = I_S_HIEBAS
        I_S_HIEFLAG = I_S_HIEFLAG
        I_S_HIERSEL = I_S_HIER_SEL
      TABLES
        I_T_LANGU = I_T_LANGU
        E_T_HIETEXT = C_T_HIETEXT
        E_T_HIEINTV = C_T_HIEINTV.
  END_CASE.
```

In the above, a function module, “ZFM_VEN_PURORG_HIER_TRANSFER”, has been called. Please find the function module code at the end.

Configure the Extractor in BW

Upon finishing the extractor on the ECC side, the BW portion will need to be configured to load the hierarchy into a BW Info Object. This section explains how to replicate the created Datasource in the BW and assign it to the Infosource that feeds the Info Object where the hierarchy is assigned. The section then illustrates how to create an Info Package from the Datasource, select the hierarchy, and load it into the BW, where the hierarchy will then be available for reporting.

Step 1: Prepare the Info Object to accept data from the Datasource

In BW, go to Administrator Workbench via RSA1 and find the desired Info Object; in this case, 0VEN_PURORG. On the Hierarchy tab, make sure the check box with hierarchies is selected. The Info Object 0VEN_PURORG is ready to hold the data coming from the Datasource.
Step 2: Replicate the Datasource in SAP BI

Click on source systems in the RSA1 transaction. Find the desired source system in the pane on the right side, right-click on it, and select Datasource Overview from the pop-up menu.

After completing the above, follow the path, SAP Application Components>Financial Accounting>Special Purpose Ledger> Master Data Financial Accounting: Special Purpose Ledger. All Datasources generated from the BW07 transaction in ECC fall under the Master Data Financial Accounting: Special Purpose Ledger node. Right-click on Master Data Financial Accounting: Special Purpose Ledger to perform Replicate Datasources. ZDS_VEN_PURORG_HIER appears under Data Financial Accounting: Special Purpose Ledger after the replication is complete.

Step 3: Assign the Datasource to the Infosource

Click on the icon with a dash next to ZDS_VEN_PURORG_HIER in the screen shot below to assign it to an Infosource. Because the Infosource name is usually the same as the Info Object name, label the Infosource 0VEN_PURORG by entering 0VEN_PURORG in the ‘Others’ field. Click on the continue icon. Select ‘Yes’ on the pop-up screen to complete the assignment.

On the Transfer Rules screen that appears below, in the Info Object column, type the Info Object name, “0VEN_PURORG” in the field to the right of the LIFNR field. Type its compounding Info object’s name, “0PURCH_ORG” in the field to the right of the EKORG field.
Step 4: Create the Info Package and load the hierarchy data.

Enter transaction RSA1. Under Infosource, find the Infosource 0VEN_PURORG. The Datasource ZDS_VEN_PURORG_HIER is now available under the ECC source system where the Datasource was created. Right-click on the ECC source system and select Create Info Package. Add a description of the Info Package in the Info Package Description field, as shown below, and click on the Save button.

After clicking on the Save button, the Maintain Info Package screen will appear (shown below). On the Hierarchy Selection tab, select the hierarchy Z_VEN_PURORG_SET.

No other options need to be changed. The Load Hierarchy...and Flag for Activation or Activate It check box is checked by default. Select the Schedule tab and click on the Start button to load the hierarchy from the source system. Like any other Datasource, the load with the monitor icon ⌁ can be checked.
Once the load is successful, the Z_VEN_PURORG_SET hierarchy can be viewed from transaction RSH1 by double-clicking on it from the list. The icon depicting a tree can also be clicked in the toolbar of the monitor to display the hierarchy once the load is completed. The result is shown below:

The hierarchy shown above depicts the ECC side from transaction MKH1. Now, the Z_VEN_PURORG_SET hierarchy can be included in any reports using the Info Object 0VEN_PURORG. The description of the nodes will not be present on the hierarchy. To load them, another text Datasource must be added and loaded into 0VEN_PURORG. This is because the texts are stored into a different table.

Function Module Code

FUNCTION ZFM_VEN_PURORG_HIER_TRANSFER.

**Local Interface:**

**IMPORTING**

**VALUE(I_S_HIEBAS) TYPE RSAP_S_HIEBAS**

**VALUE(I_S_HIEFLAG) TYPE RSAP_S_HIEFLAG**

**VALUE(I_S_HIERSEL) TYPE RSAP_S_HIER_LIST**

**TABLES**

**I_T_LANGU TYPE SBIWM_T_LANGU**

**E_T_HIETEXT  TYPE  RSAP_T_HIETEXT**

**E_T_HIENODE TYPE RSAP_T_HIENODE**

**E_T_FOLDERT TYPE RSAP_T_FOLDERT OPTIONAL**

**E_T_HIEINTV TYPE RSAP_T_HIEINTV OPTIONAL**

**EXCEPTIONS**

**INVALID_HIERARCHY_FLAG**

**APPLICATION_ERROR**

**--------------------------------------------------------------------------**

DATA: lt_hiers LIKE rshiertrsf OCCURS 0 WITH HEADER LINE,
lt_nodetab LIKE snodetext OCCURS 0 WITH HEADER LINE,
lv_linked_node LIKE roshienode-link.

**---- Define application data**

DATA: lt_hierarchies TYPE hierarchies,
ls_hierarchy LIKE LINE OF lt_hierarchies.

gv_datefrom = i_s_hiersel-datefrom.
gv_dateto = i_s_hiersel-dateto.
*---- Get text of hierarchie
IF i_s_hieflag-hietabfl IS INITIAL. "// Info object have to have hier.
   RAISE invalid_hierarchy_flag.
ENDIF.
gv_this_info_object = '0VEN_PURORG'. "i_s_hiebas-chahasnm.

CLEAR: e_t_hietext, e_t_hietext[].
*---- Set top node and read vendor hierarchy into node table
* // Set first node
CLEAR: e_t_hienode, e_t_hienode[].
CLEAR: e_t_foldert, e_t_foldert[].

   e_t_hienode-iobjnm = '0HIER_NODE'.
   e_t_hienode-nodename = '~ROOT'.
   e_t_hienode-tlevel = 1.
APPEND e_t_hienode.
* // Get texts of root
LOOP AT i_t_langu where langu = 'E'.
   CLEAR e_t_foldert.
   MOVE i_t_langu-langu TO e_t_foldert-langu.
   MOVE i_t_langu-langu TO e_t_hietext-langu.
   MOVE '0HIER_NODE' TO e_t_foldert-iobjnm.
   MOVE '~ROOT' TO e_t_foldert-nodename.
   SELECT SINGLE * FROM TLHITT WHERE spras EQ 'E'
      AND hityp EQ 'C'.
   IF sy-subrc EQ 0.
      e_t_hietext-txtsh = tlhitt-vtext.
      e_t_hietext-txtmd = tlhitt-vtext.
      e_t_hietext-txtlg = tlhitt-vtext.
      MOVE e_t_hietext-txtsh TO e_t_foldert-txtsh.
      MOVE e_t_hietext-txtmd TO e_t_foldert-txtmd.
      MOVE e_t_hietext-txtlg TO e_t_foldert-txtlg.
   ENDIF.
   APPEND e_t_foldert.
   APPEND e_t_hietext.
ENDLOOP.

*---- If Datasource time-independent -> Take current date
IF i_s_hieflag-hiendtfl IS INITIAL.
   gv_datefrom = sy-datum.
   gv_dateto = sy-datum.
ENDIF.

*---- Set selection date
IF gv_dateto IS INITIAL.
   gv_dateto = '99991231'.
ENDIF.

*---- Get customer hierarchy
SELECT * FROM 1fmh INTO TABLE lt_hierarchies
   WHERE hityp EQ 'C'
      AND hlifnr EQ space
      AND ( ( datab <= gv_dateto ) AND
            ( datbi >= gv_dateto ) ).
* IF sy-subrc NE 0.
* RAISE hierarchy_tab_not_found.
* ENDF.
LOOP AT lt_hierarchies INTO ls_hierarchy
  WHERE hlifnr EQ space. "// Get all roots
  PERFORM setbwnode TABLES e_t_hienode
    USING ls_hierarchy '2'
    CHANGING lv_linked_node.
  check lv_linked_node eq space.
  PERFORM getchildren TABLES e_t_hienode
    USING ls_hierarchy '2'.
ENDLOOP.
*---- Set tlevel of hierarchy table for next call
LOOP AT e_t_hienode.
  IF i_s_hieflag-hiendtfl IS INITIAL.
    clear e_t_hienode-datefrom.
    clear e_t_hienode-dateto.
  ENDF.
  MOVE e_t_hienode-nodename TO lt_nodetab-name.
  MOVE e_t_hienode-tlevel TO lt_nodetab-tlevel.
  MOVE e_t_hienode-link TO lt_nodetab-link.
  e_t_hienode-nodeid = sy-tabix.
  MODIFY e_t_hienode.
  APPEND lt_nodetab.
ENDLOOP.
*---- Get index data for parent child next depending on tlevel
CALL FUNCTION 'RS_TREE_CONSTRUCT' TABLES
  nodetab = lt_nodetab
EXCEPTIONS
  tree_failure = 1
  id_not_found = 2
  wrong_relationship = 3
  OTHERS = 4.
IF sy-subrc NE 0.
  RAISE application_error.
ENDIF.
*---- Pass data to originale table
DATA: l_hlp_sy_tabix LIKE sy-tabix.
LOOP AT lt_nodetab.
  l_hlp_sy_tabix = sy-tabix.
  READ TABLE e_t_hienode INDEX l_hlp_sy_tabix.
  CHECK sy-subrc = 0.
  e_t_hienode-link = lt_nodetab-link.
  e_t_hienode-parentid = lt_nodetab-parent.
  e_t_hienode-childid = lt_nodetab-child.
  e_t_hienode-nextid = lt_nodetab-next.
  MODIFY e_t_hienode INDEX l_hlp_sy_tabix.
ENDLOOP.
ENDFUNCTION.
Declare Global data in the Global Include of the function module

function-pool vhbw. "MESSAGE-ID ..

TYPE-POOLS: rhi.

INCLUDE rmcsionm.

* Specific types and data
TABLES: tlhitt, thitt, lfmh.

TYPES: hierarchies LIKE SORTED TABLE OF lfmh
    WITH NON-UNIQUE KEY hlifnr HEKORG,
    hierarchy TYPE LINE OF hierarchies.

DATA: gv_this_info_object LIKE rodcchabas-chabasnm.
    * Increment nodeid
DATA: gv_nodeid LIKE ROSHIENODE-NODEID.
DATA: gv_datefrom LIKE roshiersel-datefrom.
DATA: gv_dateto LIKE roshiersel-dateto.
DATA: BEGIN OF GS_NODE_IDX,
    nodename LIKE roshienode-nodename,
    datefrom LIKE roshienode-datefrom,
END OF GS_NODE_IDX,
GT_NODE_IDX LIKE HASHED TABLE OF GS_NODE_IDX
    WITH UNIQUE KEY nodename
datefrom.

DEFINE next_nodeid.
    add 1 to gv_nodeid.
    move gv_nodeid to &1.
END-OF-DEFINITION.

*---------------------------------------------------------------------
* Form SETBWNODE
*---------------------------------------------------------------------
* Maps nodo into Bw hierarchy format
*---------------------------------------------------------------------
* -->PTR_HIENODE BW Nodes
* -->PSI_HIERARCHY Actual node
* -->PVI_LEVEL Node level
*---------------------------------------------------------------------
FORM setbwnode TABLES ptr_hienode TYPE rsap_t_hienode
    USING value(psi_hierarchy) TYPE hierarchy
    value(pvi_level) TYPE rsap_s_hienode-tlevel
    CHANGING value(pvc_link) LIKE roshienode-link.
STATICS: ls_hienode LIKE LINE OF ptr_hienode,
    BEGIN OF ls_nodename,
        ekorg LIKE psi_hierarchy-ekorg,
        lifnr like psi_hierarchy-lifnr,
    END OF ls_nodename.
    * ls_hienode-nodeid = psi_hierarchy-kunnr.
    next_nodeid ls_hienode-nodeid.
    * Fill node name with attributes in following order
    ls_nodename-lifnr = psi_hierarchy-lifnr.
    ls_nodename-ekorg = psi_hierarchy-ekorg.
    ls_hienode-nodename = ls_nodename.
    ls_hienode-tlevel = pvi_level.
ls_hienode-iobjnm = gv_this_info_object.
ls_hienode-datefrom = psi_hierarchy-datab.
ls_hienode-dateto = psi_hierarchy-datbi.

* Node already exist ?
  * { Mark this node as linked node and read no childs } : read childs
  READ TABLE GT_NODE_IDX TRANSPORTING NO FIELDS
    WITH TABLE KEY
      ls_hienode-iobjnm = ls_nodename
    datefrom = ls_hienode-datefrom.
  IF sy-subrc EQ 0.
    pvc_link = ls_hienode-link = 'X'.
  else.
    clear: pvc_link, ls_hienode-link.
    gs_node_idx-nodename = ls_nodename.
    gs_node_idx-datefrom = ls_hienode-datefrom.
    insert gs_node_idx into table gt_node_idx.
  ENDIF.
  APPEND ls_hienode TO ptr_hienode.
ENDFORM.  " SETBWNODE

*&---------------------------------------------------------------------
* &  Form GETCHILDREN
* &---------------------------------------------------------------------
*  *<->PTR_HIENODE      Nodes in BW Format
*  *--->PSI_NODE        Actual node
*  *--->PVI_LEVEL       Deep
*---------------------------------------------------------------------
FORM GETCHILDREN TABLES ptr_hienode TYPE rsap_t_hienode
  USING value(psi_node) TYPE hierarchy
    value(pvi_level) TYPE rsap_s_hienode-tlevel.
DATA:  lv_level LIKE pvi_level,
      lv_linked_node LIKE roshienode-link.
*---- Define application data
DATA:  lt_hierarchies TYPE hierarchies,
      ls_hierarchy LIKE LINE OF lt_hierarchies.
*---- Get customer hierarchy
SELECT * FROM lfmh INTO TABLE lt_hierarchies
  WHERE hityp EQ psi_node-hityp
    AND hlifnr EQ psi_node-lifnr
    AND hekorg EQ psi_node-ekorg
    AND (( datab <= psi_node-datbi ) AND
           ( datbi >= psi_node-datab ) )
    AND (( datab <= gv_dateto ) AND
           ( datbi >= gv_datefrom ) ).

  lv_level = pvi_level + 1.
LOOP AT lt_hierarchies INTO ls_hierarchy.
  PERFORM setbwnode TABLES ptr_hienode
    USING ls_hierarchy lv_level
    CHANGING lv_linked_node.
  check lv_linked_node eq space.
  PERFORM getchildren TABLES ptr_hienode
    USING ls_hierarchy lv_level.
ENDLOOP.
ENDFORM.  " GETCHILDREN
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Hierarchies

Enhancements to the SAP Business Information Warehouse

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