Sreehari V Pillai

March 21, 2018 | 3 minute read

Handling SELECT OPTIONS in CDS using Table Function

Introduction

This quick blog describes how to push down select options feature of ABAP layer to CDS using Table functions. Before reading this short blog, I would suggest you to go through AMDP-Handling select options

We have been seeing many questions in SCN and other forums regarding how to use select options in AMDP , CDS etc. SELECT OPTIONS is not an SQL feature . Its an ABAP (or OPEN SQL) feature which SQL script does not understand . So, thinking to push this select option variable (range) directly to DB layer is not possible .

Implementation

What can we do ? Only filtering technique SQL can understand is using a where clause . In select options ,we have many choices of passing inputs , like EQ , NE , CP , BETWEEN etc. If we can convert these options into a where clause understood by SQL , we can execute it dynamically in the DB layer.

Can I use Select options in CDS ?

Yes you can , but only in the outer layer right after projecting the data , like we do in ABAP. That is, while consuming this CDS from the ABAP layer you can use the range variable . But this is not what we are looking at . We need to push this down to the DB layer .

Let us create a table function first, to fetch the list of materials along with its text .

Name: *	ZDEMO_SEL_OPT
Description: *	Select Options Demo
Original language:	EN

```
@EndUserText.label: 'Select Options Demo'
define table function ZDEMO_SEL_OPT
with parameters sel_opt : abap.char( 1000 )
returns {
    mandt : abap.clnt;
    matnr : matnr;
    maktx : maktx ;
}
implemented by method zcl_adt=>get_material;
```

This table function accepts a string as parameter and returns the material number and text .

In the corresponding implementation, we use **APPLY_FILTER function** available in SQL to apply dynamic where clause. So, in the **sel_opt** parameter of table function, we are supposed to pass a dynamic where clause corresponding to the select options .

▶ Ｇ ZCL_ADT ▶

```abap
CLASS zcl_adt DEFINITION
    PUBLIC
    FINAL
    CREATE PUBLIC .

    PUBLIC SECTION.
      INTERFACES : if_amdp_marker_hdb.
      CLASS-METHODS : get_material for TABLE FUNCTION ZDEMO_SEL_OPT.
    PROTECTED SECTION.
    PRIVATE SECTION.
ENDCLASS.


CLASS zcl_adt IMPLEMENTATION.
method get_material BY DATABASE FUNCTION FOR HDB LANGUAGE  SQLSCRIPT OPTIONS READ-ONLY using mara makt.

  lt_mara  = apply_filter( mara , :sel_opt );

  return select mara.mandt , mara.matnr , makt.maktx
      from :lt_mara mara inner join makt makt
      on mara.mandt = makt.mandt and
         mara.matnr = makt.matnr and
         makt.spras = 'E';
ENDMETHOD.
ENDCLASS.
```

Here, the filter is applied on mara table and the returned result set is saved in a variable to use further.

Now the ABAP side.

```abap
data : l_matnr type matnr,
       lt_tab type TABLE OF zdemo_sel_opt,
       L_WHERE TYPE STRING.
SELECT-OPTIONS : s_matnr for l_matnr.



START-OF-SELECTION.
```

```
L_WHERE = CL_SHDB_SELTAB=>combine_seltabs(
                           EXPORTING it_named_seltabs =
                               value #( ( name = 'MATNR' dref = REF #( s_matnr[] ) ) )
                               iv_client_field = 'MANDT'
                     ).

WRITE L_WHERE.
```

What happening here is ,

The abap program has a selection screen with material number as a select option.

The **CL_SHDB_SELTAB** and it's static method **combine_sel_tabs** returns a dynamic where clause based on the select option variable we pass .

We can specify multiple fields and it''s range variables together . This must be done when all the specified columns are available in the target projection. (We can specify MATNR , ERSDA and MATKL together as all these fields are available in MARA table).

Client column name is an optional parameter. If we pass this field , client field is also added in the dynamic where clause.

I passed 2 material numbers in the selection screen and the generated where clause is

```
test

MANDT = '   ' AND ( MATNR = '000000000011000643'  OR MATNR = '000000000011001212')
```

Now, we shall pass this value (where clause) to the table function we created.

```
select * from zdemo_sel_opt( sel_opt = @l_where ) into table @lt_tab.
```

and the where clause is executed in the DB layer and data is filtered.

Row	MATNR [C(18)]	MAKTX [C(40)]
1	000000000011000643	
2	000000000011001212	

Now , I made a small change in the SQL Script code in table function. Now the columns projected have new names.

```
lt_mat = select mara.mandt as Client,
                mara.matnr as Material,
                makt.spras as Lang,
                makt.maktx as Description
    from  mara mara inner join makt makt
            on   mara.mandt = makt.mandt and
                 mara.matnr = makt.matnr;

lt_out = apply_filter( :lt_mat , :sel_opt);

return select Client as MANDT , Material as MATNR , Description as MAKTX from :lt_out;
ENDMETHOD
```

Now we are applying the filter on a variable which has fields Client , Material , lang and Description. So , changed the dynamic where clause as

```
L_WHERE = CL_SHDB_SELTAB=>combine_seltabs(
                                EXPORTING it_named_seltabs =
                                    value #( ( name = 'Material' dref = REF #( s_matnr[] ) )
                                             ( name = 'lang' dref = REF #( s_spras[] ) )
                                           )
```

```
                                    iv_client_field = 'Client'
                        ).
```

the **apply_filter** function accepts a table , a view or a table variable in the scope and apply dynamic where clause.

Read my other blog on – mapping abap features with abap on hana

Sreehari

Alert Moderator

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it filter select options

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Michelle Crapo
March 22, 2018 at 7:51 am

Great read.

Michelle

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> **Sreehari V Pillai** | Blog Post Author
> March 22, 2018 at 8:41 am
>
> Thanks Michelle.
>
> Read my confusing blog here and suggest edits please .
>
> Sree
>
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Timo John

March 26, 2018 at 12:17 pm

Thanks for sharing,

this demonstrates by the way the increased complexity in the ABAP-Areas: Until now we neede Open-SQL which is complex enough.

Now we need to handle: ABAP + CDS; ABAP + AMDP, CDS + AMDP ...

This brings great new fun but will take years to arrive in the implementing majority of ABAPers out there.

Thanks for helping

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Sreehari V Pillai | Blog Post Author
March 26, 2018 at 1:49 pm

Adding Procedure proxy and external views to the list 🙂

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Carlos Tolosa
October 7, 2020 at 6:30 pm

Great post.

But I think Timo is right. ABAP used to be very straight forward. Now there are a bunch of artifacts with no significant advantages (but lots of troubleshooting) to accomplish what it used to be a simple things like a SELECT-OPTIONS.

Thank you all.

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surendra kasetty

May 17, 2018 at 8:47 am

Hello Srihari,

when i execute the table function, i can give only one value, i cannot give multiple values, is it possible to get multiples values on table function?

Thanks,

Surendra Kasetty

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Sreehari V Pillai | Blog Post Author
May 21, 2018 at 5:12 am

Hi Surendra,

Its said under the section in this blog.

Can I use Select options in CDS ?

Sree

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Sudeep Dey
August 21, 2018 at 11:45 am

Hi,

I'm not able to see the table function option.
How to create the table function?

I'm in HANA 1709

Thank you.

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Sreehari V Pillai | Blog Post Author
September 3, 2018 at 12:02 pm

From your below comment, I am sure now you are able to create. Let me know otherwise.

Sreehari

Like 0 | Share

Sudeep Dey
August 22, 2018 at 6:17 am

Hi,

I'm getting Error in the following lines

lt_mara = apply_filter(mara , :sel_op);

return select mara.mandt , mara.matnr , makt.maktx

The error is source code of this class is incomplete in the lt_mara.

How to resolve the error?

Thank You.

Like 0 | Share

Sreehari V Pillai | Blog Post Author
September 3, 2018 at 12:03 pm

can you post the complete code ? Not able to understand the error from the snippet.

Sreehari

Like 0 | Share

Tejaswi Paritala
January 23, 2019 at 9:32 am

Hi Sreehari,

Thanks for sharing.

I am getting below error in AMDP Method.

Error : SQLSCRIPT message: invalid identifier: Z131_CL_AMDP_TEST=>MARA#covw &A0&A1&A2&A3&A4&A5&A6&A7&A8&A9

```
30⊖ method test_sel_opt by DATABASE FUNCTION FOR HDB LANGUAGE SQLSCRIPT options READ-ONLY
31  using mara makt.
32
33  lt_mara = APPLY_FILTER( mara, :sel_opt );
34  RETURN
35   select mara.mandt,
36          mara.matnr,
37          makt.maktx
38          from :lt_mara  mara inner JOIN makt makt
39  ⊗      on mara.mandt = makt.mandt and
40             mara.matnr = makt.matnr and
41             makt.spras = 'E';
42
43
44  ENDMETHOD.
```

Kindly help.

Sreehari V Pillai | Blog Post Author

January 23, 2019 at 9:58 am

change :lt_mara mara to :lt_mara m and refer m . this must be due to ambiguity .

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Sreehari

Like 1 | Share

Tejaswi Paritala

January 23, 2019 at 11:14 am

Thanks for helping

Like 1 | Share

Invenio Solutions

March 6, 2019 at 2:39 am

Hello Sreehari,,

Firstly thanks to you , to provide a very nice document which helps to create a table function with select options.

I go through the document but I am giving a error while using select option in report where clause it is giving me an error select option was not bound.

Could you please help me on this.

```
DATA :  gv_where(1000) TYPE c.

DATA: gt_qmnotif TYPE STANDARD TABLE OF zqmamdp_qualitynotification,
      gs_qmnotif TYPE zqmamdp_qualitynotification.

SELECTION-SCREEN: BEGIN OF BLOCK b1 WITH FRAME TITLE TEXT-001.
  SELECT-OPTIONS: s_ntyp  FOR gs_qmnotif-qmart   NO INTERVALS NO-EXTENSION,
                  s_plant FOR gs_qmnotif-rm_werks NO INTERVALS NO-EXTENSION,
                  s_date  FOR gs_qmnotif-erdat.

SELECTION-SCREEN: END OF BLOCK b1.

START-OF-SELECTION.

  PERFORM get_selectoption_param.
  PERFORM get_data.
*&---------------------------------------------------------------------*
*& Form GET SELECTOPTION PARAM
```

```
*&---------------------------------------------------------------------*
FORM get_selectoption_param .

  gv_where = cl_shdb_seltab=>combine_seltabs(
                           EXPORTING it_named_seltabs =
                                   VALUE #( ( name = 'ERDAT' dref = REF #( s_date[] ) ) )
                                   iv_client_field = 'MANDT'
                           ).

ENDFORM.
*&---------------------------------------------------------------------*
*&  Form GET_DATA
*&---------------------------------------------------------------------*
*&  text
*&---------------------------------------------------------------------*
*&  -->  p1        text
*&  <--  p2        text
*&---------------------------------------------------------------------*
FORM get_data .

  CLEAR: gt_qmnotif[].
  SELECT * FROM zqmamdp_qualitynotification
          WHERE s_selopt     = @gv_where
          INTO TABLE @gt_qmnotif.

ENDFORM.
```

```abap
class ZQMCL_QUALITY_NOTIFICATION_TF definition
  public
  final
  create public .

public section.

  INTERFACES: if_amdp_marker_hdb.
  class-methods GET_QUALITYNOTIFICATIONDETAILS FOR TABLE FUNCTION ZQMAMDP_QualityNotification.
protected section.
private section.
ENDCLASS.



CLASS ZQMCL_QUALITY_NOTIFICATION_TF IMPLEMENTATION.

  method GET_QUALITYNOTIFICATIONDETAILS BY DATABASE FUNCTION FOR HDB LANGUAGE SQLSCRIPT OPTIONS READ

    lt_date  = APPLY_FILTER ( qmel , :s_selopt );

    return select qmel.mandt,
                  qmel.qmart,
                  qmsm.qmnum,
                  qmel.erdat,
                  qmel.rm_werks
             from :lt_date qmel inner join qmsm qmsm
               on qmel.mandt  = qmsm.mandt and
                  qmel.qmnum  = qmsm.qmnum;

  endmethod.
ENDCLASS.
```

```
@EndUserText.label: 'Quality Notification Report'
define table function ZQMAMDP_QualityNotification
with parameters s_selopt      : abap.char( 1000 )
returns {

mandt             : abap.clnt;
qmart             : qmart;
qmnum             : qmnum;
erdat             : erdat;
rm_werks          : rm_werks;

}
implen
```

Avanish Joshi
March 8, 2019 at 9:40 pm

Puneet,

I haven't tried this on my system yet, but pass the select options values as

Regards select * from Zqmamdp_qualitynotification(s_selopt = gv_where)

Puneet into table @gt_data

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Shiladitya Ghosh
November 12, 2019 at 2:15 pm

I'm facing the below error while trying to active the code.

```
16
17  METHOD get_material by database function for hdb language sqlscript options read-only using mara makt .
18                                          SQLSCRIPT message: identifier must be declared: SEL_OUT  &A0&A1&A2&A3&A4&A5&A6&A7&A8&A9
19  lt_mat = select mara.mandt as Client,
20                  mara.matnr as Material,
21                  makt.spras as Lang,
22                  makt.maktx as Description
23          from mara mara inner join makt makt
24          on mara.mandt = makt.mandt and
25              mara.matnr = makt.matnr;
26    lt_out = apply_filter( :lt_mat, :sel_out);
27    Return Select Client as MANDT , Material as MATNR, Description as MAKTX from :lt_out;
28  endmethod.
29  ENDCLASS.
```

Sreehari V Pillai | Blog Post Author

December 25, 2019 at 12:05 pm

How can

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Screenshot is blurry . I am bit late to comment, I hope you must have fixed the issue by now.

Sree

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Mauricio Pinheiro Predolim

November 26, 2021 at 6:50 pm

Hi Guys,

Is it possible to use more than one select-options as parameter into table function?

I saw your code and your declared three differents select-options but you are using only one.

Thanks,

Mauricio

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Sivakumar Arunachalam
December 16, 2019 at 6:19 pm

Hi Sreehari,

I'm facing time out error for this simple CDS with Table Function. Can you please help

CDS with Table Function:

```
@EndUserText.label: 'CDS view with Table function for PRCD_Elements'
define table function YCDS_PRCD_ELEMENTS
with parameters sel_opt : abap.char( 1000 )
returns {
client :mandt;
knumv :knumv;
kposn :kposn;
kschl :kscha;
kbetr :vfprc_element_amount;
kpein :kpein;
kmein :kmein;
knumh :knumh;
kwert :vfprc_element_value;
waerk :waerk;
kinak :kinak;
koaid :koaid;

}
implemented by method ycl_amdp_prcd_elements=>get_data;
```

Class for CDS

```abap
_____

CLASS ycl_amdp_prcd_elements DEFINITION
PUBLIC
FINAL
CREATE PUBLIC .

PUBLIC SECTION.
INTERFACES if_amdp_marker_hdb.
CLASS-METHODS get_data for table FUNCTION YCDS_PRCD_ELEMENTS.
PROTECTED SECTION.
PRIVATE SECTION.
ENDCLASS.

CLASS ycl_amdp_prcd_elements IMPLEMENTATION.

Method get_data
BY DATABASE FUNCTION FOR HDB LANGUAGE SQLSCRIPT
OPTIONS READ-ONLY
USING PRCD_ELEMENTS.

lt_prcd = APPLY_FILTER( prcd_elements, :Sel_opt );

RETURN

SELECT
Prcd_elements.client,
Prcd_elements.knumv,
Prcd_elements.kposn,
Prcd_elements.kschl,
Prcd_elements.kbetr,
Prcd_elements.kpein,
Prcd_elements.kmein,
Prcd_elements.knumh,
Prcd_elements.kwert,
```

```
Prcd_elements.waerk,
Prcd_elements.kinak,
Prcd_elements.koaid

from prcd_elements
* INNER join prcd_elements p2
* on p2.client = prcd.client and
* p2.knumv =prcd.knumv

Order by Prcd_elements.knumv,
Prcd_elements.kposn;

ENDMethod.

ENDCLASS.
```

Called in program as below :

```
SPAN {
font-family: "Courier New";
font-size: 15pt;
color: #000000;
background: #FFFFFF;
}
.L0S31 {
font-style: italic;
color: #808080;
}
.L0S33 {
color: #4DA619;
```

```
}
.L0S52 {
color: #0000FF;
}
.L0S55 {
color: #800080;
}
.L0S70 {
color: #808080;
}
MOVE-CORRESPONDING it_tab[] TO it_knumv[].
IF it_knumv[] IS NOT INITIAL.
DELETE ADJACENT DUPLICATES FROM it_knumv COMPARING knumv.
LOOP AT it_knumv INTO wa_knumv.
s_knumv-sign = 'I'.
s_knumv-option = 'EQ'.
s_knumv-low = wa_knumv-knumv.
APPEND s_knumv.
ENDLOOP.

l_where2 = cl_shdb_seltab=>combine_seltabs(
EXPORTING it_named_seltabs =
VALUE #( ( name = 'KNUMV' dref = REF #( s_knumv[] ) ) )
iv_client_field = 'CLIENT' ).

*PERFORM Fetch_prcd.

SELECT * FROM ycds_prcd_elements( sel_opt = @l_where2 ) INTO TABLE @DATA(it_prcd).
```

Sreehari V Pillai | Blog Post Author
December 25, 2019 at 12:09 pm

how length your dynamic where clause ? (l_where2) .

Can you try hard coding a simple where clause which might return few result sets and see if you get timeout still ?

Sree

Federico Sebastián Alvarez
March 24, 2021 at 9:50 am

Hi Pillai, great post.

Question: how do you specify the APPLY FILTER first argument, when the argument is a table name like "SAP_ECC"."MARD" instead of just MARD?

Sreehari V Pillai | Blog Post Author
April 28, 2021 at 4:19 pm

My SCN account was blocked , just got it back today.

you cannot specify the table name directly . You will have to fetch it first to a temporary table / variable and pass it to apply_filter

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