



Marcelo Berger

May 22, 2017 6 minute read

CDS View Row Level Authorizations with Data Control Language (DCL)

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In this blog, I plan to go through the steps and pre-requisites of creating a simple DCL (Data Control Language) to restrict at the row level, a custom CDS view built for analytics/reporting.

Firstly, I created a few CDS Views in HANA studio. A CDS view of type dimension on table MARA, with an association to MAKT to get the material descriptions.

I then built a simple CDS view of type cube on table VBAP with very few fields, associating to the Material CDS View dimension above. I won't go through that process and what each annotation means. There are many blogs out there explaining the concepts of CDS Views.

For this example, I want to restrict the data based on field **Material Group (VBAP-MATKL)**.

Below is my Cube CDS View, selecting data from VBAP. A few things to note:

- We need to have the annotation @AccessControl.authorizationCheck: **#CHECK**. This will allow this CDS view to be checked for any authorizations.
- I've created an **alias** for MATKL, renaming it as **MaterialGroup**. This is the field that we will use in the DCL.

```

@AbapCatalog.sqlViewName: 'ZBCSALESITEMS'
@AccessControl.authorizationCheck: #CHECK
@EndUserText.label: 'Sales Items'
@Analytics.dataCategory: #CUBE
@VDM.viewType: #BASIC
@Analytics.dataExtraction.enabled: true
define view Zbc_Sales_Items as select from vbap as v

association [0..1] to Zbd_Material as _Material on
    $projection.Material = _Material.Material

{
    key v.vbeln as DocNumber,
    key v.posnr as DocItem,
    @ObjectModel.foreignKey.association: '_Material'
    v.matnr as Material,
    v.matkl as MaterialGroup,
    @Semantics.amount.currencyCode: 'DocCurrency'
    @DefaultAggregation: #SUM
    v.netwr as NetValue,
    @Semantics.currencyCode: true
    v.waerk as DocCurrency,

    _Material
}

```

Below is my source table, which includes multiple values for Material Group:

Search in Table	VBAP
Number of hits	11
Runtime	0

Matl Group	No.Entries
	7,215
YBF02	7
YBR01	19
YBR02	14
YBR03	1
YBR05	2
YBS01	13
YBS02	29
YBSVM1	5
YBSVS1	21
YBT01	24

Because CDS views exist at the application layer, we can apply the traditional PFCG security to it, which is one of the main benefits, since we don't have to also maintain HANA DB security.

So the first step is to create an **Authorization Object** in TCODE SU21. I also created a new Object Class for this example:

• ZDCL	Test DCL Authorizations
• ZMATGRP	DCL Test for Material Group

Within the Create Authorization Object window, provide the Object technical name and Text:

Create Authorization Object

Object	ZMATGRP
Text	DCL Test for Material Group
Class	ZDCL Test DCL Authorizations
Author	
Authorization fields	
Authorization Field	Short Description

Add the field ACTVT and then hit the save button:

Text	DCL Test for Material Group
Class	ZDCL Test DCL Authorizations
Author	
Authorization fields	
Authorization Field	Short Description
ACTVT	Activity

You will be prompted for a package. Chose your package or save as local object, according to your requirements:

Create Object Directory Entry

Object R3TR SUSO ZMATGRP1

Attributes

Package \$TMP

Person Responsible MBERGER

Original System ECD

Original language

Created On

Local Object Lock Overview

You should get a message similar to the one below:

Object Check When Saving

Type Message Text

Permissible activities not maintained for field ACTVT for object ZMATGRP1

Object ZMATGRP1 saved

Technical Information Help

The screen should have changed, and you should be able to maintain the Permitted Activities:

Maintain Authorization Object

Object	ZMATGRP1
Text	DCL Test for Material Group
Class	ZDCL Test DCL Authorizations
Author	MBERGER

Authorization fields

Authorization Field	Short Description
ACTVT	Activity

Authorization Object Documentation

Create Object Documentation

Further authorization object settings

Permitted Activities

In the Permitted Activities screen, select 03 – Display, since this is a CDS View for analytics purposes, and we only need Display access.

Define Values

Object	ZMATGRP1	DCL Test for Mat
Field name	ACTVT	Activity

Activities

S..	A...	Text
<input type="checkbox"/>	01	Add or Create
<input type="checkbox"/>	02	Change
<input checked="" type="checkbox"/>	03	Display
<input type="checkbox"/>	04	Print, edit messages
<input type="checkbox"/>	05	Lock

Then add the field that needs to be authorized, in our case, Material Group (MATKL) and follow the same steps above to grant Display access. Your authorization object should look like this:

Object	ZMATGRP
Text	DCL Test for Material Group
Class	ZDCL Test DCL Authorizations
Author	MBERGER









Authorization fields

Authorization Field	Short Description
ACTVT	Activity
MATKL	Material Group

We are done creating the Authorization Object. Now we need to create roles to assign it to. So we go to PFCG and create the role, by giving it a name, and clicking Single Role. The first role I'll create will be to restrict Material Group YBF02:


Role Maintenance







     Transactions

Role     Single Role  Comp. Role   


Short Description



Within the role editor, I clicked on the Authorizations tab and then Change Authorization Data at the bottom:

Role	
Role	<input type="text" value="ZMATGRP_YBF02"/>  <input type="checkbox"/> Obsolete
Description	<input type="text" value="DCL Authorization Mat Group YBF02"/>
Target System	<input type="text"/> <input checked="" type="checkbox"/> No destination

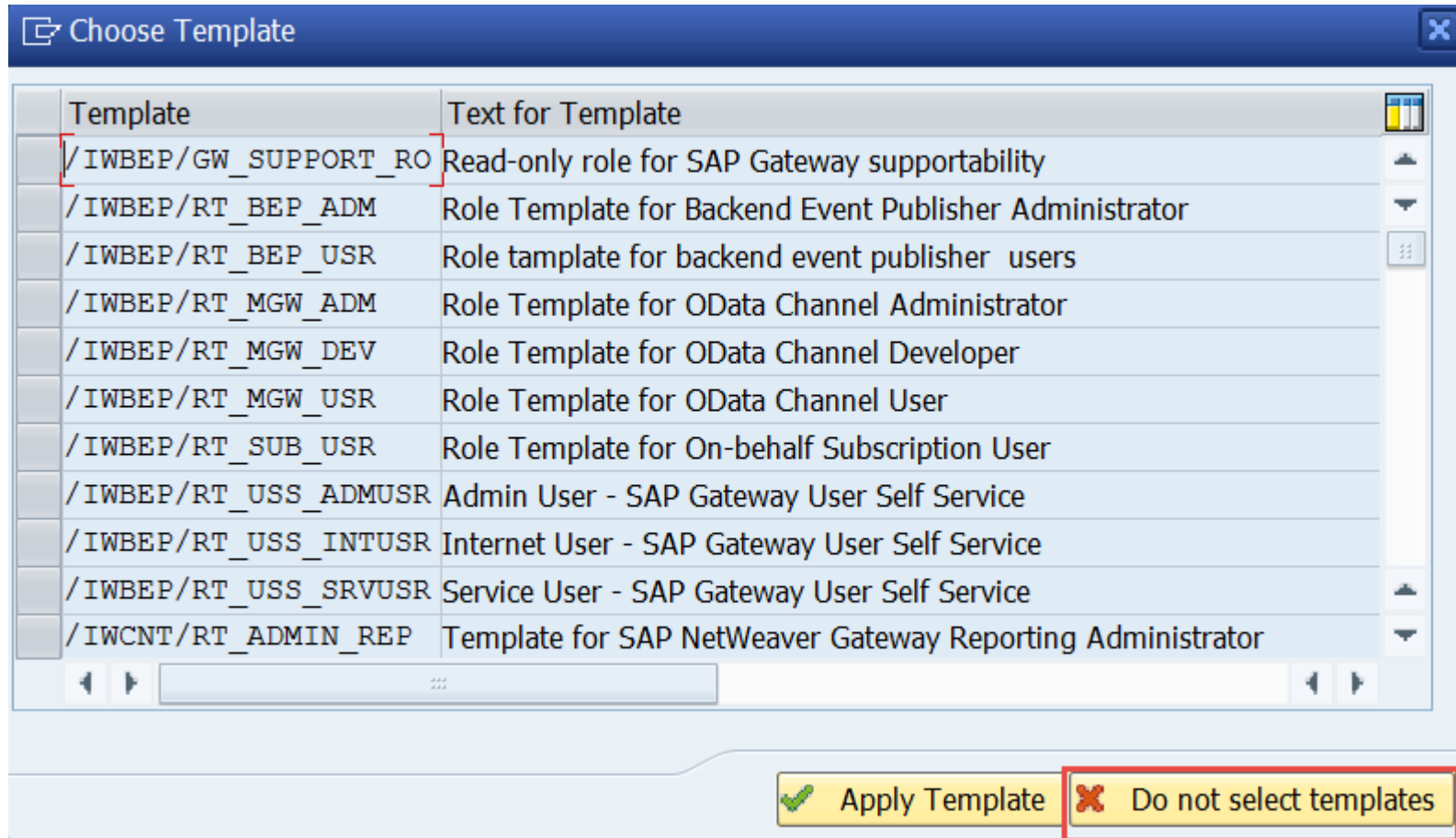
 Description	 Menu	 Workflow	 Authorizations	 User	MiniApps	 Personalization
---	--	--	--	--	----------	---

Created		Last Changed		Last Profile Generation	
User	<input type="text" value="MBERGER"/>	User	<input type="text" value="MBERGER"/>	User	<input type="text" value="MBERGER"/>
Date	<input type="text" value="05/18/2017"/>	Date	<input type="text" value="05/18/2017"/>	Date	<input type="text" value="05/18/2017"/>
Time	<input type="text" value="14:42:54"/>	Time	<input type="text" value="14:43:50"/>	Time	<input type="text" value="14:43:53"/>

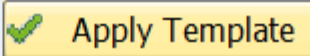
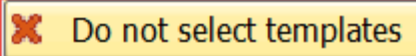
Information About Authorization Profile	
Profile Name	<input type="text" value="T-ED950397"/> 
Profile Text	<input type="text" value="Profile for role ZMATGRP_YBF02"/>
Status	Authorization profile is current

Edit Authorization Data and Generate Profiles	
	Change Authorization Data
	Expert Mode for Profile Generation

I did not select any templates:










A screenshot of the 'Choose Template' dialog box in SAP. It features a table with two columns: 'Template' and 'Text for Template'. The first row is highlighted with a red box. At the bottom, there are two buttons: 'Apply Template' (with a green checkmark icon) and 'Do not select templates' (with a red X icon). The 'Do not select templates' button is also highlighted with a red box.

Template	Text for Template
/IWBEF/GW_SUPPORT_RO	Read-only role for SAP Gateway supportability
/IWBEF/RT_BEP_ADM	Role Template for Backend Event Publisher Administrator
/IWBEF/RT_BEP_USR	Role template for backend event publisher users
/IWBEF/RT_MGW_ADM	Role Template for OData Channel Administrator
/IWBEF/RT_MGW_DEV	Role Template for OData Channel Developer
/IWBEF/RT_MGW_USR	Role Template for OData Channel User
/IWBEF/RT_SUB_USR	Role Template for On-behalf Subscription User
/IWBEF/RT_USS_ADMUSR	Admin User - SAP Gateway User Self Service
/IWBEF/RT_USS_INTUSR	Internet User - SAP Gateway User Self Service
/IWBEF/RT_USS_SRVUSR	Service User - SAP Gateway User Self Service
/IWCNT/RT_ADMIN_REP	Template for SAP NetWeaver Gateway Reporting Administrator

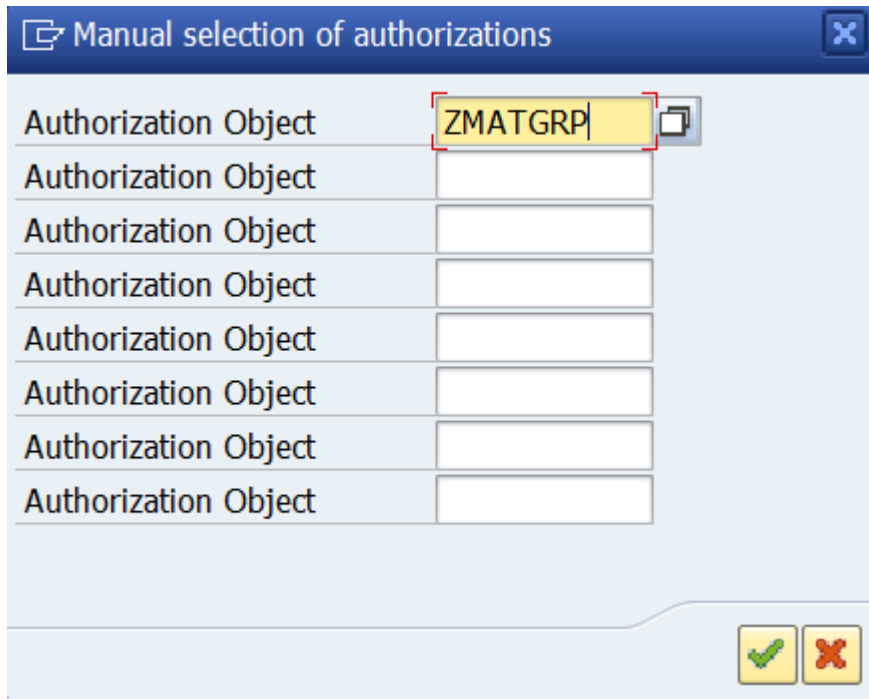
In the next screen I selected Manually to add the Authorization Object previously created:

Change Role: Authorizations

     Selection criteria  Manually  Open  Changed  Maintain

Maint. 0 unmaint. org. levels, 0 open fields, Sta

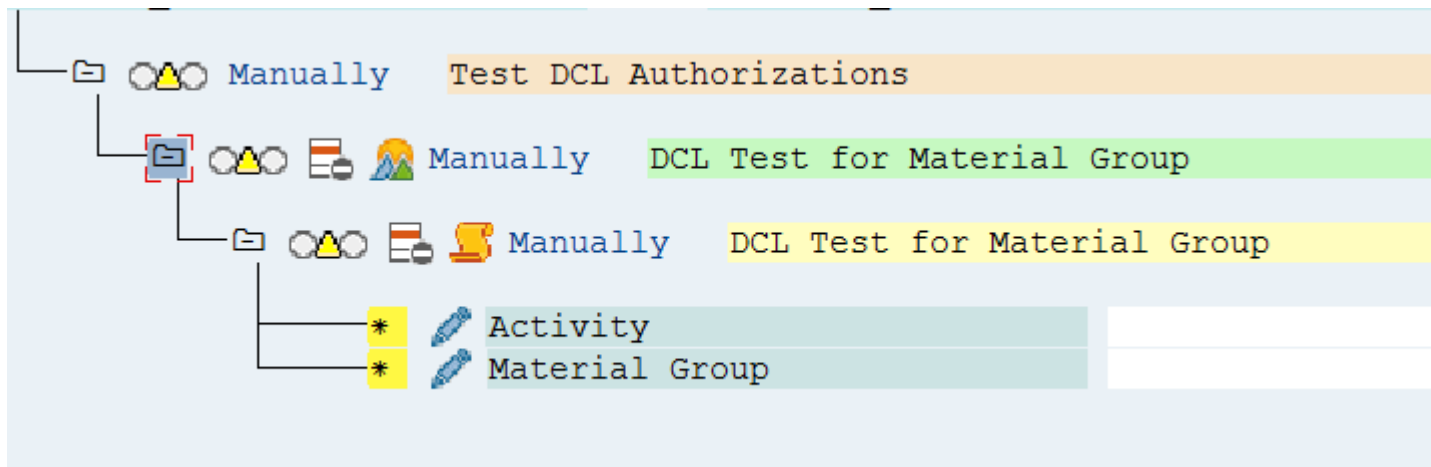
I add the authorization object and hit the green tick:



A dialog box titled "Manual selection of authorizations" with a close button (X) in the top right corner. It contains a table with 8 rows, each labeled "Authorization Object". The first row has the text "ZMATGRP" entered in the input field, which is highlighted with a yellow background and a red border. The other 7 rows have empty input fields. At the bottom right of the dialog, there are two buttons: a green checkmark button and a red X button.

Authorization Object	
ZMATGRP	
Authorization Object	
Authorization Object	
Authorization Object	
Authorization Object	
Authorization Object	
Authorization Object	
Authorization Object	

You should get a screen that looks like this:



We need to edit the authorizations, by clicking on the pencil next to each field. We'll start with Activity. Make sure the check box next to Display is checked, then hit save:

The screenshot shows the 'Define Values' dialog box in SAP. At the top, the 'Object' is 'ZMATGRP' (DCL Test for Material Group) and the 'Field name' is 'ACTVT' (Activity). Below this, a yellow bar indicates 'Full authorization'. The main section is titled 'Activities' and contains a table with columns 'S...', 'A...', and 'Text'. The first row shows '03 Display' with a checked checkbox in the 'S...' column, which is highlighted by a red box. The bottom of the dialog has a toolbar with icons for save, print, and other functions.

S...	A...	Text
<input checked="" type="checkbox"/>	03	Display

Then click the pencil next to Material Group and maintain the permitted value then hit save:

Field values

Object: ZMATGRP DCL Test for Material Group

Field Name: MATKL Material Group

Full authorization

Value Intrvl	'From'	'To'
	YBF02	

Icons: Save, Delete, Print, Copy, Paste, Undo, Redo

Your role should look like this (ignore the top two authorization object BC_A and RS):

Change Role: Authorizations

Maint. 0 unmaint. org. levels, 0 open fields, Status: Unchanged

ZMATGRP_YBF02 DCL Authorization Mat Group YBF02

- Manually Basis: Administration BC_A
- Manually Business Warehouse RS
- Manually Test DCL Authorizations ZDCL
- Manually DCL Test for Material Group ZMATGRP
- Manually DCL Test for Material Group T-ED95039700
 - Activity 03 ACTVT
 - Material Group YBF02 MATKL

Likewise, I built another role restricting data by Material Group YBR01 following the same steps above:

ZMATGRP_YBR01 DCL Authorization Mat Group YBR01

- Manually Basis: Administration BC_A
- Manually Business Warehouse RS
- Manually Test DCL Authorizations ZDCL
- Manually DCL Test for Material Group ZMATGRP
- Manually DCL Test for Material Group T-ED95039800
- Activity 03 ACTVT
- Material Group YBR01 MATKL

With my roles created, I created two users to test each role, user YBR01_DLC and YBF02_DCL, each with the corresponding roles:

YBR01_DCL:

User YBR01_DCL

Changed By MBERGER 05/18/2017 14:51:58 Status Saved

Documentation Address Logon Data SNC Defaults Parameters Roles Profiles Groups Personalization Lic. Data

Reference User

Role Assignments

Status	Role	Ty	Start Date	End Date	Short Role Description
<input checked="" type="checkbox"/>	ZMATGRP_YBR01		05/18/2017	12/31/9999	DCL Authorization Mat Group YBR01
<input checked="" type="checkbox"/>	ZS_RFCACL		09/09/2011	12/31/9999	S_RFCACL Authorization
<input checked="" type="checkbox"/>	Z_GRAC_ALL		08/28/2013	12/31/9999	Super Admin for AC
<input checked="" type="checkbox"/>	Z_RFC		07/25/2014	12/31/9999	RFC user role

YBF02_DCL:

User: YBF02_DCL
 Changed By: MBERGER 05/18/2017 14:52:53 Status: Saved

Documentation Address Logon Data SNC Defaults Parameters Roles Profiles Groups Personalization Lic. Data

Reference User: [] []

Role Assignments

Status	Role	Ty...	Start Date	End Date	Short Role Description
	ZMATGRP_YBF02		05/18/2017	12/31/9999	DCL Authorization Mat Group YBF02
	ZS_RFCACL		09/09/2011	12/31/9999	S_RFCACL Authorization
	Z_GRAC_ALL		08/28/2013	12/31/9999	Super Admin for AC
	Z_RFC		07/25/2014	12/31/9999	RFC user role

We are now finally ready to create the DCL in HANA Studio. So open it up and go to the ABAP perspective. Go to your desired package (I did it in the \$TMP package) and right click -> New -> Access Control:

\$TMP - MBERGER


- Core Data Services
 - Access
 - New**
 - Access Control
 - Data Definition
 - Copy

Give it a name and description and hit next:

New Access Control

Access Control

Create an Access Control



Project: * ECD_100_mberger_en_1 Browse...


Package: * \$TMP Browse...

☐ Add to favorite packages

Name: * ZAC_SALES_ITEMS

Description: * Test DCL Sales Items


Original language: EN

 < Back Next > Finish Cancel

Assign a transport or just hit next:

New Access Control

Selection of Transport Request

 No change recording enabled for package \$TMP

☐ Choose from requests in which I am involved


Transport Req...	User	Target	Text
------------------	------	--------	------

☐ Create a new request

Request description:

☐ Enter a request number

Request number:



Keep the selected template and hit finish:

Templates

Select one of the available templates.



☒ Use the selected template

Define Mapping Role

Defines a mapping role with a single GRANT statement by associating the specified CDS view with a classic authorization object.

The template demonstrates how view elements are mapped to the fields of the authorization object in the WHERE clause of the GRANT statement. It also includes a fixed restriction **actvt = '03'** which can be removed or modified, as required.

```
@EndUserText.label: '${role_label}'
@MappingRole: true
define role ${role_name} {
  grant select on ${view_name}
  where ( ${view_element_name_1},
          ${view_element_name_2} ) =
  aspect pfcg_auth ( ${auth_object_name},
                    ${auth_object_field_name_1},
                    ${auth_object_field_name_2},
                    actvt = '${03}' );

  ${cursor}
}
```



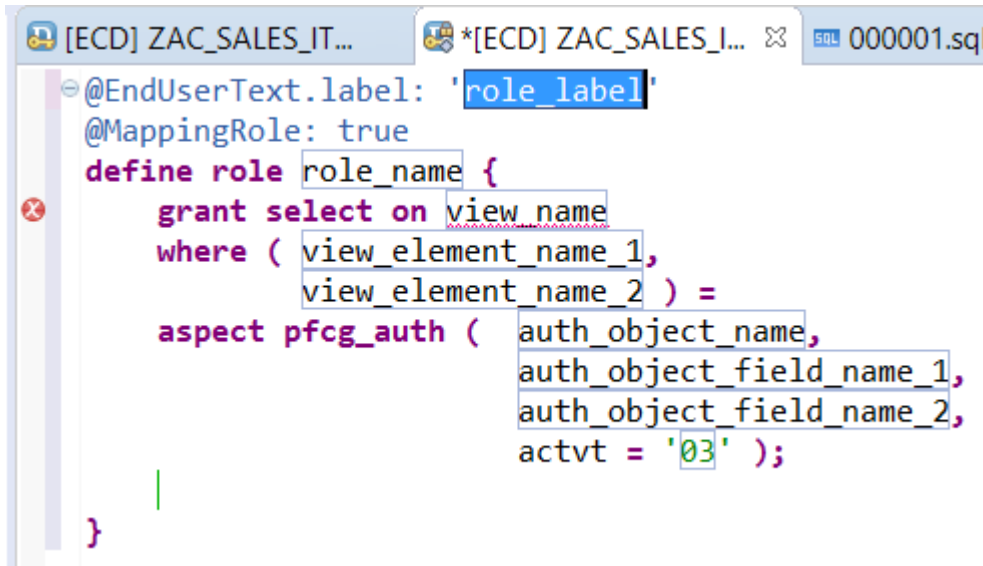
< Back

Next >

Finish

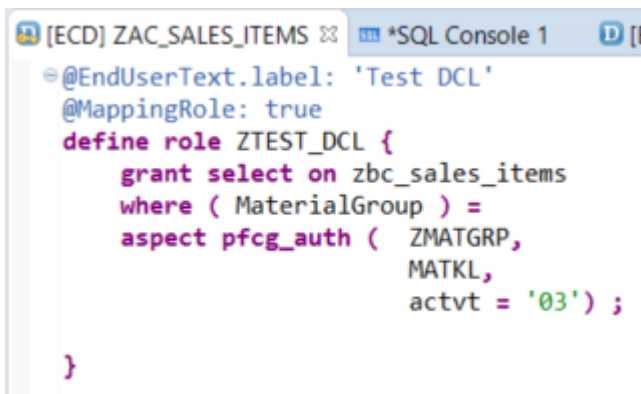
Cancel

You should have the following screen as per the template:



```
[ECD] ZAC_SALES_IT...  *[ECD] ZAC_SALES_I...  SQL 000001.sq
@EndUserText.label: 'role_label'
@MappingRole: true
define role role_name {
  grant select on view_name
  where ( view_element_name_1,
          view_element_name_2 ) =
  aspect pfcg_auth ( auth_object_name,
                     auth_object_field_name_1,
                     auth_object_field_name_2,
                     actvt = '03' );
}
```

Modify it as follows:



```
[ECD] ZAC_SALES_ITEMS  *SQL Console 1  [E
@EndUserText.label: 'Test DCL'
@MappingRole: true
define role ZTEST_DCL {
  grant select on zbc_sales_items
  where ( MaterialGroup ) =
  aspect pfcg_auth ( ZMATGRP,
                     MATKL,
                     actvt = '03' );
}
```

Define Role: provide a role name

Grant Select on: this is the CDS View which we are restricting the data. Use the DDL Source name and NOT the SQL view name

Where: is the field that we are restricting, and if there's an alias in the CDS view, use that

Aspect pfcg_auth:

ZMATGRP is the name of the authorization object defined earlier

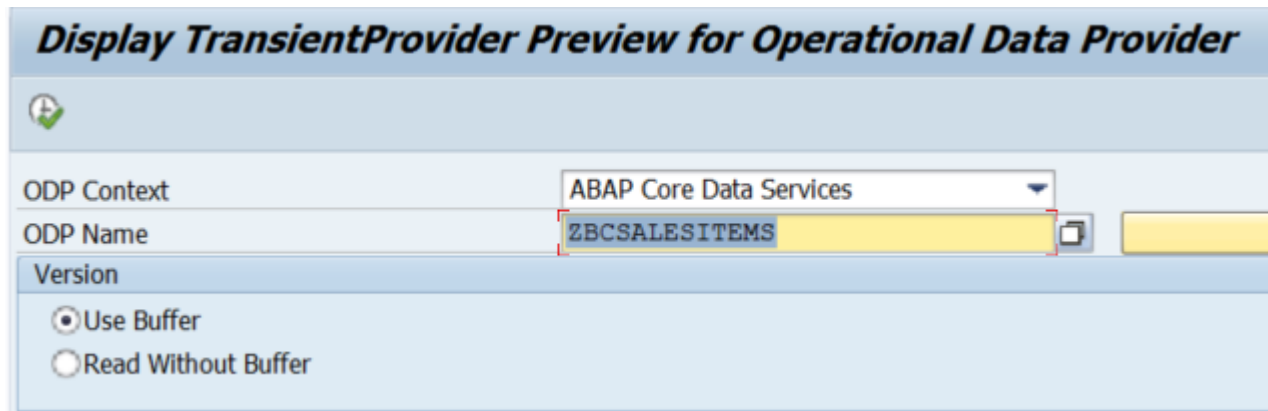
MATKL is the field in the authorization group

ACTVT is the activity, and value 03 is display

Activate the DCL, and we can now test the users we created earlier.

Log in to ECC with those users, and navigate to tcode RSRTS_ODP_DIS. Because this CDS View is of VDM type Basic, we cannot preview it in RSRT. If we had built a CDS view of VDM Type Consumption and @Analytics.Query: True, this would allow us to use RSRT.

In tcode RSRTS_ODP_DIS, we leave the ODP Context ABAP Core Data Services, and in the ODP Name, we enter the SQL View name of the CDS View. Then hit execute:



Display Transient Provider Preview for Operational Data Provider

ODP Context: ABAP Core Data Services

ODP Name: ZBCSALESITEMS

Version:

- ☒ Use Buffer
- ☐ Read Without Buffer

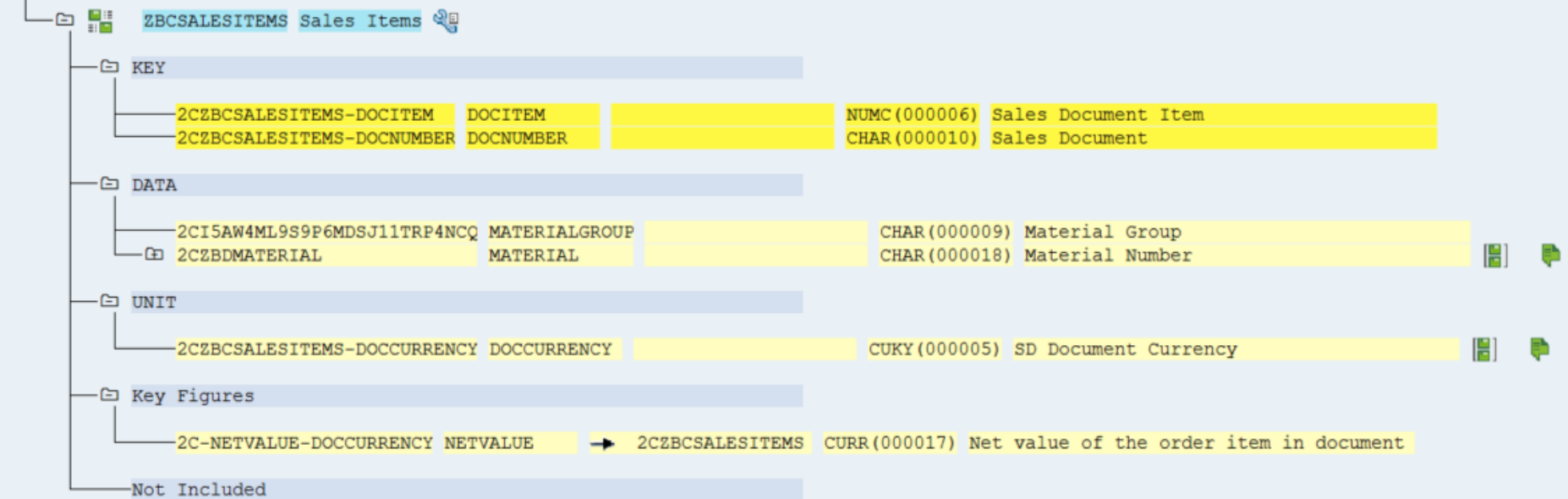
You will be presented with the layout of the CDS View, with all the key, data, unit and key figures that were previously defined. You will also notice any associations or semantics by seeing the green icons at the far right of a field.

Click on Standard Query to take you to a data preview of the CDS View, taking into account any authorizations previously defined:

Operational Data Provider ZBCSALESITEMS (TransientProvider Preview)

Set Focus **Standard Query** Details On/Off Check Metadata

TransientProvider 2CZBCSALESITEMS Software Component: \$TMP, Model: ZBC_SALES_ITEMS Time Stamp: 05/18/2017 14:18:52



Once in the data preview, add the Material Group to the rows section to validate if the DCL worked.

We can see that for user YBR01_DCL we can only see material group YBR01.

DP_1 I2CZBCSALESITEMS

Initial State

Information on Query

Static Filter

Dynamic Filter

Variable Values

Navigation Pane

Row Characteristics

- Material Group

Column Characteristics

- Key Figures

Free Characteristics

- Material
- Sales Document
- Sales Document Item
- Document Currency

Query Sales Items Up-to-Dateness of Data: 05/18/2017 02:58:43 PM MST

Refresh Swap Axes Documents Conditions Exceptions Bookmark

Key Figures

Material Group	Net value
YBR01	\$ 150.00

Row 1 - 1 / 1 Column 1 - 1 / 1

SAP YBR01_DCL hanaehhdb INS

Likewise, for user YBF02_DCL we can only see YBF02:

DP_1 !2CZBCSALESITEMS

Initial State

Information on Query

Static Filter

Dynamic Filter

Variable Values

Navigation Pane

Row Characteristics

- Material Group

Column Characteristics

- Key Figures

Free Characteristics

- Material
- Sales Document
- Sales Document Item
- Document Currency

Query Sales Items Up-to-Dateness of Data: 05/18/2017 03:00:20 PM MST

Refresh Swap Axes Documents Conditions Exceptions Bookmark

Key Figures

Material Group	Net value
YBF02	\$ 1,011.71

Row 1 - 1 / 1 Column 1 - 1 / 1

SAP YBF02_DCL hanaehhdb INS

And that's it. I hope this was informative and that it can help you in securing your data in your CDS views.

Alert Moderator

Assigned tags

SAP S/4HANA | abap cds views | analysis authorization | analysis authorizations | cds views |

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By **Former Member** , Mar 11, 2016

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[S/4 Embedded Analytics – The Virtual Data Model](#)

By **Marcelo Berger** , Mar 19, 2018

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By **Bodhisattwa Pal** , Mar 29, 2020

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By **Shyam Uthaman** , May 16, 2018

[concatenate multiple row value into single column in ABAP CDS view](#)

By **Anmo Bhat** , Jan 02, 2020

7 Comments

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Former Member

May 24, 2017 at 6:04 am

Hi marcelo berger,

Thank you for sharing such a beautiful information,

2 questions i have, Plz bear with me since i am a learner.

1. why we need to create authorization object and some cool stuff in PFCG, when we have DCL in hana studio, where we can give authorizations directly. When we can apply the traditional PFCG security???
EX : @EndUserText.label: 'role_label'
@MappingRole: true
define role ZROLE {
grant select on Zbc_sales_items
where Material group = 'YBF02';
}
2. In the above view zbc_sales_items u have applied annotation authorization check and created corresponding DCL. when i execute that DDL view, in out put i can see notification "Result set is filtered by DCL". how could i find DCL name which we applied for DDL???

Regards,

Sunny.

Like (0)



Kris Claes

June 16, 2017 at 10:34 am

Hello,

we are trying this new way of applying authorisations, but now we encounter a strange problem.

I have a CDS-view with a corresponding DCL. I made a little program to test it and that seems to work. But when we put exactly the same statement in the productive program, the authorisation check does not seem to work.

We actually see a difference in the generated statement in the SQL trace:

This is the wrong one:

```
WHERE "MANDT" = '300' AND "KREDIET" LIKE 'ZT%' AND "STATUS" IN ( 'A' , 'I' )
```

And this is the correct one:

```
WHERE "MANDT" = '300' AND "KREDIET" LIKE 'ZT%' AND ( "FISTL" LIKE '1ID-MBTK%' OR "FISTL" LIKE '1ID-MPRK%' OR "FISTL" LIKE '5DP-MCMA%' OR "FISTL" LIKE '5DP-MPRK%' OR "FISTL" LIKE '5PC-MPCS%' OR "FISTL" LIKE '5PC-MPRK%' OR "FISTL" LIKE '5TS-MPRK%' OR "FISTL" LIKE '5TS-MUPL%' OR "FISTL" LIKE 'MGD-MCDE%' OR "FISTL" LIKE 'MGD-MPRK%' OR "FISTL" LIKE 'MLF-MCSP%' OR "FISTL" LIKE 'MLF-MPRK%' )
```

Any idea how this is possible? The program source is exactly the same in both cases. Can the generation of the statement in Open SQL be influenced by some properties of an ABAP-program?

Thanks for helping.

Kris

Like (0)



Kris Claes

June 16, 2017 at 11:32 am

I can even reply myself:

these additions only work if in the properties of the program the 'fixed point arithmetic' flag is activated. Apparently this flag can 'be there' without being active.

So, if these additions don't have any effect: switch off, (and try to activate, this won't work) and on this flag in the program and try again.

Bizarre, but it works.

Kris

Like (0)



Former Member

December 5, 2017 at 9:38 pm

Can you clarify which BW version you are on, as well as HANA DB version? We are not on S4, we are on ECC 6 with MS SQL... We also have BW 7.4 SP12 on HANA 1.0 SP10, so we don't have out of the box CDS views. To make this work, it seems we need to build custom CDS views, but even after doing that, we are not sure this DCL is available in BW 7.4 SP12.

Like (0)



Vasudev Srinivasan

September 27, 2018 at 12:05 am

is it possible to code DCL's based on a custom table as of 7.5?

Like (0)



Ahmed Riyaz

October 10, 2018 at 12:15 pm

Hello Marcelo,

Thanks for your post. It has been very helpful to us. However we would like to know the other elementary roles which are required for end user to run BEx query based on CDS view.

Like for example RFC role, S_RFCACL object, etc which you have added as foundation role. Can you share info on such auth objects/roles as well ? We would be indeed grateful of you if you share the same.

Also after following this post can the authorization variable in BEx automatically populate with authorized values ? My BEx query is based on CDS view of annotation type cube.

Like (0)



David, Choong Poey Yee

January 10, 2019 at 8:19 am

Hi All,

I would like to know if it is possible to have authorization setup based on measures. E.g. I have a generic CDS View that is shared by 2 different users, User 1 and User 2.

User 1 is only allowed to see Measure 1 and User 2 is allowed to see Measure 1 & Measure 2. Is this achievable?

Best Regards

David Yee

Like (0)

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