#vSAPCDSStarterSet - Workshop Basics I

Presentation Part II

From #SAPCommunity to #SAPCommunity

Agenda

- S/4HANA how to find standard CDS Views
- S/4HANA Embedded Analytics
- S/4HANA new Datamodel
- S/4HANA Compatibility Views

- Create Custom Multidimensional Report with CDS Views
- UI Annotations

- View Entitys (New with 2020)
- Call ABAP Function from CDS View

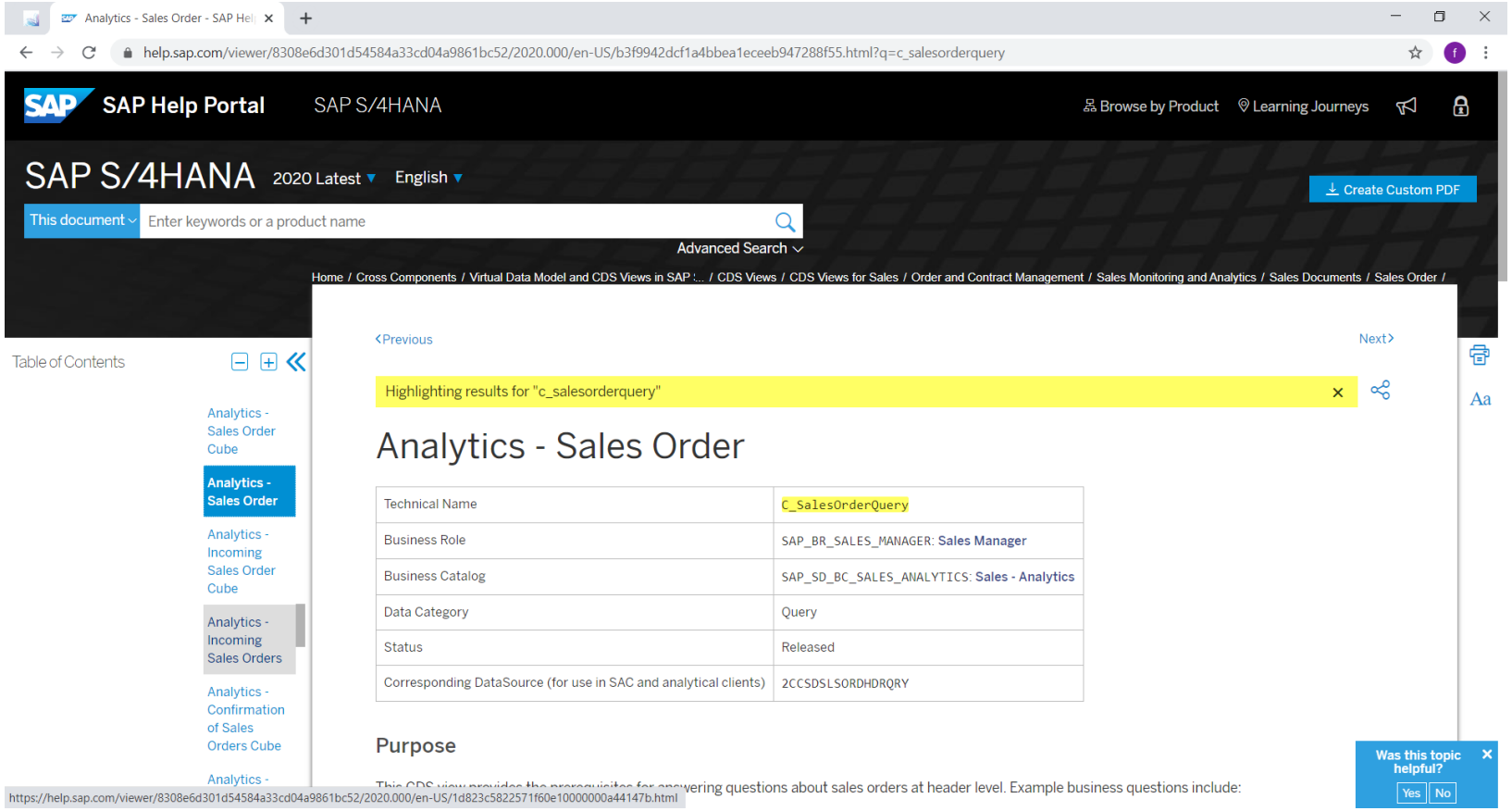
CDS DeepDive Agenda

- S/4HANA how to find standard CDS Views
- S/4HANA Embedded Analytics
- S/4HANA new Datamodel
- S/4HANA Compatibility Views

- Create Custom Multidimensional Report with CDS Views
- UI Annotations

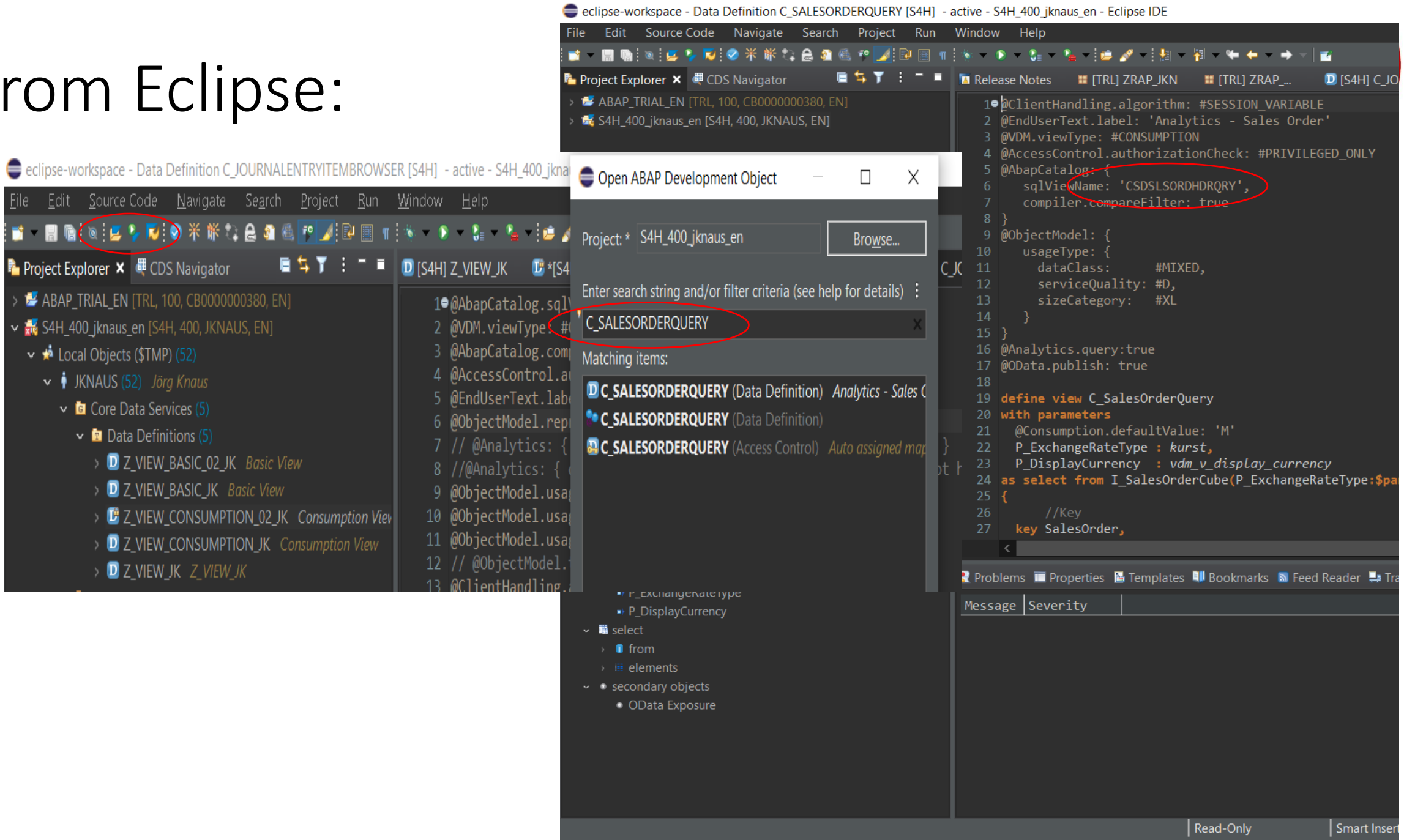
- View Entitys (New with 2020)
- Call ABAP Function from CDS View

Where to find S/4HANA Standard CDS Views

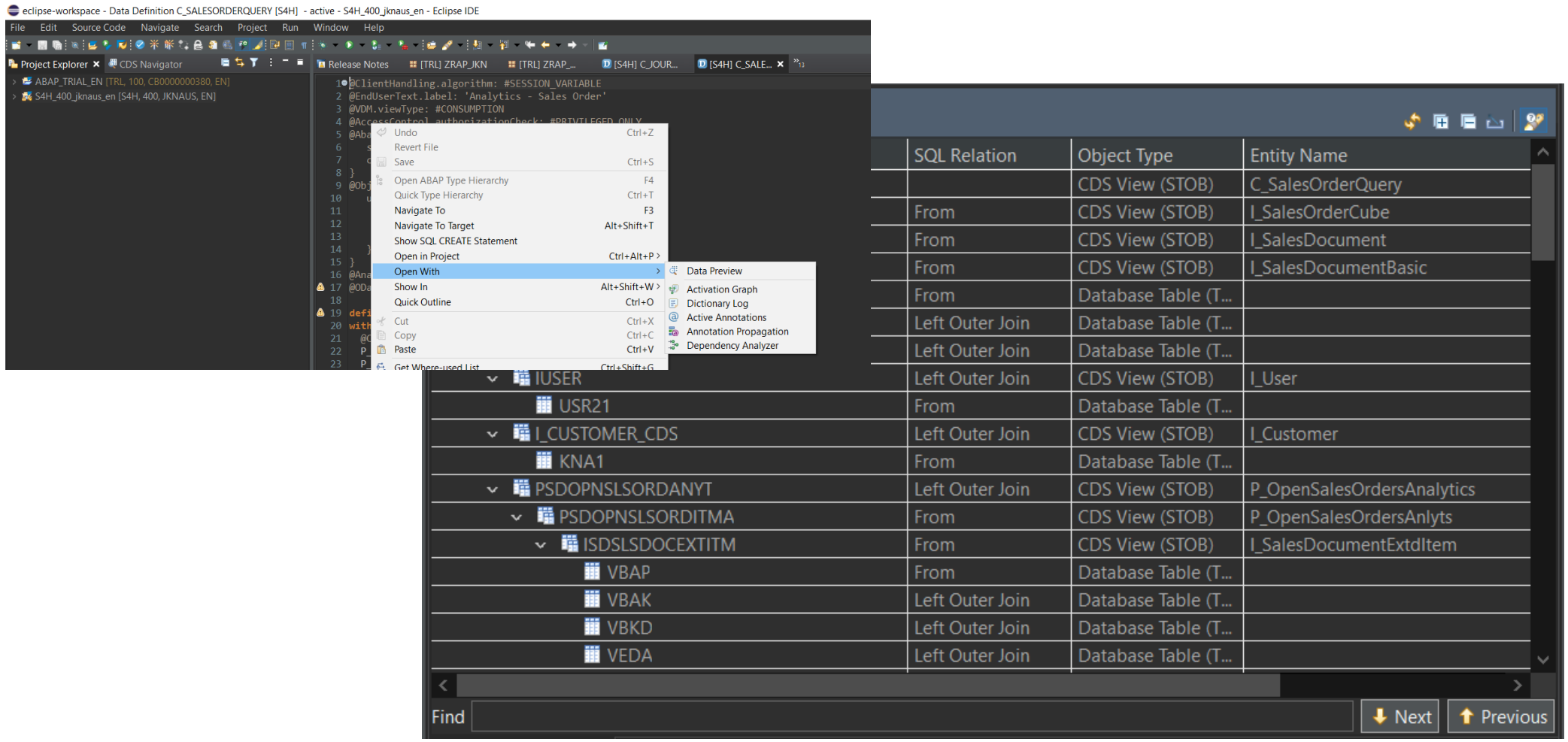


- https://help.sap.com/viewer/8308e6d301d54584a33cd04a9861bc52/2020.000/en-US/5418de55938d1d22e10000000a44147b.html

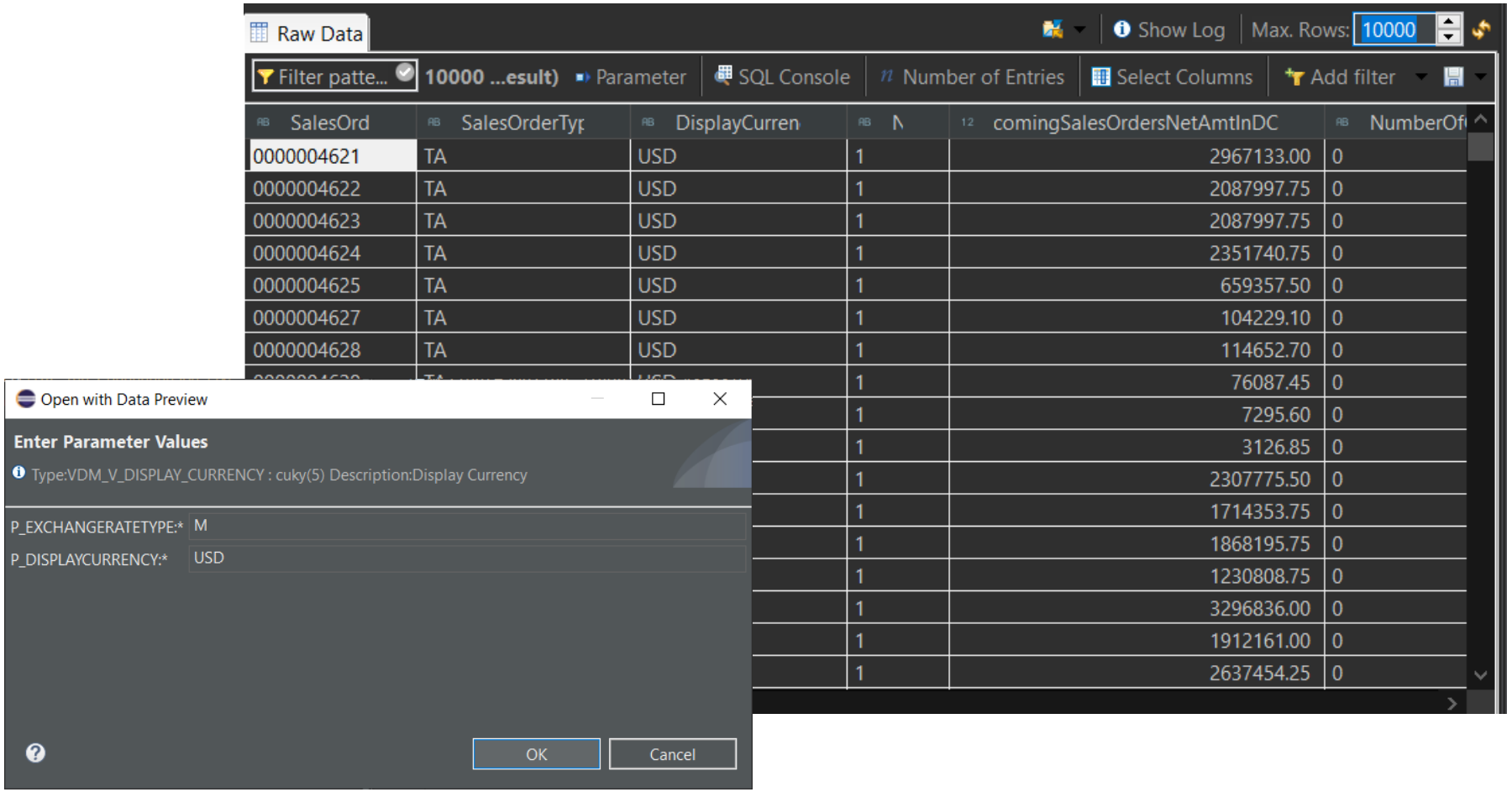
From Eclipse:



Dependency Analyzer



Data Preview



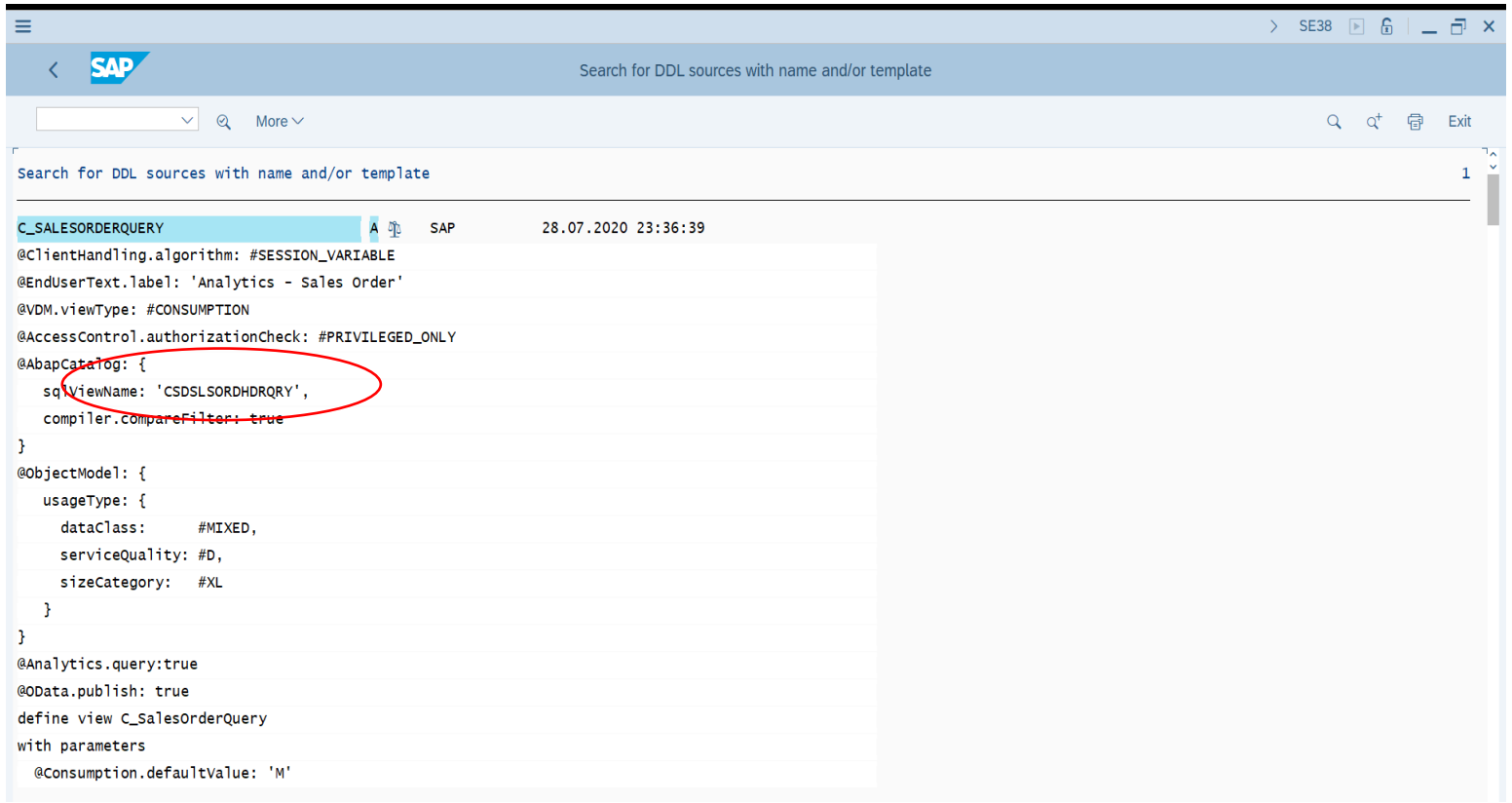
SE38


```
REPORT Z_TEST_JK.
data: ls_so type c_SALESORDERQUERY.
select * from c_salesorderquery( p_Exchange
RateType = 'M', p_DisplayCurrency = 'USD' )
 into @ls_so  .

endselect.
```

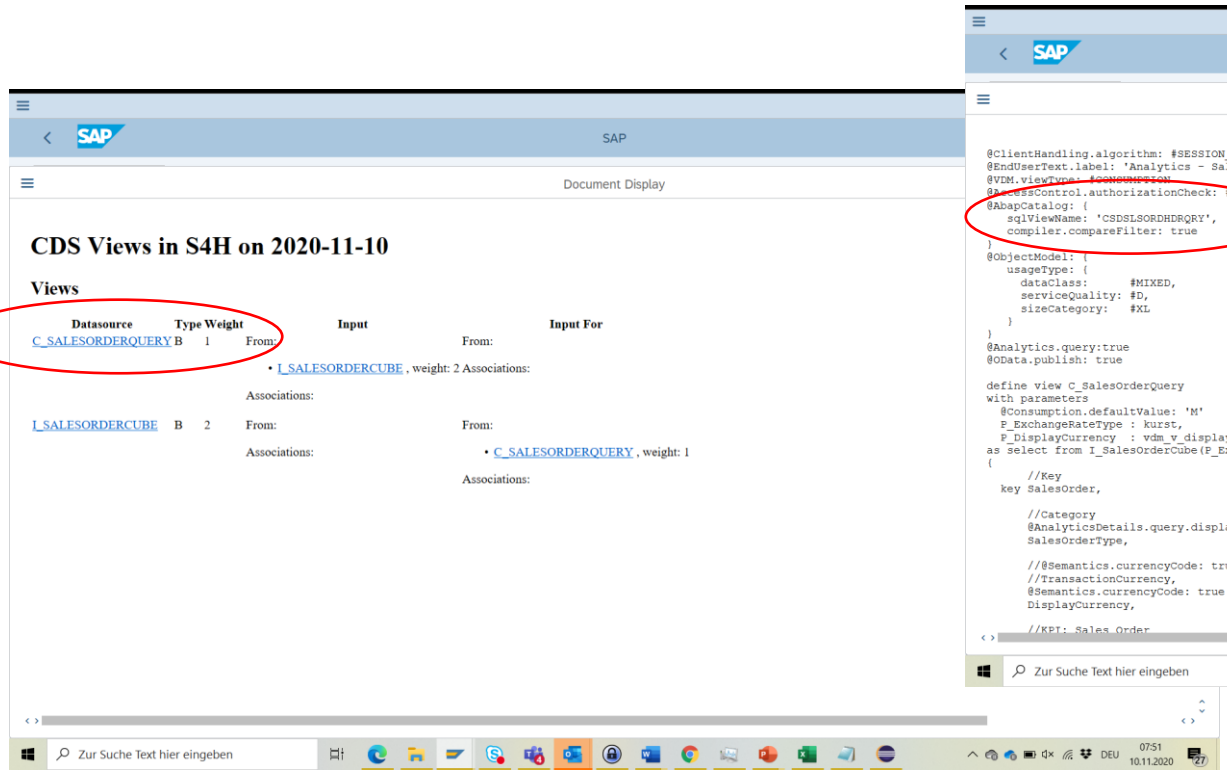
From ABAP

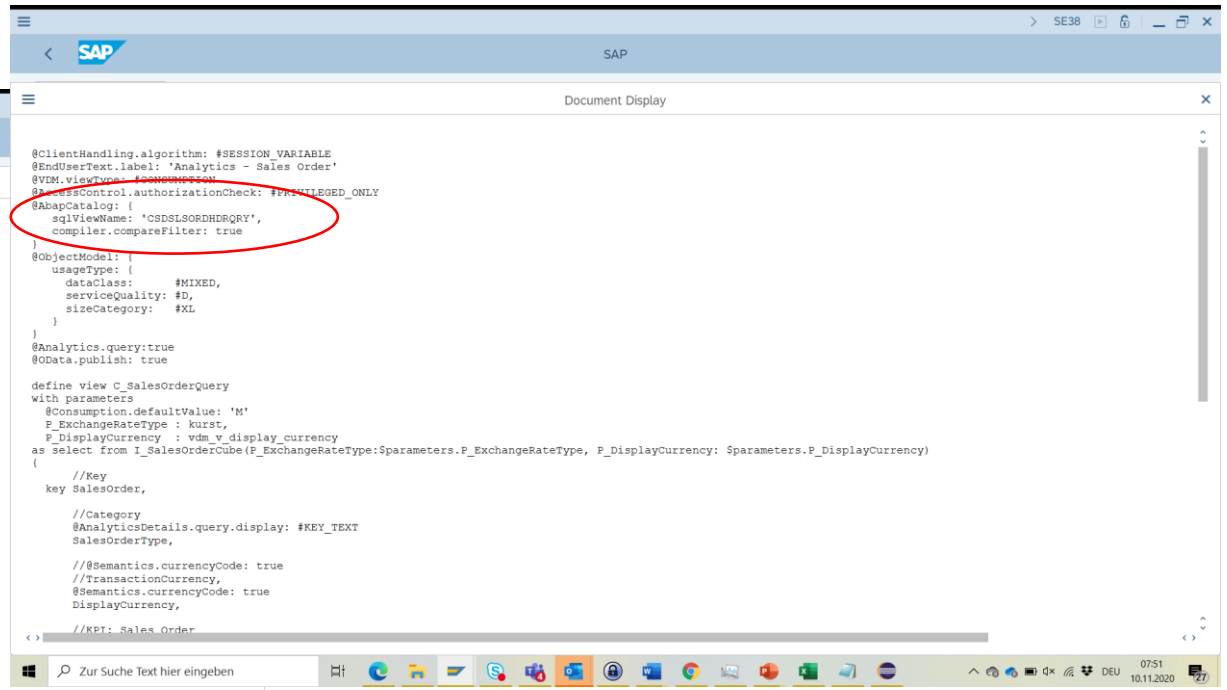
- Report RUTDDLSSHOW2



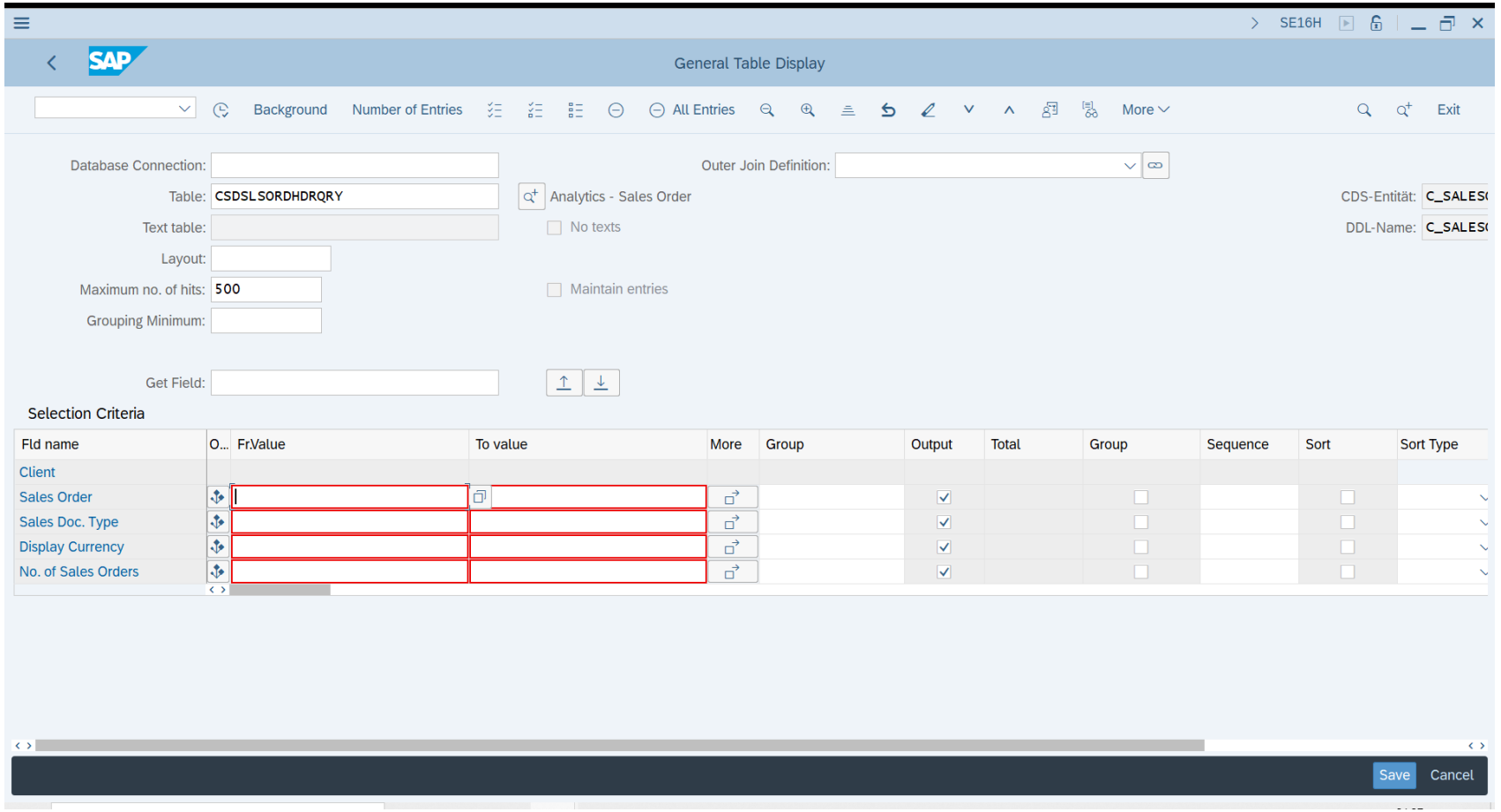
From ABAP

- Report RUTDDLSDEPENDENCIES

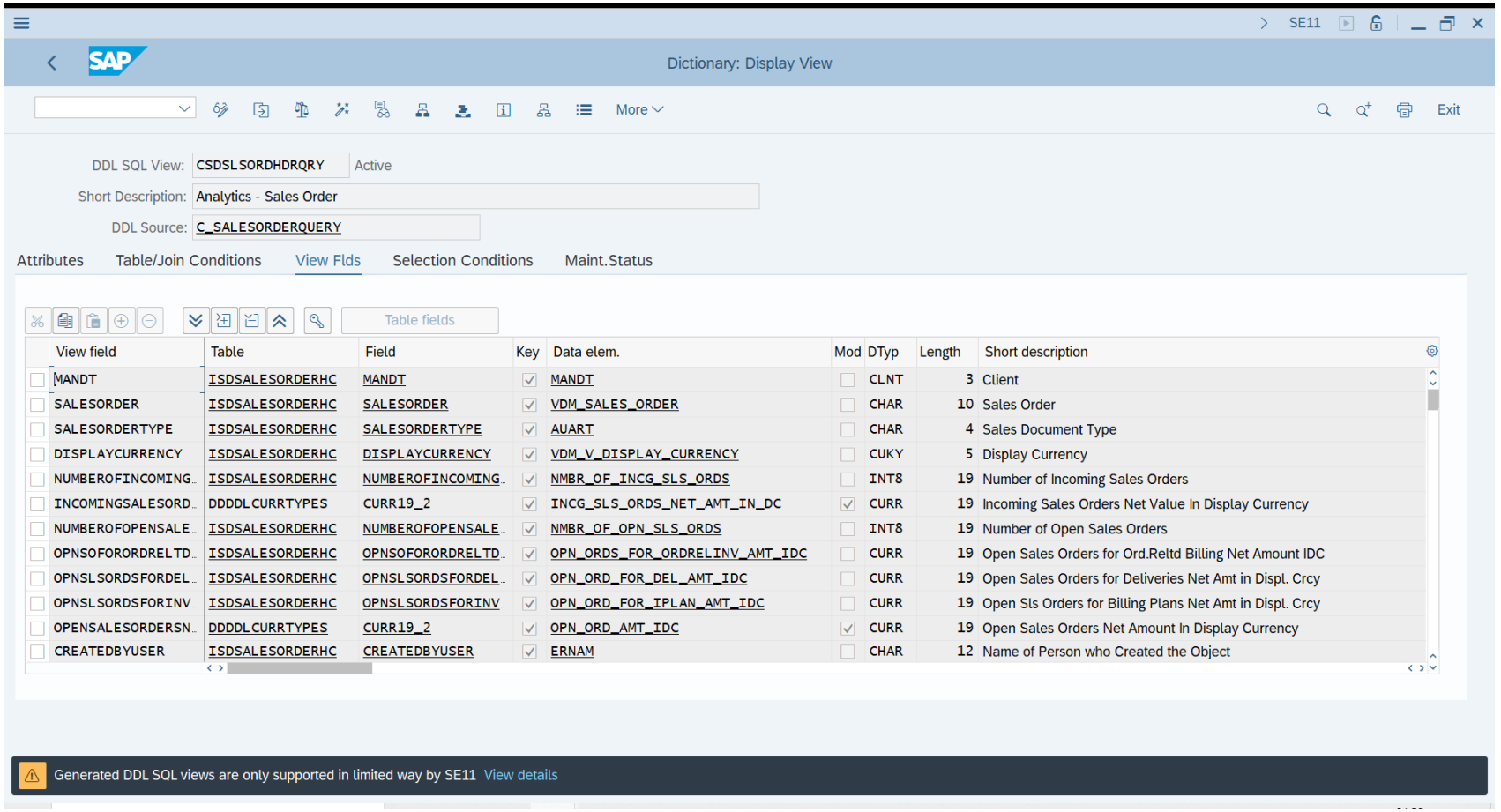




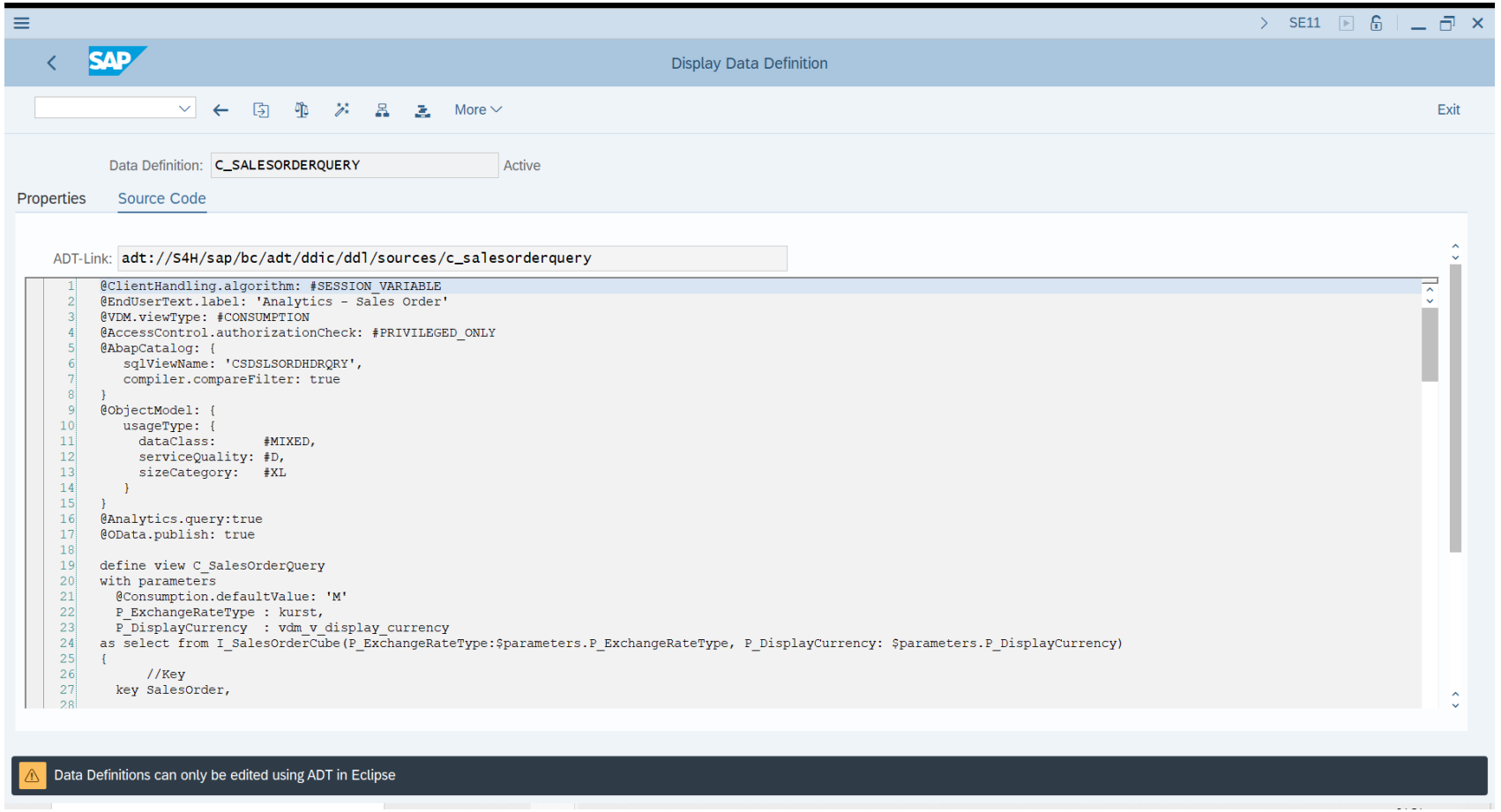
SE16H CSDSLSORDHDRQRY



SE11 Data Dictionary

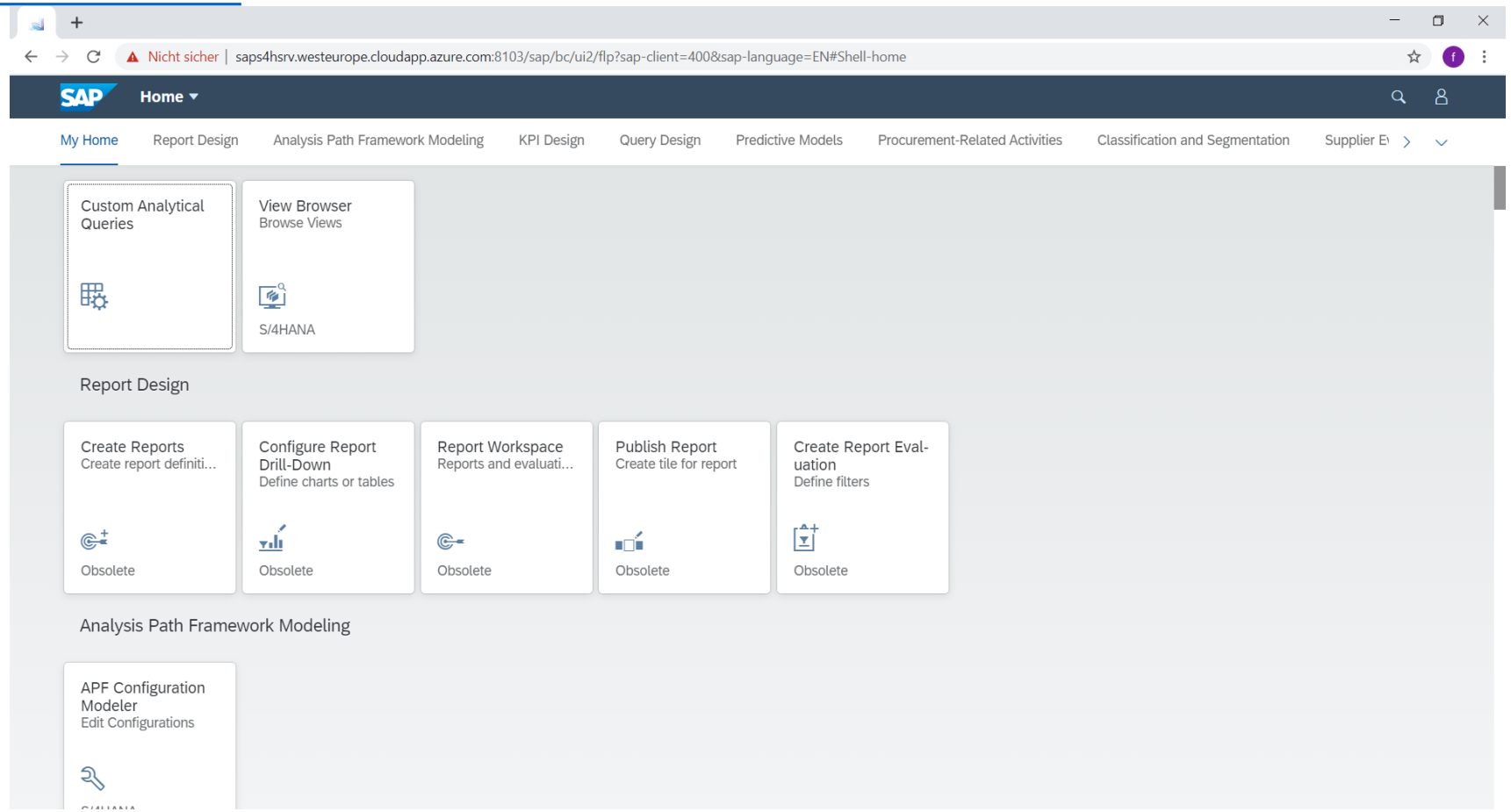


SE11 (2)


SE11
SAP
Display Data Definition
More
Exit
Data Definition: C_SALESORDERQUERY Active
Properties
Source Code
ADT-Link: adt://S4H/sap/bc/adt/ddic/ddl/sources/c_salesorderquery
@ClientHandling.algorithm: #SESSION_VARIABLE
@EndUserText.label: 'Analytics - Sales Order'
@VDM.viewType: #CONSUMPTION
@AccessControl.authorizationCheck: #PRIVILEGED_ONLY
@AbapCatalog: {
sqlViewName: 'CSDSLSORDHDRQRY',
compiler.compareFilter: true
}
@ObjectModel: {
usageType: {
dataClass: #MIXED,
serviceQuality: #D,
sizeCategory: #XL
}
}
@Analytics.query:true
@OData.publish: true
define view C_SalesOrderQuery
with parameters
@Consumption.defaultValue: 'M'
P_ExchangeRateType : kurst,
P_DisplayCurrency : vdm_v_display_currency
as select from I_SalesOrderCube(P_ExchangeRateType:$parameters.P_ExchangeRateType, P_DisplayCurrency: $parameters.P_DisplayCurrency)
{
//Key
key SalesOrder,
Data Definitions can only be edited using ADT in Eclipse

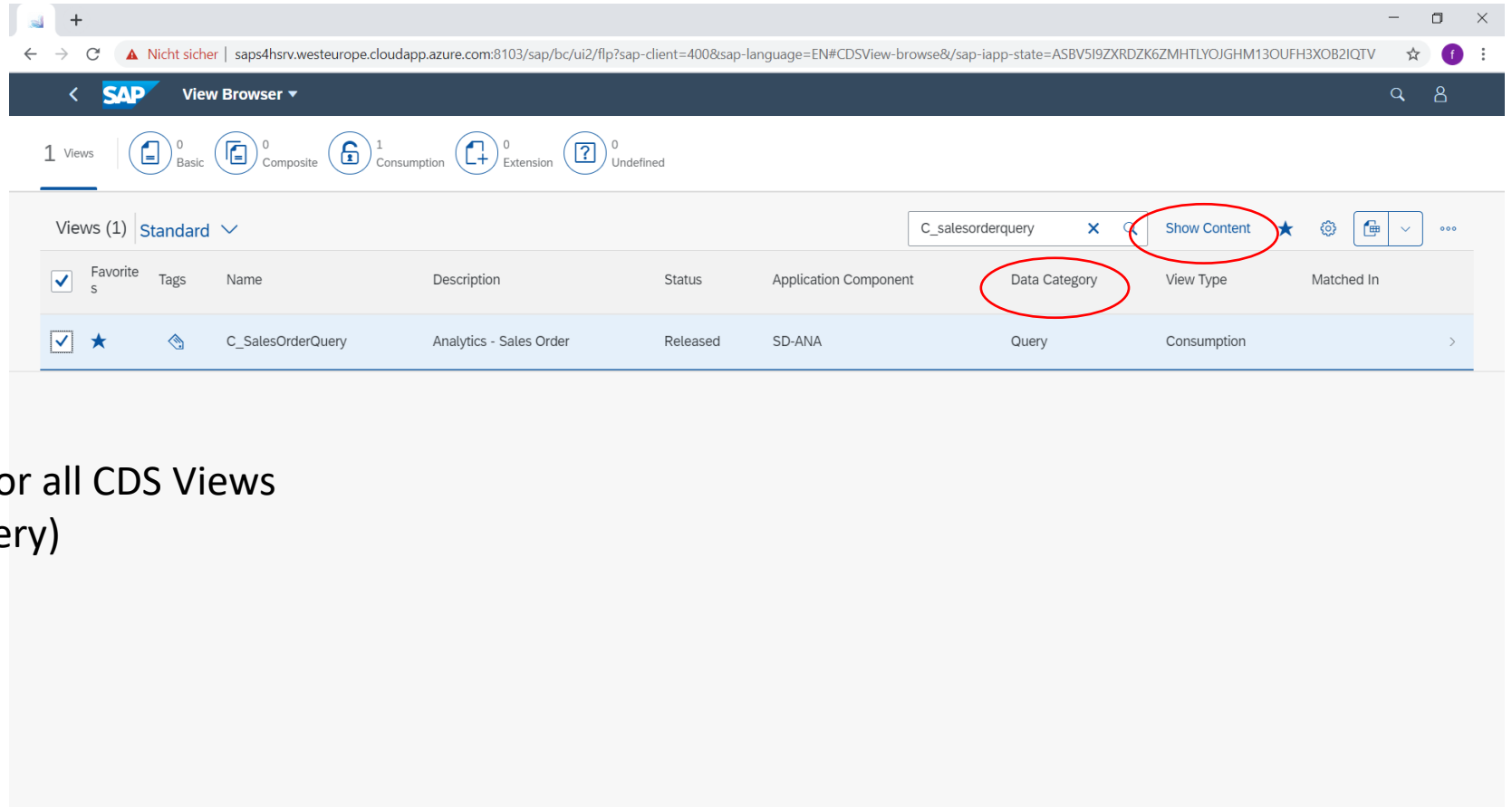
Fiori Launchpad

https://saps4hsrv.westeurope.cloudapp.azure.com:8103/sap/bc/ui2/flp?sap-client=400&sap-language=EN#Shell-home



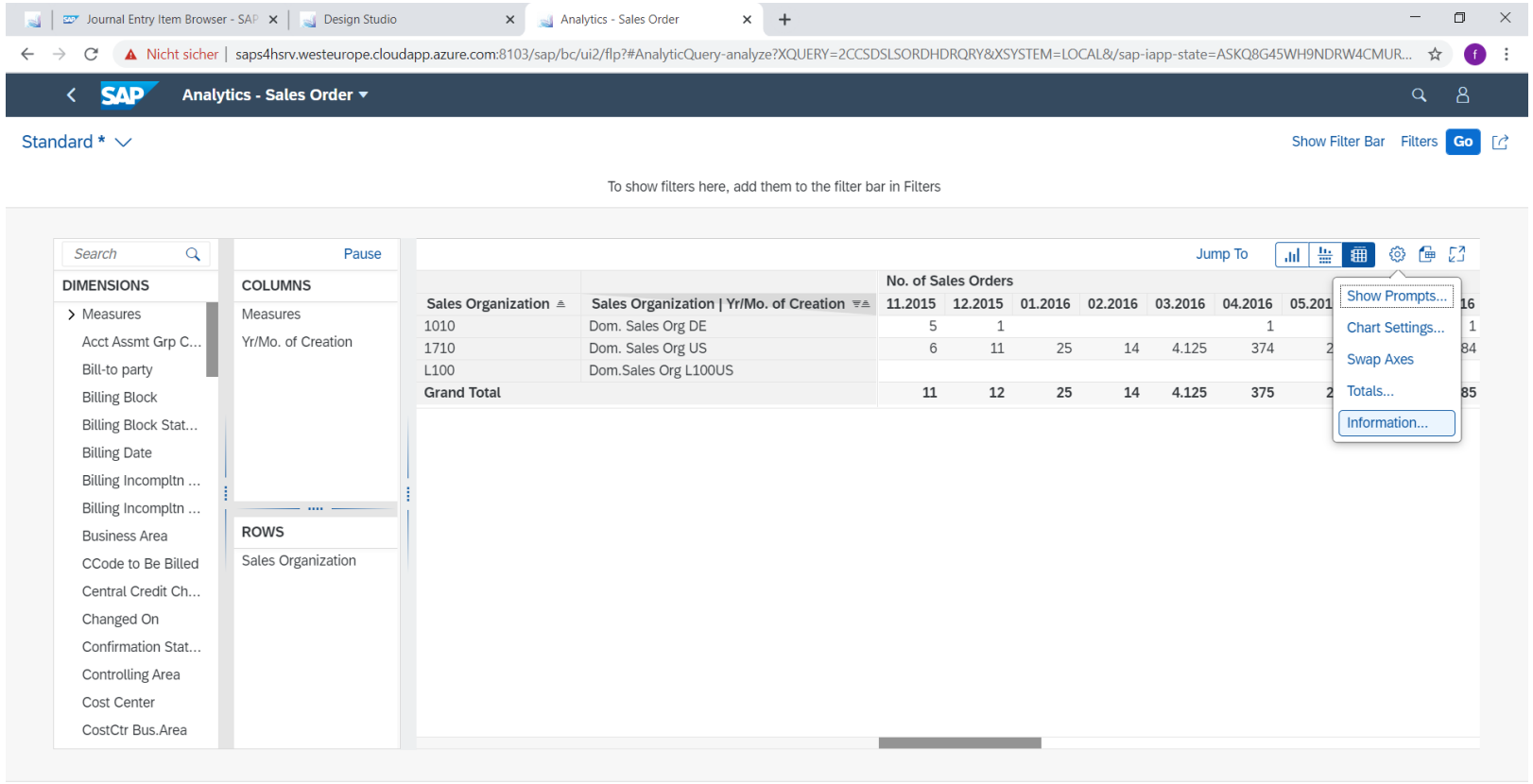
Requires Role SAP_BR_ANALYTICS_SPECIALIST

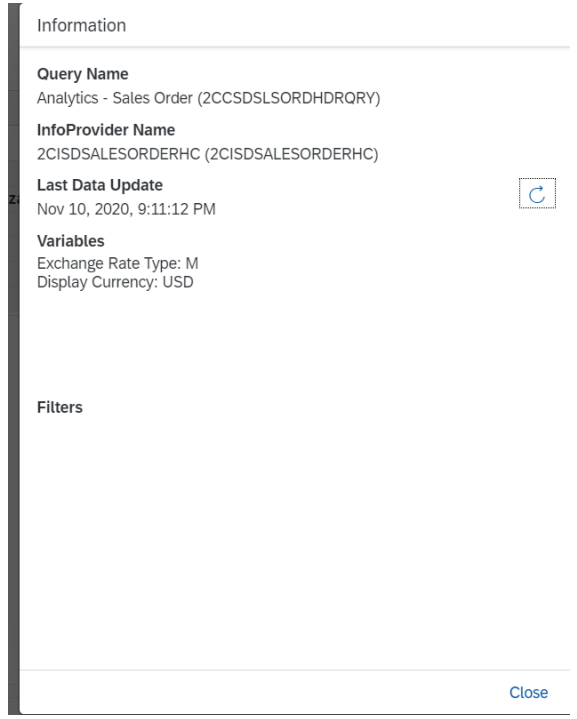
Fiori View Browser



⇒ Show Content is not possible for all CDS Views
(Depends on attributes like Query)

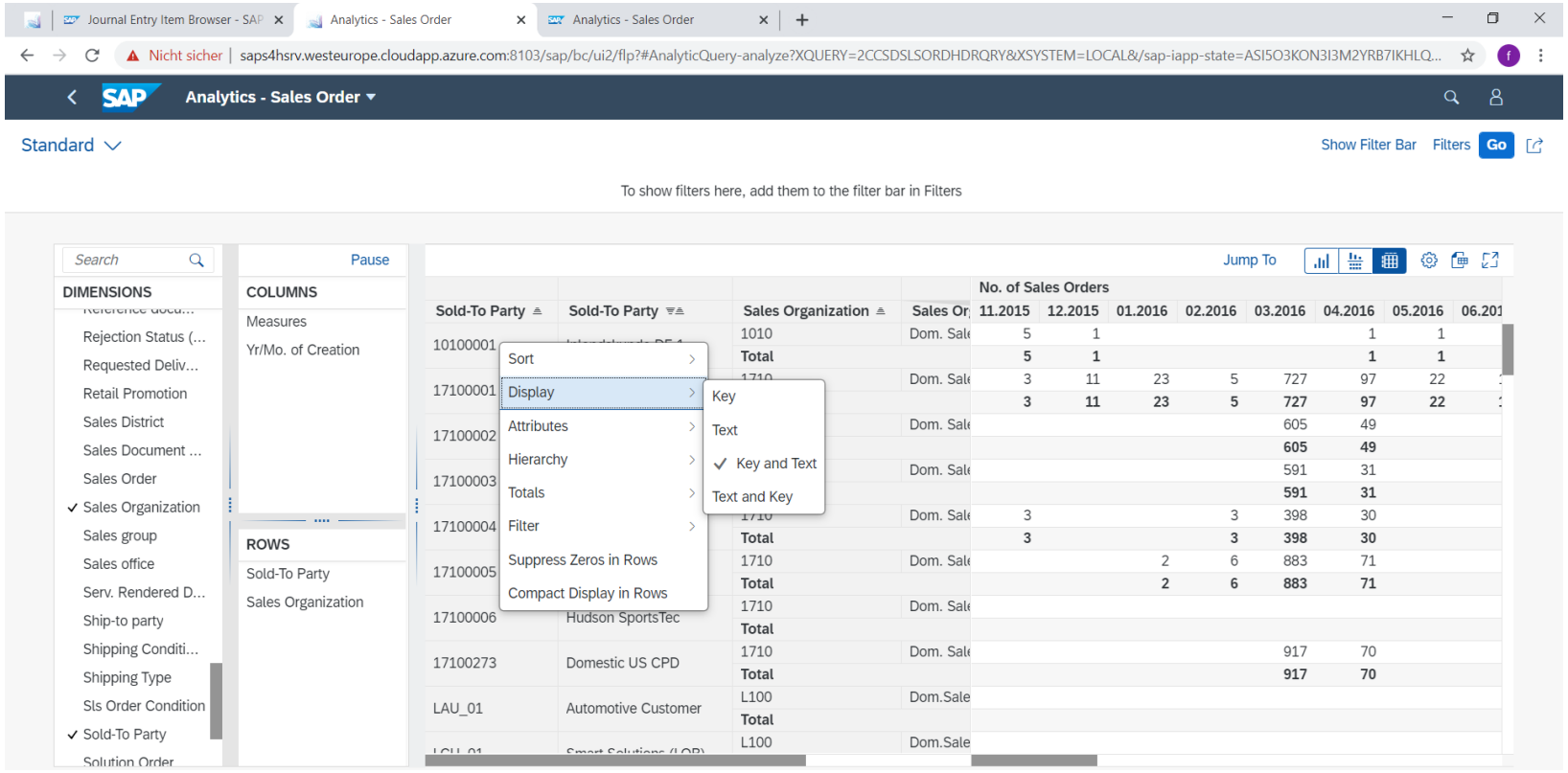
Show Content (Multidimensional)



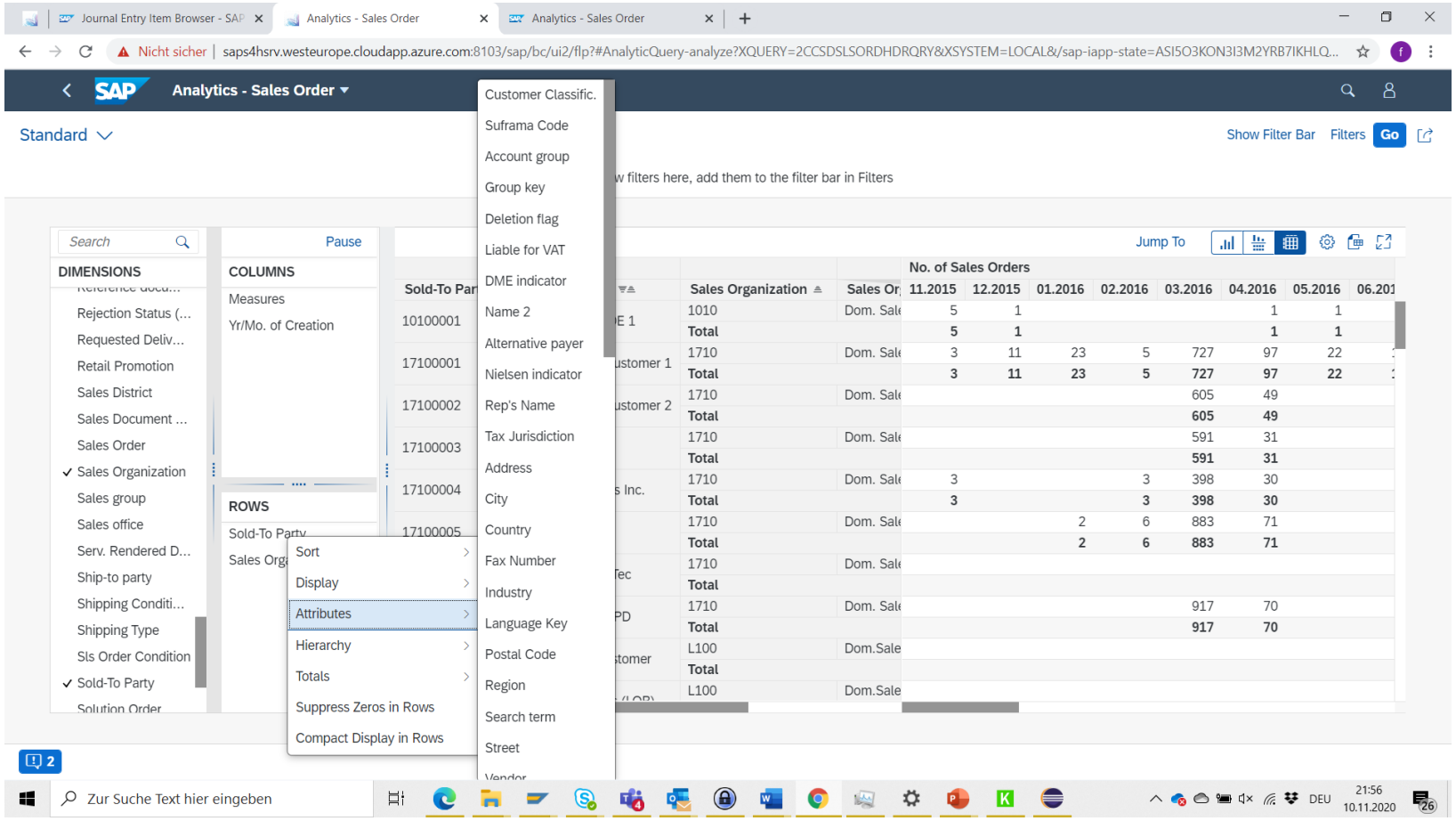


https://saps4hsrv.westeurope.cloudapp.azure.com:8103/sap/bc/ui2/flp?#AnalyticQuery-analyze?XQUERY=2CCSDSLSORDHDRQRY&XSYSTEM=LOCAL&/sap-iapp-state=ASKQ8G45WH9NDRW4CMURD7WIA7XKX1LUZPAD9HKR

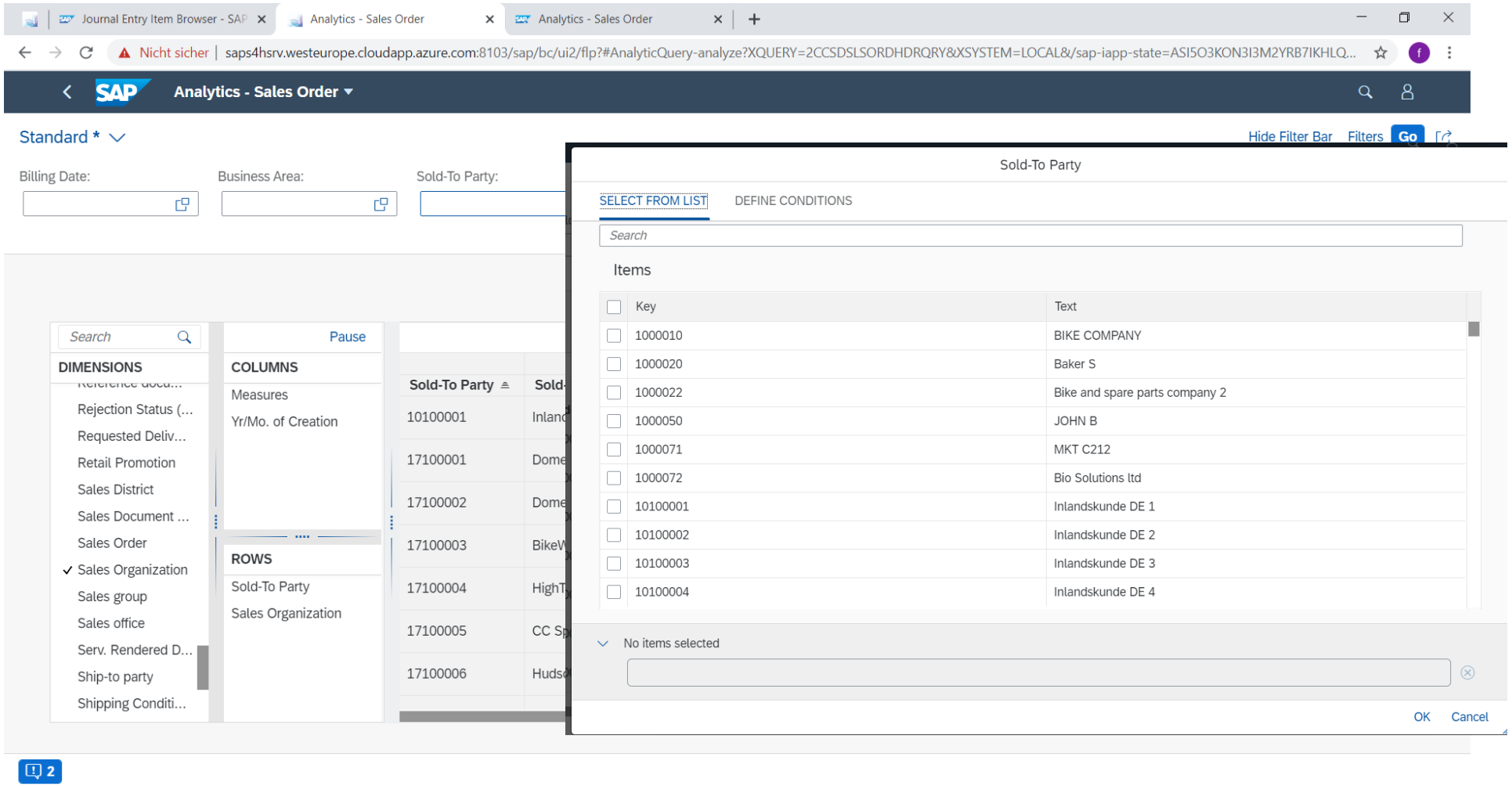
Fiori: Descriptions



Fiori: Attributes (Master Data)

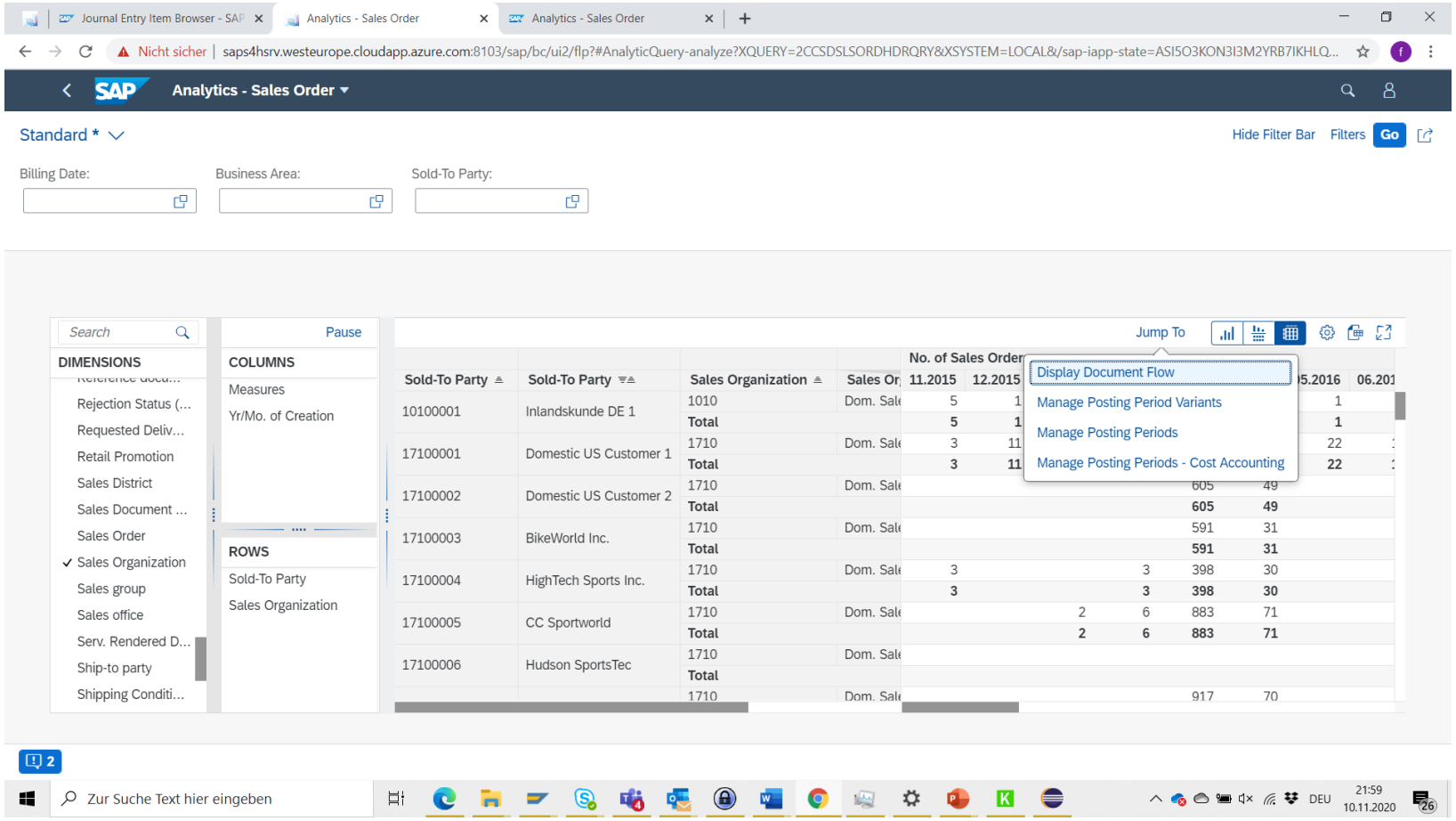


Fiori: Filters

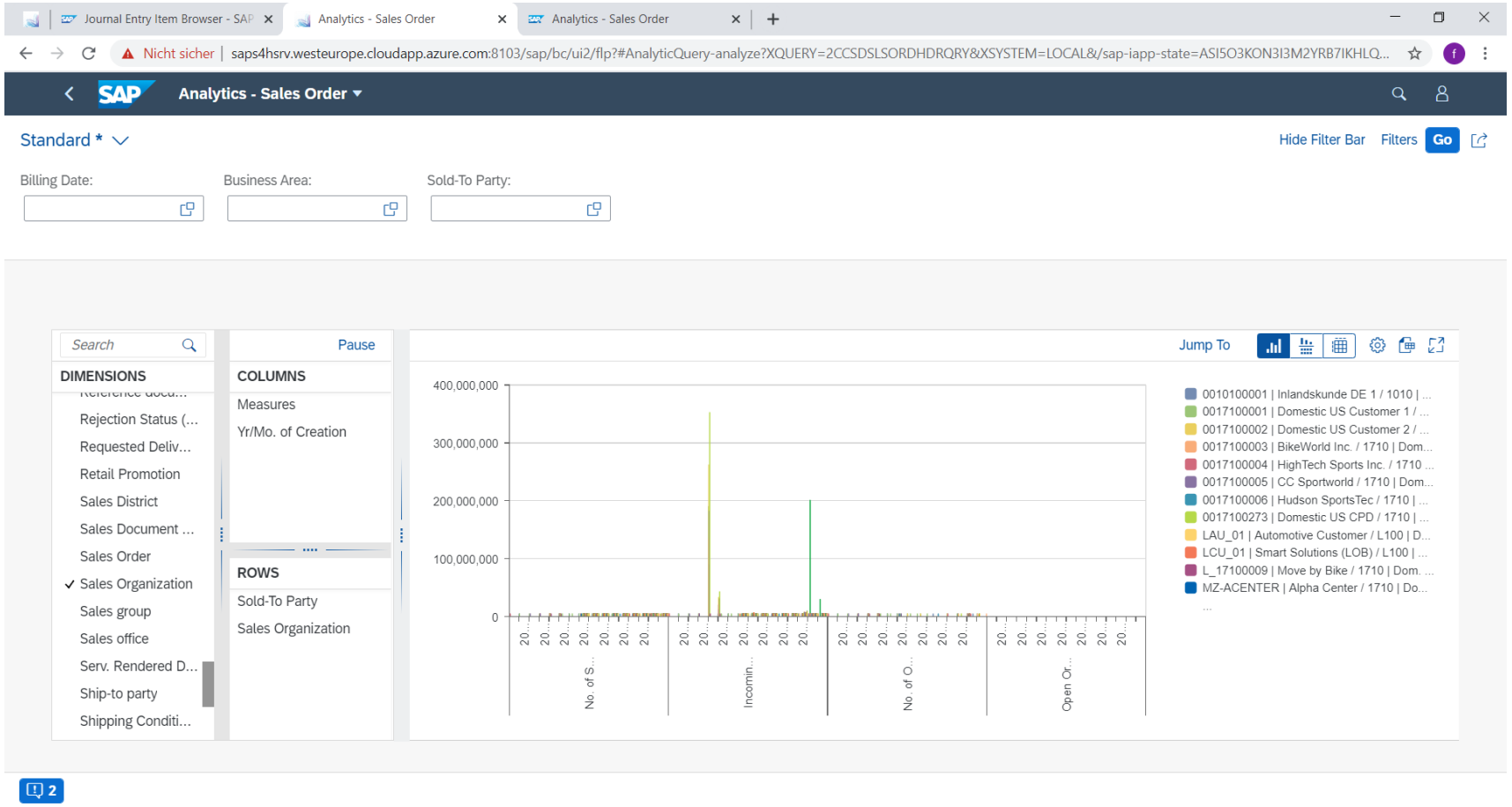


Including
Value Helps

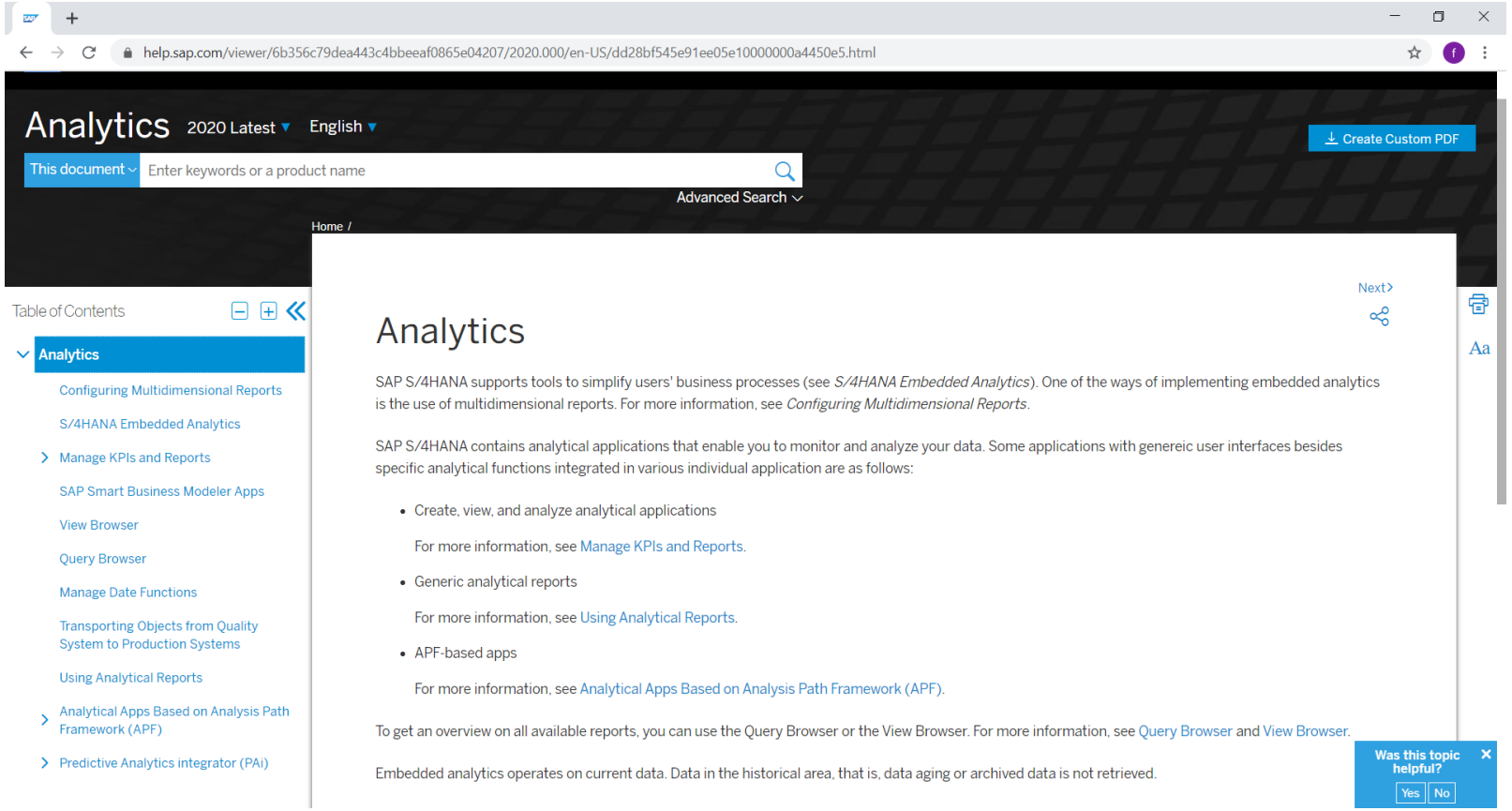
Navigation (Semantic Object)



Business Charts

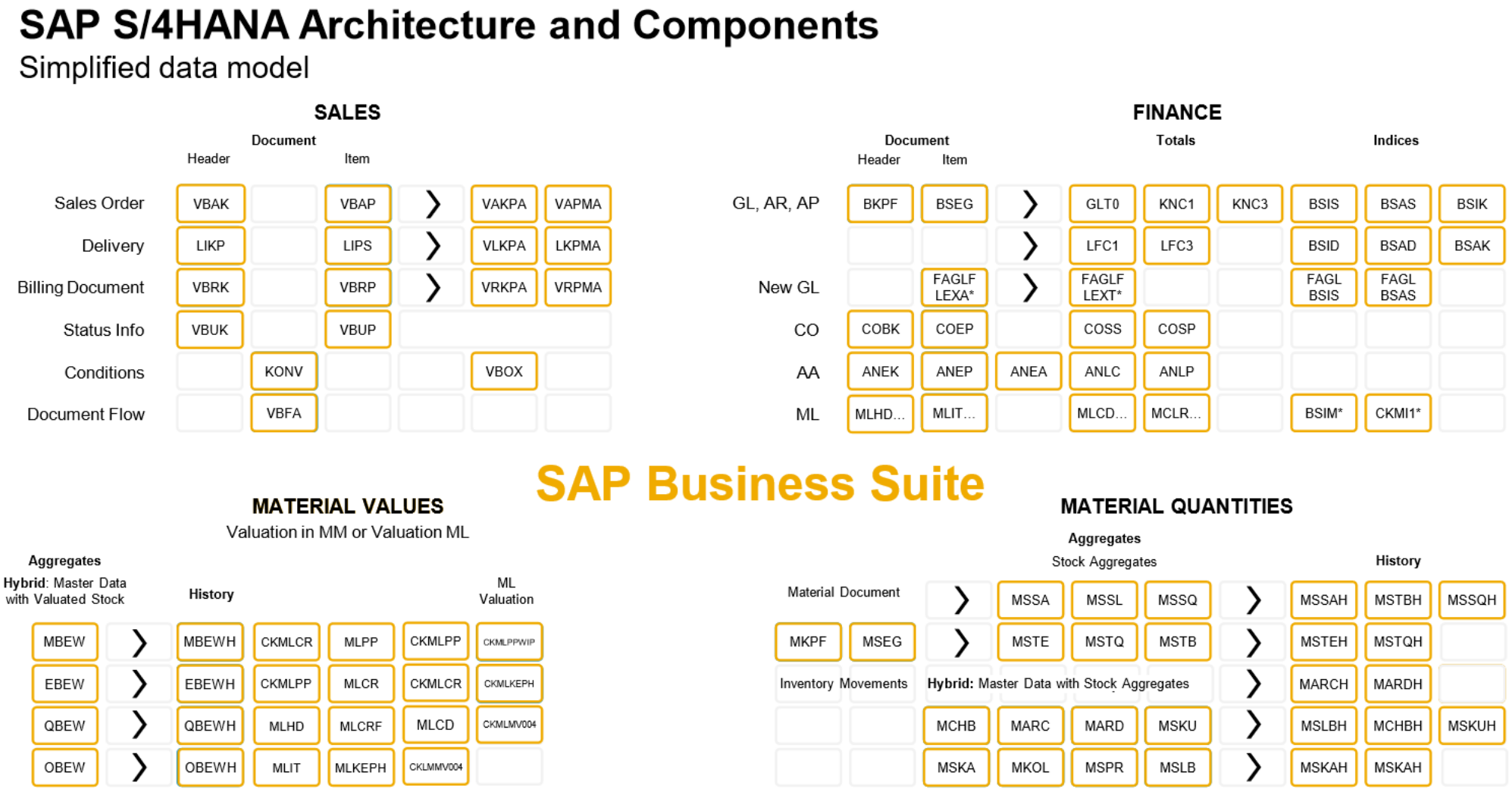


Overview of Analytics Tools

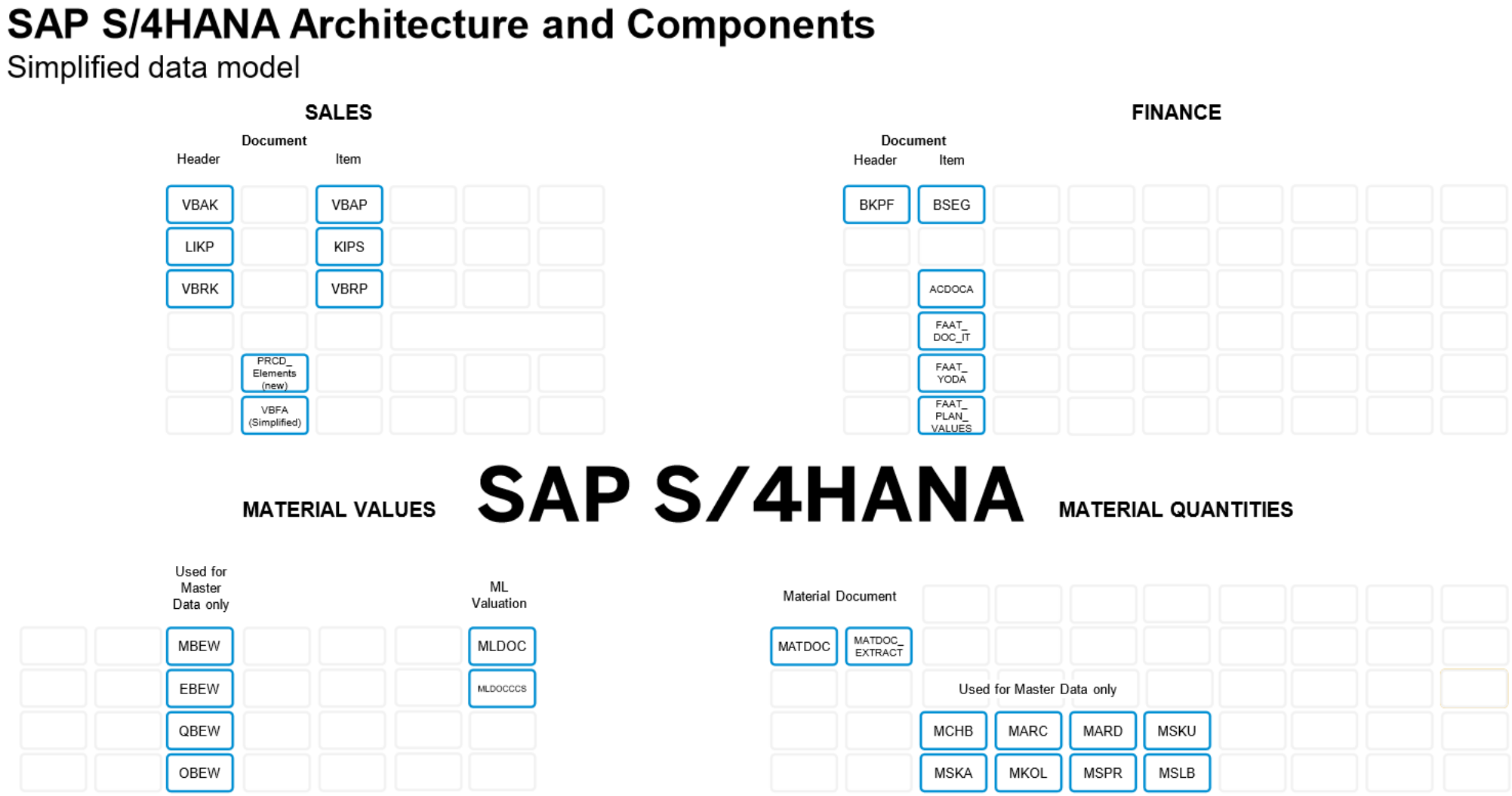


https://help.sap.com/viewer/6b356c79dea443c4bbeeaf0865e04207/2020.000/en-US/dd28bf545e91ee05e10000000a4450e5.html

Old Data Model



New Data Model

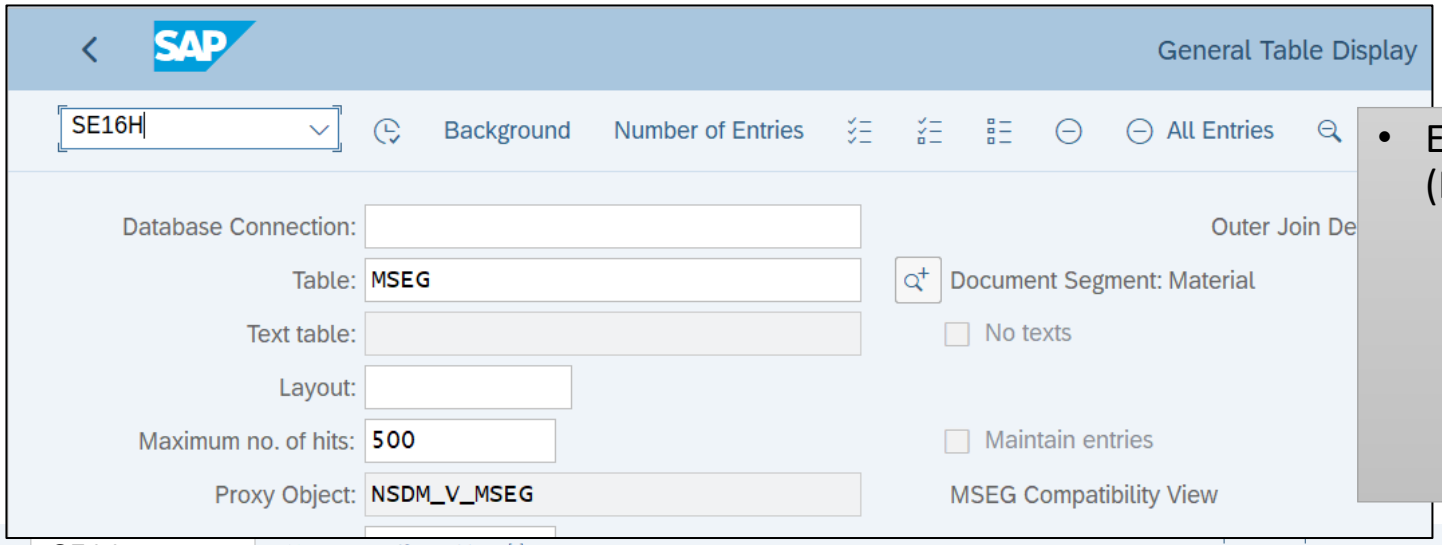


Compatibility Views

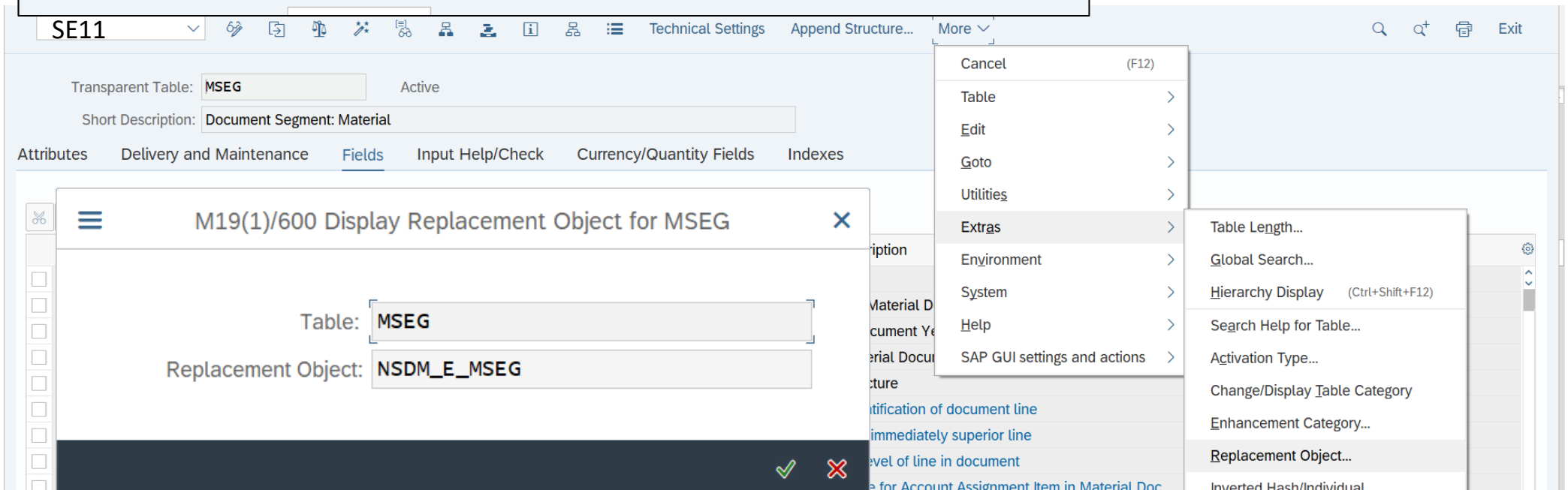
- V1:
  - table is replaced by a DB view (CDS) with the same name
  - Data is backuped during SUM in a table with suffix _BCK
  - Example BSAD, BSAD_BCK,

- V2:
  - Table still exists but selects are redirected to a new CDS
  - No inserts / updates to old table
  - COEP, V_COEP_ORI

Compatibility View



- Example: Select on MSEG uses Compatibility CDS View (Proxy) to read data from MATDOC Table



Replacement Object

[S4Q] COEP

```
1  @EndUserText.label : 'CO-Objekt: Einzelposten periodenbezogen'
2  @AbapCatalog.enhancementCategory : #EXTENSIBLE_CHARACTER_NUMERIC
3  @AbapCatalog.tableCategory : #TRANSPARENT
4  @AbapCatalog.deliveryClass : #A
5  @AbapCatalog.dataMaintenance : #LIMITED
6  @AbapCatalog.replacementObject : 'v_coep_view'
7  define table coep {
8    key include coep_key not null
9      @AbapCatalog.foreignKey.keyType : #KEY
10     @AbapCatalog.foreignKey.screenCheck : true
11     extend belnr :
12       with foreign key [0..*,1] cobk
13         where mandt = coep.mandt
14           and kokrs = coep.kokrs
15           and belnr = coep.belnr
```

V_COEP

[S4Q] COEP | [S4Q] V_COEP | [S4Q] V_COEP

SQL Dependency Tree

SQL Name	SQL Relation	Object Type	Entity Name
V_COEP		CDS View (STOB)	v_coep_view
SELECT			
COEP	From	Database Table (TABL)	
UNION ALL			
V_COEP_R3	From	CDS View (STOB)	V_Coep_R3_view
V_COEP_R2	From	CDS View (STOB)	V_Coep_R2_view
V_COEP_R1	From	CDS View (STOB)	V_Coep_R1_view
V_COEP_ACDOCA_R	From	CDS View (STOB)	v_coep_acdoca_r_view
V_COEP_ACDOCA_R3	From	CDS View (STOB)	v_coep_acdoca_r3_view
V_COEP_ACDOCA_R2	From	CDS View (STOB)	V_Coep_Acdoca_R2_view
V_COEP_ACDOCA_R1	From	CDS View (STOB)	V_Coep_Acdoca_R1_view
ACDOCA	From	Database Table (TABL)	
FINSC_CMP_VERSND	Inner Join	Database Table (TABL)	
TKA01	Inner Join	Database Table (TABL)	
PRPS	Left Outer Join	Database Table (TABL)	

https://blogs.sap.com/2020/10/10/pitfalls-at-s-4hana-db-tables-with-replacement-object/

Finance: ACDOCA

not everything in ACDOCA is there in BSEG

- Below postings contains the line items in ACDOCA table only and not in BSEG table (identified with document status as “U” in BSTAT field in BKPF table) for the database improvement, performance etc.:
- Asset depreciation postings
- Ledger specific postings
- Foreign currency valuation postings
- CO internal postings

- https://blogs.sap.com/2020/08/03/what-a-universal-journal-table-acdoca-covers-and-what-not/
- https://blogs.sap.com/2020/09/24/analytics-on-universal-journal-the-heart-of-sap-s-4hana/

S/4HANA Embedded Analytics with CDS

DIMENSION

1. All dimensions must have an **@Analytics.dataCategory: #DIMENSION** classification in the header of the view.
2. Associations with texts and names are executed through annotation **@ObjectModel.text.element**.
3. Associations of external attributes are determined by foreign key using annotation **@ObjectModel.foreignKey.association**.
4. Dimensions with composite keys needs a definition of a single field as a representative key, this configuration is achieved through annotation **@ObjectModel.representativeKey**.
5. Annotation **@Semantics** helps to define text and address fields.

SELECT from physical Table

https://blogs.sap.com/2018/03/18/create-an-analytical-model-based-on-abap-cds-views/

CUBE

@Analytics.dataCategory: #CUBE

1. Associations of external attributes are determined by foreign key using annotation **@ObjectModel.foreignKey.association**.
2. **@DefaultAggregation** annotation should be place before the fields determined as *measures*.
3. Annotation **@Semantics** helps to define text, currency, quantity and address fields.
4. All the associations are exposed in the bottom of the view to provide access to **Attributes** and **Texts** during the query consumption.

Select from DIMENSION

Test with /N**RSRTS_ODP_DIS**

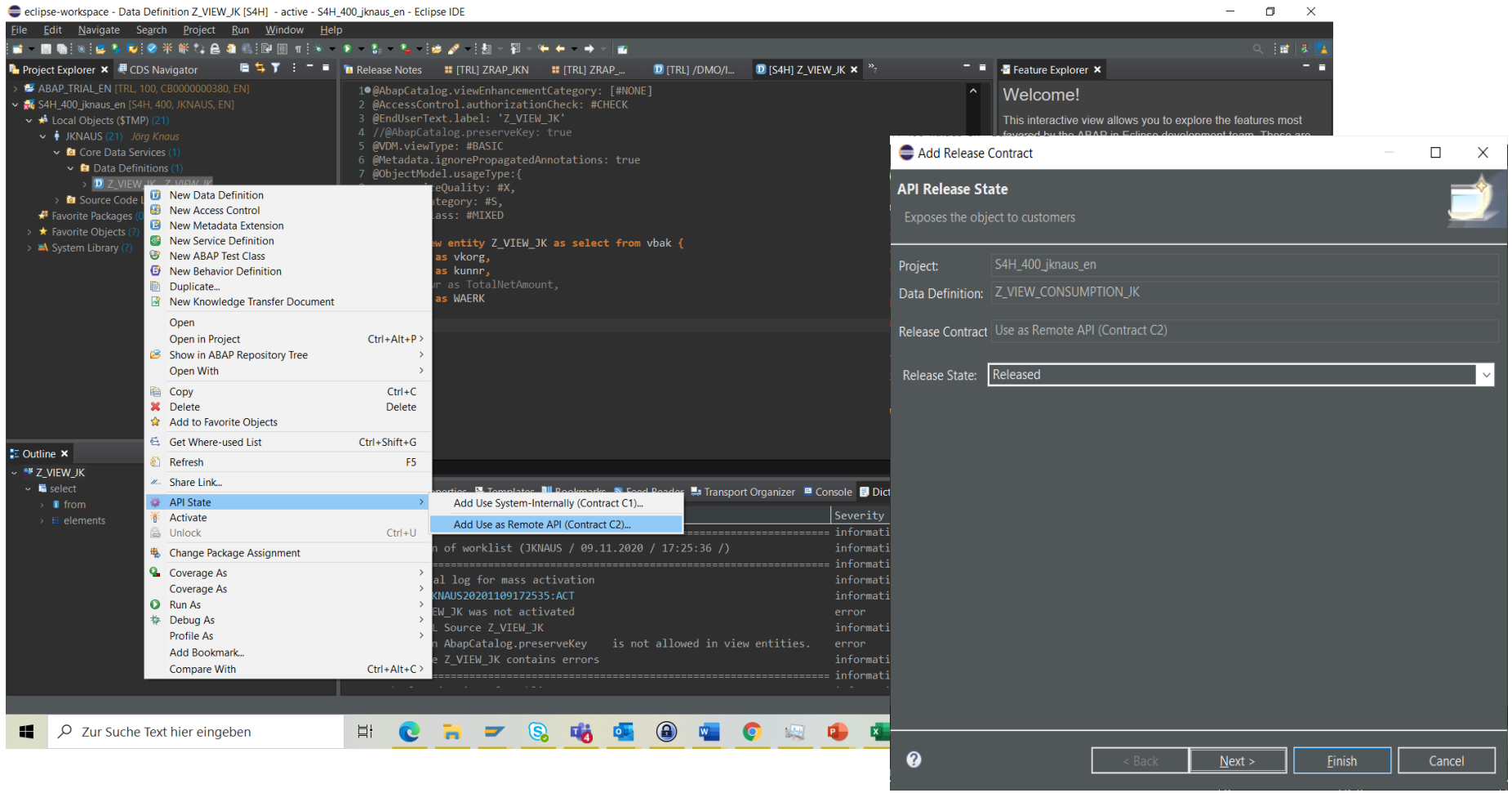
QUERY

- **@Analytics.query: true**
- @VDM.viewType: #COMPOSITE
- Select from CUBE

```
@AnalyticsDetails.query.axis: #COLUMNS «Show in Column
@AnalyticsDetails.query.axis: #ROWS     «Show in Row
@AnalyticsDetails.query.display: #KEY_TEXT “Show Text
```

- Test with /NRSRT

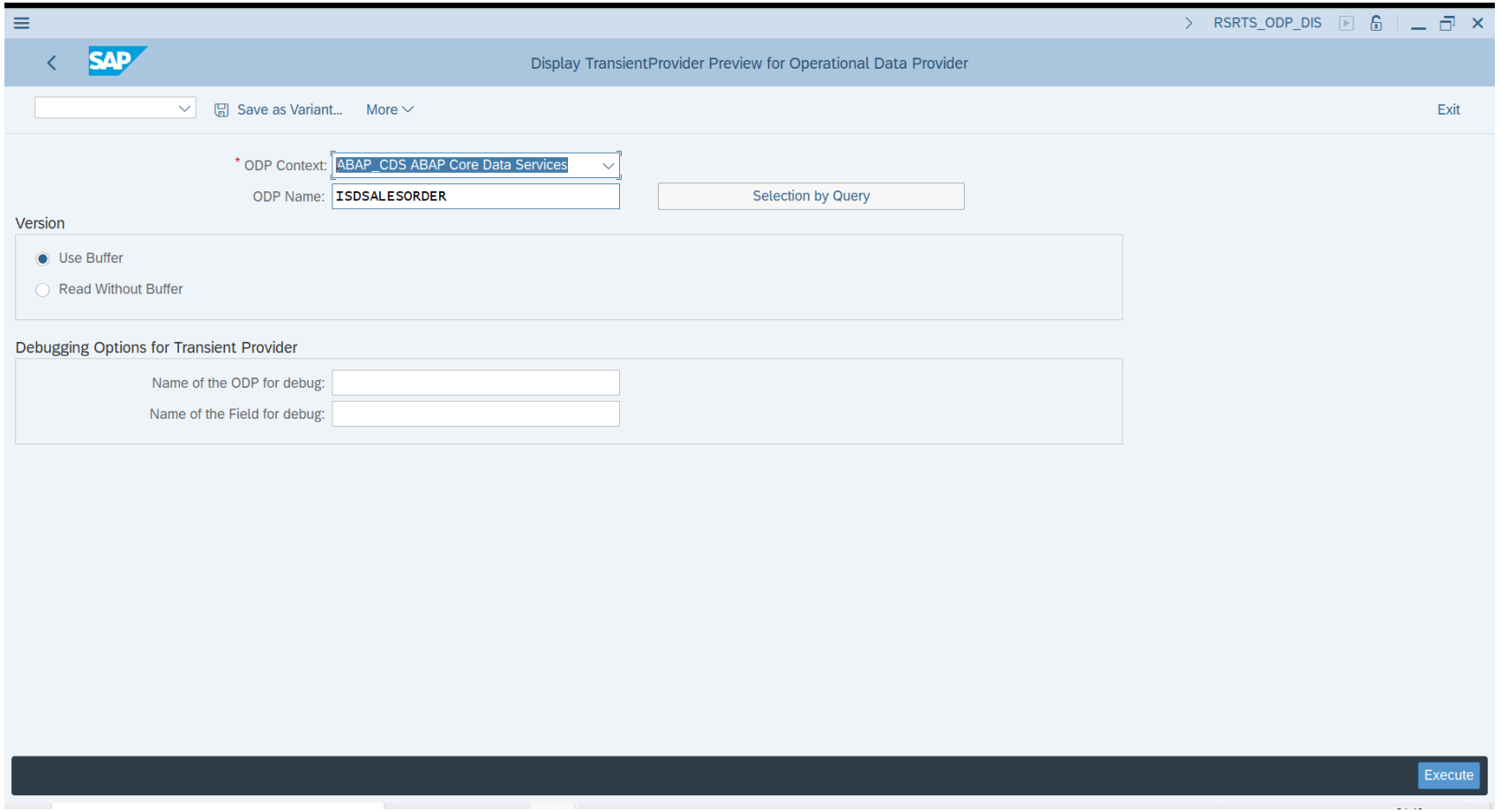
Set API State to released (C2-Query)



F4 Help and Attributes: Association (For example Customer Name)


```
define view Z_VIEW_BASIC_02_JK as select from vbak
  association[1..1] to I_Customer     as _Customer on $projection.kunnr =
_Customer.Customer
{
    key vbeln as vbeln,
    vkorg as vkorg,
    vtweg as vtweg,
       @ObjectModel.foreignKey.association: '_Customer'
      kunnr,
      _Customer,
 @Semantics.amount.currencyCode: 'WAERK'
    netwr as TotalNetAmount,
    waerk as WAERK
    }
```

/NRSRTS_ODP_DIS ISDSALESORDER (Cube)



RSRTS_ODP_DIS

Operational Data Provider ISDSALESORDER (TransientProvider Preview)

Set Focus | Standard Query | Details On/Off | Check Metadata | More | Find | Exit

TransientProvider 2CISDSALESORDER Time Stamp: 03.11.2020 18:16:36

ISDSALESORDER Sales Order

KEY

2CISDSALESORDER	SALESORDER		CHAR(000010)	Sales Order

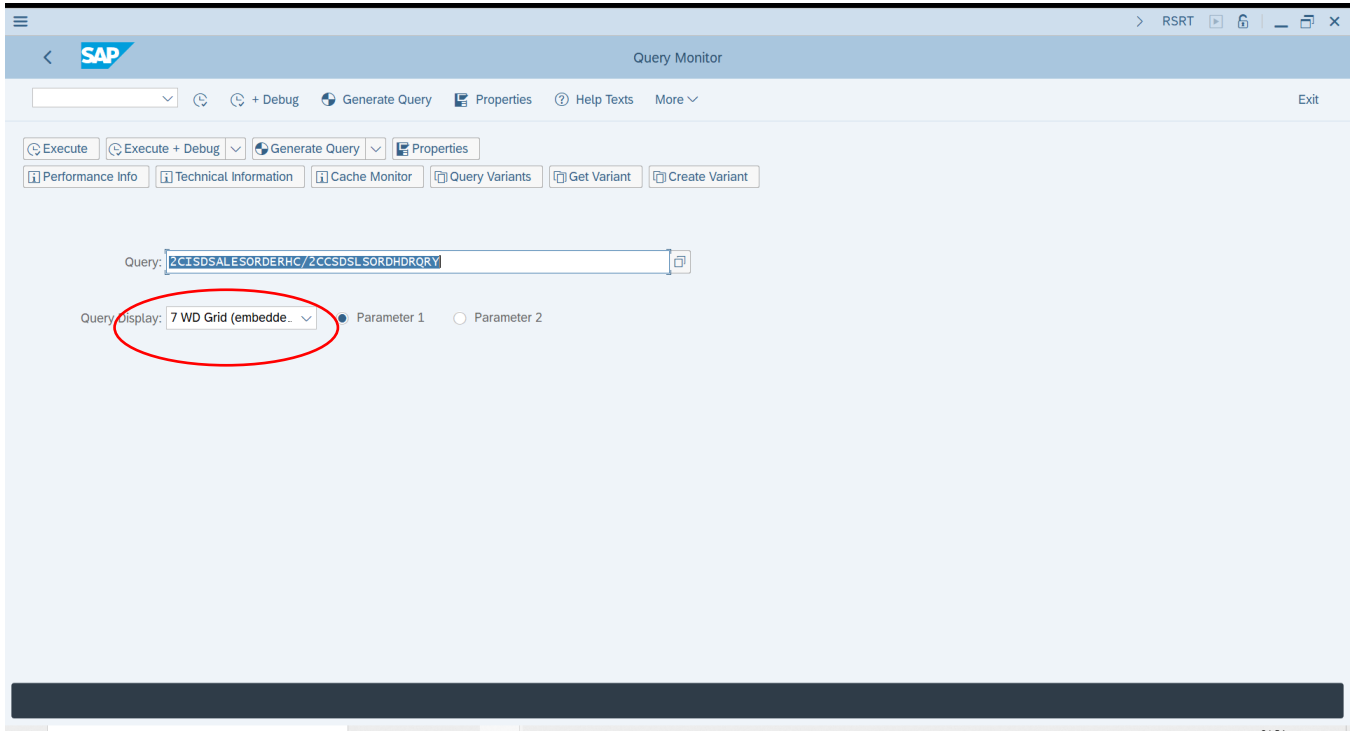
DATA

2CF8IQ0PSMNKXXE9S4S0S5BHTFM	ADDITIONALCUSTOMERGROUP5		CHAR(000003)	Customer group 5
2CFB37NX3U9CCW999XYHWF41EFL	LASTCHANGEDBYUSER		CHAR(000012)	User Who Last Changed the Business Docum
2CFK3RGDN7NEXN4LF6O2OMTUAQ1	CENTRALCREDITCHKTECHERRSTS		CHAR(000001)	Status of Technical Error SAP Credit Man
2CFNOS4SKA1EWYMU18CB1DV6J3T	CUSTOMERTAXCLASSIFICATION8		CHAR(000001)	Tax Classification 8 for Customer
2CFXB11VDRNSC54GMLREAZS16WG	SDPRICINGPROCEDURE		CHAR(000006)	Pricing Procedure in Pricing
2CG9J2E3M2RDTEY7LY5ZLT41EQC	RETAILADDITIONALCUSTOMERGRP7		CHAR(000003)	Customer Group 7
2CGDP1TL7WBXUTFV88CW4XIPWV5	ADDITIONALCUSTOMERGROUP1		CHAR(000003)	Customer group 1
2CGDS2HBB34SQVA9O2WT5AJG66C	SHIPPINGCONDITION		CHAR(000002)	Shipping Conditions
2CGE8MA1SSI21DLPHKCD5RWZ9H1	CORRESPNCEXTERNALREFERENCE		CHAR(000012)	Your Reference
2CGG1NG6H3J2J52OJKBO99IFR4O	CUSTOMERREBATEAGREEMENT		CHAR(000010)	Agreement (various conditions grouped to
2CGHOJ61ZC3ZOHSLF5P8B7BSI9X	OVERALLCHMLCMPLNCSTATUS		CHAR(000001)	Product Marketability Status
2CGMLHWHTZWERHWJVC9MNQ29LSU	INCOTERMSLOCATION1		CHAR(000070)	Incoterms Location 1

Save | Refresh | Cancel

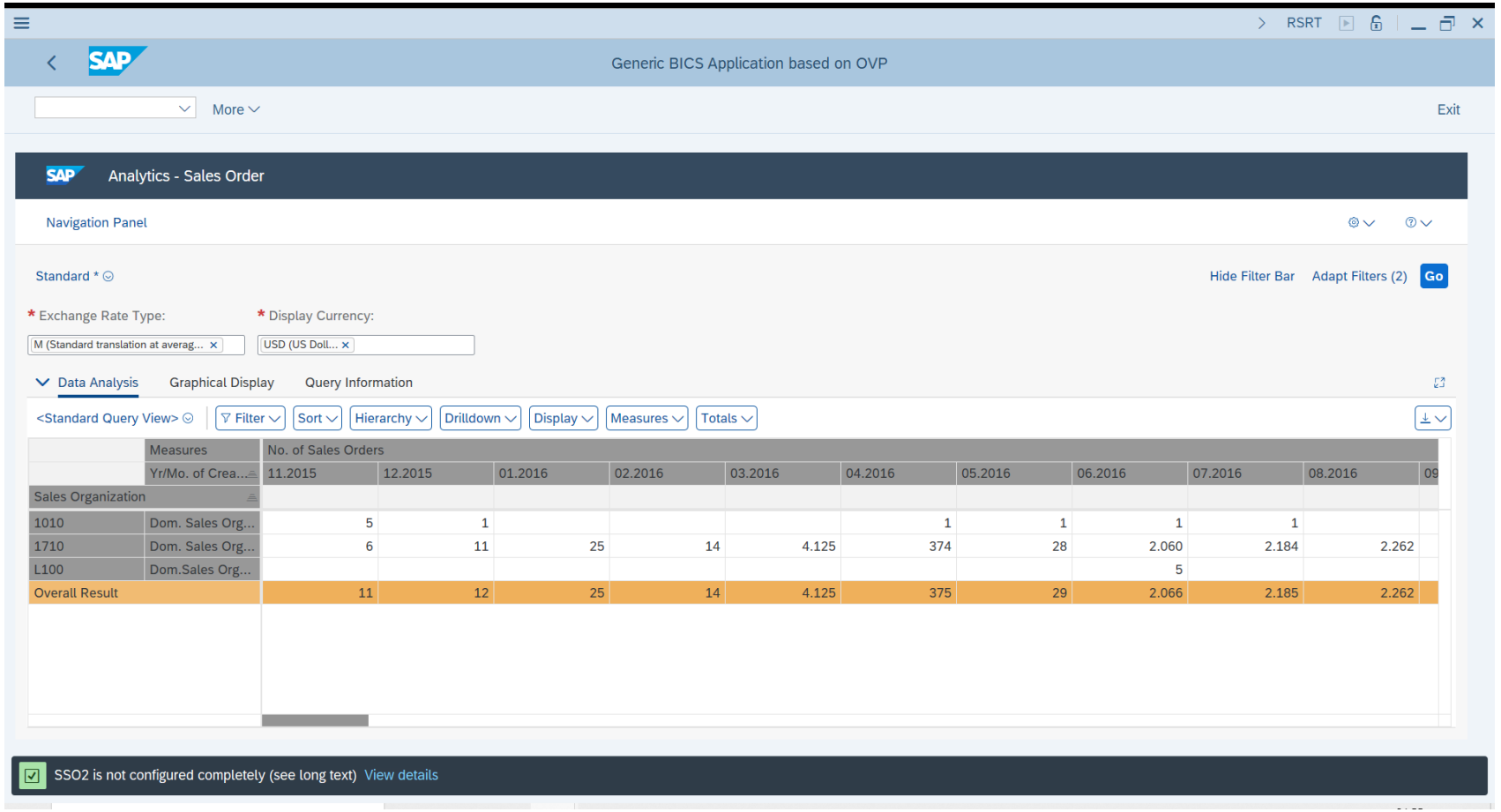
Webdynpro (Queries)

- /NRSRT



https://saps4hsrv.westeurope.cloudapp.azure.com:8103/sap/bc/webdynpro/sap/fpm_bics_ovp?bsa_query=2CCSDSLSORDHDRQRY&sap-client=400&sap-language=EN#

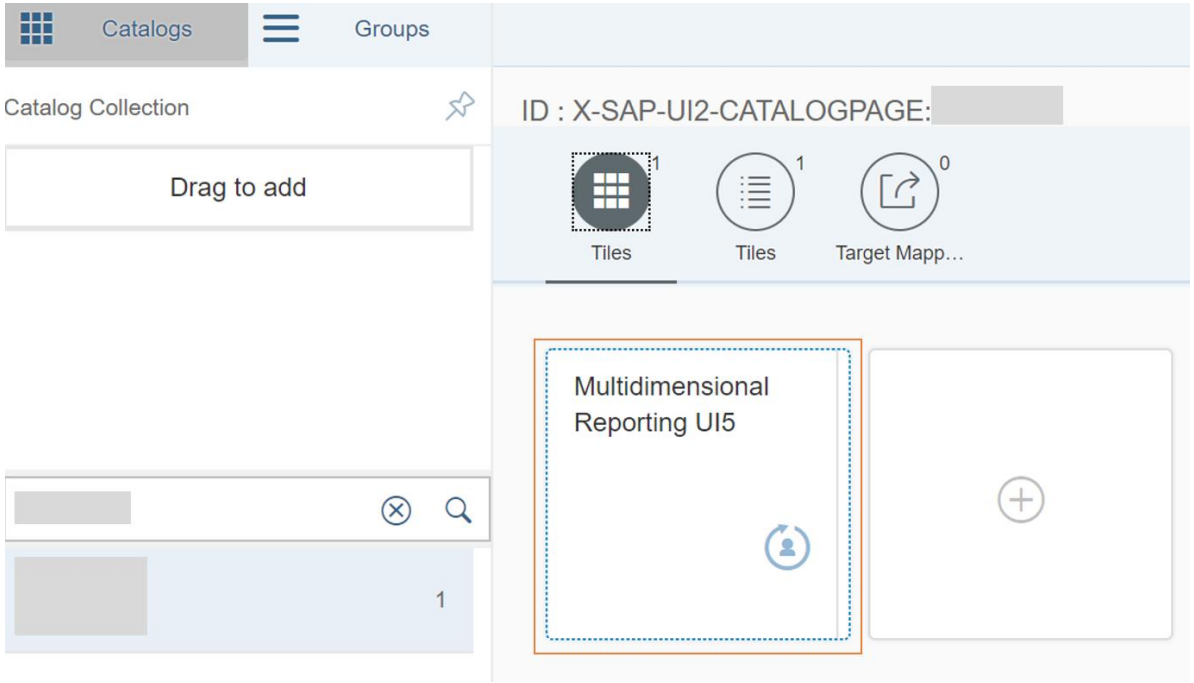
Webdynpro(2)



Measures		No. of Sales Orders									
	Yr/Mo. of Crea...	11.2015	12.2015	01.2016	02.2016	03.2016	04.2016	05.2016	06.2016	07.2016	08.2016	09
Sales Organization												
1010	Dom. Sales Org...	5	1				1	1	1	1		
1710	Dom. Sales Org...	6	11	25	14	4.125	374	28	2.060	2.184	2.262	
L100	Dom.Sales Org...								5			
Overall Result		11	12	25	14	4.125	375	29	2.066	2.185	2.262	

Create Custom Fiori Tile Multidimensional

- https://blogs.sap.com/2018/07/11/how-to-create-custom-fiori-multidimensional-reporting-application-in-s4hana-on-premise/
- 2623507 – Fiori Multidimensional Reporting in S/4 HANA onPremise using custom analytical queries



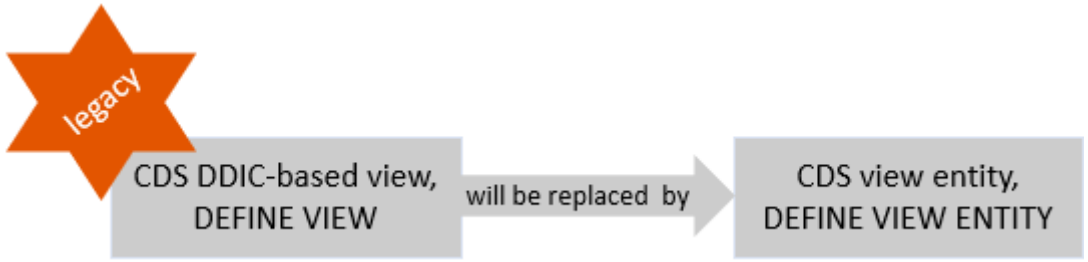
Next, create Target mapping and set Intent/Target/General and Parameters as below.

Intent/Target/General:

Name	Value
Semantic Object	<Set the same Semantic Object used in the title>
Action	<Set the same Action used in the title>
Application Type	SAPUI5 Fiori App
Title	<Title of the target mapping>
URL	/sap/bc/ui5_ui5/sap/FIN_DS_ANALYZE
ID	fin.acc.query.analyze
Device type	Check Desktop only

New with S/4HANA 2020/NW7.55
CDS View Entities

- No separate DDL and View



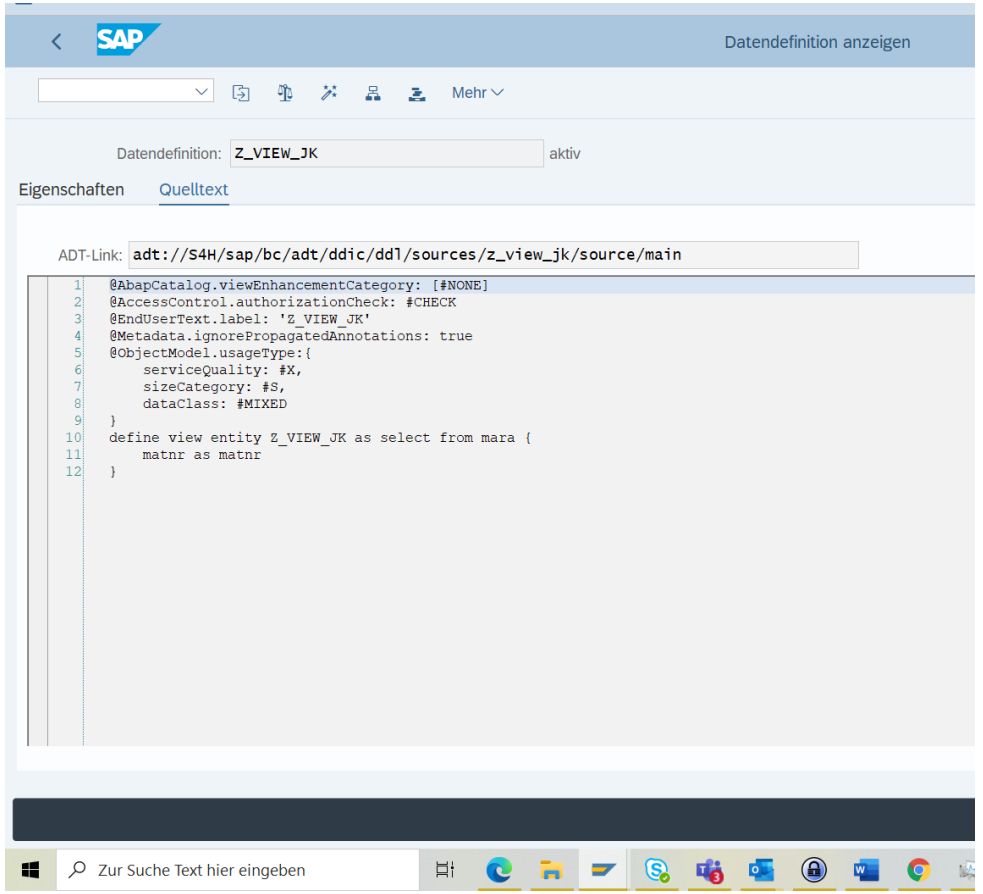
Differences:

- The view entity doesn't require the annotation *@AbapCatalog.sqlViewName.*
- The view entity doesn't require the annotation *@AbapCatalog.compiler.compareFilter: true,* because the filter is implicitly and automatically compared.
- The view entity doesn't require the annotation *@ClientHandling.algorithm*, since client handling takes place implicitly.
- The view entity doesn't require the annotation *@AbapCatalog.preserveKey: true*, because there's **no ABAP Dictionary** view attached to a CDS view entity.
- The view entity is defined using the statement DEFINE VIEW ENTITY.

https://blogs.sap.com/2020/09/02/a-new-generation-of-cds-views-cds-view-entities

View Entity

=> SE16H (currently) not possible

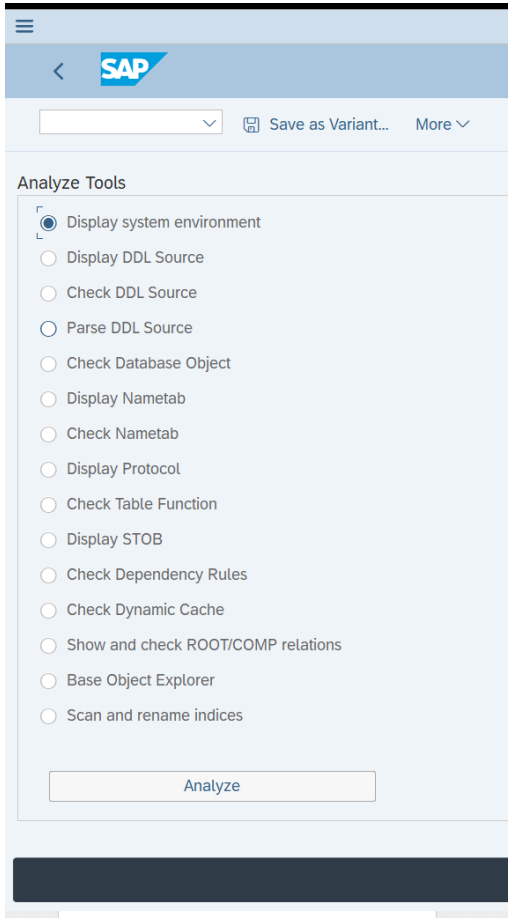


CDS Expert Tools

- /NSDDLAR
- Package SDUT

- To generate DDLs

Report	Usage
RUTDDLSANALYZE	Analysis of DDL Sources
RUTDDLSSHOW	Search for DDL sources with name and/or template
RUTDDLSSHOW2	CDS Source Display
RUTDDLSDEL	Delete the DDL Source and the generated view
RUTDDLSACT	Activates Set of DDL Sources



https://blogs.sap.com/2016/06/28/core-data-services-standard-utilities-reports/

Call ABAP from CDS

- Table Function / AMDP

https://blogs.sap.com/2020/05/19/cds-table-function-using-with-clause-improved-response-time/

https://blogs.sap.com/2020/07/21/leveraging-table-functions-within-cds-views-in-s-4hana/

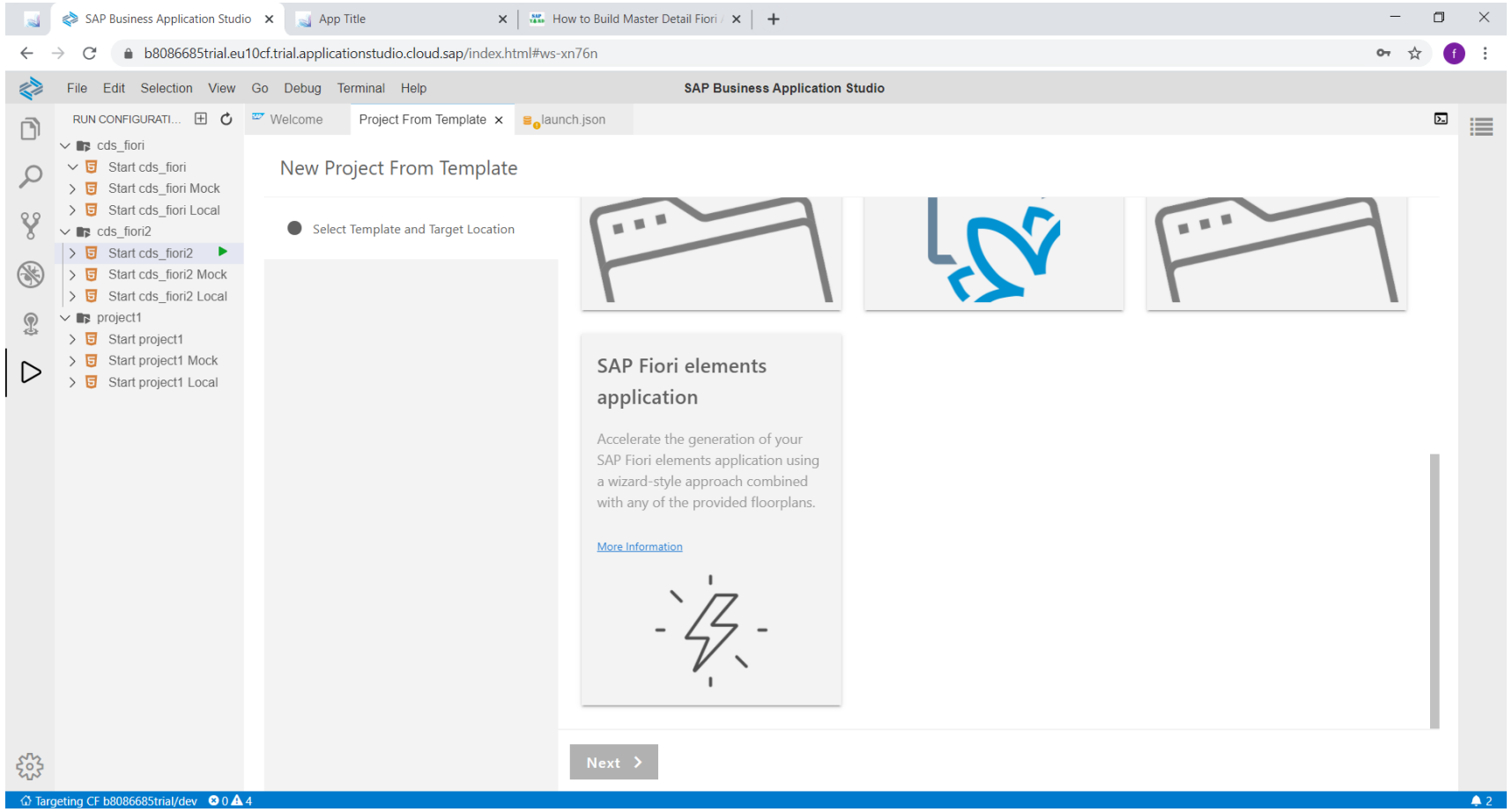
- Code Exits (Virtual Element)

https://blogs.sap.com/2020/05/11/abap-code-exits-in-cds-views/

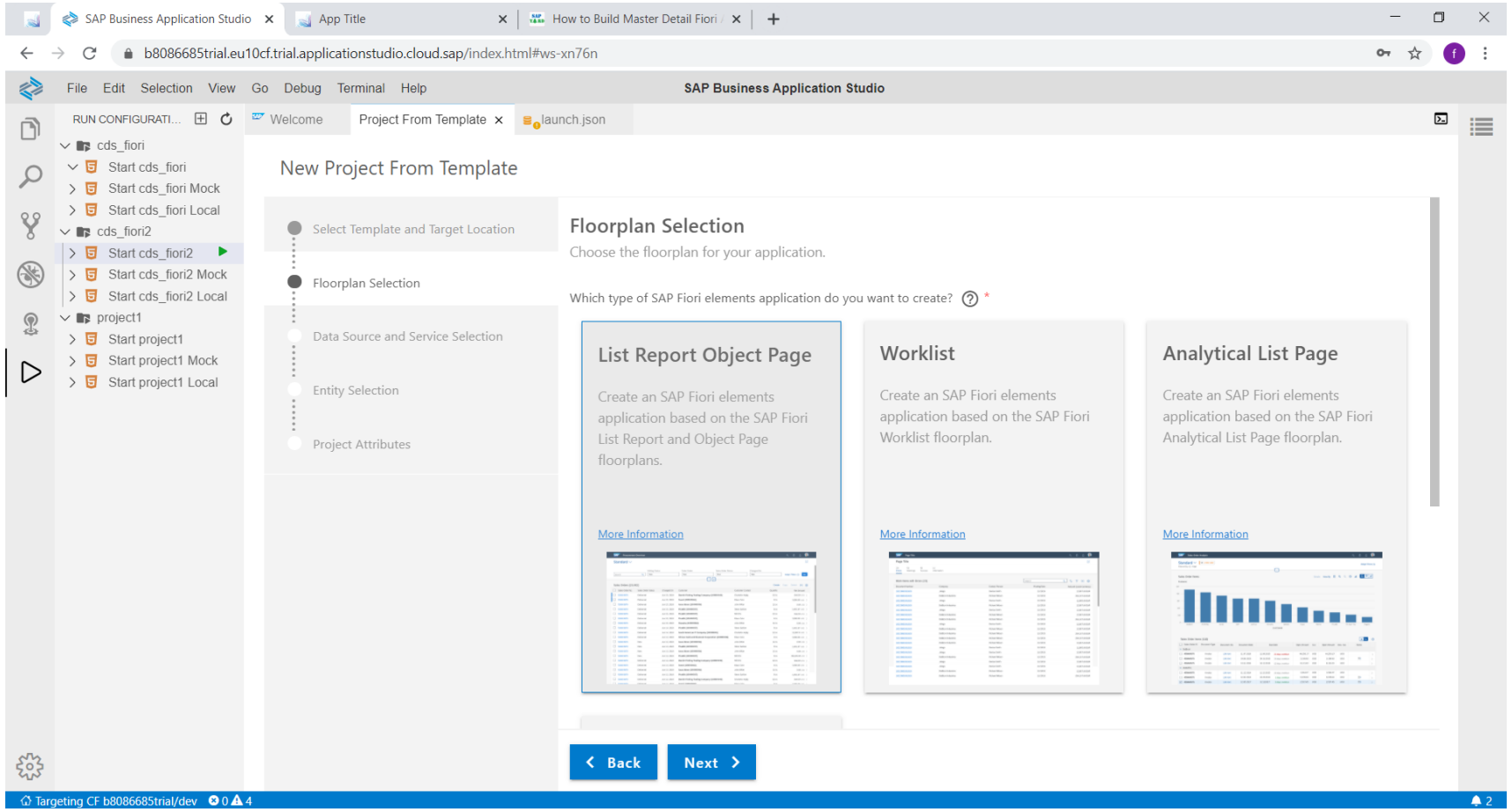
```
define view zv_sflight_cds
  as select from sflight
{
…
      seatsmax_f,
      seatsocc_f,
      @ObjectModel.readOnly: true
      @ObjectModel.virtualElement: true
      @ObjectModel.virtualElementCalculatedBy: 'ABAP:ZCL_CDS_FUNCTION'
      cast( '' as abap.char(255)) as text
```

Anhang: Generate Fiori

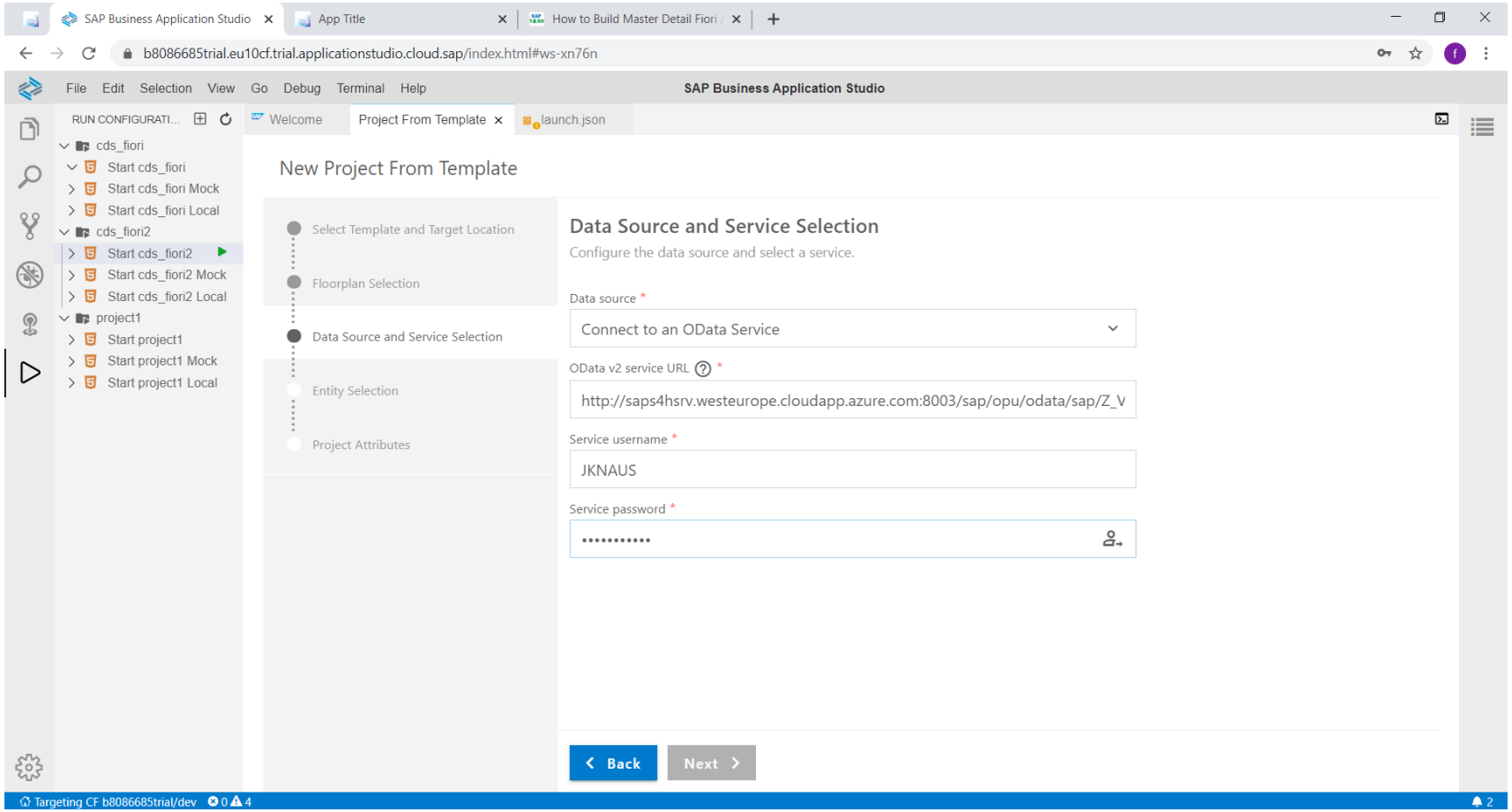
Application Studio



Fiori Elements List Report Object Page

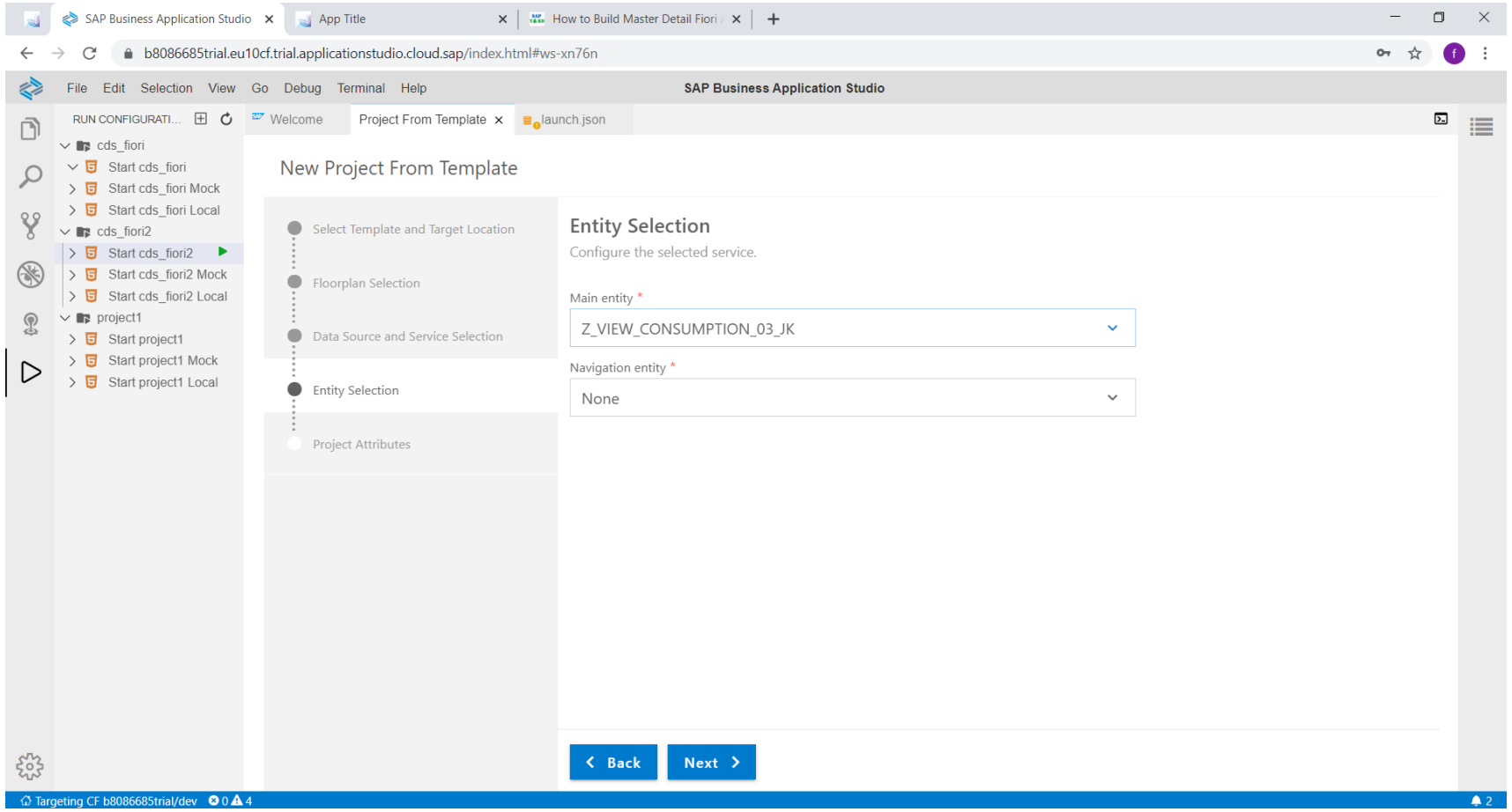


Select ODATA

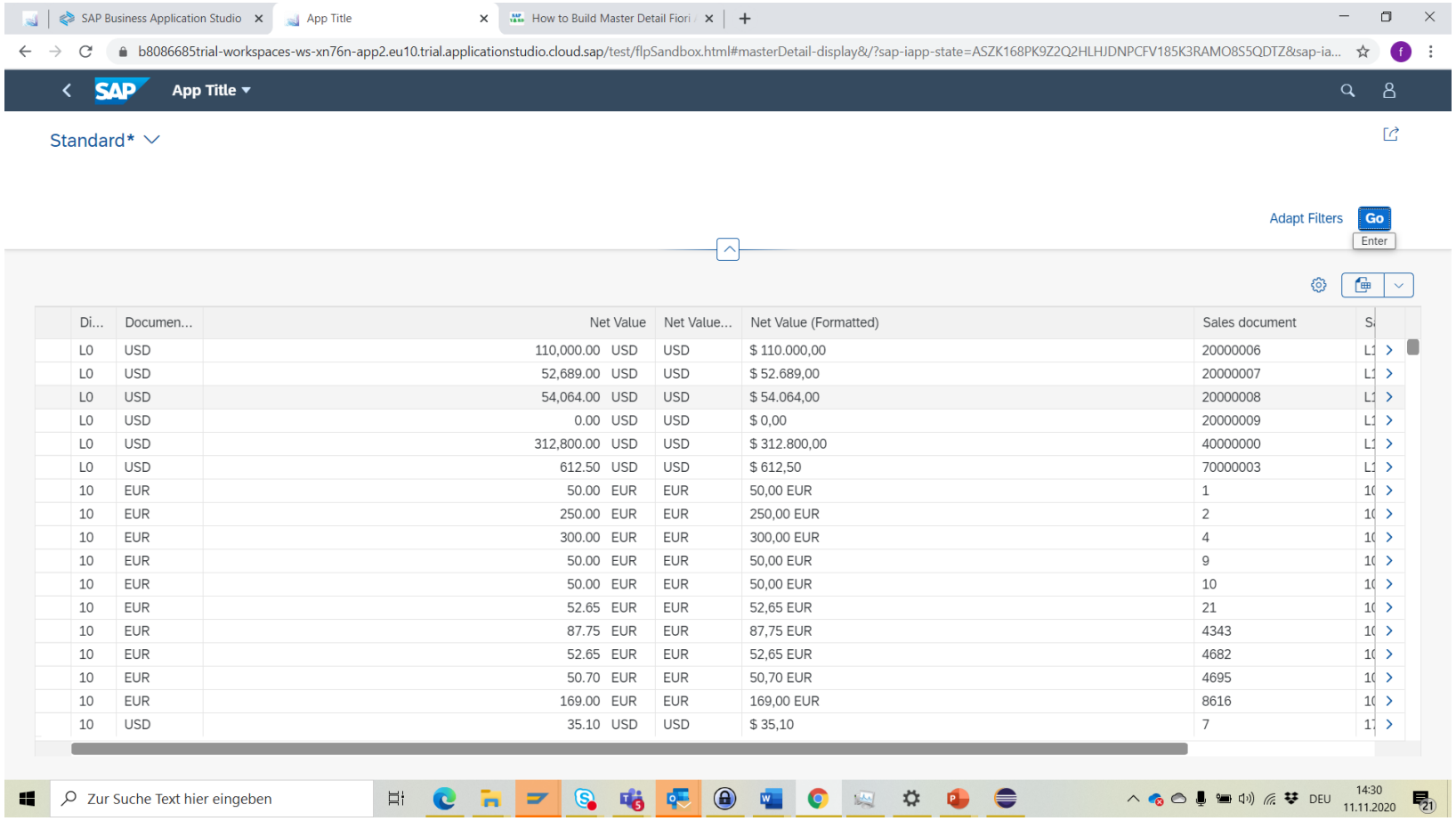


http://saps4hsrv.westeurope.cloudapp.azure.com:8003/sap/opu/odata/sap/Z_VIEW_CONSUMPTION_03_JK_CDS/?$format=xml

ODATA: Main Entity



Generated Fiori:



Di...	Documen...	Net Value	Net Value...	Net Value (Formatted)	Sales document	S
L0	USD	110,000.00 USD	USD	$ 110.000,00	20000006	L1
L0	USD	52,689.00 USD	USD	$ 52.689,00	20000007	L1
L0	USD	54,064.00 USD	USD	$ 54.064,00	20000008	L1
L0	USD	0.00 USD	USD	$ 0,00	20000009	L1
L0	USD	312,800.00 USD	USD	$ 312.800,00	40000000	L1
L0	USD	612.50 USD	USD	$ 612,50	70000003	L1
10	EUR	50.00 EUR	EUR	50,00 EUR	1	10
10	EUR	250.00 EUR	EUR	250,00 EUR	2	10
10	EUR	300.00 EUR	EUR	300,00 EUR	4	10
10	EUR	50.00 EUR	EUR	50,00 EUR	9	10
10	EUR	50.00 EUR	EUR	50,00 EUR	10	10
10	EUR	52.65 EUR	EUR	52,65 EUR	21	10
10	EUR	87.75 EUR	EUR	87,75 EUR	4343	10
10	EUR	52.65 EUR	EUR	52,65 EUR	4682	10
10	EUR	50.70 EUR	EUR	50,70 EUR	4695	10
10	EUR	169.00 EUR	EUR	169,00 EUR	8616	10
10	USD	35.10 USD	USD	$ 35,10	7	17

Master / Detail in Fiori with association

```
2  @AbapCatalog.sqlViewName: 'ZRMER_POCDS'
3  @AbapCatalog.compiler.compareFilter: true
4  @AbapCatalog.preserveKey: true
5  @AccessControl.authorizationCheck: #CHECK
6  @EndUserText.label: 'PO header-item details for
7  master-detail fiori application'
8  @OData.publish: true
9  define view zrmer_po_cds as select from ekko as
1  header
0  association[0..*] to ekpo as _ITEM on header.ebeln =
1  _ITEM.ebeln {
1     key ebeln as purchase_order,
1     lifnr as vendor,
2     ekorg as purchase_org,
1     bedat as doc_date,
3     _ITEM
1  }
4
1
5
```

https://blogs.sap.com/2020/05/22/create-a-fiori-application-to-perform-crud-operations-with-sap-fiori-elements-and-bopf-framework-in-s-4-system-using-cds-annotations/

https://sapcodes.com/2020/05/12/fiori-elements-cds-view-with-ui-annotations/
https://blogs.sap.com/2018/04/04/create-an-analytical-list-page-using-abap-cds-views-and-annotations/

https://blogs.sap.com/2019/11/07/developing-app-with-sap-fiori-elements-list-report-page-object-page-using-cds-view-and-annotations-abap-programming-model-on-sap-s-4-hana./

@ui.lineItem @ui.identification

16. Add the UI annotations

@UI.lineItem
@UI.identification

With the appropriate attributes to the

SalesOrderItemUUID
SalesOrderUUID
SalesOrderItem
Product
CurrencyCode
GrossAmount
Quantity

fields

```
@UI: {
    lineItem: [ { label: 'Sales Order Item', position: 10, importance: #HIGH } ],
    identification:[ { label: 'Sales Order Item', position: 10 } ]
}
SalesOrderItem;

@UI: {
    lineItem: [ { label: 'Product', position: 30, importance: #MEDIUM } ],
    identification:[ { label: 'Product', position: 30 } ]
}
Product;

@UI: {
    identification:[ { label: 'Currency', position: 60 } ]
}
CurrencyCode;

@UI: {
    lineItem: [ { label: 'Amount', position: 50, importance: #MEDIUM } ],
    identification:[ { label: 'Amount', position: 50 } ]
}
GrossAmount;

@UI: {
    lineItem: [ { label: 'Quantity', position: 40, importance: #MEDIUM } ],
    identification:[ { label: 'Quantity', position: 40 } ]
}
Quantity;
}
```

@search.searchable

21. Add the @Search

    @Search.searchable: true

    annotation to the header and to the SalesOrder and Customer fields.

```
5
6  @OData.publish: true
7
8  @Metadata.allowExtensions: true
9
10 @Search.searchable: true
11
12 define view Zs4h_C_Slsorder_Tp_999
13   as select from Zs4h_I_Slsorder_Tp_999 as SalesOrder
14
15   /* Composition associations  */
16   association [0..*] to Zs4h_C_Slsorderitem_Tp_999 as _Item
17     on _Item.SalesOrderUUID = SalesOrder.SalesOrderUUID
18
19 {
20       //Zs4h_I_SlsOrder_Tp_999
21   key SalesOrderUUID,
22
23       @Search.defaultSearchElement: true
24       @Search.fuzzinessThreshold: 0.7
25       SalesOrder,
26
27       @Search.defaultSearchElement: true
28       @Search.fuzzinessThreshold: 0.7
29       Customer,
30
31       OverallStatus,
```

@UI.selectionField

26. Add the

    @UI.selectionField

    annotation to the fields

    SalesOrder
    Customer

```
12  annotate view Zs4h_C_Slsorder_Tp_999 with
13  {
14
15    @UI.hidden: true
16    SalesOrderUUID;
17
18    @UI: {
19        lineItem: [ { label: 'Sales Order', position: 10, importance: #HIGH } ],
20        identification:[ { label: 'Sales Order', position: 10 } ],
21        selectionField: [ { position: 10 } ]
22    }
23    SalesOrder;
24
25    @UI: {
26        lineItem: [ {label: 'Customer', position: 20, importance: #MEDIUM } ],
27        identification: [ { label: 'Customer', position: 20 } ],
28        selectionField: [ { position: 20 } ]
29    }
30    Customer;
31
```

Anhang Annotations

serviceQuality

ObjectModel.usageType.serviceQuality	This annotation reflects the quality of the service that results from the CDS view. Using this annotation, the consumer is able to decide whether or not the annotated CDS view fits the demanded response time and the throughput requirements. Each CDS view can be assigned to one of the following quality categories: **A**: The annotated CDS view may be consumed within the business logic for high volume transactions or in background processing. **B**: The annotated CDS view may be consumed within business logic for transactions or in background processing. **C**: The annotated CDS view may be consumed from the UI in transactions for single object retrieval. **D**: The annotated CDS view may be consumed in analytical reporting. **X**: The annotated CDS view is used to push down the application's code to SAP HANA DB. **Scope:** [VIEW]

sizeCategory

ObjectModel.usageType.sizeCategory	The size category enables the consumer of a service to estimate the possible results set. It reflects the set of data that has to be searched through to compute, for example, the number of rows in the results set by using a count(*) function in a CDS view. You can assign one of the following size categories, which specifies the expected number of data sets (rows) in a production customer system: **S**: < 1000 **M**: < 100.000 **L**: < 10.000.000 **XL**: < 100.000.000 **XXL**: >= 100.000.000 **Scope:** [VIEW]

View Type

VDM.viewType	Defines the type of a VDM view **Scope:** #TABLE FUNCTION, #VIEW **Evaluation Runtime (Engine):** None - Used for **SAP internal** structuring and interpretation of the CDS views **Values:**	
	Value	**Description**
	BASIC	views that form the core data basis without data redundancies.
	COMPOSITE	views that provide data derived and/or composed from the BASIC views.
	CONSUMPTION	views that serve for specific application purposes and may be defined based upon public interface (for example, BASIC and COMPOSITE) views.

Online Help: All CDS Annotations

- https://help.sap.com/viewer/cc0c305d2fab47bd808adcad3ca7ee9d/7.5.9/en-US/c2dd92fb83784c4a87e16e66abeeacbd.html