# SAP ABAP CDS View Use Cases for Data Provisioning

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#### Abstract

SAP ABAP CDS views introduced by SAP in S/4 HANA offers a variety of use cases for Reporting and Modeling scenarios in S/4 HANA as well as BW/4 HANA. Because of their versatile nature, a developer can use them as a transient provider for S/4 HANA Embedded Analytics as well as an extractor for BW/4 HANA Data provisioning scenarios. In this paper we will discuss the details of these use cases and the key annotations required for CDS view development so that they can be used in different contexts.

Keywords: SAP S/4 HANA, SAP BW/4 HANA, Embedded Analytics, ABAP CDS Views, CDS CUBE, CDS Query, CDS Extractors, ODP\_CDS.

#### **1 Introduction:**

ABAP CDS views have become increasingly popular as well as one of the key objects required in SAP S/4 HANA or BW/4 HANA context. Due to their SQL based programming option as well as different Annotations, they can be used easily by SAP developers as per the requirement for reporting as shown in the picture below.



In the first scenario, CDS views can be used as a transient provider for BW Query creation within the S/4 HANA system using Embedded BW modeling approach. The BW query uses the Embedded BW that is within S/4 HANA which is part of the SAP NetWeaver stack. CDS views used here replace the traditional InfoProviders for the Queries and are called as a transient InfoProviders as there is no storage of data in the CDS layer.

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The second scenario is about virtual consumption of ABAP CDS Views in SAP BW/4HANA. BW data sources are defined on ABAP CDS Views and Open ODS Views are defined on top of it. Here no data is loaded and the BW Query is run on BW/4 HANA.

Third scenario uses CDS views in the ETL process rather than providing virtual access to the data. Here CDS views are used to load the data in the BW/4 HANA system. Using Source System ODP CDS, BW DataSources are defined on ABAP CDS Views. Then the data flow in SAP is completed using transformations and then storage in Data Store Object advanced (aDSOs). Now we will take a look at each scenario in detail.

# 2.1 Scenario #1:

The BW query uses the Embedded BW that is part of the SAP S/4HANA system. Since it is part of the SAP NetWeaver stack, this is SAP NetWeaver BW but not SAP BW/4HANA. Queries on ABAP CDS views technically run on transient providers, which are automatically created from ABAP CDS Views.



Here the key annotation required in an ABAP CDS view to act as a transient provider is @Analytics.dataCatagory: #CUBE. This makes the CDS view appear in the list of InfoProviders when you are trying to create a Query. However you need to click on the checkbox to select transient providers when creating a query. Also it should be noted that if the ABAP CDS view has the annotation @AbapCatalog.SQLviewName: 'ABC', then the name of the transient provider is 2CABC. The prefix 2C is added automatically. Since this scenario does not have an InfoObject based modeling approach, this will support master data and hierarchies virtually as per the defined data model in the CDS CUBE view. Transaction RSRTS\_ODP\_DIS can be used to find Transient Providers and check their details.

All the features of the BW query definitions like restricted key figures, calculated key figures, variables, report-to-report interface etc. can be used as usual using this approach. There are no limitations for using these features. However the key difference is master data or hierarchy provisioning for the fields using ASSOCIATIONS defined in the CUBE view. CDS views which are defined as master data views or hierarchies need to be attached in the CUBE views using ASSOCIATIONS and they need to be attached to the particular fields using the Annotation @*ObjectModel.foreignKey.association*. This will make sure that the corresponding master data or hierarchy information flows through the field and can be used in BW query definition e.g., hierarchy based restricted key figures.



#### 2.2 Scenario #2:

In this scenario BW data sources are defined on ABAP CDS Views and Open ODS Views can be defined on BW DataSources. In this scenario, no data is loaded, but the BW query and its online analytical processing features are processed in SAP BW/4HANA. Following annotations are essential for CDS views to be used in this context.



@*Analytics.dataExtraction.enabled:true* - This will help enable extraction of data from the CDS views to BW/4 HANA.

One of the following annotations need to be used as per the context in which CDS view is being used as a transactional data source or master data source -

- @Analytics.dataCatagory: #CUBE
- @Analytics.dataCatagory: #FACT
- @Analytics.dataCatagory: #DIMENSION

To use ODP based on ABAP CDS Views, a source system must be defined (ODP\_CDS) with ODP Context ABAP\_CDS. Then a Data Source needs to be created for the CDS view. Then subsequently define an Open ODS View on the Data Source.

😣 Source Systems	Tech. Name	Execute Func	0	Object Information
DDP - BW	ODP_BW	Create		
ODP - SAP (Extractors)	ODP_SAP	Create		
ODP - SAP HANA Information Views	ODP_HANA	Create		
ODP - SLT Queue	ODP_SLT	Create		
ODP - ABAP CDS Views	ODP_CDS	Create		
• 👮 ODP - CDS Views	ODP-CDS	Check ABAP_CDS		
ODP-CDS T41(400)	T41_CDS	Check ABAP_CDS		
ODP - SAP Business ByDesign	ODP_BYD	Create		
ODP - Other Contexts	ODP	Create		
🕨 🧰 File	FILE	Create		
SAP HANA Local Database Schema	HANA_LOCAL	Create		
SAP HANA Smart Data Access	HANA_SDA	Create		
• 🥅 SAP HANA Tenant Database Schema	HANA_MDC	Create		
• 🧰 Big Data	BIG DATA	Create		

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This approach uses modeling through Open ODS Views, utilizing semantic information. A composite provider can be created using the Open ODS view and then subsequently used in the BW Query. SAP BW Query functionalities, SAP BW/4HANA authorizations, and BW Hierarchies can be utilized in this approach of data modeling. This is helpful in cases where Virtual (real-time) consumption of OLTP data in SAP BW/4HANA is required. This approach of using CDS view is very suitable for the scenario where you would like to use a Composite Provider to combine transactional data from SAP S/4HANA (using an Open ODS view) with historical data from SAP BW/4HANA, stored in a DataStore Object (advanced).

#### 2.3 Scenario #3:

In this scenario CDS views are used in ETL, so that the data is loaded to SAP BW/4HANA. Using Source System ODP CDS, BW DataSources are defined on ABAP CDS Views From the data sources same as the scenario 2 discussed above. However here we can have multiple extraction scenarios of delta loads as the Data is persisted in the BW/4 HANA system. The annotations required for using CDS views in this scenario are the same as scenario 2.



There are additional annotations required to enable Delta extraction scenarios, otherwise full extraction is supported by default.

@*Analytics.dataExtraction.delta.byElement.name:* This annotation helps define the field based on which the filtering during generic delta extraction will be done.

@Analytics.dataExtraction.delta.byElement.maxDelayInSeconds: This can be used to define the delay in seconds for the delta extraction run. If you do not define this annotation, the default value is 1800 seconds which is 30 minutes. In that case only records with a timestamp older than 30 minutes are extracted in the current run. These missed records are going to be extracted during the next delta run.

@Analytics.dataExtraction.delta.byElement.detectDeletedRecords: This annotation helps the system to remember all key combinations of the view that were extracted in delta mode. If a key combination does not occur in the view anymore, this will automatically generate a delete image in the extracted data. This annotation is only feasible for low-level volumes of data and should not be used for high volume scenarios to avoid performance issues.

@*Analytics.dataExtraction.delta.byElement.ignoreDeletionAfterDays*: Referring to the annotation before, the extraction will ignore deleted records if they are older than the specified number of days.

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Apart from the above Delta extraction Annotations, it is also possible to use BW managed Delta extraction, where no delta extraction annotation is required in CDS view and the option based on timestamp is used in the data source on BW side.

Here are the following scenarios which are possible for CDS based extraction:

- CDS Extraction in FULL mode (without Delta Capability)
- CDS Delta Extraction (BW-managed) based on Date/Time Stamp
- CDS Delta Extraction (ODP-managed) based on Date/Time Stamp
- CDS Delta Extraction based on Change Data Capture (CDC)

# **Conclusion:**

ABAP CDS views are very versatile objects which can be used in different contexts for the data modeling as well as data provisioning scenarios in BW/4 HANA. When they are used as a transient provider in embedded analytics in S/4 HANA, they enable reporting directly from the S/4 System without full fledged Data warehousing setup and can be very useful in operational reporting out of the box. They can also be used to provide data in the BW/4 HANA system virtual or persistent as required. Then can in turn be used for the business scenarios where the data modeling and advanced data warehousing capabilities of BW/4 HANA are utilized.

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