Tushar Sharma

September 9, 2017 | 6 minute read

# ABAP Core Data Services – Introduction (ABAP CDS view)



## Table of Content:

After the evolution of SAP HANA, the technology within the SAP is changing rapidly and there has been a paradigm shift in the way business applications are developed at SAP.

The rule of thumb is simple: ***"Do as much as you can in the database to get the best performance"***.

When I started learning about ABAP CDS views few months back, I had to search many different blogs and pages written by the experts. Now, I thought of presenting a blog series for the beginners like me who are keen to learn ABAP CDS views.

Let's Start !!

## Introduction

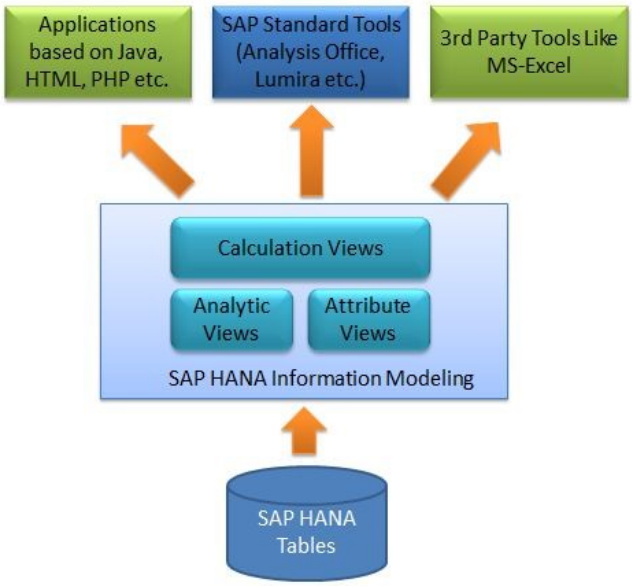
Data models are a cornerstone of application development. They provide a standardized method for defining and formatting database contents consistently across systems, enabling different applications to share the same data — reducing development costs, speeding time to market, and improving quality and performance.

Those familiar with application development in the ABAP world are no strangers to the traditional data modeling tools included with SAP NetWeaver Application Server (SAP NetWeaver AS) ABAP — in particular, the ABAP data dictionary (DDIC), which stores definitions of objects, such as database tables and views, that can be used in ABAP programs. And then along came SAP HANA and the new paradigm of pushing down data-intensive logic to the database layer.

The concept of Virtual Data Model (VDM) was introduced with HANA Live few years ago, SAP HANA Live is a Virtual data model on top of suite tables which uses native SAP HANA SQL views called Calculation views for real-time operational Reporting.

This came with certain challenges:

- It didn't support hierarchies properly. Hierarchies help businesses to analyze their data in a tree structure through different layers with drilldown capability. For example, a time hierarchy consists comprises of levels such as fiscal year, fiscal quarter, fiscal month and so on.
- High quality data models should provide a single definition and format for the data. They should be clear and unambiguous, reusable and flexible, even extensible.
- Since, the HANA Live virtual data models were defined in the HANA database layer it led to duplication of security roles between Business Suite for transactional processing and HANA database for operational reporting.




Now, some questions comes in mind:

1. So how can you capture the semantics of the data model in the database so that the model can be easily reused by different consumers, e.g. by OData clients and by OLAP tools?
2. How can you extend the meta model to service your applications?
3. Impossible, you say?

Maybe, if we didn't have **Core Data Services (CDS)**.

## *"Core Data Services to build design-time data-persistence models"*

***It is an infrastructure that can be used by database developers to create the underlying (persistent) data model which the application services expose to UI clients.***

To take advantage of **SAP HANA** for application development, SAP introduced a new data modeling infrastructure known as **Core data services**. With CDS, data models are defined and consumed on database server rather than on application server. CDS also offers capabilities beyond the traditional data modeling tools, including support for conceptual modeling and relationship definitions, built-in functions, and extensions. Originally, CDS was available only in the design-time and runtime environment of SAP HANA. Now, the CDS concept is also fully implemented in SAP NetWeaver AS ABAP, enabling developers to work in the ABAP layer with ABAP development tools while the code execution is pushed down to the database.

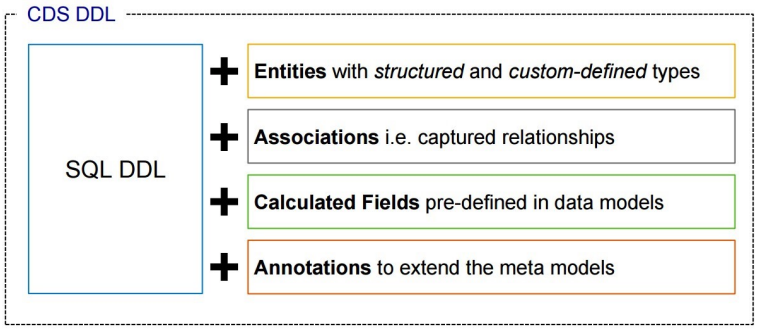
CDS simplifies and harmonizes the way you define and consume your data models, regardless of the consumption technology. Technically, it is an enhancement of SQL which provides you with a data definition language (DDL) for defining semantically

rich database tables/views (CDS entities) and user-defined types in the database. Some enhancements include:

- Expressions used for calculations and queries in the data model
- Associations on a conceptual level, replacing joins with simple path expressions in queries
- Annotations to enrich the data models with additional (domain specific) metadata

CDS is supported natively in both the ABAP and the HANA Platforms !

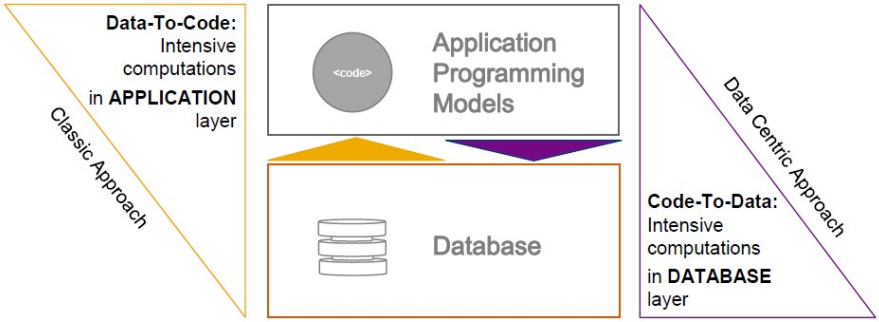
In fact, CDS is (in my opinion) the most ambitious and exciting SAP development in the area of data modeling in recent years. You can finally define and consume your data models in the same way (syntax, behaviour, etc.) regardless of the SAP technology platform (ABAP or HANA). Unwantedly the phrase: "***One Data Model to rule them all***" always comes to mind when I think of CDS.




Besides a great blog by Horst Keller, describes the two different flavors of CDS.

Core Data Services – One Concept, Two Flavors

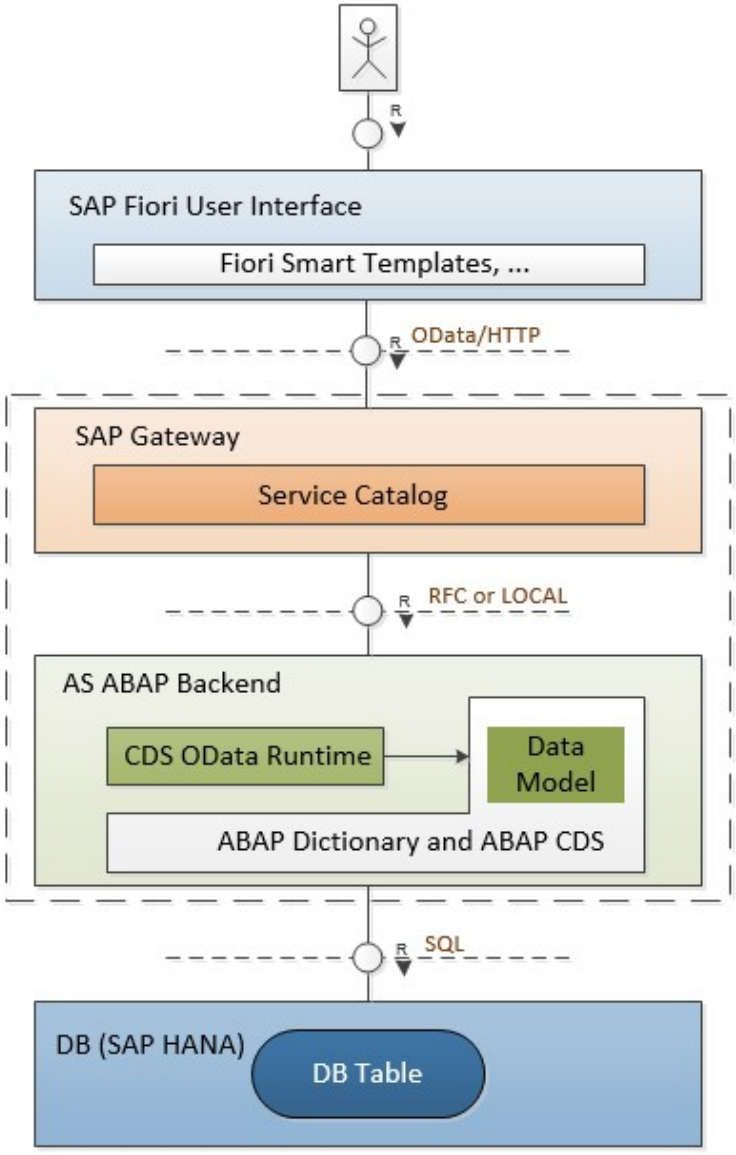
After going through the above blog, we came to know that CDS can be written in two different flavours and uses the ***"Code Pushdown"*** techniques introduced with NW AS ABAP 7.4 SP5 where SAP added new possibility for ABAP developers to leverage HANA capabilities. In code pushdown technique all calculations are performed on database layer instead of application layer, which results in fast retrieval of data, resulting cutback of application execution.



## Architecture overview

The CDS architecture looks something as shown below:

1. **Database layer** – This layer can be configured with most of the popular DB like Oracle, SAP HANA, etc.. However, to get the best result it's recommended to have SAP HANA.
2. **Application layer –** This layer contains AS ABAP Backend and SAP Gateway, integrated using RFC calls.
3. **Presentation layer –** This layer contains SAP Fiori User Interface for exposing the applications for the end user.




## CDS Releases

Below is an overview of changes in CDS functionalities with the ABAP specific releases.

For more details see – Feature Matrix.

| S.no | ABAP Release | Changes with ABAP specific releases |
|---|---|---|
| 1. | In ABAP 7.40, SP05 | CDS views has been introduced. |
| 2. | In ABAP 7.40, SP08 | CDS annotations<br>CDS views with parameters<br>CDS view enhancements<br>Expressions and Functions<br>Join type for associations<br>Path expression with filter conditions<br>Checking literals against fixed domain values |
| 3. | In ABAP 7.40, SP10 | CDS Access Control |
| 4. | In ABAP 7.50, SP00 | CDS Table functions<br>Session variables<br>CDS view with input parameters<br>Annotation for input parameters<br>Key fields<br>Evaluation of annotations<br>Publishing associations<br>Extensions |

| | | |
|---|---|---|
| 5. | In ABAP 7.51, SP00 | Client handling<br>Cross Joins<br>Annotations |

**Availability of CDS in SAP Platforms**

The Core Data services are available in below mentioned SAP Platforms:

1. SAP NetWeaver 7.50, SP01, or higher.
2. SAP NetWeaver 7.4 SP05
3. SAP HANA SPS6
4. SAP Business Suite EHP7 (Suite on HANA)
5. S/4HANA
6. SAP Business Warehouse 7.3

**Motivation behind Core Data Services**

1. Semantically Rich data-models: Entity relationship model and is declarative in nature, very close to conceptual concept.Domain specific languages (DDL, QL, DCL). Declarative, close to conceptual thinking.
2. CDS is completely based on SQL: Any 'Standard SQL' features are directly available like joins, build-in functions,..
3. Fully Compatible across any DB: CDS is generated into managed Open SQL views and is integrated into SAP HANA layer. These views are supported by all major DB.
4. Support for Annotations: CDS syntax supports domain-specific annotations that can be easily evaluated by other components, such as the UI, analytics, and OData services.
   - @AnalyticsDetails.aggregrationBehaviour
   - SUM()
   - Substring()  [SQL functions]
5. Associations: Simplified definition of views on top of views. Path expressions to navigate along relations.
6. Extensibility: We can extend SAP-defined CDS views with fields that will be automatically added to the CDS view along with its usage hierarchy.

- On model level through extensions.
- On meta-model level through annotations.

***CDS entities and their metadata are extensible and optimally integrated into the ABAP Data Dictionary and the ABAP language.***

To keep the focus on core objective (Core Data Services) of this blog, I tried to make it as small as possible.

Suggestions and questions are welcomed !!

Follow:-

- ABAP Core Data Services – Part 1 (ABAP CDS Entities).
- ABAP Core Data Services – Part 2 (Types of CDS view).
- ABAP Core Data Services – Part 3 (Virtual Data Model Types)

Thank you.

Credits:-
ABAP CDS Development Guide

Core Data Services- Overview & Concepts

SAP Community Wiki – Core Data Services

New Data Modeling Features in SAP NW ABAP 7.4 SP5

Core Data Services [CDS] in SAP S/4 HANA

ABAP CDS Feature Matrix

Alert Moderator

## Assigned tags

SAP HANA

ABAP Development

SAP Access Control

ABAP CDS view

ABAP Core Data Service Views

beginner

Core Data Services (CDS)

View more... 〉

## Similar Blog Posts

ABAP CDS VIEWS simplified - PART 1

By ARPAN PARNAMI Feb 17, 2020

Understanding evolution of CDS and AMDP in most simple way

By Ujjwal Singh May 19, 2019

Jump Start to ABAP Core Data Services

By Esha Rajpal Jul 05, 2017

## Related Questions

Pass select option to CDS View only! No AMDP

By amit chauhan Jun 16, 2020

ABAP CDS view Calculation view

By Pramod Kumar Jan 14, 2021

Developer permissions to work(Create/ Delete/ Modify/ View/ Display data) on SAP ABAP CDS

By Jelli Praveen Mar 29, 2021

## 20 Comments

**You must be Logged on to comment or reply to a post.**

Jocelyn Dart
September 10, 2017 at 12:17 pm

Hi Tushar, It's great you are trying to do a consolidated blog series for beginners on this VERY important topic for anyone coding for Fiori or HANA

Suggest you also add the link to the latest version of the official guide for this topic to this and all the other blogs in your series, i.e.

ABAP CDS Development Guide

All the best

Jocelyn

Like 0 | Share

Tushar Sharma | Blog Post Author
September 11, 2017 at 5:23 am

Hi Jocelyn,

Thanks for the guidance. Sure, I'll add all blogs link of my series.

Thank you !

Like 1 | Share

Jaideep Adhvaryu
October 1, 2021 at 11:26 pm

Hi Jocelyn,

We are evaluating good data extraction from ECC6 to SAP BW and non-SAP system. And looking at ODP and ABAP CDS.

It seems ODP does NOT support non-SAP target systems. While I am not finding a clear statement if full featured ABAP CDS is also available in ECC6.

Could you clarify on both ODP & ABAP CDS?

Thanks!

AJ

Like 0 | Share

Barend Janse van Rensburg
November 14, 2017 at 1:15 pm

Hi Tushar,

Thanks for the good information. Do you perhaps have a suggested way to identify a list of all the CDS views available in a S4 HANA system?

Thanks,
B

Like 0 | Share

Tushar Sharma | Blog Post Author
November 27, 2017 at 8:51 am

Hi Barend,

In DDDDLSRCT table you can find all the available CDS views in S/4HANA system.

Thanks,

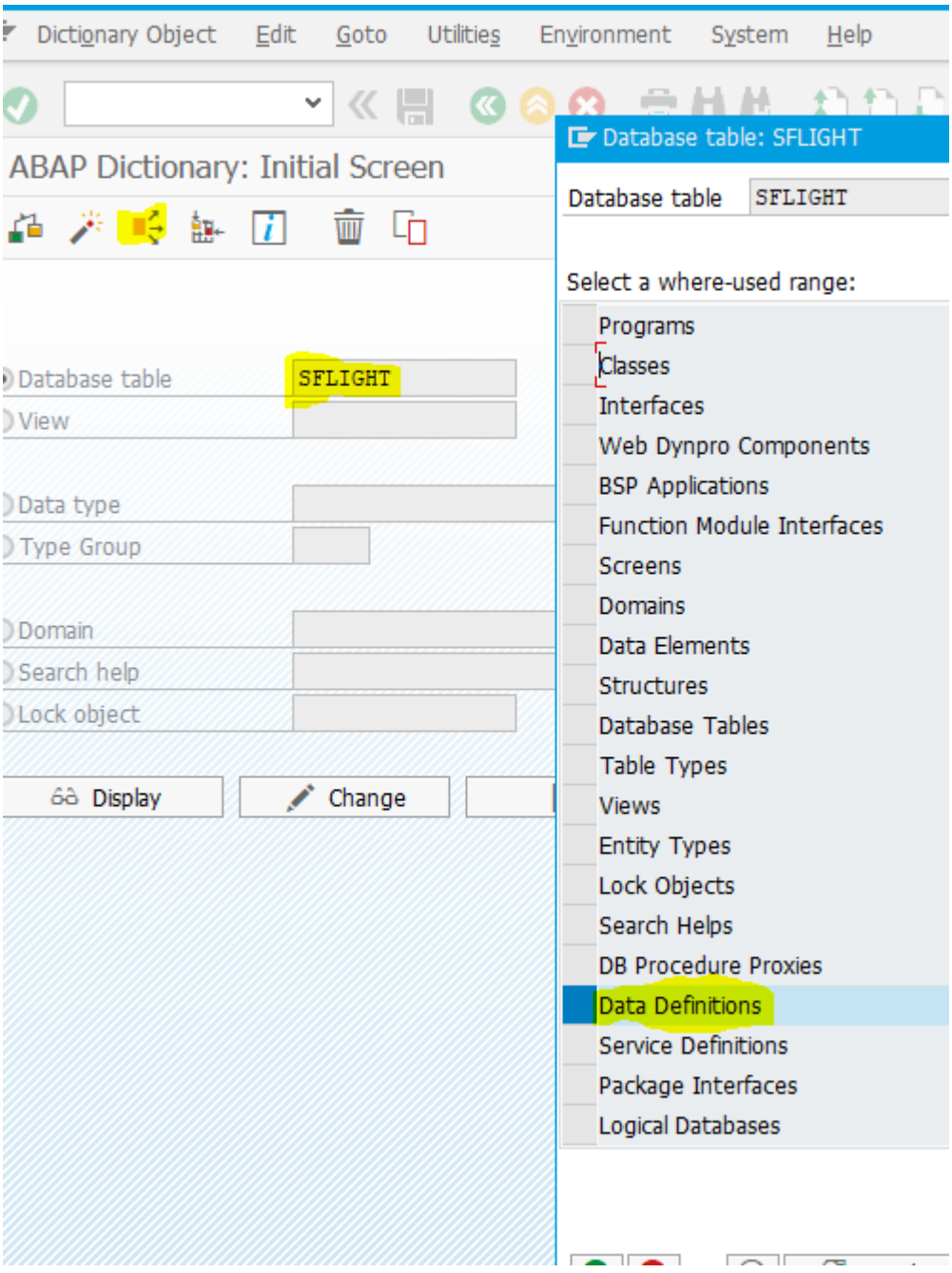
Tushar

Like 0 | Share

kyo choi

May 7, 2021 at 8:05 pm

You can also use SE11, DDL Source for each tables.




Like 0 | Share

Siemens Healthcare BW
December 5, 2017 at 7:25 am

Hello Tushar,
comparing scripted Calculation Views and CDS Views, what am I supposed to use when ?
Thanks
Werner

Like 0 | Share

Tushar Sharma | Blog Post Author
December 6, 2017 at 11:03 am

Hi Werner,

**Calculation view** are composite views and can be used to combine other views like analytical, attribute, other calculation views & tables. This type of view in present in HANA Modelling environment.

For more information check SAP HANA Modelling guide.

HANA CDS (Core data services) is a layer above "pure database" in order to define semantically-enriched data models. In contrast to HANA modelling views a HANA CDS document can define tables (called entities), views, table types, asociations and annotations. So, as you can see CDS is mush more powerful than calculation view or any other HANA modelling view.

For more information check SAP HANA Core Data services (CDS).

Regarding the detailed information check this discussion thread.

Thanks,

Tushar

Like 0 | Share

kyo choi

June 4, 2021 at 4:27 am

Calculation views are for Native HANA developments where it's used for large database like BW or DW.  Here the ABAP CDS view is in case we have to use it for SAP S/4 HANA ABAP reports like embedded analytics or creating OData with association and navigation for the UI5 or Fiori Application.

Like 0 | Share

Smriti Gupta
May 21, 2018 at 4:45 pm

Hello Tushar,

A well written structured blog for beginners of Cds. Thanks for coming up with the series

Regards

Smriti

Like 2 | Share

DurgaPrasanth vemula
September 24, 2018 at 6:45 am

i have a requirement where i need to disable the field in the standard CDS View 'C_PurchaseReqnItem' and as per the below it is displaying the Field PurReqCreationDate in the "Manage Purchase Requisition Professional" Fiori App.

@UI: { fieldGroup: { qualifier: 'QuantityDate02', position: 20, importance: #HIGH } }

Document.PurReqCreationDate,

Now My Requirement i need to disable the field as i had to use annotation

@ObjectModel.readOnly: true

i had done the below code

@AbapCatalog.sqlViewAppendName: 'ZCPURREQNITM'

@EndUserText.label: '${ddl_source_description}'

extend view C_PurchaseReqnItem with zC_PurchaseReqnItem {

@ObjectModel.readOnly: true

Document.PurReqCreationDate }

But I am getting error "View field PURREQCREATIONDATE-C_PURCHASEREQNITEM already exists in parent object (DDL source )" could you please help how to handle this situation.

Like 0 | Share

Ila Chaudhary
October 8, 2018 at 11:06 am

Hi Tushar,

Well explained. Very helpful

Thanks

Ila Chaudhary

Like 0 | Share

Selvakumar Mohan
October 15, 2019 at 4:25 am

2019 Oct - Still the best intro document for CDS ??

Like 1 | Share

Jay Malla
January 22, 2020 at 4:38 am

We have an ECC system with ABAP 7.50 SP 11 on IBM DB6 but table functions and AMDP is not working. Is there a document that states which version I need for table functions and AMDP?

Regards,

Jay

Like 0 | Share

Tushar Sharma | Blog Post Author
February 18, 2020 at 6:26 am

Hi Jay,

Please go through the below link, I hope you will get your answers there.

https://help.sap.com/doc/abapdocu_750_index_htm/7.50/en-US/abenamdp.htm

Like 1 | Share

Jay Malla
February 18, 2020 at 7:45 am

We were unable to use table functions for our ABAP 7.50 SP 11 system on IBM DB6.

Like 0 | Share

SRIRAM KRISHNAMOORTHY
February 27, 2020 at 2:55 am

Hi Jay,

Good to see you here in this blog. I am not an expert in CDS, but from my understanding CDS and AMDP are only supported well by HANA database though in principle it also supports few more databases. Especially the AMDP methods only support HANA as per SAP guidelines. Also SAP will only support as per thier agreement for any issues if the underlying database is HANA. So this might be the main reason why table functions is not supported in your case.

Sriram Krishnamoorthy

Like 0 | Share

Param Sadagopan
February 6, 2021 at 9:45 pm

Hi Tushar,

Well explained. However, if you can give an example of a calculation view as I want to learn how it enhances data models.

param

Like 0 | Share

kyo choi
May 7, 2021 at 8:11 pm

Calculation view is for the HANA DB.  CDS view is for ABAP.

Like 0 | Share

srinivasaraju vysyaraju
June 14, 2021 at 9:25 am

Hi Tushar,

Well explained. Very helpful

Thanks,

Srinivasaraju V

Like 1 | Share

**Find us on**

| | |
|---|---|
| Privacy | Terms of Use |
| Legal Disclosure | Copyright |
| Trademark | Cookie Preferences |
| Newsletter | Support |