

# ABAP Core Data Services: A new generation of CDS views – CDS view entities

Andrea Schlotthauer, SAP  
December 2022

Public

# Agenda

**1**

## Introduction

**2**

## Part I

Motivation &  
Advantages

**3**

## Part II

Migration from CDS  
DDIC-based view to  
CDS view entity

- Manual
- Tool-based

**4**

## Further information

# Introduction

# Introduction



Release Info, CDS view entity:

- ABAP 7.55
- Kernel Release 7.81
- ABAP Platform 2020
- ABAP Platform Cloud 2008

[Source, Release Info: ABAP Keyword Documentation \(sap.com\)](#)

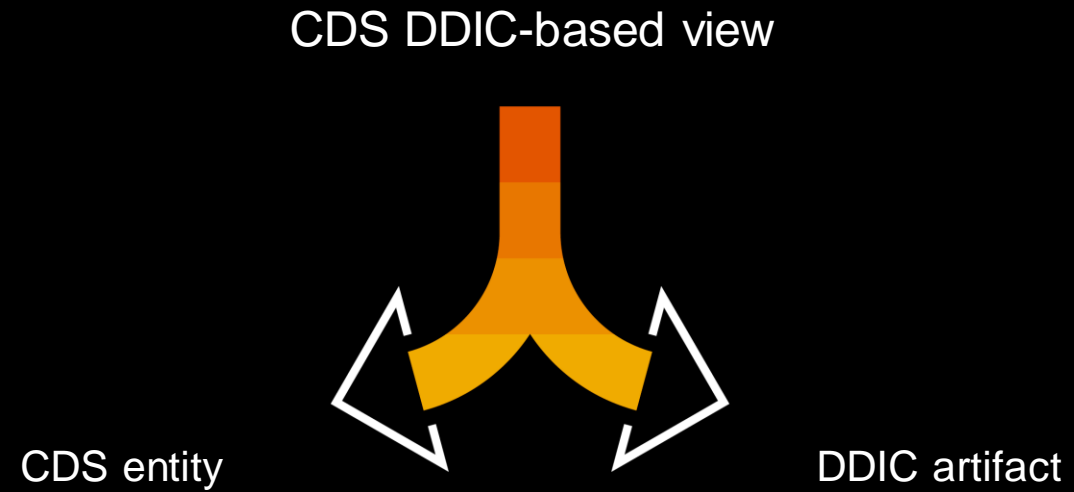
# Overview of CDS entities (ABAP Platform 2022)

CDS entity name	Statement	Purpose	Status
CDS View Entity	DEFINE VIEW ENTITY	<ul style="list-style-type: none"> <li>Data selection</li> <li>VDM interface view</li> </ul>	Replacement for DDIC-based view
CDS Projection View	DEFINE VIEW ENTITY AS PROJECTION ON	<ul style="list-style-type: none"> <li>Exposing data of underlying CDS view</li> <li>Top-most layer of a CDS data model in the RAP context</li> <li>VDM consumption view</li> </ul>	
CDS Table Function	DEFINE TABLE FUNCTION	Select data with AMDP functions (SAP HANA-native functions)	
CDS Hierarchy	DEFINE HIERARCHY	Hierarchy modeling	
CDS Custom Entity	DEFINE CUSTOM ENTITY	Implementing an unmanaged query, unmanaged RAP BO	
CDS Abstract Entity	DEFINE ABSTRACT ENTITY	Data type for RAP actions or functions	
CDS DDIC-Based View	DEFINE VIEW	<ul style="list-style-type: none"> <li>Data selection</li> <li>VDM interface view</li> </ul>	Obsolete

# **Part I:**

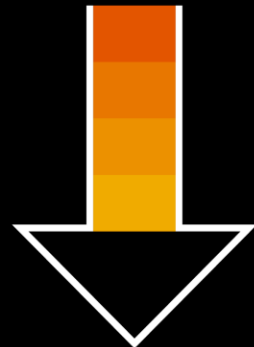
## **Motivation & Advantages**

# Motivation & Advantages



# Motivation & Advantages

CDS view entity



CDS entity

DDIC artifact





# Motivation & Advantages

## No DDIC artifact

- Only **ONE name** for CDS view entities (and not three names any more)
- One object less that can become inconsistent
- Faster activation



# Motivation & Advantages



## Simplified definition, consumption & management

- View entities are represented adequately on SAP HANA database.
- Stricter syntax & semantic checks indicate problematic situations more explicitly, for example, annotation checks.
- Automatic and implicit client handling.
- Obstacles have been removed (such as handling of CDS extends).
- Improved type safety within CDS expressions (typed literals and stricter checks).
- Improved refactoring of view stacks.

# Motivation & Advantages

## Optimized CDS activation

- Significant performance improvements
  - No CDS-managed DDIC views are generated
  - Drastically simplified handling of CDS extends
  - Example



View stack / scenario	Activation time DDIC-based view	Activation time CDS view entity
10 / CREATE VIEW Stack	20,19 s	10,61 s
20 / CREATE VIEW Stack	40,56 s	21,37 s
10 / CHANGE FIELD	32,68 s	22,11 s
20 / CHANGE FIELD	68,88 s	48,09 s

# Motivation & Advantages

## Improved architecture

- Checks of key elements
- Amount / quantity handling
- Improved buffer handling using CDS tuning objects



# Further information



- [A new generation of CDS views: CDS view entities | SAP Blogs](#)
- [CDS view entities are feature complete. Overview of new features, improvements, and differences | SAP Blogs](#)
- [Buffering CDS View Entities | SAP Blogs](#)
- [ABAP Core Data Services: New syntax for extending CDS entities | SAP Blogs](#)
- [Feature Matrix: Data Modeling with ABAP Core Data Services | SAP Blogs](#)

**Demo**

```

define view entity DEMO VIEW ENTITY AS
  with parameters
    @EndUserText.label: 'Parameter for abap.int test'
    p_abap_int4 : abap.int4
  as select from sflight as a
    inner join spfli as b on 1 = 1 -- literal on left side of ON condition
    association to scarr as scarr on 1 = 1 -- literal on left side of ON condition
  {
    key a.carrid,
    b.deptime, -- prefix mandatory

    //case expression with expressions and functions as operands
    case cast( a.carrid as char3)
    when ( cast( 'AA' as char2), 1, 2) then 'American Airlines'
    when ( cast( 'LH' as char2), 1, 2) then 'Lufthansa'
    else 'Others'
    end
    as Airline,

    //substring with session variable, parameter, and arith_exp as operands
    substring( $session.user_timezone, $parameters. _abap_int4,1*2) as Subs,

    // complex case with expressions as operands and with new statement ELSE NULL
    case when a.seatsmax * 2 = case 500 when 7 then 1 end
    then 'x'
    else null
    end
    as Arith_on_left_side_of_case,

    //new feature: typed literal
    abap.dec '.15'
    as dec_literal
  } where --where clause case and arith_exp as operands
    b.distance * 5 = case a.price when 500 then 0 else 1 end

```

# CDS view entity extension

```
extend view entity DEMO_VIEW_ENTITY_AS with  
{  
  _scarr  
}
```

- No DDIC append view
- No name after WITH
- No dummy field required



# New feature: Calculated quantity with calculated unit reference

```
@AccessControl.authorizationCheck: #NOT_ALLOWED  
@EndUserText.label: 'CDS view entity, calculated quantity'
```

```
define view entity DEMO_CDS_CALCULATED_QUANTITY  
  as select from demo_rent  
{  
  key apartment_id          as ApartmentId,  
    apartment_size          as ApartmentSize,  
    apartment_unit          as ApartmentUnit,  
    currency                as Currency,  
  
    // currency field and unit field in arith expression  
    @Semantics.quantity.unitOfMeasure: 'calculatedUnit'  
    rent_decfloat34 / apartment_size as rent_per_size,  
    concat( concat(currency, '/' ), apartment_unit )  
              as calculatedUnit  
}
```

# New feature: Calculated quantity with calculated unit reference

## Data Preview:

12	ApartmentId	12	ApartmentSize	RB	ApartmentUnit	RB	Currency	12	rent_per_size	RB	calculatedUnit
1			60.00		MTK		EUR		14.1666666666666666666666666666...		EUR/MTK
2			94.45		MTK		EUR		13.76389624139756484912652196...		EUR/MTK
3			125.00		MTK		EUR		2E+1		EUR/MTK

# New feature: Entity buffer as separate CDS tuning object

CDS view entity that allows buffering:

```
@AbapCatalog.entityBuffer.definitionAllowed: true
```

```
define view entity DEMO_CDS_GEN_BUFFERED_VIEW
  as select from sairport
{
  key id      as Id,
  key name    as Name,
    time_zone as Time_Zone
}
```

Entity buffer:

```
define view entity buffer on
  layer core
  type generic number of key elements 1
```

# Part II:

## Migration from DDIC-based view to view entity

# Compatibility & Migration

## Incompatibility by design

- CDS view entities by design incompatible to the existing CDS views.
- No automatic migration.



# Compatibility & Migration

## Helper tools



Tool name	Technical name	Available since
Program that lists usages of CDS-managed DDIC views	RUT_WHERE_USE_SQLVIEW	ABAP 7.57 <a href="#">SAP Note 3201681</a> (Downport for Releases 7.52 – 7.56)
Program for migration analysis	RUTDDL_S_MIGRATION_CANDIDATES	ABAP 7.56, ABAP Platform 2021
Manual migration		
Program for tool-based migration	RUTDDL_S_V2_MIGRATION	

# Compatibility & Migration



## Usage of CDS-managed DDIC view

- RUT\_WHERE\_USE\_SQLVIEW
- Downport for releases 7.52 – 7.56 as explained in [SAP Note 3201681](#).
- Lists all usages of CDS-managed DDIC view in an ABAP system.

## Compatibility & Migration

## RUT\_WHERE\_USE\_SQLVIEW

Usages of CDS-managed DDIC view						
<div> <div> <div>🔍</div> <div>☰</div> <div>☰</div> <div>🔍</div> <div>🔍<sup>+</sup></div> <div>🏠</div> <div>▼</div> </div> <div> <div>Σ</div> <div>▼</div> <div>Σ/Σ</div> <div>▼</div> </div> <div> <div>🖨</div> <div>🔍</div> <div>▼</div> <div>🔄</div> <div>▼</div> <div>📊</div> <div>📄</div> </div> <div> <div>👤</div> <div>Display Object</div> <div>👤</div> <div>Show View</div> <div>👤</div> <div>Where-Used</div> </div> </div>						
Object	Type	CDS-managed DDIC ...	Package	Software Component	Package of DDIC view	Software Component of DDIC view
	CLAS					
	CLAS					
	CLAS					
	TABL					
	DDLS					
	DDLS					
	PROG					
	ECTD					
	ECTD					
	ECTD					
	ECTD					



# Compatibility & Migration

## Migration candidates report

- RUTDDL\_MIGRATION\_CANDIDATES (since ABAP 7.56, ABAP Platform 2021)
  - Checks whether a view can be migrated to a view entity or not.
  - Classifies the views into one of the following categories:
    - ❌ Migration not possible due to a technical constraint (e.g. DDL name <> entity name).
    - ⚠ Migration possible with some potential behavior changes. Changes in the DDL source required.
    - 😊 Migration possible, some minor changes in the DDL source might be required.



[Video tutorial](#) that demonstrates the migration analysis tool (0:56 min)

# Compatibility & Migration

## CDS Entities

### Migration candidates for CDS Entities

Overall status

Categories that are checked. Click F1 for details.

DDL Source	Entity Name	View name	Source Type	AS4LOCAL	Overall Status	DDLs STOB	Dec Shift	Ext View	Buffering	Data Types	Select * Check	ComFilt(I)	AnoClieDep	Ext *	ComFilt(F)
ANDREA_AR...	ANDREA_CD...	HIROGHIR...	V	A	●○○	●○○	○○	○○	●○○	○○	○○	○○	○○	○○	○○
ANDREA_MA...	ANDREA_MA...	BGGREG	V	A	●○○	○○	○○	○○	●○○	○○	○▲○	○○	○○	○○	○▲○
DEMO_CDS...	DEMO_CDS...	COALV1	V	A	○▲○	○○	○○	○○	○○	○○	○○	○▲○	○○	○○	○○
DEMO_CDS...	DEMO_CDS...	DEMOCDSD...	V	A	○▲○	○○	○○	○○	○○	○○	○○	○▲○	○○	○○	○○
ANDREA_TE...	DEMO_CDS...	DEMO_CS_...	V	A	●○○	●○○	○○	○○	○○	○○	○○	○▲○	○○	○○	○○
DATE_FUNC...	DEMO_CDS...	DEMO_CDS...	V	A	●○○	●○○	○○	○○	○○	○○	○○	○▲○	○○	○○	○○
FLTP_TO_D...	DEMO_CDS...	DEMO_CDS...	V	A	●○○	●○○	○○	○○	○○	○○	○○	○▲○	○○	○○	○○
DEMO_SALE...	DEMO_SALE...	DEMO_SALBP	V	A	○▲○	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○
DEMO_SALE...	DEMO_SALE...	DEMO_SALE...	V	A	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○
DEMO_SALE...	DEMO_SALE...	DEMO_SAL...	V	A	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○
DEMO_SALE...	DEMO_SALE...	DEMO_CDS...	V	A	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○
DEMO_SALE...	DEMO_SALE...	DEMO_SALE...	V	A	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○
DEMO_SALE...	DEMO_SALE...	DEMO_SALE...	V	A	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○
DEMO_SALE...	DEMO_SALE...	DEMO_SALE...	V	A	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○
DEMO_SALE...	DEMO_SALE...	DEMO_SALE...	V	A	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○
DEMO_SALE...	DEMO_SALE...	DEMO_PAR...	V	A	○▲○	○○	○○	○○	○○	○○	○○	○▲○	○○	○○	○○
DEMO_SALE...	DEMO_SALE...	DEMOANALY...	V	A	○▲○	○○	○○	○○	○○	○○	○○	○▲○	○○	○○	○○
ZZAS_MIGV2...	ZZAS_MIGV2...	ZZASMIGV2_...	V	A	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○
ZZAS_MIGV2...	ZZAS_MIGV2...	ZZAS_MIGV2...	V	A	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○
ZZAS_MIGV2...	ZZAS_MIGV2...	ZZASMIGV2_...	V	A	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○

F1

#### DDLs name and STOB name are not identical

Entity name (STOB Name) and DDLS name are not identical for this CDS view. But they must be identical for a CDS view entity.

That's why migration is not possible for this view. The only way to migrate this view is to delete this view in the original system and create it as a view entity by specifying a new name. This new name of the view entity must be unique in the landscape and must not clash with the old names (DDLs name, STOB name, SQL view name) of the view.

# Compatibility & Migration

## Manual migration (since ABAP 7.56, ABAP Platform 2021)

1. Check migration candidates with report RUTDDL\_MIGRATION\_CADIDATES.
2. Open the DDL source in ADT.
  - a. Remove *AbapCatalog.sql/ViewName* header annotation.
  - b. Add *entity* keyword.
  - c. Perform additional changes if required (prefixes, parameters, annotations, ...).
3. Activate the view entity in ADT. This last step will perform the object type change from CDS view to CDS view entity.



# Compatibility & Migration

## Manual migration

### CDS DDIC-based view

```
@AbapCatalog.sqlViewName: 'ZZASGLFK'
@AbapCatalog.compiler.compareFilter: false
@AbapCatalog.preserveKey: true
@AccessControl.authorizationCheck: #NOT_ALLOWED
@EndUserText.label: 'manual mig test'
@AbapCatalog.buffering.status: #SWITCHED_OFF
@AbapCatalog.buffering.type: #SINGLE
@AbapCatalog.buffering.numberOfKeyFields: 12
@ClientHandling.algorithm: #SESSION_VARIABLE
define view zzas_test_manual_migration
as select from demo_ddic_types
{
  *
}
```

### CDS view entity

```
@AccessControl.authorizationCheck: #NOT_ALLOWED
@EndUserText.label: 'manual mig test'
define view entity zzas_test_manual_migration
as select from demo_ddic_types
{
  key id as Id,
  int1 as Int1,
  int2 as Int2,
  int4 as Int4,
  int8 as Int8,
  dec10 as Dec10,
  dec10_2 as Dec102,
  dec20 as Dec20
}
```

# Compatibility & Migration



## Tool-based migration (since ABAP 7.56, ABAP Platform 2021)

- RUTDDLSV2MIGRATION
- An inactive version is generated by the tool. Last step (activation) must be done by the developer.
- In case of issues, manual rework of the source.
- Reverse migration: open an incident on BC-DWB-DIC.

# Compatibility & Migration

## Tool-based migration

- Steps of the migration tool:
  - Initial consistency
  - Precheck – same checks as migration candidates report
  - Generate inactive version of the migrated DDLS (currently more than 20 rules for adjustment)
  - Check activation of the generated source








Embedded help: Execute RUTDDLSV2MIGRATION > *More* > *Program Documentation*




[Video tutorial](#) that demonstrates the migration tool (1:51 min)




**Demo**

# Migration Tool

 Migration of Views - Version 18



Sequence / Message	N..	Message
>  ZZAS_MIGV2_1		
>  ZZAS_MIGV2_2		
>  ZZAS_MIGV2_3		

```
@AbapCatalog.sqlViewName: 'ZZASMIGV2_3V'
@AbapCatalog.compiler.compareFilter: tru
@AbapCatalog.preserveKey: true
@AccessControl.authorizationCheck: #NOT_
@EndUserText.label: 'migration'
define view zzas_migv2_3
  as select from veri_types
{
  key k_char as KChar,
    f_accp as FAccp,
    f_cuky as FCuky,
    f_dats as FDats
}
where
  k_char = #DATATYPE.'CHAR'
```

```
@AccessControl.authorizationCheck: #NOT_
@EndUserText.label: 'migration'
define view entity zzas_migv2_3
  as select from veri_types
{
  key k_char as KChar,
    f_accp as FAccp,
    f_cuky as FCuky,
    f_dats as FDats
}
where
  k_char = 'CHAR'
```



**Further information**

## Further information

- ABAP Keyword Documentation on SAP Help Portal: [ABAP Keyword Documentation \(sap.com\)](#)
- Blog post about the migration from CDS views to CDS view entities: [A new generation of CDS views: how to migrate your CDS views to CDS view entities](#)
- [Video tutorial](#) that demonstrates the migration candidates tool (0:56 min)
- [Video tutorial](#) that demonstrates the migration tool (1:51 min)

# Thank you.

Contact information:

**Andrea Schlotthauer**  
andrea.Schlotthauer@sap.com

Follow us



[www.sap.com/contactsap](https://www.sap.com/contactsap)

© 2021 SAP SE or an SAP affiliate company. All rights reserved.

No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission of SAP SE or an SAP affiliate company.

The information contained herein may be changed without prior notice. Some software products marketed by SAP SE and its distributors contain proprietary software components of other software vendors. National product specifications may vary.

These materials are provided by SAP SE or an SAP affiliate company for informational purposes only, without representation or warranty of any kind, and SAP or its affiliated companies shall not be liable for errors or omissions with respect to the materials. The only warranties for SAP or SAP affiliate company products and services are those that are set forth in the express warranty statements accompanying such products and services, if any. Nothing herein should be construed as constituting an additional warranty.

In particular, SAP SE or its affiliated companies have no obligation to pursue any course of business outlined in this document or any related presentation, or to develop or release any functionality mentioned therein. This document, or any related presentation, and SAP SE's or its affiliated companies' strategy and possible future developments, products, and/or platforms, directions, and functionality are all subject to change and may be changed by SAP SE or its affiliated companies at any time for any reason without notice. The information in this document is not a commitment, promise, or legal obligation to deliver any material, code, or functionality. All forward-looking statements are subject to various risks and uncertainties that could cause actual results to differ materially from expectations. Readers are cautioned not to place undue reliance on these forward-looking statements, and they should not be relied upon in making purchasing decisions.

SAP and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP SE (or an SAP affiliate company) in Germany and other countries. All other product and service names mentioned are the trademarks of their respective companies.

See [www.sap.com/trademark](https://www.sap.com/trademark) for additional trademark information and notices.