



# Agenda



- Core Data Services - intro
- ABAP Core Data Services
- Join & Associations
- OData
- Annotations
- UI5

# What I want to make



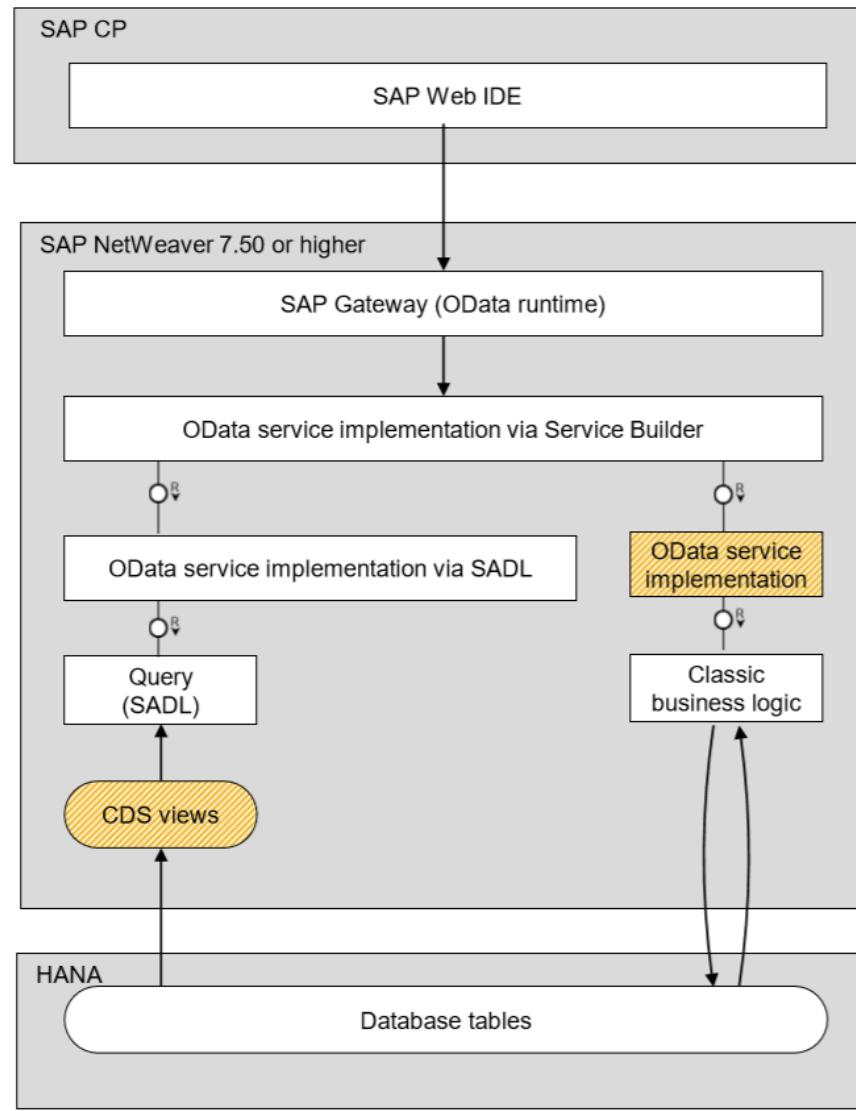
Brewery name:		Brewery city:			
Search				Adapt Filters	Go
Brewery name	Street	Zipcode	Brewery city	Houseno	
Maximus Brouwerij	Pratumplaats	3454 NA	Utrecht	2	>
Brouwerij De Leckere B.V.	Schaverijstraat	3534 AS	Utrecht	15	>
Jopen B.V.	Emrikweg	2031 BT	Haarlem	19	>
De Koningshoeven - La Trappe Trappist	Eindhovenseweg	5056 RP	Berkel-Enschot	3	>

← List of breweries

... and their beer →

Jopen B.V. Haarlem			
General Information		Second Facet	
<hr/>			
General Information			
Brewery:	Jopen B.V.	City:	Haarlem
<hr/>			
Second Facet			
<hr/>			
Beer	Pack aging	description	Price
Jopen Hoppenbier	Bottle 33 cl	Fris met een aangenaam bittertje, 6,8% Jopen Hoppenbier is het enige driegebrandbier ter wereld met een dubbele hopgave. Een fris bier met een zachte moutige	1.85 EUR
Jopen Gerstebier	Bottle 33 cl	Vanwege het lagere alcoholpercentage heeft Jopen Gerstebier een doordrinkbaar karakter. Lekker verfrissend met een licht bittere nasmaak. Gerstebier, bovengistend bier, was erg populair in de negentiende eeuw. Dit blonde, redelijk bittere	2.20 EUR
De kruidige smaak is complex en zacht. Innen kent wordt gebruikt met fruit, een			

# Core Data Services



Picture from SAP SE

# CDS – One concept, two flavors



Horst Keller

July 20, 2015 4 minute read

## CDS – One Concept, Two Flavors

- **HANA CDS**

SQL-based Data Description Language (DDL) that allows you to define database tables, views, data types by wrapping the according SQL statements and enriching them with semantical properties.

- **ABAP CDS**

The ABAP Core Data Services (ABAP CDS) are the implementation of the general CDS concept for AS ABAP. ABAP CDS makes it possible to define semantic data models on the central database of the application server. On AS ABAP, these models can be defined independently of the database system.

<https://blogs.sap.com/2015/07/20/cds-one-model-two-flavors/>

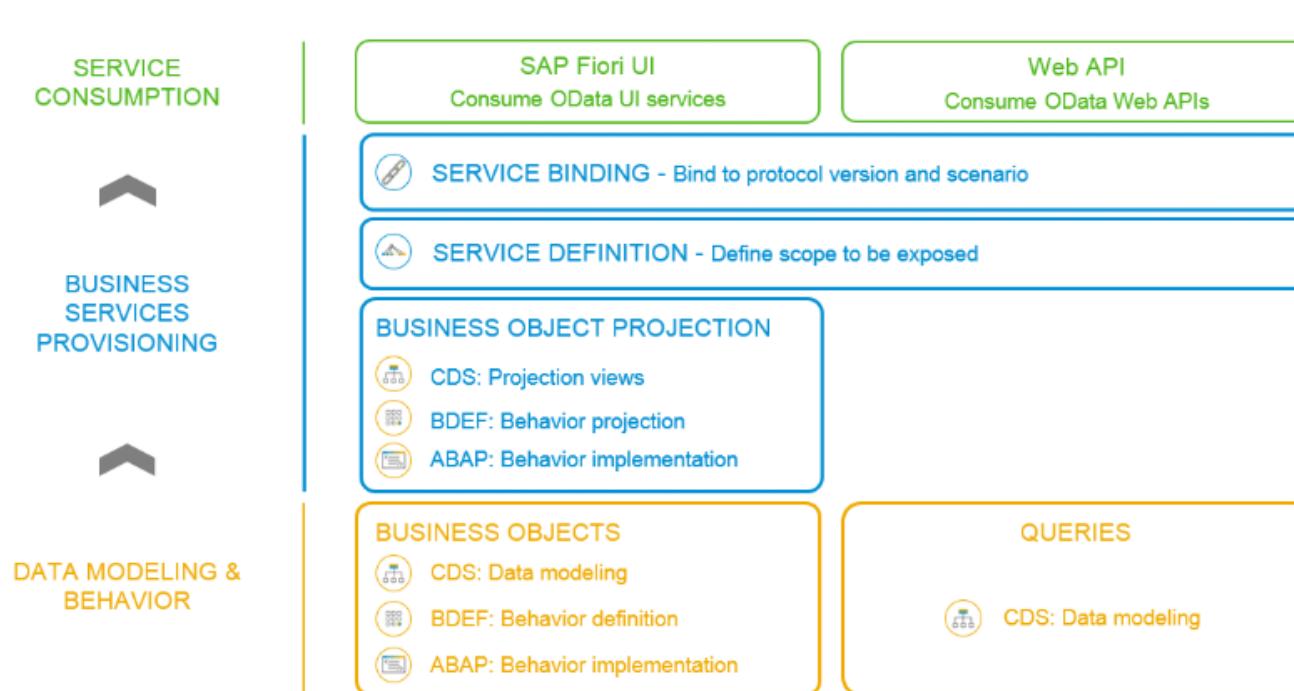


Carine Tchoutou Djomo 

October 25, 2019 6 minute read

## Getting Started with the ABAP RESTful Programming Model

### Architecture Overview

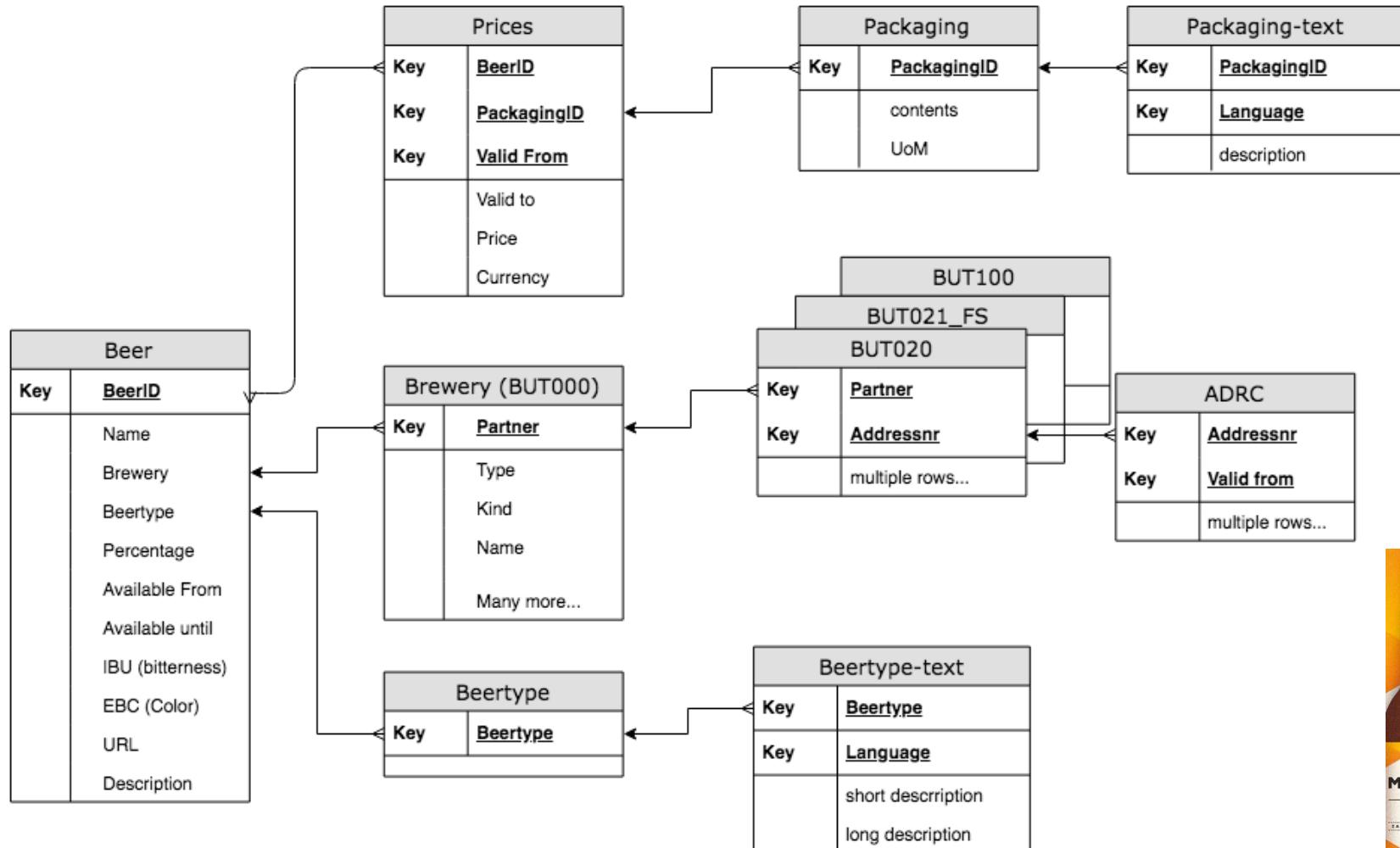


<https://blogs.sap.com/2019/10/25/getting-started-with-the-abap-restful-programming-model/>

# But first ...



# Data model



# Creating the views 1

- The texttables for beertypes & packaging

```
@AbapCatalog.sqlViewName: 'ZDDLBEERTYPES' ..... //datadictionary viewname
@AbapCatalog.compiler.compareFilter: true ..... // true: The filter conditions of associations
@AccessControl.authorizationCheck: #NOT_REQUIRED
@EndUserText.label: 'Soorten bier (incl. texttable)'
define view ZNL1_BEERTYPES

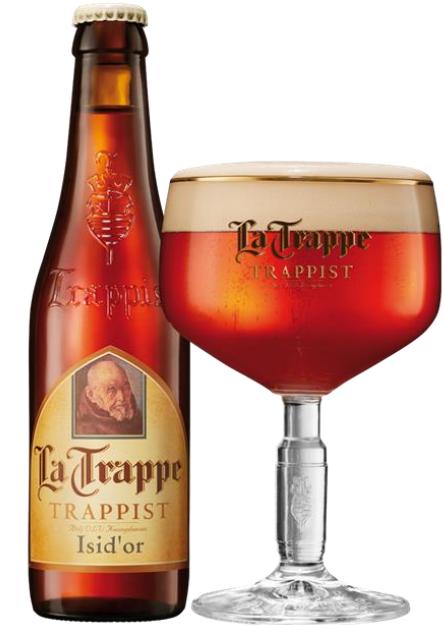
.... with parameters @Environment.systemField: #SYSTEM_LANGUAGE
..... p_langu : abap.lang

as select from zbr_type ..... as beertype
.... inner join zbr_typer ..... as beertypetext
.... on beertypetext.zbeertype = beertype.zbeertype
.... and beertypetext.langu ..... = $parameters.p_langu
{.
key beertype.zbeertype as beertype,
.... stext as short_description,
.... ltext as long_description
}
```



# Creating the views 2

- View on breweries & beers
  - Views
    - ZNL4\_CURRENTBEERS
    - ZNL5\_BREWERIES
- Show in Eclipse



- An association is used to link a view (or table) to the source view (or table) in CDS View.
- In an association, the cardinality is defined. Cardinality is the relationship between the source and associated view in the form of [ min .. max ] (only the target cardinality is stated)

# Associations 2

- Create association between
  - Beers and breweries
  - Breweries and beers ;-)



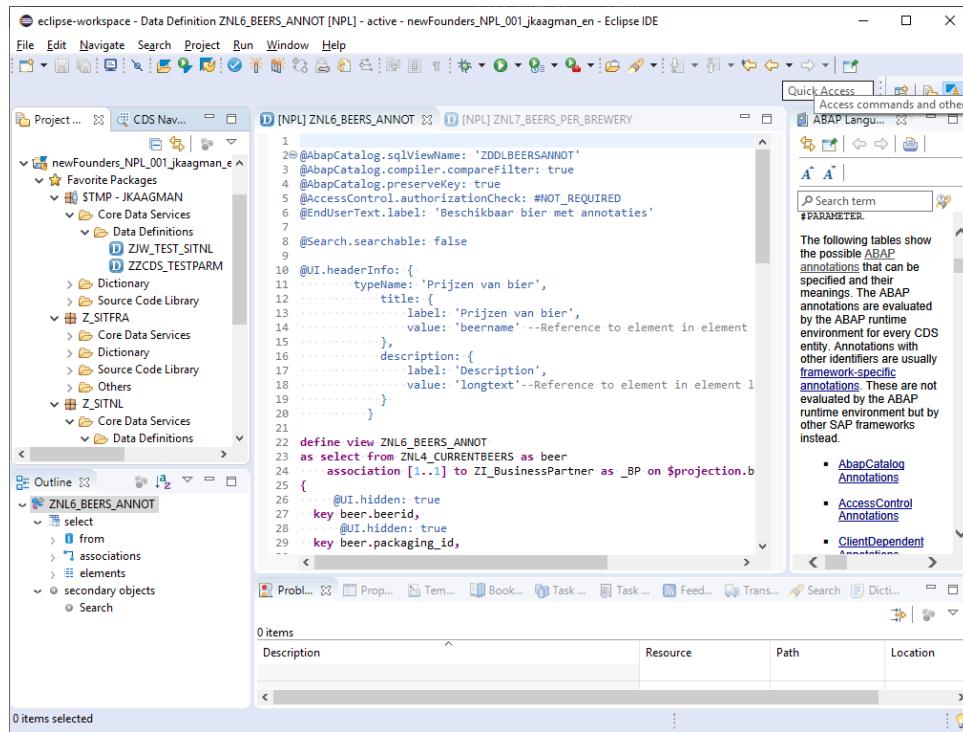
# Annotations

- `@Search.searchable: true`
- `@EndUserText.label: 'Brewery ID'`
- `@UI.hidden: true`  
`@UI.lineItem.position: 30`
- `@Semantics.unitOfMeasure: true`  
`@Semantics.quantity.unitOfMeasure: 'UoM'`



# Associations and annotations

- Show Associations in ADT
  - ZNL6\_BEERS\_ANNOT
  - ZNL7\_BEERS\_PER\_BREWERY



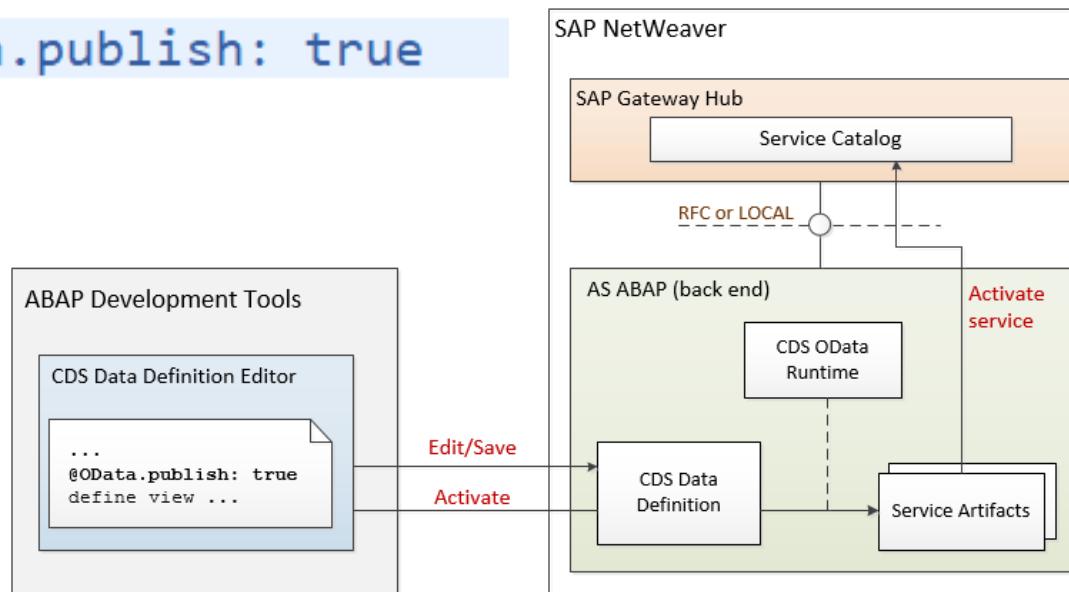
The screenshot shows the Eclipse IDE interface for SAP ABAP development. The left side features a project tree with packages like 'newFounders\_NPL\_001\_jkaagman\_en' and various data definitions. The main area displays the code for 'ZNL6\_BEERS\_ANNOT'. The code defines a view 'ZNL6\_BEERS\_ANNOT' with a select clause that joins 'ZNL4\_CURRENTBEERS' and 'ZI\_BusinessPartner' on their respective projection fields. Annotations are used throughout the code, such as @UI.headerInfo for the view header and @UI.hidden for keys. A tooltip on the right provides a general overview of ABAP annotations, stating they are evaluated by the ABAP runtime environment for every CDS entity. Annotations starting with '@' are framework-specific.

```
1 2@AbapCatalog.sqlViewName: 'ZDDDBEERSANNOT'
2 3@AbapCatalog.compiler.compareFilter: true
2 4@AbapCatalog.preserveKey: true
2 5@AccessControl.authorizationCheck: #NOT_REQUIRED
2 6@EndUserText.label: 'Beschikbaar bier met annotaties'
2 7
2 8@Search.searchable: false
2 9
2 10@UI.headerInfo: {
2 11    typeName: 'Prijzen van bier',
2 12    title: {
2 13        label: 'Prijzen van bier',
2 14        value: 'Prijzen van bier'--Reference to element in element
2 15    },
2 16    description: {
2 17        label: 'Description',
2 18        value: 'longtext'--Reference to element in element 1
2 19    }
2 20}
2 21
2 22define view ZNL6_BEERS_ANNOT
2 23as select from ZNL4_CURRENTBEERS as beer
2 24  association [1..1] to ZI_BusinessPartner as _BP on $projection.b
2 25{
2 26    @UI.hidden: true
2 27    key beer.beerid,
2 28    @UI.hidden: true
2 29    key beer.packaging_id,
```



- Create OData service with annotation

```
@OData.publish: true
```

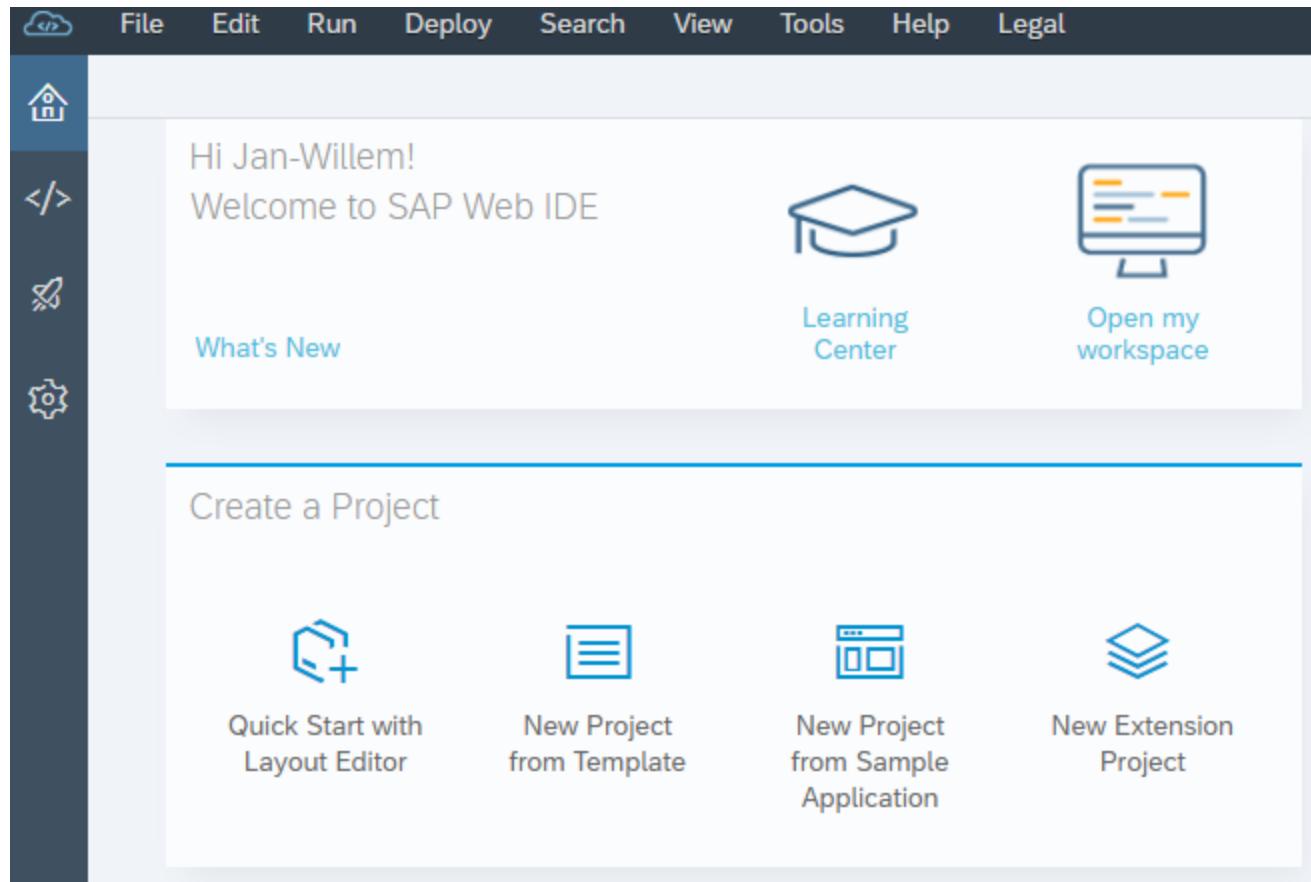


- Transactie /IWFND/MAINT\_SERVICE



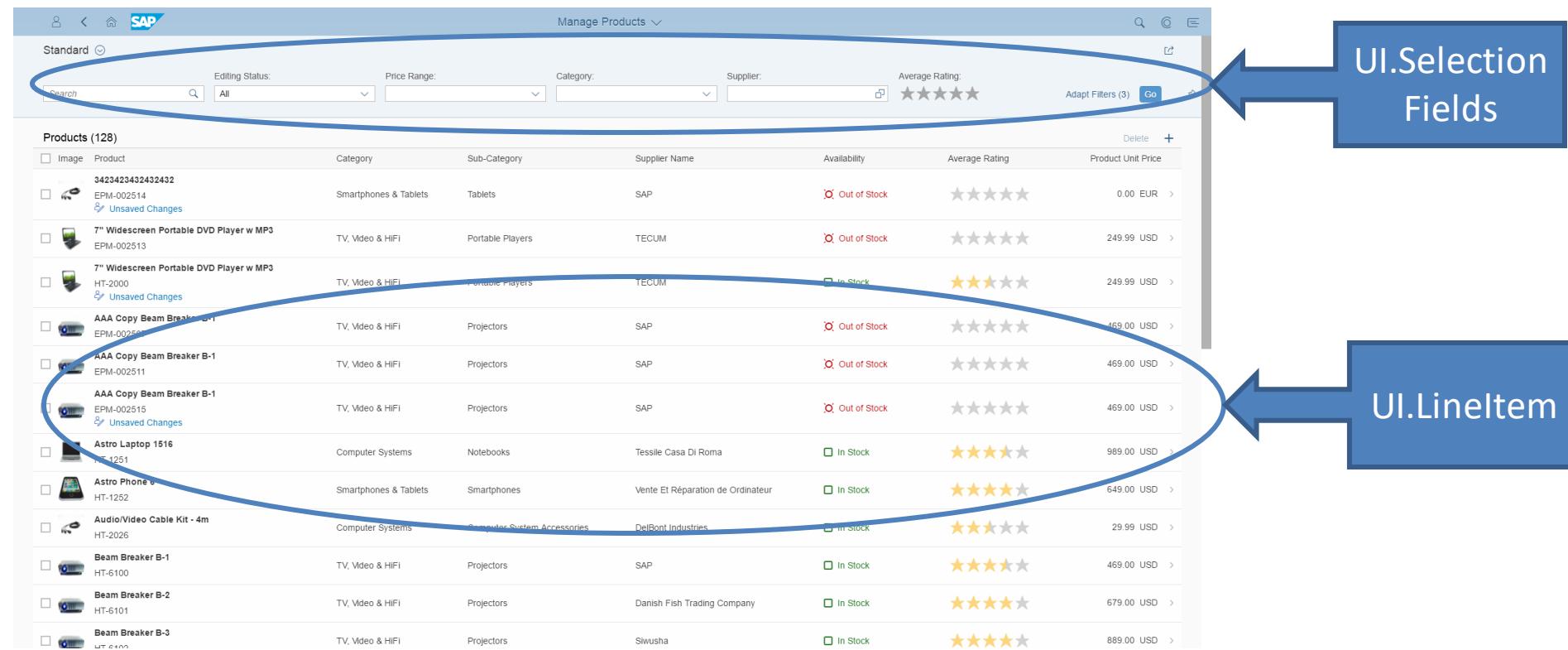
# Genereer de UI5 - frontend

- In the WebIDE the UI5 – frontend can be generated



# UI5 Frontend- Smart Table

- SAP Fiori Elements (formerly Smart Templates)
  - List report
  - Object page



The screenshot shows a SAP Fiori application titled "Manage Products". The interface includes a header with search, filter, and sorting options. Below is a table listing 128 products. Annotations highlight specific areas:

- A blue arrow points from a callout labeled "UI.SelectionFields" to the top navigation bar and the search/filter area.
- A blue arrow points from another callout labeled "UI.LineItem" to the product table rows.

Image	Product	Category	Sub-Category	Supplier Name	Availability	Average Rating	Product Unit Price
	3423423432432432	Smartphones & Tablets	Tablets	SAP		Out of Stock	0.00 EUR
	EPM-002514 	TV, Video & HiFi	Portable Players	TECUM		Out of Stock	249.99 USD
	7" Widescreen Portable DVD Player w MP3 EPM-002513	TV, Video & HiFi	Portable Players	TECUM		In Stock	249.99 USD
	7" Widescreen Portable DVD Player w MP3 HT-2000 	TV, Video & HiFi	Projectors	SAP		Out of Stock	469.00 USD
	AAA Copy Beam Breaker B-1 EPM-002509	TV, Video & HiFi	Projectors	SAP		Out of Stock	469.00 USD
	AAA Copy Beam Breaker B-1 EPM-002511	TV, Video & HiFi	Projectors	SAP		Out of Stock	469.00 USD
	AAA Copy Beam Breaker B-1 EPM-002515 	TV, Video & HiFi	Projectors	SAP		Out of Stock	469.00 USD
	Astro Laptop 1516 HT-1251	Computer Systems	Notebooks	Tessile Casa Di Roma		In Stock	989.00 USD
	Astro Phone 6 HT-1252	Smartphones & Tablets	Smartphones	Vente Et Réparation de Ordinateur		In Stock	649.00 USD
	Audio/Video Cable Kit - 4 m HT-2026	Computer Systems	Computer System Accessories	DelBont Industries		In Stock	29.99 USD
	Beam Breaker B-1 HT-6100	TV, Video & HiFi	Projectors	SAP		In Stock	469.00 USD
	Beam Breaker B-2 HT-6101	TV, Video & HiFi	Projectors	Danish Fish Trading Company		In Stock	679.00 USD
	Beam Breaker B-3 HT-6102	TV, Video & HiFi	Projectors	Siwusha		In Stock	889.00 USD

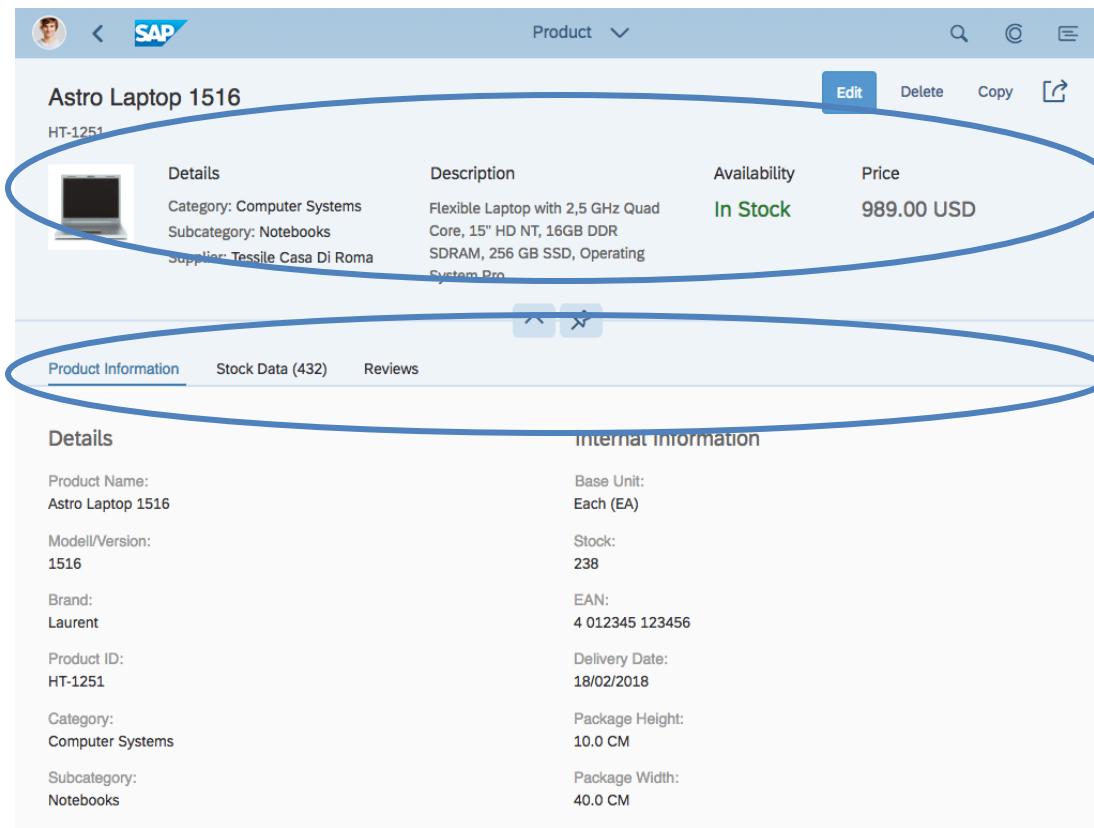
# UI5 Frontend – Object Page



Object page Layout



# UI5 Frontend – Object Page



The screenshot shows an SAP UI5 object page for a product named "Astro Laptop 1516". The top header includes the SAP logo and navigation buttons for "Edit", "Delete", "Copy", and "Print". The main content area is divided into several sections:

- Product Information:** Includes a thumbnail image of the laptop, details like "Category: Computer Systems", "Subcategory: Notebooks", and "Supplier: Tessile Casa Di Roma".
- Description:** Describes the product as a "Flexible Laptop with 2,5 GHz Quad Core, 15" HD NT, 16GB DDR SDRAM, 256 GB SSD, Operating System Pro".
- Availability:** Shows "In Stock".
- Price:** Listed as "989.00 USD".

Below this, there are tabs for "Product Information", "Stock Data (432)", and "Reviews". The "Product Information" tab is active, showing detailed information in two columns:

Details	Internal Information
Product Name: Astro Laptop 1516	Base Unit: Each (EA)
Modell/Version: 1516	Stock: 238
Brand: Laurent	EAN: 4 012345 123456
Product ID: HT-1251	Delivery Date: 18/02/2018
Category: Computer Systems	Package Height: 10.0 CM
Subcategory: Notebooks	Package Width: 40.0 CM

UI.HeaderFacets

UI.Facets



# What I made



**Standard** ▼

Brewery name:

Search 🔍

Brewery city:  📍

⬆️ ⬇️ ✖️

Adapt Filters Go

Brewery name	Street	Zipcode	
<b>Maximus Brouwerij</b>	Pratumplaats	3454 NA	<span>&gt;</span>
Brewery city: Utrecht			
Houseno: 2			
House suppl: A			
<b>Brouwerij De Leckere B.V.</b>	Schaverijstraat	3534 AS	<span>&gt;</span>
Brewery city: Utrecht			
Houseno: 15			
House suppl:			
<b>Jopen B.V.</b>	Emrikweg	2031 BT	<span>&gt;</span>
Brewery city: Haarlem			
Houseno: 19			
House suppl:			
<b>De Koningshoeven - La Trappe Trappist</b>	Eindhovenseweg	5056 RP	<span>&gt;</span>
Brewery city: Berkel-Enschot			
Houseno: 3			
House suppl:			

**Brouwerij De Leckere B.V. Utrecht**

General Information Second Facet

**General Information**

Brewery: Brouwerij De Leckere B.V. City: Utrecht

**Second Facet**

Beer	Packing	description	Price
Black Saxon	Bottle 33 cl	Zwart bier, door het gebruik van zowel donkere als geroosterde moutsoorten. Een echte klassieker, die zijn oorsprong in het oosten van Duitsland vindt. Geuren van roggebrood, gebrande noten en drop, met een volle smaak en tonen van	3.85 EUR
Dark Paulus	Bottle 50 cl	Meergranen abdijbier. Donker van kleur door gebruik van black barley mout. Volle, frisse, fruitige smaak met extra citrus door dryhopping met Mandarina Bavaria. Door het toevoegen van een rumextractie van Pecan- en Mesquitehout	3.60 EUR
Lichte Gaard	Bottle 25 cl	Een licht alcoholisch zomers bier met tonen van framboos. Lekker doordrinkbaar, voor de warme zonnige dagen	1.79 EUR
100 Jaar De Stijl	Bottle 33 cl	Dit Bier Is Speciaal Gebrouwen Voor 100 Jaar De Stijl. Een Lichtblond Bier Van Hoge Gisting Dat Naar Traditie Lang Koud Wordt Gelagerd. Licht Moutige Zacht Hoppige Smaak Met Fruit In De Neus En Zacht Bloemige Bittere Nasmaak.	2.29 EUR
Witte Vrouwen	Bottle 25 cl	Sterk verfrissend bier op basis van witbier en weizen. Zacht volle moutsmaak en zoet romig in de afdronk. Geniet van deze unieke smaakcombinatie van wit en weizen.	1.19 EUR
SpringHaver	Bottle 25 cl	SpringHaver lentebock, gebrouwen met gerstemout en gemoute haver. Een heerlijk licht bier met frisse smaak, ideaal voor in de lente.	1.59 EUR
Blauwe Biji	Bottle 25 cl	Zwaar karakteristiek amberkleurig bier. Royal van samenstelling. Volle rijke zoete moutsmaak met lekker bittertje in de afdronk. Puur om van te genieten.	2.09 EUR

# What I made



Standard ▾

Brewery name:

Brewery city:

Brewery name Street Zipcode

Maximus Brouwerij	Pratumplaats	3454 NA	>
Brewery city: Utrecht Houseno: 2 House suppl: A			
Brouwerij De Leckere B.V.	Schaverijstraat	3534 AS	>
Brewery city: Utrecht Houseno: 15 House suppl:			
Jopen B.V.	Emrikweg	2031 BT	>
Brewery city: Haarlem Houseno: 19 House suppl:			
De Koningshoeven - La Trappe Trappist	Eindhovenseweg	5056 RP	>
Brewery city: Berkel-Enschot Houseno: 3 House suppl:			

Brouwerij De Leckere B.V. Utrecht

General Information Second Facet

General Information

Brewery: Brouwerij De Leckere B.V. City: Utrecht

Second Facet

Beer	Packaging	description	Price
Black Saxon	Bottle 33 cl	Zwart bier, door het gebruik van zowel donkere als geroosterde moutsoorten. Een echte klassieker, die zijn oorsprong in het oosten van Duitsland vindt. Geuren van roggebrood, gebrande noten en drop, met een volle smaak en tonen van	3.85 EUR
Dark Paulus	Bottle 50 cl	Meergranen abdijbier. Donker van kleur door gebruik van black barley mout. Volle, frisse, fruitige smaak met extra citrus door dryhopping met Mandarina Bavaria. Door het toevoegen van een rumextractie van Pecan- en Mesquitehout	3.60 EUR
Lichte Gaard	Bottle 25 cl	Een licht alcoholisch zomers bier met tonen van framboos. Lekker doordrinkbaar, voor de warme zonnige dagen	1.79 EUR
100 Jaar De Stijl	Bottle 33 cl	Dit Bier Is Speciaal Gebrouwen Voor 100 Jaar De Stijl. Een Lichtblond Bier Van Hoge Gisting Dat Naar Traditie Lang Koud Wordt Gelagerd. Licht Moutige Zacht Hoppige Smaak Met Fruit In DeNeus En Zacht Bloemige Bittere Nasmaak.	2.29 EUR
Witte Vrouwen	Bottle 25 cl	Sterk verfrissend bier op basis van witbier en weizen. Zacht volle moutsmaak en zoet romig in de afdronk. Geniet van deze unieke smaakcombinatie van wit en weizen.	1.19 EUR
SpringHaver	Bottle 25 cl	SpringHaver lentebock, gebrouwen met gerstemout en gemoute haver. Een heerlijk licht bier met frisse smaak, ideaal voor in de lente.	1.59 EUR
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- Oops... Let's fix that in the WebIDE !

# Adding Authorizations

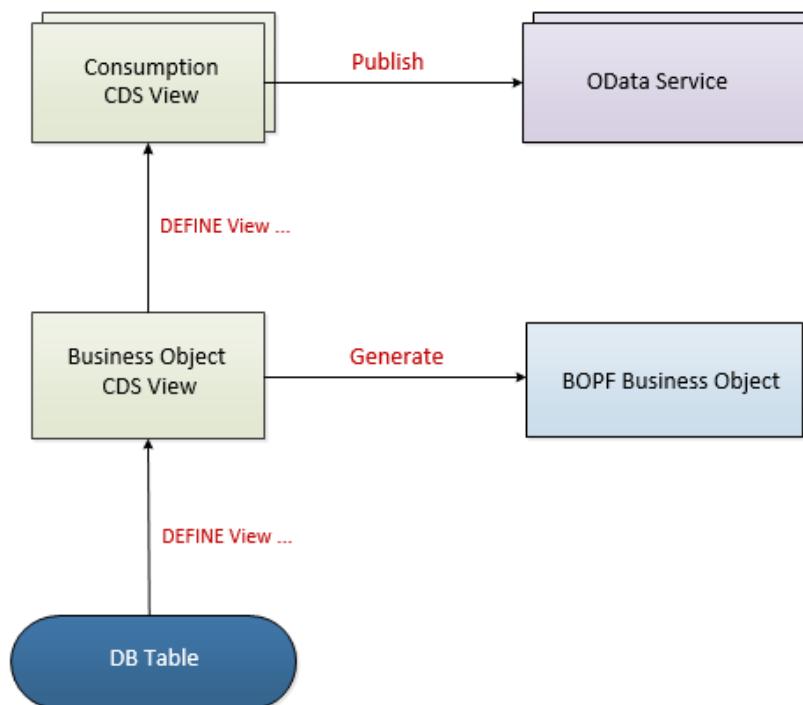
- Authorizations can be assigned directly to the CDS view by means of ACL.
- For instance PFCG-rolen:

```
define role Zvnsg_Bpb_Auth {  
    grant select on  
        ZVNSG_BPB_AUTH  
    where  
        (CityName) =  
            aspect pfcg_auth( ZAUT_CITY, ZA_CITY, actvt='03' ) ;
```



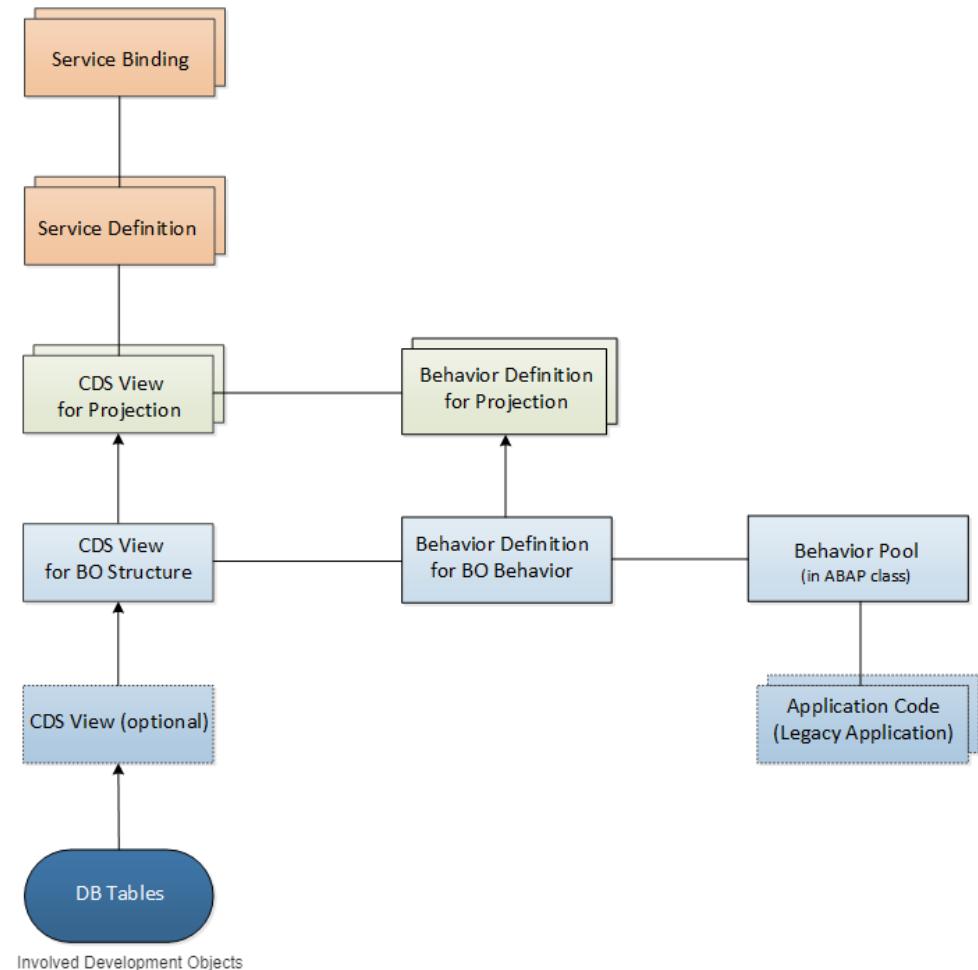
# Newer releases

- ABAP 7.52
  - Annotation-files separated from the Data Definitions
  - Integration with the BOPF framework



# Newer releases

- S/4HANA 1909
  - RESTful programming model
  - Behaviour definition



# Newer releases



- **S/4HANA 1909 RESTful programming model:**

Annotation and Values	Effect
@ObjectModel.writeActivePersistence: '<database_table/view>'	Specifies the database table or the database view for storing BO data changes that result from transactional behavior
@ObjectModel.createEnabled:true	Allows you to create new business object instances
@ObjectModel.deleteEnabled:true	Allows you to delete business object instances
@ObjectModel.updateEnabled:true	Allows you to update existing business object instances

# More information

- ABAP Restful programming model:  
<https://help.sap.com/viewer/923180ddb98240829d935862025004d6/Cloud/en-US/289477a81eec4d4e84c0302fb6835035.html>
- ABAP Programming Model for Fiori:  
<https://help.sap.com/viewer/cc0c305d2fab47bd808adcad3ca7ee9d/1809.000/en-US/3b77569ca8ee4226bdab4fcebd6f6ea6.html>
- ABAP CDS development user guide and documentation  
<https://help.sap.com/viewer/f859579898c7494dbe2449bbf278dcc/Cloud/en-US/7c078765ec6d4e6b88b71bdaf8a2bd9f.html>  
[https://help.sap.com/doc/abapdocu\\_752\\_index\\_htm/7.52/en-US/index.htm?file=abencds.htm](https://help.sap.com/doc/abapdocu_752_index_htm/7.52/en-US/index.htm?file=abencds.htm)  
<https://wiki.scn.sap.com/wiki/display/ABAP/CDS+-+Core+Data+Services>  
<https://archive.sap.com/documents/docs/DOC-69643>
- Q&A  
<https://answers.sap.com/topics/abap+cds.html>
- Parameters  
<https://blogs.sap.com/2018/01/06/optional-parameters-in-cds-views/>  
<https://stackoverflow.com/questions/48259694/how-can-i-select-data-similar-to-sql-where-like-from-a-parameter-value>
- Associations  
<https://blogs.sap.com/2016/08/12/from-open-sql-joins-to-cds-associations/>  
<https://blogs.sap.com/2018/08/20/cardinality-of-association-in-cds-view/>
- More info  
<http://sapabapcentral.blogspot.com/p/abap-cds-data-definitions.html>  
<http://www.saplearners.com/category/abap-cds-views/>  
<https://blogs.sap.com/2017/09/09/abap-core-data-services-introduction-abap-cds-view/>  
<https://blogs.sap.com/2017/09/18/implementing-fuzzy-search-using-cds-sap-hana/>
- Tutorials  
<https://developers.sap.com/tutorials/abap-dev-adt-create-cds-view.html>  
<https://blogs.sap.com/2016/03/10/my-cds-view-self-study-tutorial-part-1-how-to-test-odata-service-generated-by-cds-view/>  
<https://www.youtube.com/playlist?list=PLQgI37f2ZGcOteTK3gUA2NXr-9-zE3JaH>

# More information



Technical Articles



**Carine Tchoutouo Djomo** SAP

October 25, 2019 6 minute read

## Getting Started with the ABAP RESTful Programming Model

<https://blogs.sap.com/2019/10/25/getting-started-with-the-abap-restful-programming-model/>



**Jocelyn Dart** SAP   

November 16, 2016 9 minute read

## Fiori Elements – How to develop a List Report – Basic Approach

<https://blogs.sap.com/2016/11/16/fiori-elements-how-to-develop-a-list-report-basic-approach/>

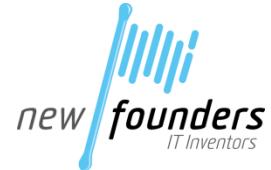
# Thank you for your attention



- Cheers!



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W: <https://newfounders.nl/>

