



23 november 2019

CDS

newFounders

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

# What I want to make

Brewery name:  Brewery city:

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	Eindhoveneweg	5056 RP	Berkel-Enschot	3	>

← List of breweries

... and their beer →

Jopen B.V. Haarlem

General Information

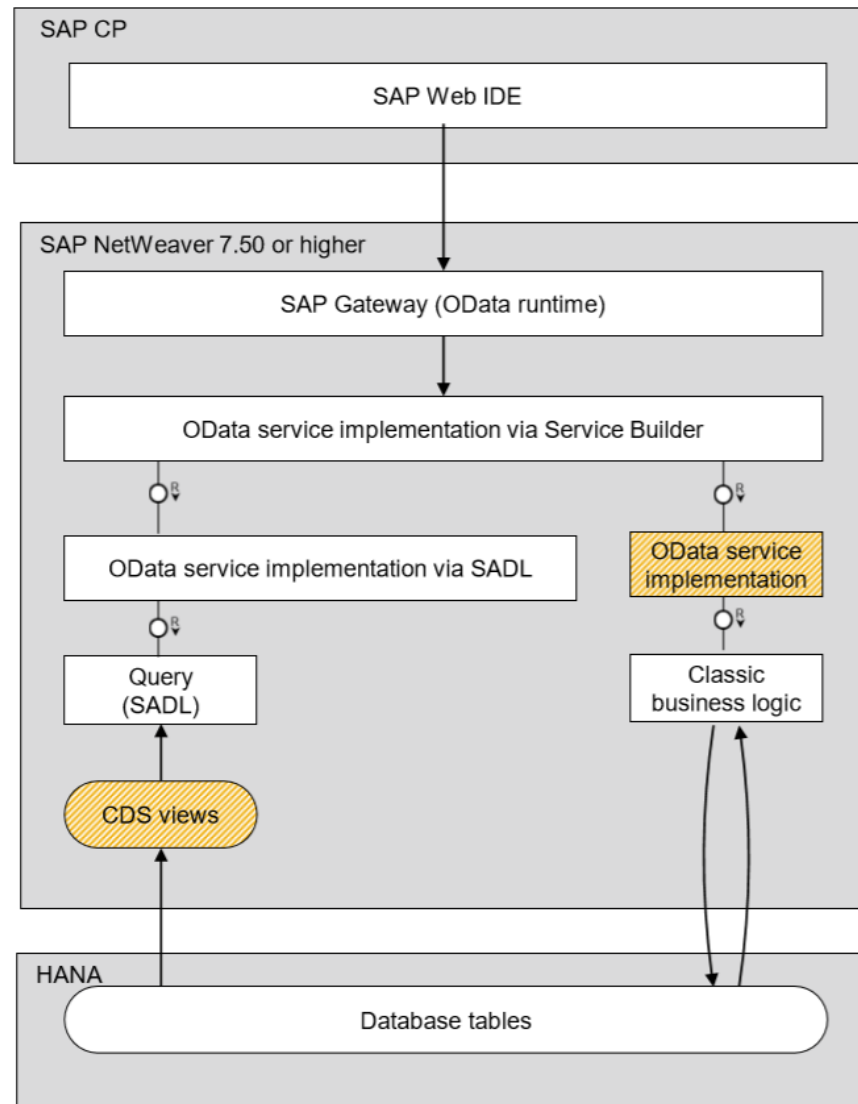
Brewery: Jopen B.V. City: Haarlem

Second Facet

Beer	Pack aging	description	Price
Jopen Hoppenbier	Bottle 33 cl	Fris met een aangenaam bittertje, 6,8% Jopen Hoppenbier is het enige driegranenbier ter wereld met een dubbele hoggave. 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, bovenglistend bier, was erg populair in de negentiende eeuw. Dit blonde, redelijk bittere	2.20 EUR

De kruidige smaak is complex en zacht. Jopen Kvlt wordt gebrouwen met gruit, 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/>

# CD & S - "third" flavour



Carine Tchoutouo Djomo 

October 25, 2019 6 minute read

## Getting Started with the ABAP RESTful Programming Model

### Architecture Overview

SERVICE  
CONSUMPTION



BUSINESS  
SERVICES  
PROVISIONING



DATA MODELING &  
BEHAVIOR

SAP Fiori UI  
Consume OData UI services

Web API  
Consume OData Web APIs



SERVICE BINDING - Bind to protocol version and scenario



SERVICE DEFINITION - Define scope to be exposed



BUSINESS OBJECT PROJECTION



CDS: Projection views



BDEF: Behavior projection



ABAP: Behavior implementation

BUSINESS OBJECTS



CDS: Data modeling



BDEF: Behavior definition



ABAP: Behavior implementation

QUERIES



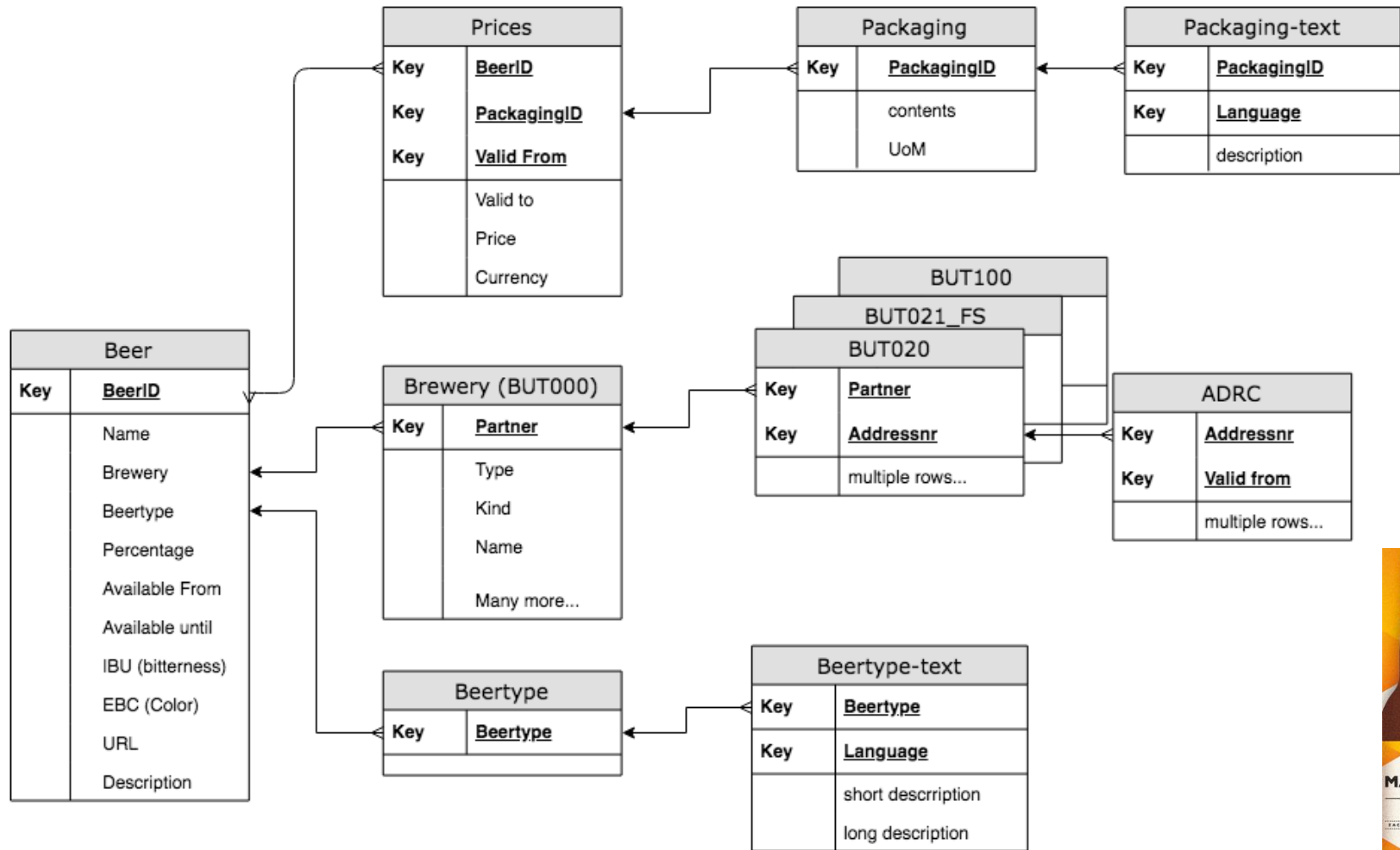
CDS: Data modeling

<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

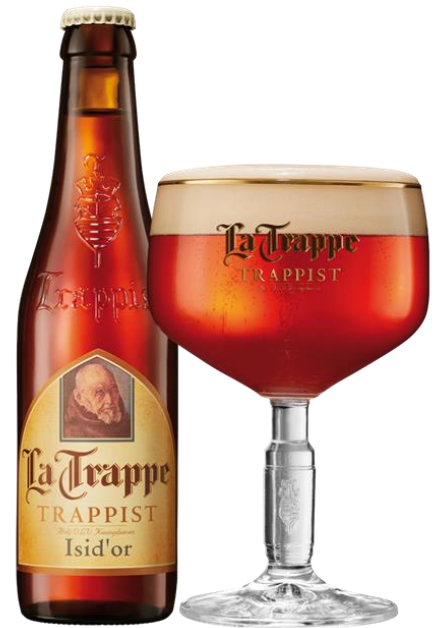
```
@AbapCatalog.sqlViewName: 'ZDDLBEERTYPES'...//datadictionary viewname
@AbapCatalog.compiler.compareFilter: true...// true: The filter conditions of associations
@AccessControl.authorizationCheck: #NOT_REQUIRED
@EndUserText.label: 'Soorten bier (incl. texttabel)'
define view ZNL1_BEERTYPES
...
  with parameters @Environment.systemField: #SYSTEM_LANGUAGE
  ...
  p_langu : abap.Lang
...
as select from zbr_type...as beertype
...
  inner join zbr_typed...as beertypedtext
...
  on beertypedtext.zbeertype = beertype.zbeertype
...
  and beertypedtext.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 ;-)



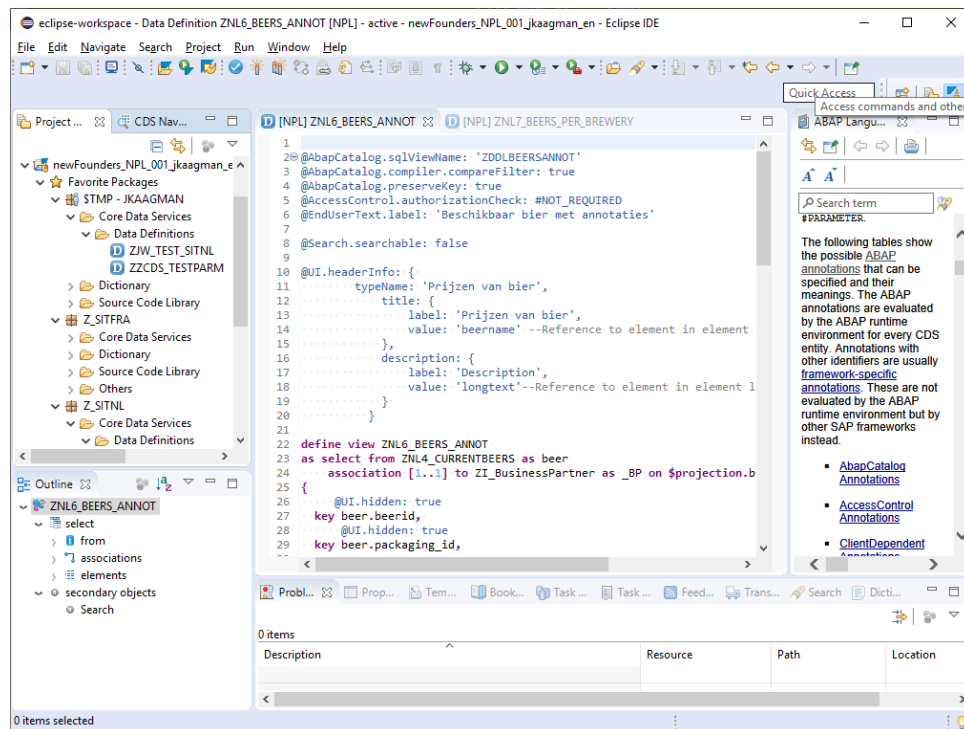
# Annotations

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



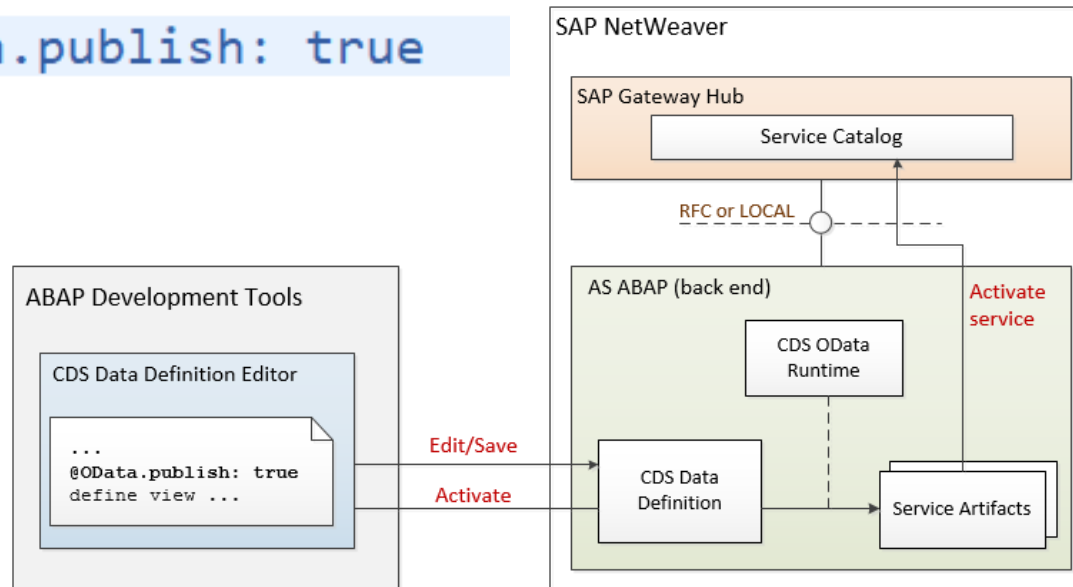
# Associations and annotations

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



- Create OData service with annotation

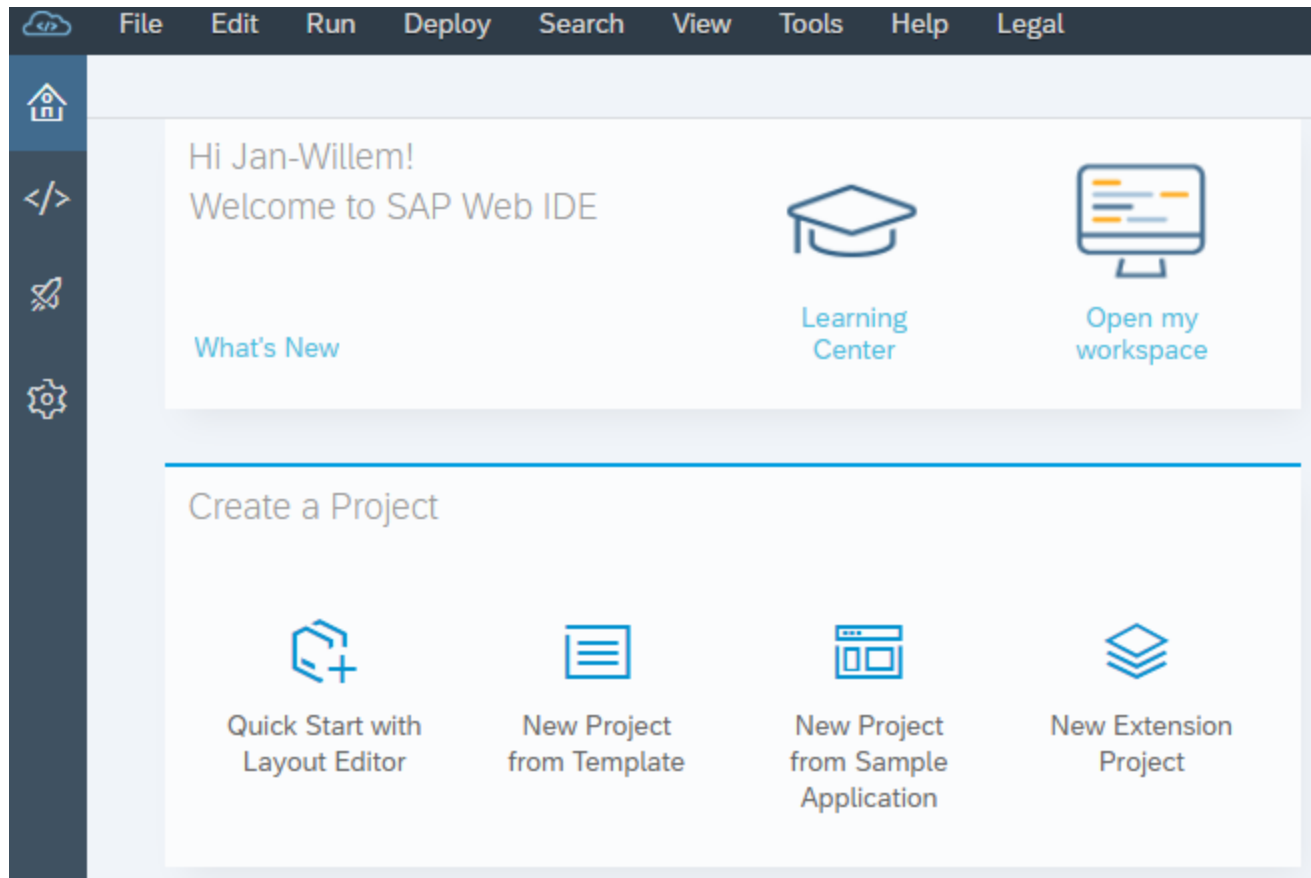
```
@OData.publish: true
```



- 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

Standard

Search

Editing Status: All Price Range: Category: Supplier: Average Rating: ★★★★★ Adapt Filters (3) Go

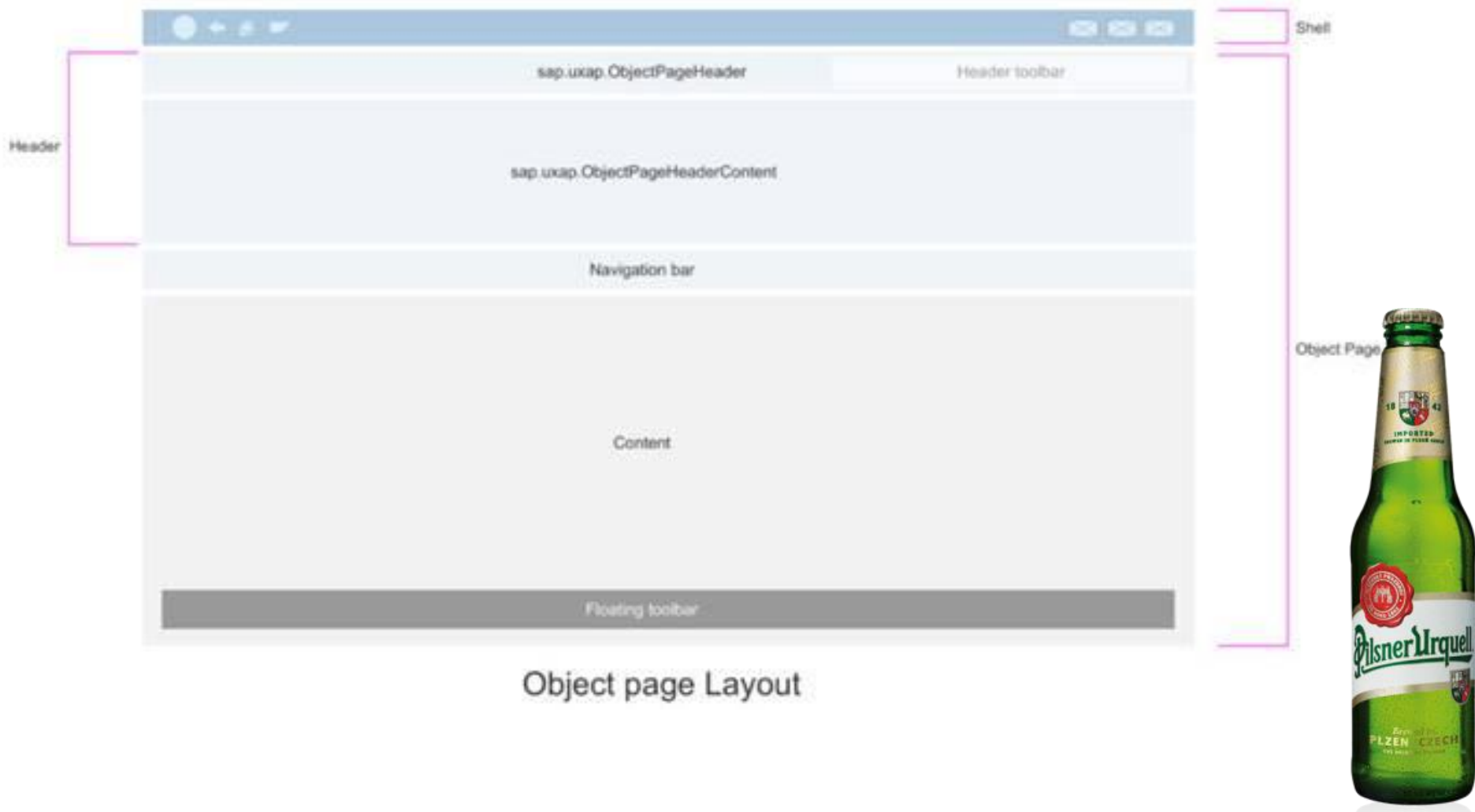
Products (128)

Image	Product	Category	Sub-Category	Supplier Name	Availability	Average Rating	Product Unit Price
	34234234234232 EPM-002514 <a href="#">Unsaved Changes</a>	Smartphones & Tablets	Tablets	SAP	Out of Stock	★★★★★	0.00 EUR >
	7" Widescreen Portable DVD Player w MP3 EPM-002513	TV, Video & HiFi	Portable Players	TECUM	Out of Stock	★★★★★	249.99 USD >
	7" Widescreen Portable DVD Player w MP3 HT-2000 <a href="#">Unsaved Changes</a>	TV, Video & HiFi	Portable Players	TECUM	In Stock	★★★★★	249.99 USD >
	AAA Copy Beam Breaker B-1 EPM-002510	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 <a href="#">Unsaved Changes</a>	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 HT-1252	Smartphones & Tablets	Smartphones	Vente Et Réparation de Ordinateur	In Stock	★★★★★	649.00 USD >
	Audio/Video Cable Kit - 4m 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 >

UI.Selection  
Fields

UI.LineItem

# UI5 Frontend – Object Page



# UI5 Frontend – Object Page

The screenshot shows the SAP UI5 Object Page for 'Astro Laptop 1516'. The page is divided into two main sections: a top header area and a main content area. The top header area contains the product name, a small image of the laptop, and a table with columns for Details, Description, Availability, and Price. The main content area contains two tabs: 'Product Information' and 'Stock Data (432)'. The 'Product Information' tab is active, showing details about the product, including its name, category, and internal information like base unit, stock, and delivery date. Blue ovals and arrows highlight specific UI components: one oval around the top header area points to 'UI.HeaderFacets', and another oval around the 'Product Information' tab points to 'UI.Facets'.

Details	Description	Availability	Price
Category: Computer Systems Subcategory: Notebooks Supplier: Tessile Casa Di Roma	Flexible Laptop with 2,5 GHz Quad Core, 15" HD NT, 16GB DDR SDRAM, 256 GB SSD, Operating System Pro	In Stock	989.00 USD

Product Information Stock Data (432) Reviews

**Details**

Product Name: Astro Laptop 1516

Modell/Version: 1516

Brand: Laurent

Product ID: HT-1251

Category: Computer Systems

Subcategory: Notebooks

**Internal Information**

Base Unit: Each (EA)

Stock: 238

EAN: 4 012345 123456

Delivery Date: 18/02/2018

Package Height: 10.0 CM

Package Width: 40.0 CM

UI.HeaderFacets

UI.Facets



# What I made

Standard ▾

Brewery name:

Search

Brewery city:

Adapt Filters

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	Eindhoveneweg	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

Search <input type="text"/>			
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 moutsmak en zoet romig in de afdrank. 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 Bijl	Bottle 25 cl	Zwaar karakteristiek amberkleurig bier. Royaal van samenstelling. Volle rijke zoete moutsmak met lekker bittertje in de afdrank. Puur om van te genieten.	2.09 EUR

# What I made

Standard ▾

Brewery name:

Search

Brewery city:

Adapt Filters

Second Facet

General Information

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

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:		

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 moutsmak en zoet romig in de afdrank. 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 Bijl	Bottle 25 cl	Zwaar karakteristiek amberkleurig bier. Royaal van samenstelling. Volle rijke zoete moutsmak met lekker bittertje in de afdrank. Puur om van te genieten.	2.09 EUR

- Oops... Let's fix that in the WebIDE !

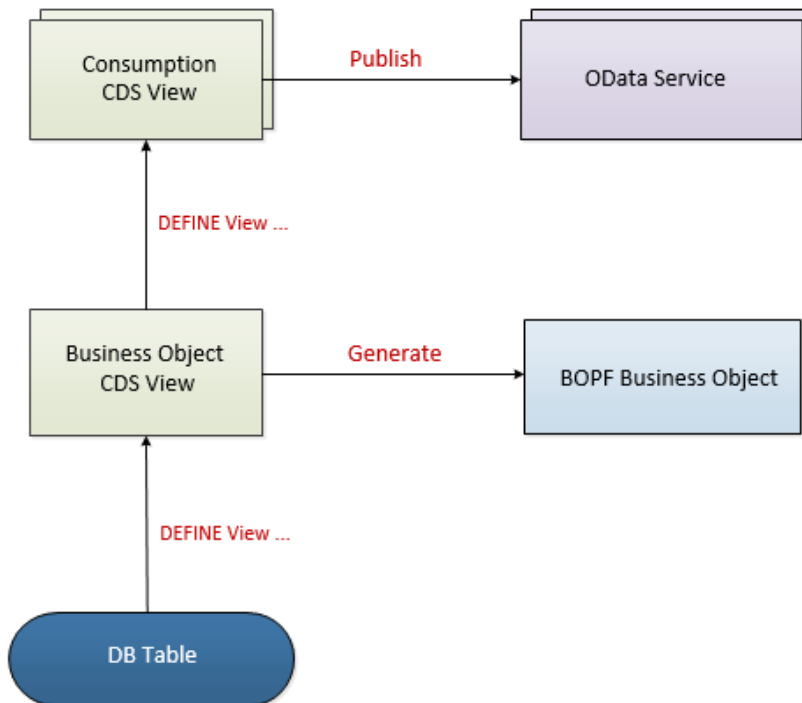
# Adding Authorizations

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

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

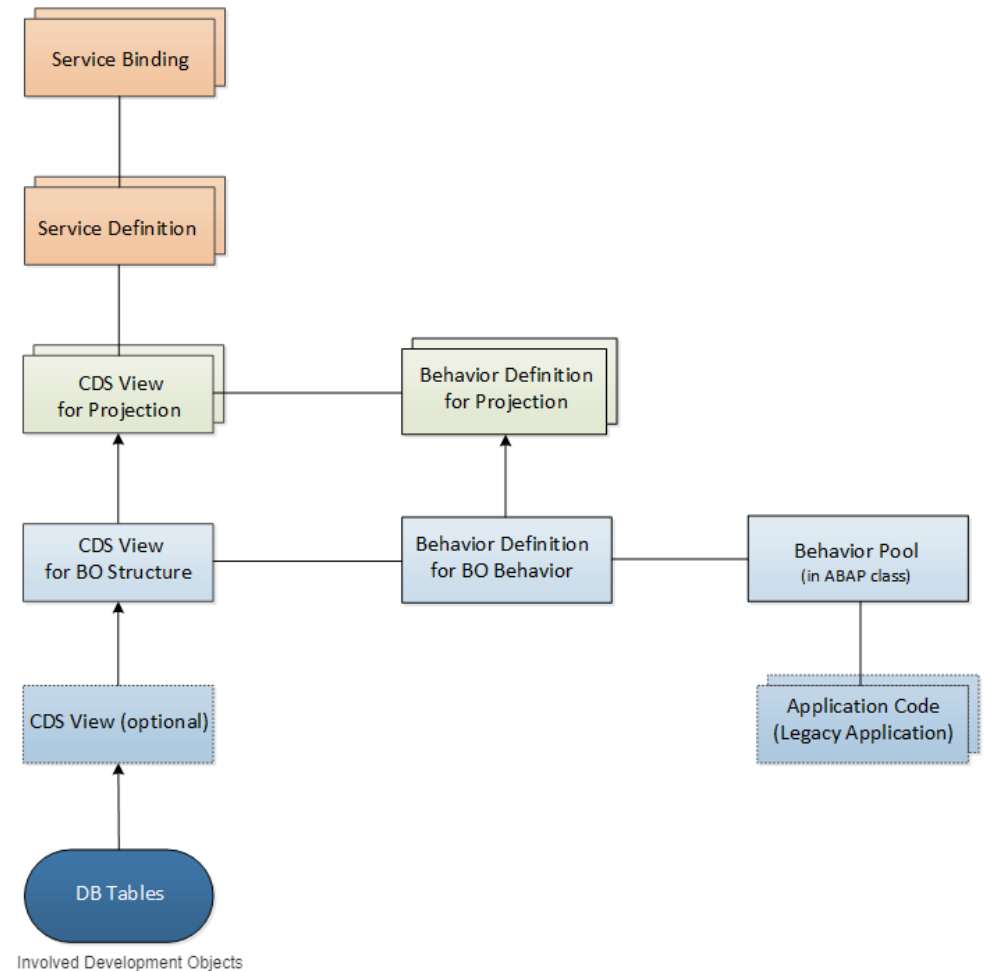


- ABAP 7.52
  - Annotation-files separated from the Data Definitions
  - Integration with the BOPF framework



# Newer releases

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





- 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/3b77569ca8ee4226bdab4fceb6d6f6ea6.html>
- ABAP CDS development user guide and documentation  
<https://help.sap.com/viewer/f859579898c7494dbe2449bb7f278dcc/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>

Technical Articles



**Carine Tchoutouo Djomo** 

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**   

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!



# Jan-Willem Kaagman

*IT Inventor*

newFounders BV.

E: Jan-Willem.Kaagman@newFounders.nl  
T: +31 (0)6 185 171 68  
T: +31 (0)73 614 4465  
L: <https://linkedin.com/in/janwillemkaagman/>  
W: <https://newfounders.nl/>

