

# **“SAP S/4HANA Fiori Elements Developments & Extensibility”**

## **Real time Business Scenarios**

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## Disclaimer

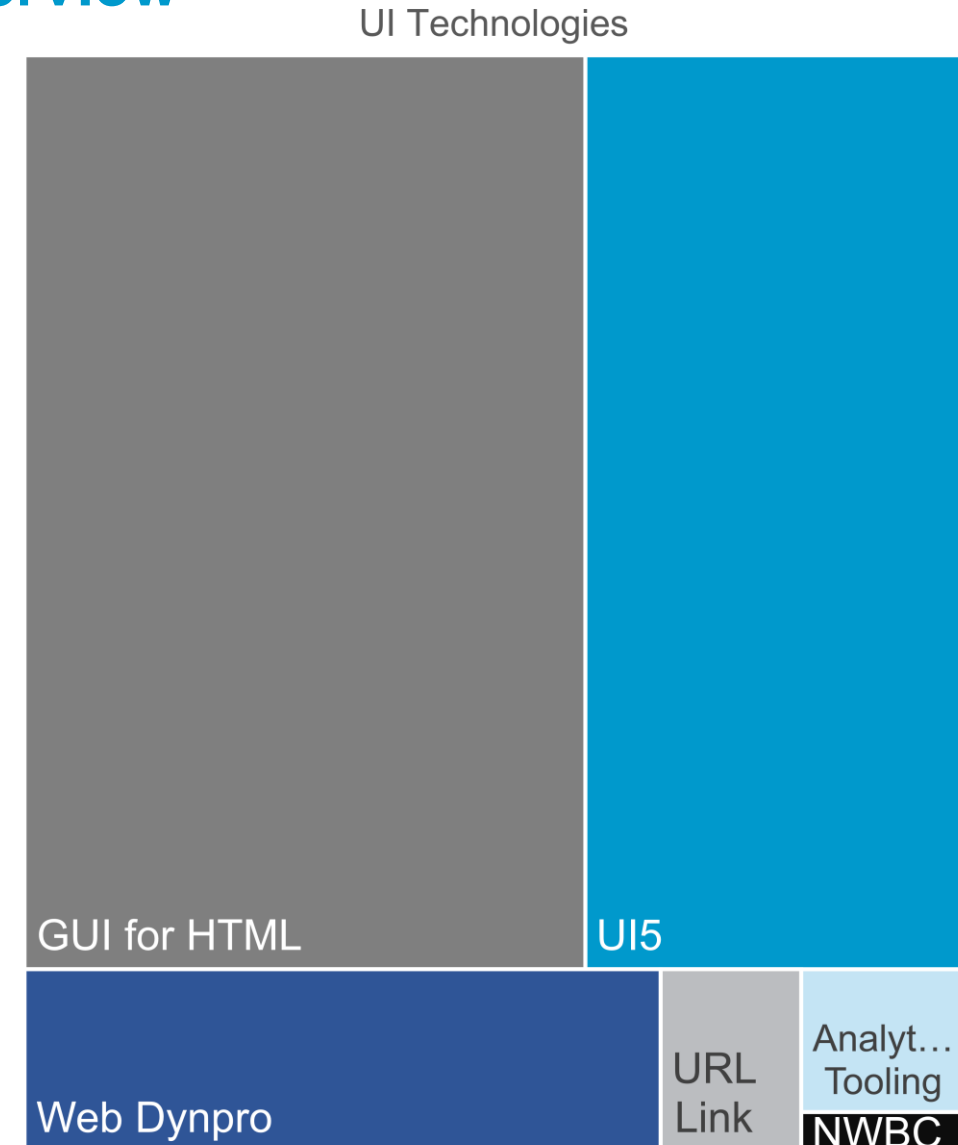
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- This is the information based on my experience , insights and current information( and somewhat educated opinion) on the current and future state of the SAP offering.
- Readers are cautioned not to place undue reliance on these forward-looking statements, they should not be relied upon in making purchasing decisions / Development Decision.

# Agenda

- S/4 HANA Project Fiori Scope & Development overview
- Custom Fiori elements development approaches
- Standard Fiori Elements extensions
- Lesson learned
- References: OData services approaches used
- Appendix:Fiori Elements Use Case Details

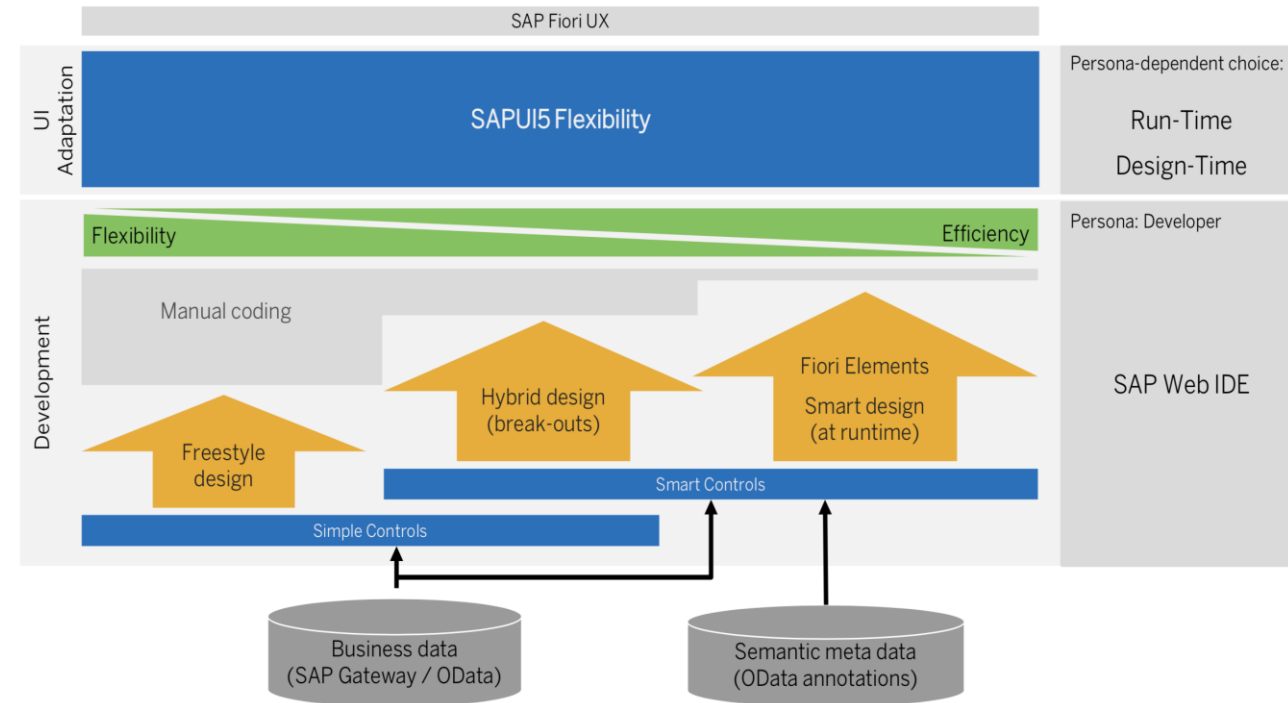
# S/4 HANA Project Fiori Scope & Development overview

- Development inventory
  - ✓ Standard & Custom Fiori Applications
  - ✓ WRICEF
- Apps are in Scope in typical S/4HANA Projects
  - ✓ GUI for HTML
  - ✓ UI5 Based Application
  - ✓ Web Dynpro
  - ✓ URL Link
  - ✓ Analytics Tooling Based Apps ( ex Lumira, SAC, Design Studio etc)
- Technology vision – Anywhere, Any computer, any device
  -  X
  -  ✓
- Custom Fiori Apps which includes **Fiori Elements or Free Style using Smart controls-based applications.**



# Custom Fiori Development Approaches Used : High Level Solution Over view

- Development Standards, Guidelines, Best practices are set for the UX Development.
- **Fiori Elements are most preferable**, if not then **smart controls** with free style is preferable over complete free style development.
- **Design consistency, development efficiency is great with Fiori Elements .**
- Backend Developers are encouraged to upskill and fully utilize the power of Fiori elements.



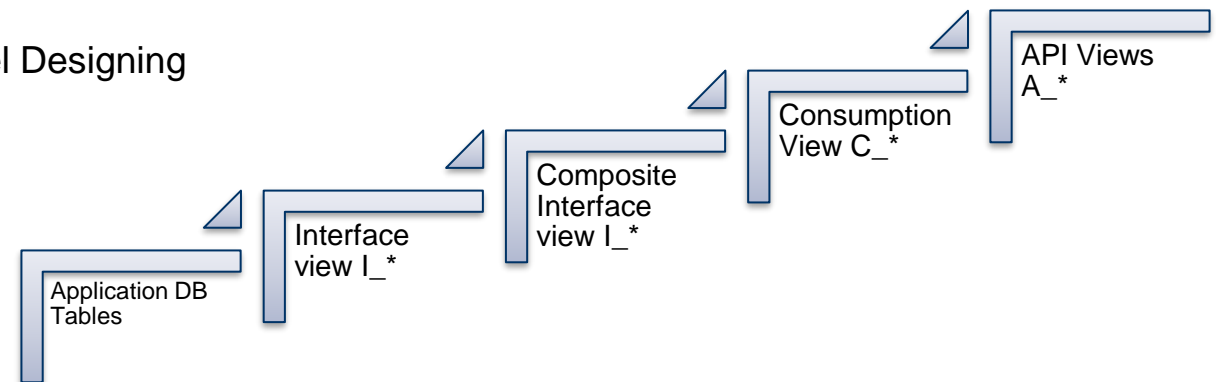
# S/4HANA Project : Custom Fiori Elements Development overview

## Highlighting Fiori Elements/ Smart Controls Features utilized:

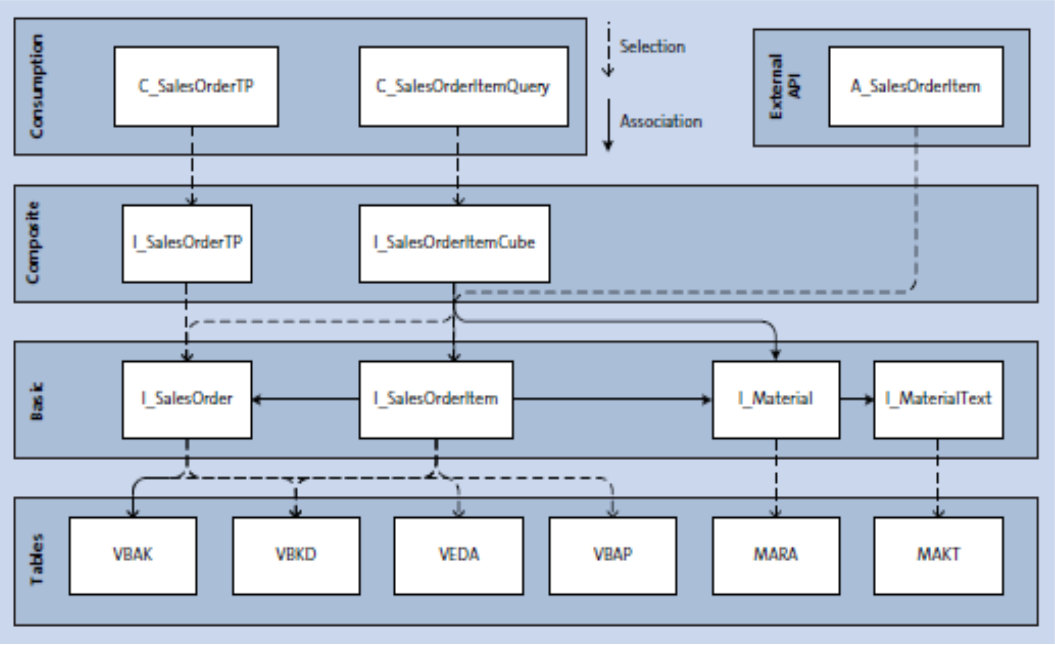
- Decoupled Backend and UI Logic. Utilization of CDS with annotations.
- Complete End to End Transactional apps developed with List Report / Object Page having Multiple Facets.
- UI Extensibility is achieved with List Report / Object Page extension, which helps to achieve specific custom requirements i.e. adding custom actions for workflow approval.
- Validations/exception handling, change documents are managed at Backend (BOPF) Layer.
- Navigation from Fiori Elements (List Report) to Free style applications.
- Custom Smart Tree controls with Flexible Column layout (FCL). Complex Hierarchical Business logic implemented via CDS-AMDP table functions.

# SAP S/4HANA Architecture & VDM Models Designing Overview

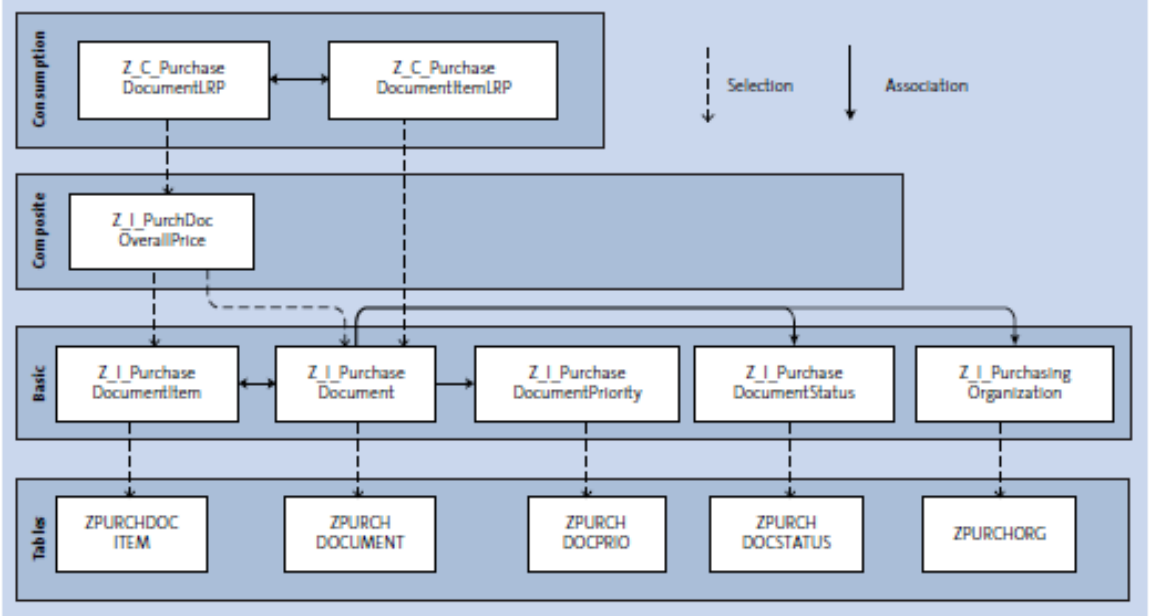
## VDM – Virtual Data Model Designing



### Standard VDM

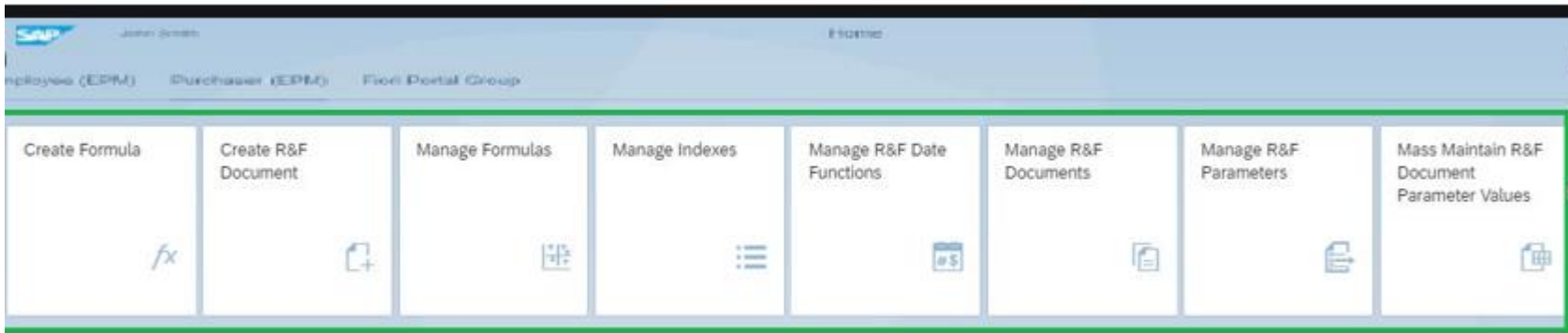


### Custom VDM



# Custom Fiori Elements based applications : Use Cases

Built Fiori Elements based applications for complex Business requirement which **fully utilized the power of Fiori Elements and smart controls**.



- Fiori Apps are consistently designed with Fiori Elements, Smart controls and combination with Free style applications.
- Manage Apps (**Business users entry point**) are Fiori Elements based apps, which navigates to either Fiori Elements or Free Style for CUD (Create/Update/Delete) operations.
- All Manage apps are navigating to object page for detailed information.
- Usages of new UI control like Calculation Builder for better user experience.



## Many Different Approaches are Needed!

- ✓ Fiori Elements → List Report/Object Page → Create/Update/Delete (CUD) with generated BOPF.
- ✓ Flexible Column Layout (FCL) → [Smart Tree Table](#) → Object Page with Smart Tables.
- ✓ Fiori Elements → List Report / Object Page → Create/Update/Delete (CUD) (Not via BOPF).
- ✓ Standard Fiori Elements → Extensions → Add Custom Fields, Enhance Standard Value Help

**Demo: Let's see this in real time**

# Fiori Elements – Lessons Learned

- Almost 60-80% requirements can be managed with Fiori Elements / Smart control.
  - Increase design consistency and significantly reduces development efforts.
- Backend **CDS Data Modelling** is most critical and important.
- **Annotations and their evaluation** at each layer (CDS/MPC/Local UI) must be very clear.
- Maximum **utilization of SAP Standard CDS/ Standard Value helps CDS's** provided.
- **Upskilling Backend developers** with S/4HANA preferred technology i.e. CDS annotations etc .
- Strong **QA review process / Standards / Guidelines for UX Development** needed.
- Keep exploring **Standard SAP Fiori elements** Based apps UI and Backend Modelling.

## My Blog Posts published on Fiori Elements

- [Fiori Elements extensibility using CDS and KUE \(Key User Extensibility Tool\)](#)
- [Fiori elements utilizing CDS with Virtual elements](#)
- [Fiori Element: Collective / Multiple value help on selection field](#)
- [Fiori Elements-Value help on a selection field within a value help dialog](#)
- [Fiori Elements- Complex Tree Hierarchical Reports – Challenges & Solution Design Part 1](#)
- [Fiori Elements- Complex Tree Hierarchical Reports – Challenges & Solution Design Part 2](#)

## Other references

- [ODATA Services approaches](#)
- [Fiori Elements Wiki](#)
- [Fiori on S/4HANA](#)

# References : Fiori Elements OData Services approaches used

## Backend Modelling



## ODATA Modelling



## UI Modelling

### ▪ CDS Reference Data Source Approach (60-70% usages)

- CDS with Annotations
- BOPF– **Active/ Draft Persistence**



CDS- Consumed as **Reference data source (most preferred)**



Fiori Elements( List Report / Object Page ) Read Only / Transactional Apps

### ▪ CDS Auto-Exposure: @Odata.Publish = True (20% usages)

- CDS with Annotations



CDS Exposed directly as OData



**Fiori Elements**( List Report/ Object Page, OVP) simple Read only KPI / APF

### ▪ CDS Map to Data Source Approach(10% usages)

CDS, BAPI's, Classes



- CDS Map to Data Source
- BAPI/RFC/ Class for CUD



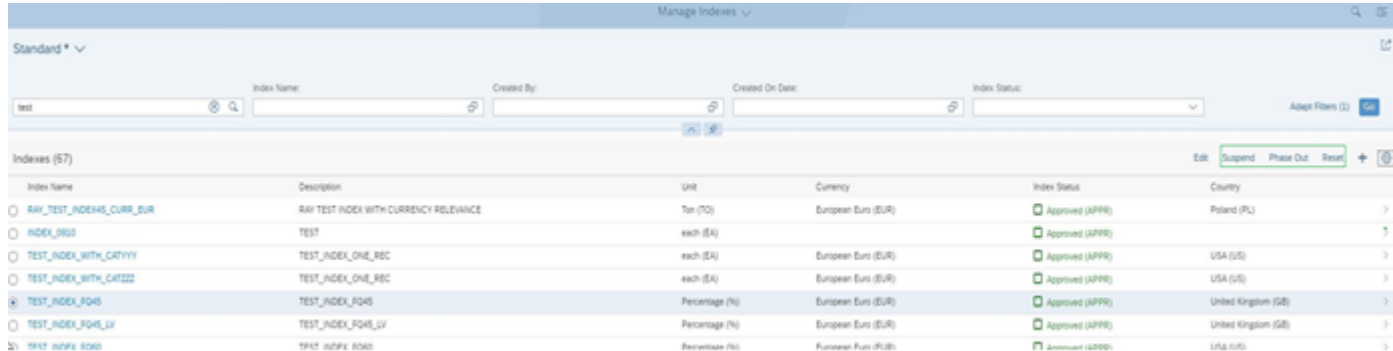
Free Style/Custom Development/ Smart Controls  
List Report / Object page

# **Fiori Elements Use Case Details**

# **Custom Business Scenarios**

# Fiori Elements : List Report

Fiori Elements → List Report → CUD Functionality handled with generated BOPF



Index Name	Description	Unit	Currency	Index Status	Country
RAI_TEST_INDEX45_CURR_EUR	RAI TEST INDEX WITH CURRENCY RELEVANCE	Ton (T)	European Euro (EUR)	Approved (APPR)	Poland (PL)
INDEX_0002	TEST	each (EA)	European Euro (EUR)	Approved (APPR)	USA (US)
TEST_INDEX_WITH_CAT1111	TEST_INDEX_ONE_REC	each (EA)	European Euro (EUR)	Approved (APPR)	USA (US)
TEST_INDEX_WITH_CAT2222	TEST_INDEX_ONE_REC	each (EA)	European Euro (EUR)	Approved (APPR)	USA (US)
TEST_INDEX_FQ45	TEST_INDEX_FQ45	Percentage (%)	European Euro (EUR)	Approved (APPR)	United Kingdom (GB)
TEST_INDEX_FQ45_LV	TEST_INDEX_FQ45_LV	Percentage (%)	European Euro (EUR)	Approved (APPR)	United Kingdom (GB)
TEST_INDEX_FQ45	TEST_INDEX_FQ45	Percentage (%)	European Euro (EUR)	Approved (APPR)	United Kingdom (GB)

```
6 @Search.searchable: true
7
8 @ObjectModel.modelCategory: #BUSINESS_OBJECT
9 @ObjectModel.compositionRoot: true
10 @ObjectModel.transactionalProcessingEnabled: true
11 @ObjectModel.writeActivePersistence: 'LOCAL' // Root table
12 @ObjectModel.semanticKey: 'INDEX_ID' // Table Key
13 @ObjectModel.representativeKey: 'INDEX_ID' // BOPF Instance Key
14
15 @ObjectModel.createEnabled: true
16 @ObjectModel.updateEnabled: 'EXTERNAL CALCULATION'
17 @ObjectModel.deleteEnabled: false // Delete is facilitated via :
18 @ObjectModel.draftEnabled: false
```

- Fiori Elements List Report with multiple selection Fields / UI Line Items with Criticality Text / Semantic Annotations.
- **Edit and Create (+)** are generated via CDS annotations and functionality / validations handle at **BOPF Layer**.
- Highlighted green buttons are additional actions handled via **BOPF actions**.
- **URL enabled Line Items** which calls to other Fiori Elements object Page for detailed view.



Static Properties

Associations

Determinations

- ACTION\_AND\_FIELD\_CONTROL Generated
- ADMINISTRATIVE\_DATA Set the Admin Data
- SET\_INITIAL\_VALUES Set the initial Index Header fld values

Validations

- CHECK\_APPLICABLE\_CATEGORY

ext

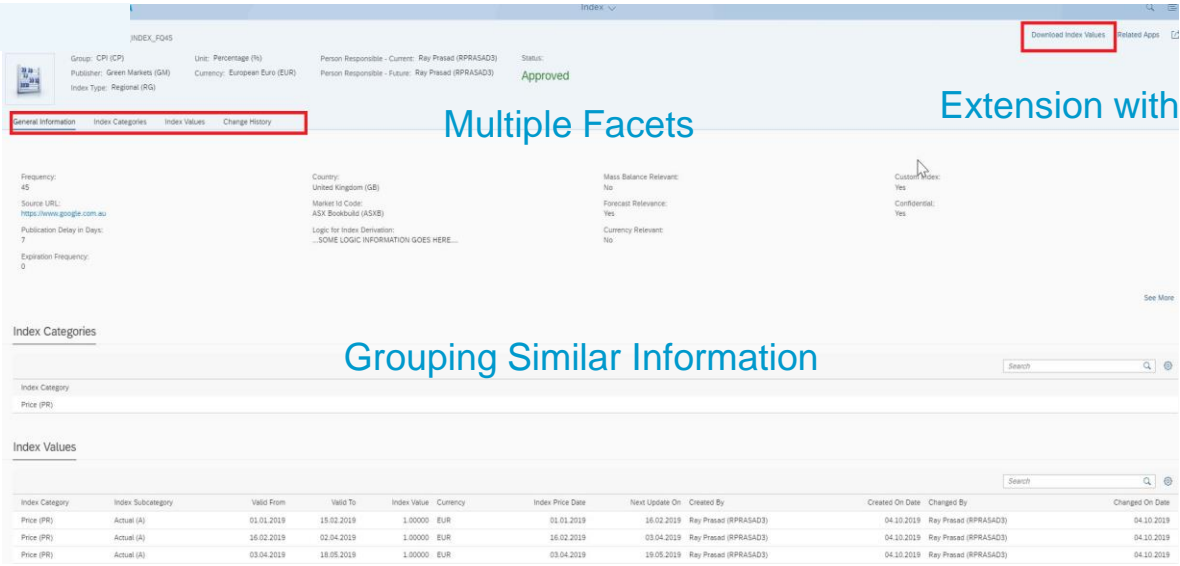
controllers

- CustomLogic-dbg.controller.js
- CustomLogic.controller.js

i18n

# Fiori Elements : Object Page View

## CDS Generated Object Page → Local UI annotations → Extensibility



Multiple Facets

Extension with Custom Action

Grouping Similar Information

Associated CDS

### Extending Object in manifest.json

```

"extends": {
  "extensions": {
    "sap.ui.controllerExtensions": {
      "sap.suite.ui.generic.template.ObjectPage.view.Details": {
        "controllerName": "orica.rfindexfactsheet.ext.controllers.CustomLogic",
        "sap.ui.generic.app": {
          "ZC_RF_IndexFS": {
            "EntitySet": "ZC_RF_IndexFS",
            "Header": {
              "Actions": {
                "DownloadValues": {
                  "id": "downloadValuesButton",
                  "text": "{@i18n}>downloadValuesButtonLabel",
                  "press": "onPressDownloadValues"
                }
              }
            }
          }
        }
      }
    }
  }
}
```

### Annotation Structure

odata Data Source: mainService

Select Targets				Search
Node	Edit Qualifier	Key Information	Expression	
Entity Types				
ZC_RF_IndexFS				
Local Annotations		Source: localAnnotations		
UI.HeaderFacets				
UI.Facets				
UI.CollectionFacet		ID: GeneralInformation; Label: G...		
UI.ReferenceFacet		Label: Index Categories; Target: {...		
UI.ReferenceFacet		Label: Index Values; Target: {to_I...		
UI.ReferenceFacet		Label: Change History; Target: {t...		

```

sap.ui.controller("orica.rfindexfactsheet.ext.controllers.CustomLogic", {
  // ...
  onPressDownloadValues: function(oEvent) {
    // Get the Index Name for this Object
    var selectedObject = oEvent.getSource()._getBindingContext().getObject();
    var indexName = selectedObject.IndexName;
    // ...
  }
});
```



# Free Style with Smart controls with Object Page

Flexible Column Layout(FCL) → Smart Tree Table → Object Page ( Multiple Facets ) with Smart Tables

3794

Selected Serial Number Hierarchy Path:  
(90)SE001(250)29327818000013794

Detailed Hierarchical Tree Structure

Standard

Orica External HU	Packa...	External HU	
▼ (90)S	L8000013794	CONT...	293278180...
▼ (90)	577783	PALLE...	1000577783
▼	00577751	BOX	1000577751
	0567527	BAG	1000567527
	0567528	BAG	1000567528
	0567529	BAG	1000567529
	0567530	BAG	1000567530
	0567531	BAG	1000567531
	0567532	BAG	1000567532
	0567533	BAG	1000567533
	0567534	BAG	1000567534
	0567535	BAG	1000567535
	01000567536	BAG	1000567536
	000577752	BOX	1000577752
▼ (90)SE001(250)1000577753	BOX	1000577753	

00567528 BAG

Object Page

Statu

Created By  
GBIRSE (Gary Birse)

Creation Date  
20.11.2019, 08:00:00

Changed By

Changed On  
20.11.2019, 08:00:00

HU Items

HU History

Serial Number Information

Serial Number History

Standard

Material	Batch	Quantity	Plant	Storage ...
Test Material	9000000000	10.000 PC	Orica Gyt...	HU Fin G...

HU History

Standard

Serial Number	Object Text	O...	Object Key	Transaction Date
00567528	Goods Receipt Document	WE	49000439082019	20.11.2019
00567528	Inbound Delivery	03	0180001940	20.11.2019

# Object Page with CUD Functionality

Fiori Elements → List Report / Object Page → Custom CUD Logic (Not with BOPF Generated)

- App has been developed with CDS annotations.
- Usages of Object Model's CUD annotations for enabling the UI for CUD functionality.
- Redefining the respective CUD method to achieve custom save functionality.
- Redefining **DPC\_EXT**( Create / Update ) entity & custom logic call for DB Update.
- Usage of **MPC\_EXT** to control the behaviour for few fields( should not be editable in case of Edit).
- No “**BOPF**” Generation.

Parameter Name	Parameter Type	Description	Created On Date	Changed On Date
BP	Base Price (BP)	TEST	03.12.2019	03.12.2019
HT	Price (PR)	Price (PR)	14.10.2019	14.10.2019

ANOTHER\_BP\_4\_CUST

General Information

Parameter Name: ANOTHER\_BP\_4\_CUST      Parameter Type: Base Price (BP)      Description: TEST

# Free Style: Excel Upload

## Free Style Transactional App → Wizard → Excel Upload

- Most common Business scenario where needs to read excel and upload in the backend.
- Validations should be performed on the data to be upload.
- SAP Standard '**Journal entry upload**' app is recommended for **Excel parsing/reading** functionality. Some standard functions can be re-used.

1. Select File

File:  [Download Template](#)

2. Review & Submit

No errors found in the file. Please submit.

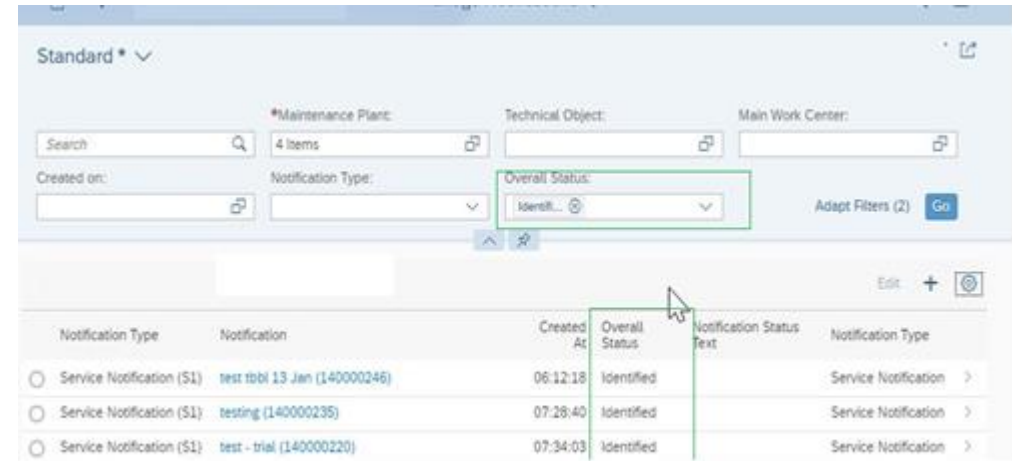
Index Name	Category	Sub Category	Price	Price Date	Valid From	Valid To	File Row	Status	Message
INDEX45	PR	A	1.00000	01/01/2021			1	✓	

[Submit](#)

## Object Page with CUD Functionality

**Fiori Elements ( List Report) → CDS → Virtual Elements ( utilized existing ABAP Logic)**

- Few Business scenarios where few field calculations need ABAP Logic like FM/ Class-Method etc.
- Virtual elements really helped ease the remaining development using Fiori Elements
- Refer my [Blog](#) for more information.



## Elements

```
@ObjectModel: {
  filter.transformedBy: 'ABAP:ZCL_WM_OVERALLSTATUS_EXIT',
  virtualElement: true,
  virtualElementCalculatedBy: 'ABAP:ZCL_WM_OVERALLSTATUS_EXIT'
}

@ObjectModel.foreignKey.association: '_OverallStatus'
cast(' ' as ze_vm_overallstatus )
```

Class/Interface

ZCL\_WM\_OVERALLSTATUS\_EXIT

Implemented / Active

Properties

Interfaces

Friends

Attributes

Methods

Events

Types

Aliases

Parameters

Exceptions

Sourcecode

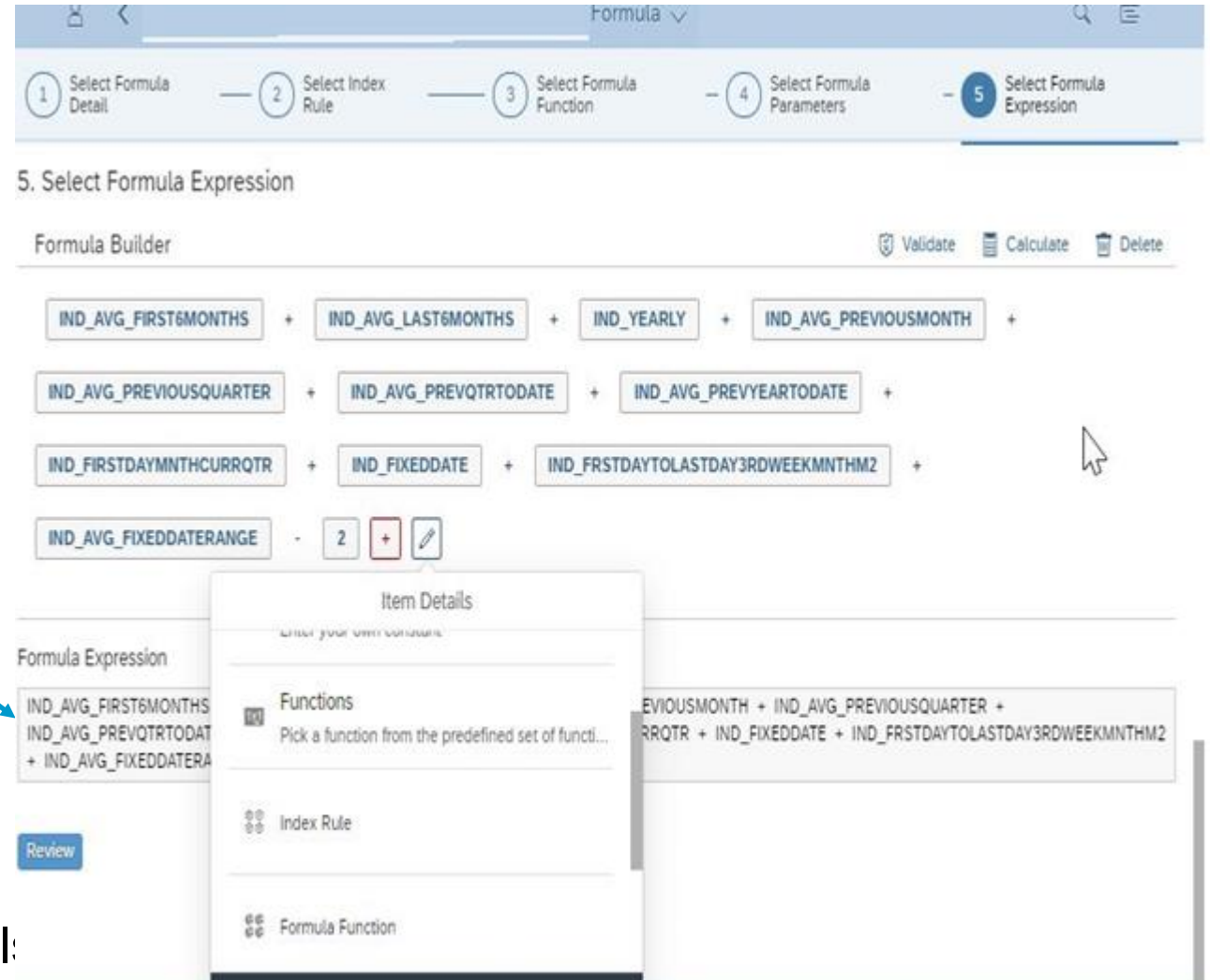
Method	Level	Visibility
IF_SADL_EXIT_CALC_ELEMENT_READ~GET_CALCULATION_INFO	Instance Method	Public
IF_SADL_EXIT_CALC_ELEMENT_READ~CALCULATE	Instance Method	Public
IF_SADL_EXIT_FILTER_TRANSFORM~MAP_ATOM	Instance Method	Public

# Apps utilized New controls

## Transactional Apps → Wizard → Calculator Builder

### New controls

- Card
- **Calculation Builder**  
(Helped us a lot to meet our custom functionality 😊)
- Code Editor
- Colour Palette
- CSS Grid
- Micro Process Flow
- Network Graph
- Single Planning Calendar
- Status Indicator
- T Account
- Lots more!



<https://sapui5.hana.ondemand.com/#/controls>

# Fiori Elements – SAP Standard Apps Extension use cases scenarios

SAP Standard Fiori Elements based List Report extension with additional Custom fields.

## Business Scenario

We had extended few SAP Standard Fiori Element apps with additional fields.

## Development Overview

- Identify the SAP Standard OData Service and **Top Level Consumption CDS**.
- Extend CDS with additional fields and annotations.
- Orica had extended few SAP Standard Fiori Element apps with additional fields.
- Remember to use associations instead of normal joins 😊
- Refer my [blog](#) for the Technical Details:

Standard \* ▾

\*Ledger: OL (Leading Ledger (IFRS)) Company Code: 1066 (Orica Japan Co Ltd) GL Account: 100000 (Cash On Hands) Status: All Items

Line Items (1) Standard \* ▾

Network...	Notification	Object CL...	O...	Offset GL Description in Foreign Lang	Offsetting Account	Offsetting Acct Name
Company Code: 1066 - Orica Japan Co Ltd						
GL Account: 100000 - Cash On Hands						
				奥村ロイヤリティ - 会社間	Acc Royalties - ICo (118000)	Acc Royalties - ICo

```
@DataCatalog:sqlviewAppendName: ZE_JOURNENTEXTTEXT
@EndUserText.label: 'Extension For C_JournalEntryItemBrowser'
extend view C_JournalEntryItemBrowser with ZE_JournalEntryItemBrowser
association[0..1] to ZI_GLAccountTextInCompanyCode as GLTextinCompanyCode on P_Jourr
P_Jourr
P_Jourr

association[0..1] to ZI_GLAccountTextInCompanyCode as _OFFSETGLTextinCompanyCode on F
P_Jourr
P_Jourr

{
  @EndUserText.label: 'GL Description in Foreign Language'
  _GLTextinCompanyCode.GLAccountTextCompanyCode as GLDescriptionForeign

  @EndUserText.label: 'OffSet G/L Description in Foreign Lang'
  _OFFSETGLTextinCompanyCode.GLAccountTextCompanyCode as OFFSETGLDescriptionForeign
```

# **Standard APPS Extension: Business Scenarios**

# Fiori Elements – SAP Standard Apps Extension use cases scenarios

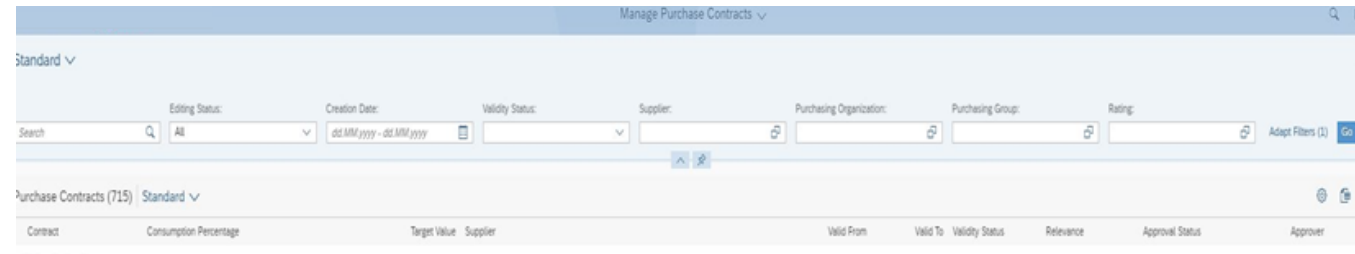
## Fiori Elements : Extension using KUE with CDS extensions

### Business Scenario :

- Orica needs to hide few actions / Edit / Delete/ other actions from Manage Purchase contracts.
- Contracts will be created via other interfaces so not allowed to change via Fiori App.
- Add some custom fields in Object Page.

### Technical Explanations

- Utilizing Key User extensibility with CDS Extension( in case any additional Fields)
- Assigned security Role  
SAP\_UI\_FLEX\_KEY\_USER
- Refer my [blog](#) for the Technical Details:



Standard Actions are Hidden via KUE



# Fiori Elements – SAP Standard Apps Extension use cases scenarios

## Business Scenario :

- Needs to Extend Standard value help with additional input criteria.
- Extend Manage Purchase Order , Supplier value help with additional input criteria as Partner Functions.

## Technical Explanations

- Identify the CDS associated for the supplier value help.
- Extend with additional with association of other CDS which brings data for the Partner Function.

```
2 @EndUserText.label: 'Extend Supplier value help'
3 extend view C_MM_SupplierValueHelp with ZE_C_MM_SUPPLIERVALUEHELP
4 association[1..1] to I_SupplierPartnerFunc as _PartnerFunc on _PartnerFunc.Supplier = $projection.Supplier
5
6 {
7
8 @EndUserText.label: 'Partner Function'
9 _PartnerFunc.PartnerFunction,
10 @EndUserText.label: 'Account Group'
11 Supplier.SupplierAccountGroup as AccountGroup
```

## Business Requirement

Business needs value help inside value help.  
Not available in Standard Apps.

We are currently achieving it in Custom Apps.  
Refer my [Blog](#) for this POC.

The screenshot shows the 'Manage Purchase Order' app interface. The 'SELECT FROM LIST' tab is selected, and the 'DEFINE CONDITIONS' section is active. It contains a search bar and several input fields for filtering: Vendor, Company Code, Name of Supplier, Country Key, City, Postal Code, Region, Partner Function, and Account Group. The 'Partner Function' and 'Account Group' fields are highlighted with a green box, and a blue arrow points from the 'Account Group' field in the code snippet above to this box. Below the input fields is a table with columns: Vendor, Comp..., Name of Supplier, Cou..., City, Postal Code, Regl..., and Pa...

# Fiori Elements – SAP Standard Apps Extension use cases scenarios

## Business Scenario :

- Needs to include Export Excel functionality enabled for the Find Maintenance Notification Fiori Elements based apps.

## Technical Explanations

- Achieved via Run time UI Adaptation Project
- Refer Jocelyn Dart [Blog](#) on further technical detail.



Thank you

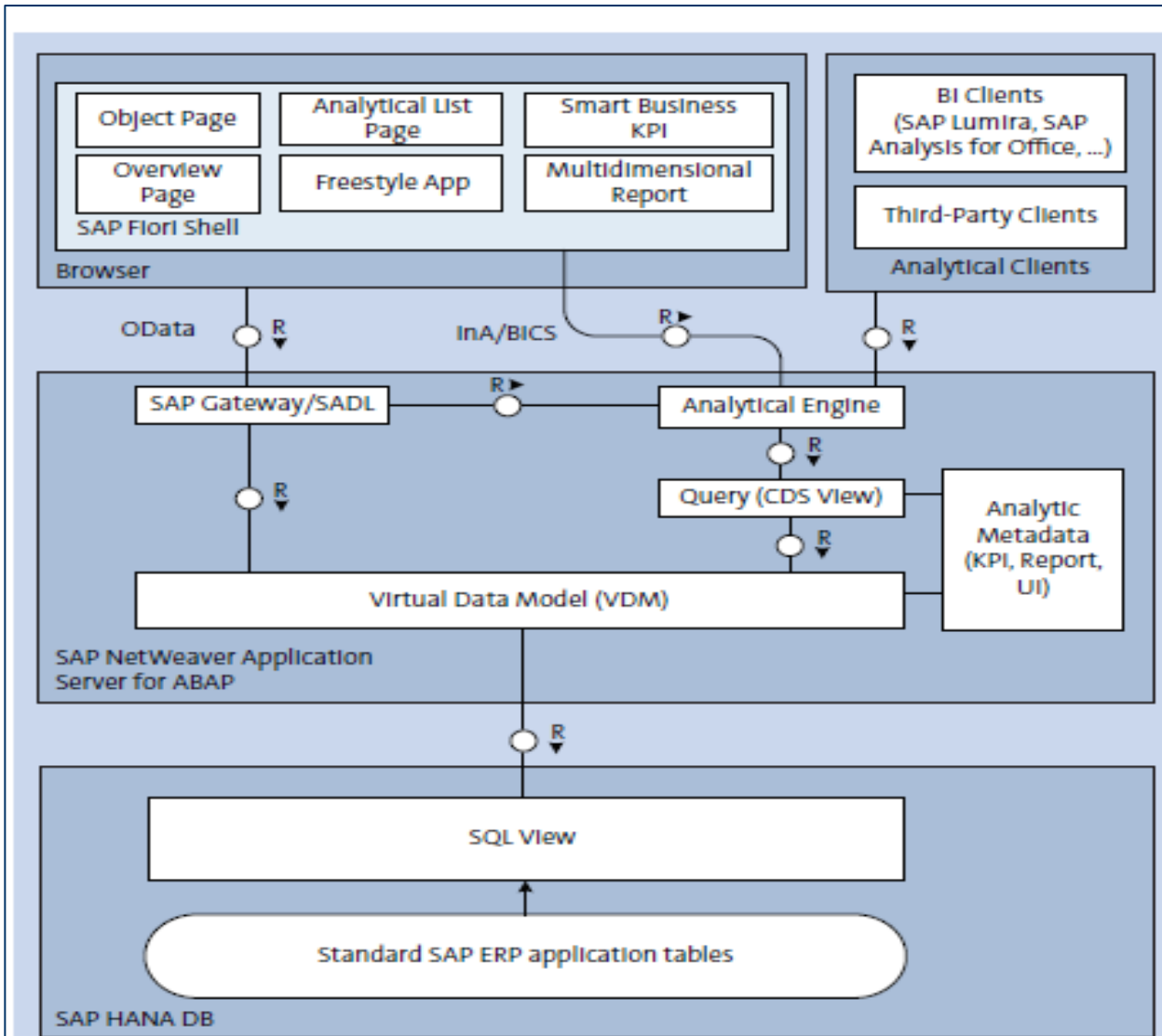
### **Contact details**

#### **Mohit Bansal**

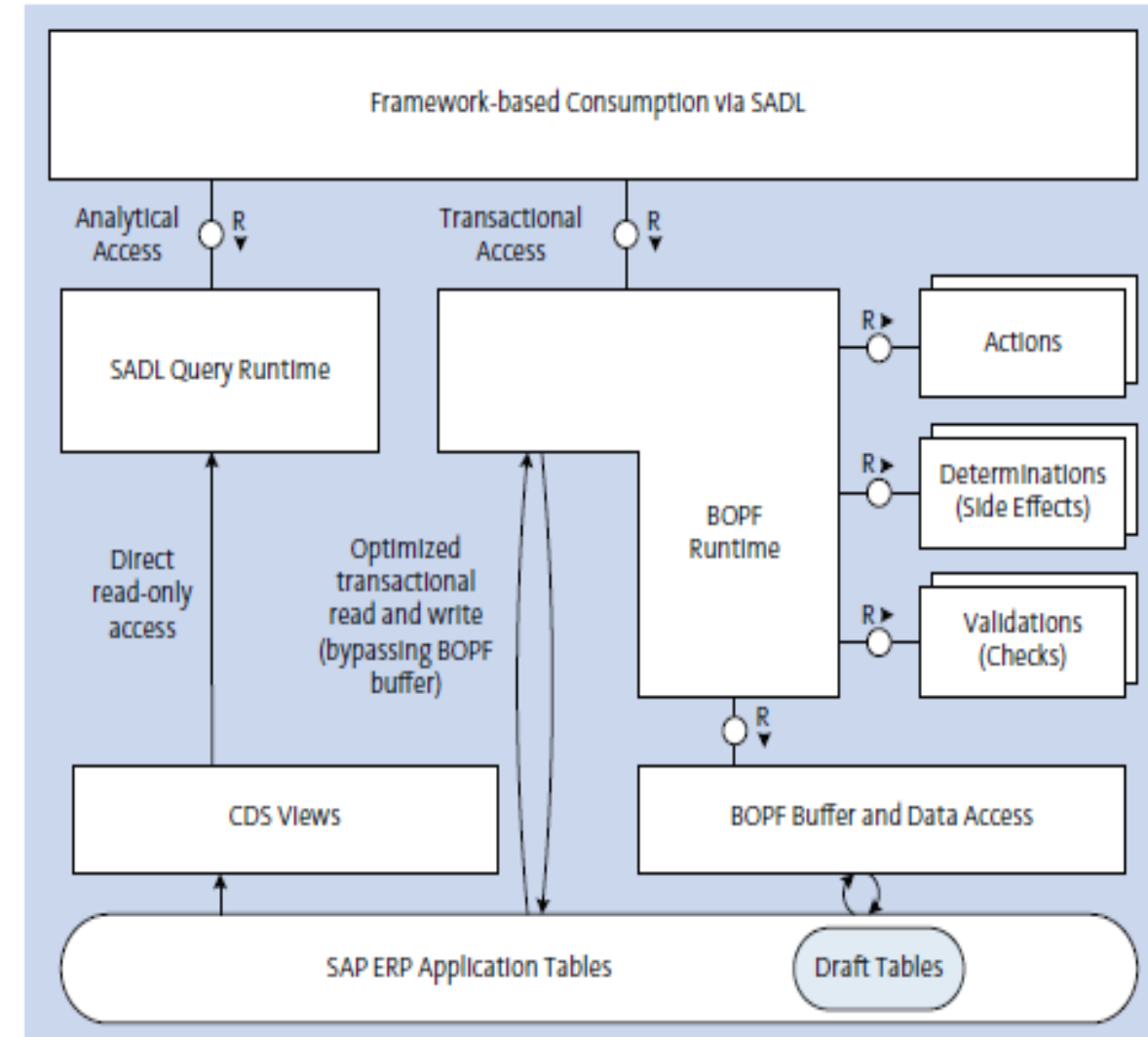
- Email – [mohithmbansal@gmail.com](mailto:mohithmbansal@gmail.com)
- Mobile Number + 65-91573959
- LinkedIn :
  - <https://www.linkedin.com/in/mohit-bansal-430a8218/>
- SDN Blogs:  
<https://people.sap.com/mohit.bansal3#content>

# Appendix

# SAP S/4HANA Architecture & VDM Models Designing Overview



Analytical Apps Development



Transactional Apps Development