Ten tips from using the ABAP Programming Model for SAP Fiori on AnyDB

DX134

John Patterson | @jasper_07

Our Fiori adoption

Costing too much

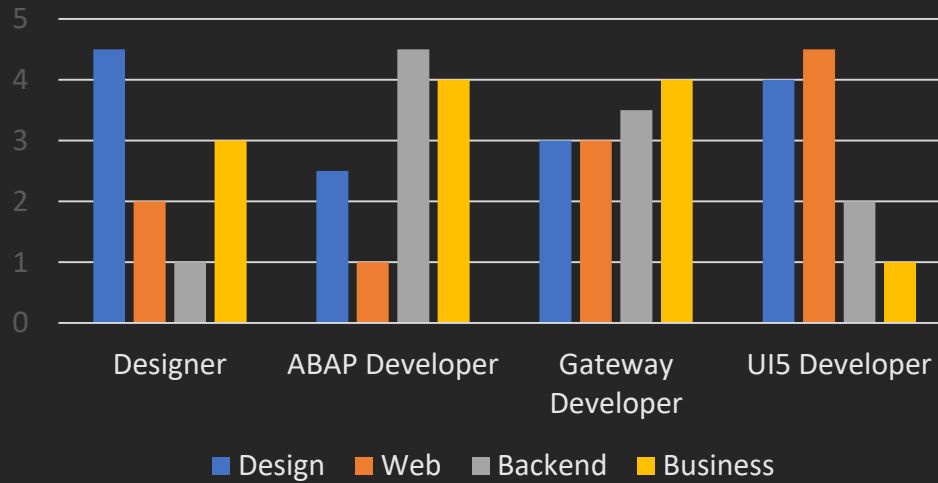Taking too long

Hard to find resources

Can't keep up with demand
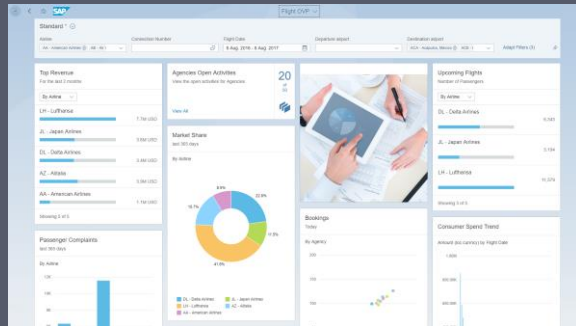
Need more developers to upskill

You go to war with the developers you have

My Team

Fiori Elements

Metadata-Driven Uis based on CDS Annotations

Overview Page

List Report

Object Page

The Fiori Triangle

Scope

Fiori
Elements

Fiori Elements +
Breakouts

Freestyle SAPUI5 apps

Efficiency

Resources

Time

Flexibility

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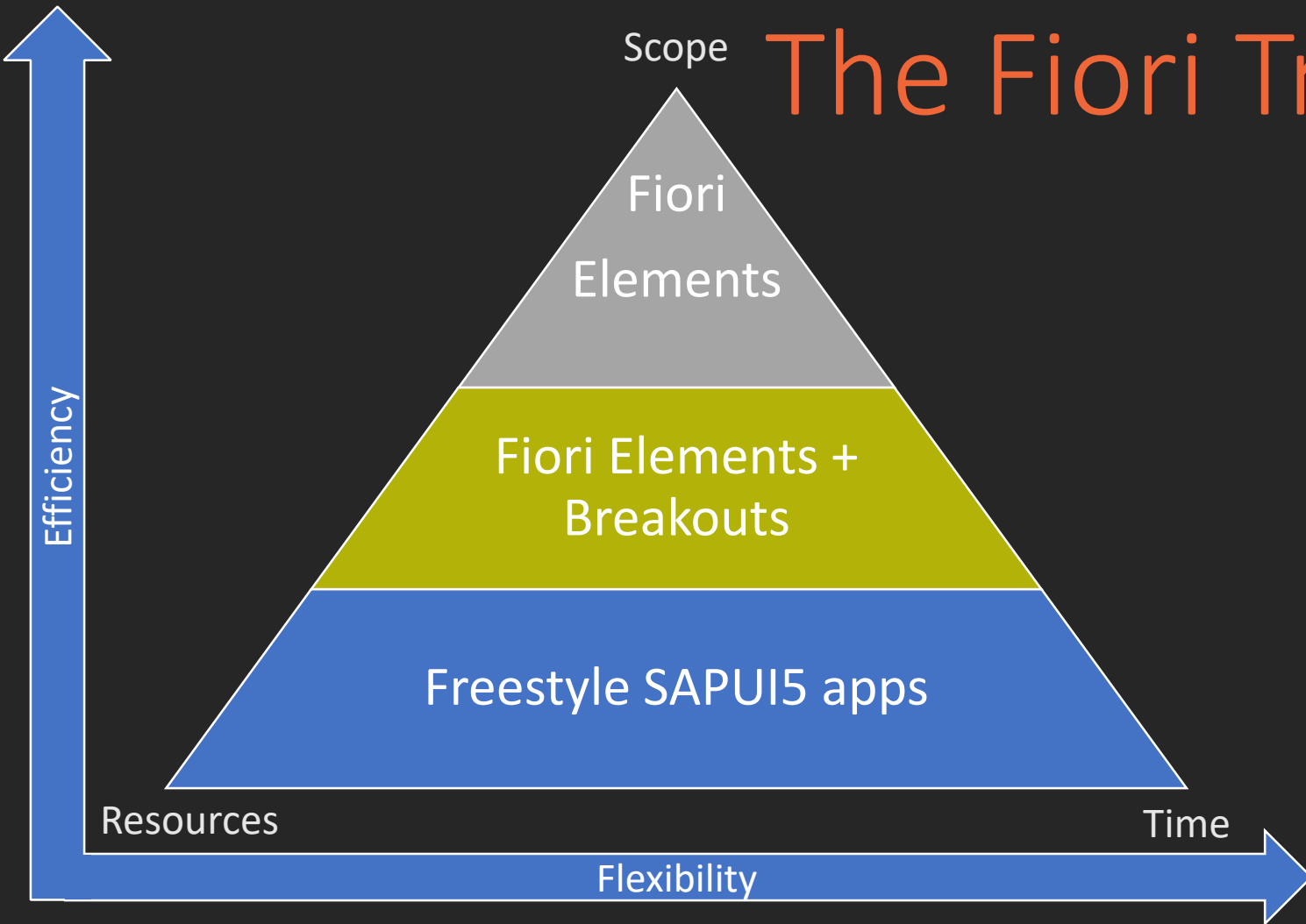
Limitations

CDS on AnyDB

- Performance issues
- No Fuzzy search
- Work arounds

Fiori Elements

- Steeper than expected learning curve
- WebIDE wizard missing key features
- Breakouts very restricted Extension API

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Get access to a system with examples

1

Working examples really reduce the learning curve

Solutions

Solutions : Filtered (12 of 75)

View: | All Solutions ▾ | S/4HANA

Name	Available In	Status	Operations
SAP S/4HANA, on-premise edition 1610 FPS01 TRIAL SAP SE | Jun 14, 2017	Amazon Web Services, Microsoft Azure, Microsoft Azure (Classic)	● Available	Create Instance	›
SAP S/4HANA Chemicals trial with industry best practices 1610 TRIAL SAP SE | May 25, 2017	Amazon Web Services, Microsoft Azure, Microsoft Azure (Classic)	● Available	Create Instance	›
<mark>SAP S/4HANA 1610 FPS01, Fully-Activated Appliance</mark> TRIAL SAP SE | May 22, 2017	Amazon Web Services, Microsoft Azure, Microsoft Azure (Classic)	● Available	Create Instance	›
SAP Model Company for Subscription Billing MC SAP SE | May 19, 2017	Amazon Web Services, Microsoft Azure (Classic), Microsoft Azure	● Available	Create Instance	›
SAP Solution Manager 7.2 & Focused Solutions Demo System with SAP S/4HANA TRIAL SAP SE | Mar 31, 2017	Amazon Web Services	● Available	Create Instance	›
SAP Model Company for Connected Manufacturing MC SAP SE | Mar 6, 2017	Amazon Web Services, Microsoft Azure, Microsoft Azure (Classic)	● Available	Create Instance	›
SAP Solution Manager 7.2 SPS03 for the Design and Build in Your S/4HANA Planning Phase TRIAL SAP SE | Jan 9, 2017	Amazon Web Services, Microsoft Azure, Microsoft Azure (Classic)	● Available	Create Instance	›
SAP S/4HANA 1610, Fully-Activated Appliance TRIAL SAP SE | Dec 22, 2016	Amazon Web Services, Microsoft Azure (Classic), Microsoft Azure	● Available	Create Instance	›
SAP S/4HANA 1610 TRIAL SAP SE | Nov 1, 2016	Amazon Web Services, Microsoft Azure, Microsoft Azure (Classic)	● Available	Create Instance	›
SAP S/4HANA, on premise edition 1511 FPS01 Fully-Activated TRIAL SAP SE | Apr 1, 2016	Amazon Web Services, Microsoft Azure, Microsoft Azure (Classic)	● Available	Create Instance	›
SAP NetWeaver AS Java 7.5 on SAP ASE 16.0 TRIAL	Amazon Web Services, Microsoft Azure (Classic), Microsoft Azure	● Available	Create Instance	

Support

Links

Start building up your own library of examples

2

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Generating OData Services

1	**2**	**3**
Via CDS Annotation @OData.publish	Via SEGW using CDS Referenced Data Source	Via SEGW using Mapped Data Source
EXPOSE	ENRICH	ENHANCE

When to use @OData.publish?

3

Generates a single root entity with associations. Ideal for List Report and Object Page

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Structure CDS views like SAP

4

Fiori UI

HTTPS

OData Service

Consumption Views — Domain specific views
Help define end user layouts

Interface Views — Definition of core entities
Simple projection of DB table
Exposure of all business data

Private Views — Technical helper views
Not part of the public/external interface

Physical Tables

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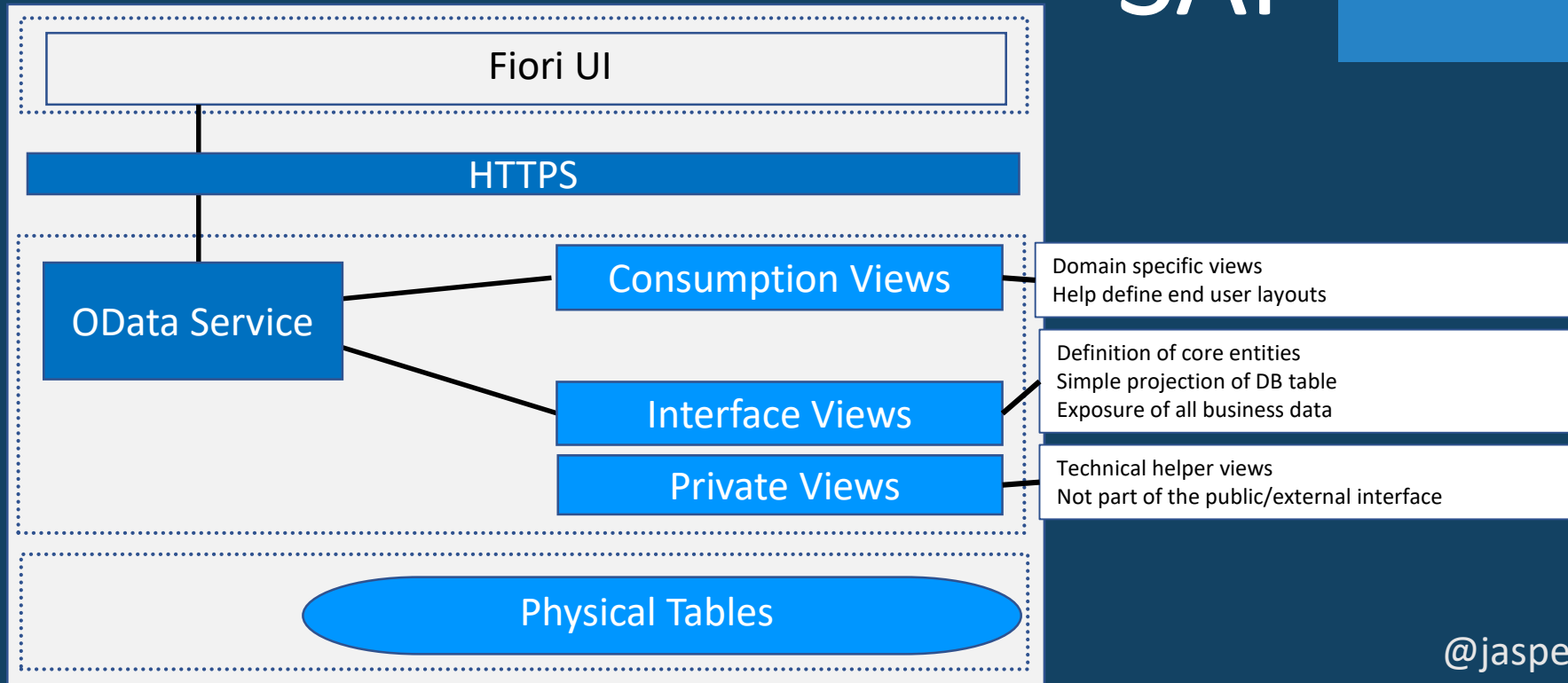
Views on Views

Consumption View "C"

Private View "P"

Interface View "I"

Database table

SQL Dependency Tree

SQL Name	Relation	Type	Entity Name
CMMPURGRPANA		CDS View	C_PurchasingGroupAnalysis
PMMPURGRPAN3	from	CDS View	P_PurchasingGroupAnalysis3
PMMPURGRPAN1	from	CDS View	P_PurchasingGroupAnalysis1
IMMPURGDOCITEM	from	CDS View	I_PurchasingDocumentItem
EKPO	from	Table	
IMMPURCHASINGDOC	left outer join	CDS View	I_PurchasingDocument
EKKO	from	Table	
IMMPURCHASINGDOC	inner join	CDS View	I_PurchasingDocument
EKKO	from	Table	
PMMRELDATES	inner join	CDS View	P_RelevantDates
PMMCALENDATE	from	CDS View	P_CalendarDate
ICALENDARDATE	from	CDS View	I_CalendarDate
SCAL_TT_DATE	from	Table	
PPURORDHISDETAIL	left outer join	CDS View	P_PurchaseOrderHistoryDetail
PMMPURGRPAN2	from	CDS View	P_PurchasingGroupAnalysis2

Find

Open SQL vs Native SQL

5

Analyze how CDS on HANA works to bridge the gaps in AnyDB

Aggregate Example

Open SQL will want to 'group by' all non-aggregate fields = SELECT fields + the KEY fields

That doesn't work!! KEY is unique

Trick don't use KEY fields, let CDS populate a locally generated KEY

Learnt from observing HANA XS and Analytical views

```
define view Zc_Te_Abooking as select from Zi_Te_Bookings as book
 association [1] to Zc_Te_Agency as _Agency on $projection.AgencyNumber = _Agency.AgencyNumber
 association [1] to Zi_Te_Carrier as _Carrier on $projection.CarrierId = _Carrier.CarrierId
 association [1] to Zi_Te_Connection as _Connection on $projection.CarrierId = _Connection.Ca
                                        and $projection.ConnectionId = _Connection.
{
    @Search.defaultSearchElement: true
    book.CarrierId,
    book.ConnectionId,
    @UI.lineItem: [{position:10,qualifier:'Carrier', importance:#HIGH}]
    _Carrier.Name as CarrierName,

    book.FlightDate,
    book.BookId,
    @Semantics.currencyCode: true
    cast( 'USD' as abap.cuky ) as Currency,
    @UI.lineItem: [{position:20,qualifier:'Carrier', importance:#HIGH, type: #AS_DATAPOINT },
    @DefaultAggregation: #SUM
    book.LocalCurrencyAmount as Amount,
    book.AgencyNumber,
    @UI.lineItem: [{position:10,qualifier:'Agency', importance:#HIGH}]
    coalesce( _Agency.AgencyName, 'Internet Booking' ) as AgencyName,
    @DefaultAggregation: #COUNT
    cast(0 as abap.int4) as NumberOfItems,
    _Connection.AirportFrom,
    _Connection.AirportTo,
    _Connection,
    _Agency
}
```

Automagic KEY

```xml
▼<EntityType Name="Zc_Te_AbookingType" sap:label="Analytics on Booking" sap:semantics="aggregate" sap:content-version="1">
  ▼<Key>
     <PropertyRef Name="ID"/>
  </Key>
  <Property Name="ID" Type="Edm.String" Nullable="false" sap:creatable="false" sap:updatable="false" sap:sortable="false" sap:filterable="false"/>
  <Property Name="CarrierId" Type="Edm.String" MaxLength="3" sap:aggregation-role="dimension" sap:display-format="UpperCase" sap:label="Airline"/>
  <Property Name="NumberOfItems" Type="Edm.Int32" sap:aggregation-role="measure"/>
  <Property Name="AirportFrom" Type="Edm.String" MaxLength="3" sap:aggregation-role="dimension" sap:display-format="UpperCase" sap:label="Departure
```

Zc_Te_Abooking?$top=5&$orderby=Amount desc&$select=CarrierName,Currency,Amount

```
{
  - d: {
      __count: "8",
    - results: [
        - {
          - __metadata: {
              id: http://vhcalnplci.dummy.nodomain:8000/sap/opu/odata/sap/ZTE_FLIGHT_OVP_SRV/Zc_Te_Abooking('-.-.-.-.-.-.23.-.3.-._.SQ%20-%20Singapore%20AirlinesUSD'),
              uri: http://vhcalnplci.dummy.nodomain:8000/sap/opu/odata/sap/ZTE_FLIGHT_OVP_SRV/Zc_Te_Abooking('-.-.-.-.-.-.23.-.3.-._.SQ%20-%20Singapore%20AirlinesUSD'),
              type: "ZTE_FLIGHT_OVP_SRV.Zc_Te_AbookingType"
          },
          CarrierName: "SQ - Singapore Airlines",
          Currency: "USD",
          Amount: "25604007.50"
        },
```
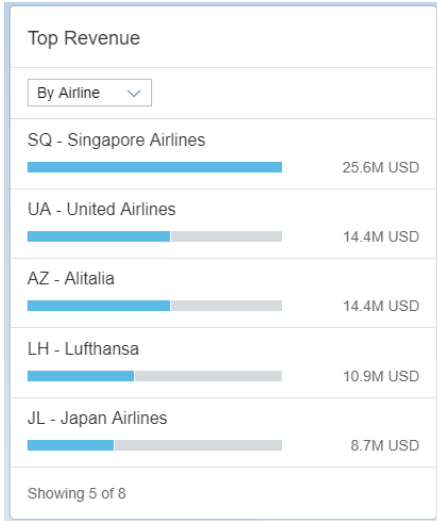
Simple Effective and Reusable

When to use SEGW & CDS Reference?

6

Need multiple root entities, like an OVP or need to add additional metadata, enrich query results or mix CDS with classic Gateway

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Enrich returned values

```abap
CL_EPM_REF_APPS_SHOP_DPC_EXT

256⊖  METHOD images_get_entity.
257     super->images_get_entity(
258       EXPORTING
259         iv_entity_name            = iv_entity_name
260         iv_entity_set_name        = iv_entity_set_name
261         iv_source_name            = iv_source_name
262         it_key_tab                = it_key_tab
263         io_request_object         = io_request_object
264         io_tech_request_context   = io_tech_request_context
265         it_navigation_path        = it_navigation_path
266       IMPORTING
267         er_entity                 = er_entity
268         es_response_context       = es_response_context
269     ).
270
271     DATA(lt_entityset) = VALUE cl_sepmra_shop=>tt_productimage( ( CORRESPONDING #( er_entity ) ) ).
272
273     _shop_facade->image_enrich_transient_values( CHANGING ct_image = lt_entityset ).
274
275     er_entity = lt_entityset[ 1 ].
276   ENDMETHOD.
277
```

Know your Smart Controls

SAP Fiori Design Guidelines

Search 🔍

UI Elements › Filter › Filter Bar / Smart Filter Bar › Smart Filter Bar Annotations

Updated: November 11, 2016

Smart Filter Bar Annotations

Latest SAPUI5 Version
1.46 ⌄

Intro   Usage   Components   Data Types   Properties   Resources

Intro

ℹ️ Information   This article is intended as an aid to designers and developers who want to explore the detail configuration options available for the smart filter bar.

The smart filter bar is a wrapper that analyzes a given OData service and renders a filter bar based on the content defined by the service. For example, the OData service determines whether a field is visible on the filter bar, and whether it supports type-ahead and value help. To configure more settings or overwrite the settings from the OData service, the developer can set additional annotations in an external document (metadata.xml).

Smart Control Example

1. Smart Filter Bar
2. Multi Select Fixed Value
3. Interval value

Smart Control Example

```
</EntityType>
<EntityType Name="Zc_Te_Flight_FilterType" sap:label="Filter for OVP" sap:content-version="1">
  <Key>
    <PropertyRef Name="CarrierId"/>
    <PropertyRef Name="ConnectionId"/>
    <PropertyRef Name="FlightDate"/>
  </Key>
  <Property Name="CarrierId" Type="Edm.String" Nullable="false" MaxLength="3" sap:display-format="UpperCase" sap:filter-restriction="multi-value" sap:label="Airline" sap:value-list="fixed-values"/>
  <Property Name="ConnectionId" Type="Edm.String" Nullable="false" MaxLength="4" sap:display-format="NonNegative" sap:label="Connection Number"/>
  <Property Name="FlightDate" Type="Edm.DateTime" Nullable="false" Precision="0" sap:display-format="Date" sap:filter-restriction="interval" sap:label="Flight Date"/>
```

1   **2**

3

```
> C ZCL_ZTE_FLIGHT_MPC_EXT >

66    METHOD add_interval_filter.
67      create_annotation( iv_entity_type = iv_entity_type iv_property = iv_property )->add( iv_key   = /iwbep/if_ana_odata_types=>gcs_ana_odata_annotation_key-filter_restriction
68                                                                                           iv_value = /iwbep/if_ana_odata_types=>gcs_ana_odata_annotation_value-filter-interval ).
69    ENDMETHOD.
70
71    METHOD create_annotation.
72      ro_annotation = model->get_entity_type( |{ iv_entity_type }| )->get_property( |{ iv_property }| )->/iwbep/if_mgw_odata_annotatabl~create_annotation(
73        iv_annotation_namespace = /iwbep/if_mgw_med_odata_types=>gc_sap_namespace ).
74    ENDMETHOD.
75
76    METHOD define.
77      super->define( ).
78
79      "set flight date as an interval
80      add_interval_filter( EXPORTING iv_entity_type = gc_zc_te_flighttype iv_property = 'FlightDate' ).
81
82      "set carrier as a multi select static value list
83      add_multi_value_filter( EXPORTING iv_entity_type = gc_zc_te_flighttype iv_property  = 'CarrierId' ).
84      model->get_entity_type( gc_zc_te_flighttype )->get_property( 'CarrierId' )->set_value_list( /iwbep/if_mgw_odata_property=>gcs_value_list_type_property-fixed_values ).
85      add_text_property( EXPORTING iv_entity_type = gc_zc_te_flighttype iv_property = 'CarrierId'  iv_text_property = 'to_Carrier/Name' ).
86
87
```

3

1   **2**

When to use SEGW & Mapped data source?

More complex scenarios, you want to dynamically change the behavior or inject additional logic into a query

Query Options

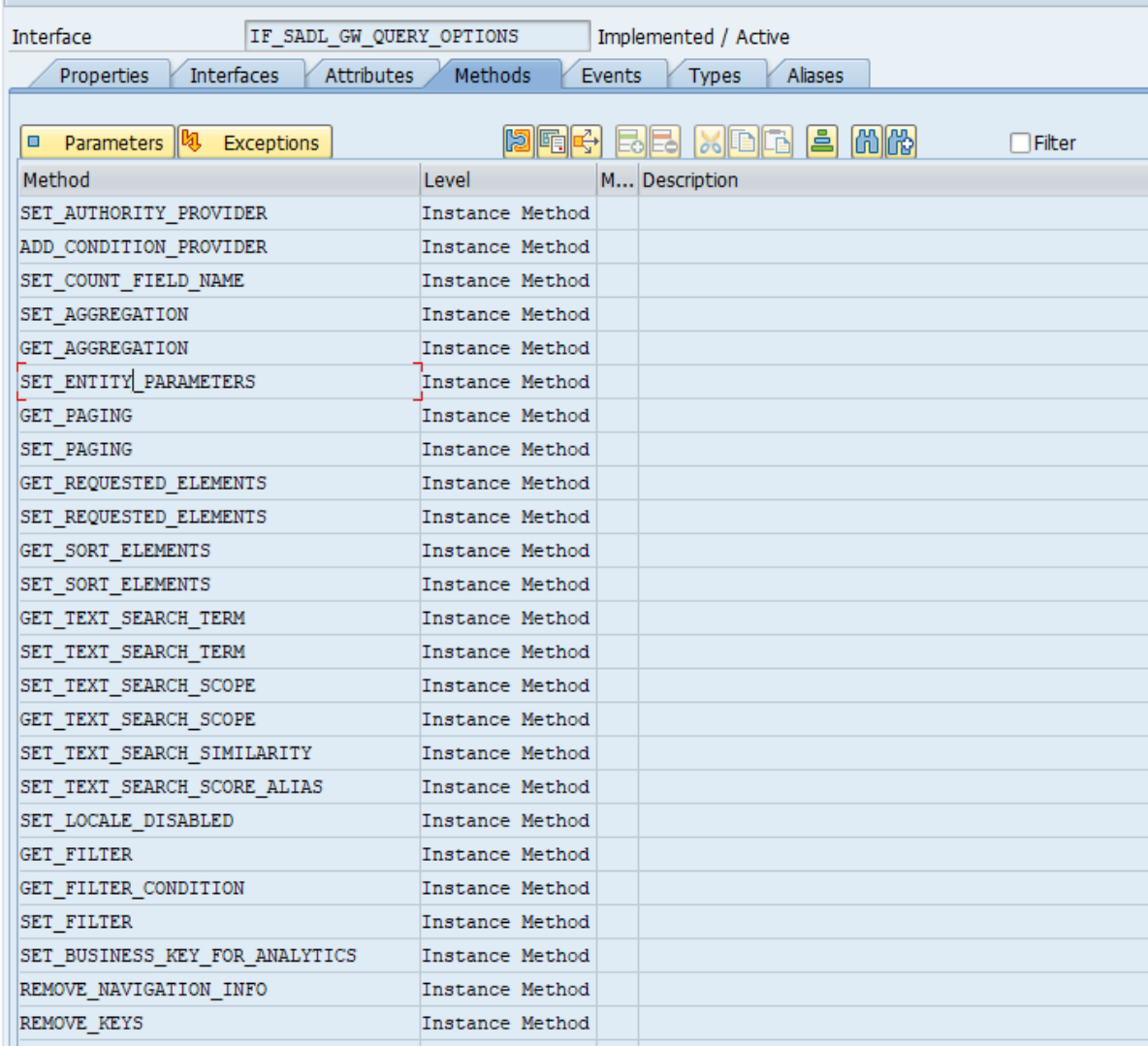Set search fields

Add additional sort criteria

Define additional field selection

Add additional filter criteria

Define aggregates and groups

Set parameters

Change navigation behavior

Interface	IF_SADL_GW_QUERY_OPTIONS	Implemented / Active

Properties	Interfaces	Attributes	Methods	Events	Types	Aliases

| ■ Parameters | Exceptions | | | | | ☐ Filter |

Method	Level	M...	Description
SET_AUTHORITY_PROVIDER	Instance Method		
ADD_CONDITION_PROVIDER	Instance Method		
SET_COUNT_FIELD_NAME	Instance Method		
SET_AGGREGATION	Instance Method		
GET_AGGREGATION	Instance Method		
SET_ENTITY_PARAMETERS	Instance Method		
GET_PAGING	Instance Method		
SET_PAGING	Instance Method		
GET_REQUESTED_ELEMENTS	Instance Method		
SET_REQUESTED_ELEMENTS	Instance Method		
GET_SORT_ELEMENTS	Instance Method		
SET_SORT_ELEMENTS	Instance Method		
GET_TEXT_SEARCH_TERM	Instance Method		
SET_TEXT_SEARCH_TERM	Instance Method		
SET_TEXT_SEARCH_SCOPE	Instance Method		
GET_TEXT_SEARCH_SCOPE	Instance Method		
SET_TEXT_SEARCH_SIMILARITY	Instance Method		
SET_TEXT_SEARCH_SCORE_ALIAS	Instance Method		
SET_LOCALE_DISABLED	Instance Method		
GET_FILTER	Instance Method		
GET_FILTER_CONDITION	Instance Method		
SET_FILTER	Instance Method		
SET_BUSINESS_KEY_FOR_ANALYTICS	Instance Method		
REMOVE_NAVIGATION_INFO	Instance Method		
REMOVE_KEYS	Instance Method		

Query Options Example

```abap
18
19⊖ CLASS ZCL_ZCDS_SADL_TEST2_DPC_EXT IMPLEMENTATION.
20
21
22⊖   METHOD if_sadl_gw_query_control~set_query_options.
23
24      "add additional filter
25      io_query_options->get_filter_condition( IMPORTING et_filter_condition = DATA(lt_filter_condition) ).
26      APPEND VALUE #( element = 'PROCESSED' operator = 'EQ' low = abap_false ) TO lt_filter_condition.
27⊖     IF lines( lt_filter_condition ) > 1.
28        APPEND VALUE #( operator = 'AND' ) TO lt_filter_condition.
29      ENDIF.
30      io_query_options->set_filter( it_filter_condition = lt_filter_condition ).
31
32      "add additional fields to be selected
33      io_query_options->get_requested_elements( IMPORTING et_elements = DATA(lt_requested_elements) ).
34      APPEND 'PRODUCT_ID' TO  lt_requested_elements.
35      io_query_options->set_requested_elements( lt_requested_elements ).
36
37      "set STATUS and CURRECNY_CODE parameters
38      DATA(lt_parameters) = VALUE if_sadl_public_types=>tt_entity_parameters( (
39          entity_alias = 'SalesOrderHeaders'
40          parameters = VALUE #( ( name = 'CURRENCY_CODE' value = 'AUD' ) ( name = 'STATUS' value = 'APPROVED' ) )
41      ) ).
42      io_query_options->set_entity_parameters( lt_parameters ).
43
44      super->if_sadl_gw_query_control~set_query_options( iv_entity_set = iv_entity_set io_query_options = io_query_options ).
45
46    ENDMETHOD.
47
```

Breakout 9

Good examples hidden in the SAPUI5 SDK, WebIDE wizard has limitations, know when to walk away

Breakout Example

File tree (left panel):

- sdk
  - 1.46.9
  - test-resources
    - sap
      - suite
        - ui
          - commons
          - generic
            - template
              - demokit
                - reuselib
                - sample.analytical.list.page
                - sample.analytical.list.page.with.params
                - sample.manage.products
                - sample.nondraft.sales.orders
                - sample.sales.orders
                - sample.stta.manage.products
                  - webapp
                    - annotations
                    - changes
                    - ext
                      - controller
                        - ComplexTableExtension.controller.js
                        - DetailsExtension.controller.js
                        - ListReportExtension.controller.js
                      - fragments
                    - i18n
                    - localService
                    - test
                    - WEB-INF
                    - Component.js
                    - manifest.json
                  - neo-app.json

Code (right panel):

```javascript
sap.ui.controller("STTA_MP.ext.controller.ListReportExtension", {

    onInitSmartFilterBarExtension: function() {
        // the custom field in the filter bar might have to be
        // bound to a custom data model
        // if a value change in the field shall trigger a follow
        // up action, this method is the place to define and
        // bind an event handler to the field
    },

    onListNavigationExtension: function(oEvent) {
        var oNavigationController = this.extensionAPI.getNavigationController();
        var oBindingContext = oEvent.getSource().getBindingContext();
        var oObject = oBindingContext.getObject();

        // for  laser printers  we trigger external navigation for all others we
        if (oObject.ProductCategory == "Laser Printers") {
            oNavigationController.navigateExternal("EPMProductManageSt");
        } else {
            // return false to trigger the default internal navigation
            return false;
        }
        // return true is necessary to prevent further default navigation
        return true;
    },

    onBeforeRebindTableExtension: function(oEvent) {
        // usually the value of the custom field should have an
        // effect on the selected data in the table. So this is
        // the place to add a binding parameter depending on the
        // value in the custom field.
        var oBindingParams = oEvent.getParameter("bindingParams");
        oBindingParams.parameters = oBindingParams.parameters || {};
```

Fiori Elements and Build.me

Great for rapid prototyping Fiori Elements, but don't assume the generated code is reusable

Takeaways

1 One size doesn't fit all

2 Fiori Elements can be used to help solve scaling problems

3 Need to find examples and create own examples

Give something back to the community

FEEDBACK

Please complete a session evaluation for this session!

DX134

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SAP TECHED

Links

Code from talk - github.com/jasper07/Teched17

SAPUI5 SDK - Fiori Elements Reference Apps

Fiori Design Guidelines - Smart Table

Generating an OData Service Based on a CDS View

Fine-Tuning the Execution of SADL-Based Gateway Services

The Semantically Rich Data Model – An ABAP based CDS Views example

My CDS view self study tutorial