

Navigating the Clean Core Journey at SBB

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Agenda.

- About SBB and S/4 journey
- Looking Back and Planning Next Steps
- Fiori Low Code extension
- ABAP Cloud model and Three Tier extensibility
- Released Objects Dilemma
- Wrapper – The chosen ones



About SBB



1.39 million passengers per day



93.2% punctuality for passenger trains



3,266 km of managed routes



11,569 trains on the network per day



801 station and stops for passenger transport



170,000 net tons of freight traffic per day



1,655 GWh traction power consumption

SBB S/4 HANA transformation journey

- Transitioning from SAP ECC to SAP S/4HANA
- Greenfield approach
- Prioritizing a Fiori first user experience and API first principle.










Looking Back and Planning Next Steps



Looking Back 'Maintenance Plan manager'


- Core application, in use for more than 15 years.
- Classical GUI based application.


Mutation - WP für Mehrfachzähler- und Strategiepläne

Menü       


Auswahl Plangruppe

Plangruppe  bis 


Plangruppenzähler bis 


Baugruppe bis 

Verwendung

Wartungsplan  WP suc...

nur für WPs von P-OP

Technischer Platz bis 

Equipment bis 

nur für AMGT

Klasse

Zusatzdaten

Zusatzdaten in ST2 anzeigen ☐ (nicht in ZIR_MR_WMAN2xy gespeicherte)

Anwendungslog (SLG1)

Loglevel Save 4 Objekt: ZIR_MR, Unterobjekt: WMAN

Looking Back 'Maintenance Plan manager'

Mutation - Steuerungstabelle1 des MFZ-Wartungsplanmanagers

Menü

Anzeigen/Ändern

Objektliste

Steuertabelle2 (St2)

Datum setzen (St2)

WP's aktualisieren (St2)

Anzahl Zeilen: 1186

</

Looking Back 'Task List Manager'

- Core application, in use for more than 10 years.
- Webdynpro ABAP based application

PVT - Produktverwaltung

IH Bausteine

Auswählen Aktualisieren Anlegen Neue Version Kopie Anzeigen Ändern Statuswechseln

Auswählen Selektionsvariante: Alle Felder

Zurücksetzen Übernehmen

Kopfdaten

Plangruppe:	<input type="text"/>	Bis	<input type="text"/>	
Plangruppenzähler:	<input type="text"/>	Bis	<input type="text"/>	
Werk:	<input type="text"/>	Bis	<input type="text"/>	
IH Status:	<input type="text"/>	Bis	<input type="text"/>	
Planergruppe:	<input type="text"/>	Bis	<input type="text"/>	
Wartungsstrategie:	<input type="text"/>	Bis	<input type="text"/>	
Bezeichnung Kopf:	<input type="text"/>			
Langtext:	<input type="text"/>	Bis	<input type="text"/>	
Angelegt am:	<input type="text"/>	Bis	<input type="text"/>	
Angelegt von:	<input type="text"/>	Bis	<input type="text"/>	
Geändert am:	<input type="text"/>	Bis	<input type="text"/>	
Geändert von:	<input type="text"/>	Bis	<input type="text"/>	

Positionsdaten

Arbeitsplatz:	<input type="text"/>	Bis	<input type="text"/>	
Werk:	<input type="text"/>	Bis	<input type="text"/>	
Spezialwerkzeug/FHM:	<input type="text"/>	Bis	<input type="text"/>	
Dokumentart:	<input type="text"/>	Bis	<input type="text"/>	
Dokument:	<input type="text"/>	Bis	<input type="text"/>	
Dokumentversion:	<input type="text"/>	Bis	<input type="text"/>	
Teildokument:	<input type="text"/>	Bis	<input type="text"/>	
Bez. Vorgang:	<input type="text"/>			
Geändert am:	<input type="text"/>	Bis	<input type="text"/>	
Geändert von:	<input type="text"/>	Bis	<input type="text"/>	

Merkmale

Merkmal DIN Code:	<input type="text"/>	Bis	<input type="text"/>	
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Looking Back 'Task List Manager'

PVT - Produktverwaltung

IH Bausteine

Grösse anpassen

Kopfdaten

Sicht: * [Standardsicht]
 Druckversion
 Export

M...	A...	Pin...	Plangr.	P..	Zähler	Gültig ab	Änderungsnr.	L...	Angeleg.am	Angelegt von	Geänd.am	Geändert von	Ve...	W...	Status	M...	Pl...	Kurztext Plan	Profil	K...	Strat.
000	000	A	PF000857	2	2	07.12.2017			07.12.2017		08.02.2018		4BA	2...	5				P-APS		
000	000	A	PF000857	3	3	01.02.2018			01.02.2018		08.02.2018		4BA	2...	4				P-APS		
000	000	A	PF000858	1	1	06.03.2017			06.03.2017		06.03.2017		4BA	2...	1				P-APS		
000	000	A	PF000859	1	1	06.03.2017			06.03.2017		06.03.2017		4BA	2...	1				P-APS		
000	000	A	PF000860	1	1	06.03.2017			06.03.2017		24.11.2017		4BA	2...	1				P-APS		
000	000	A	PF000861	1	1	06.03.2017			06.03.2017		24.11.2017		4BA	2...	1				P-APS		
000	000	A	PF000862	1	1	06.03.2017			06.03.2017		24.11.2017		4BA	2...	1				P-APS		
000	000	A	PF000863	1	1	06.03.2017			06.03.2017		08.12.2017		4BA	2...	5				P-APS		
000	000	A	PF000863	2	2	08.12.2017			08.12.2017		08.12.2017		4BA	2...	4				P-APS		
000	000	A	PF000864	1	1	08.03.2017			08.03.2017		29.11.2017		4BA	2...	5				P-APS		

Details

Sicht: [Standardsicht]
 Druckversion
 Export

F...	K...	Prf.Mrk.	Gültig ab	Änderungsnr.	Angeleg.am	Angelegt von	Geänd.am	Geändert von	V...	S...	W...	ViSchl.	Kurztext Vorgang	Vorgangsbeschreibung	Plangruppe des referierten Plans	Plangruppe
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	08.12.2017		08.12.2017		08.12.2017		0...	P...	2...	2103105				

Preparing for the Climb

Change management aspects

- Fiori UX acceptance

Technical aspects

- Low code approach
- Stability across SAP releases.
- Governance, technical debt.



Fiori UX – Mockup for win!

SAP Wartungsplanmanagers Alle Suchen

Standard ▾

Suchen Wartungstyp: Verwendung:

Wartungsplaner

Wartungstyp	Verwendung	Klasse
Wartungstyp ModulaRe M-MR23 (M-MR23)	ModularRE: Fahrzeuge (4MR)	>
Wartungstyp ModulaRe M-MR25 (M-MR25)	ModularRE: Fahrzeuge (4MR)	>
Wartungstyp ModulaRe M-MR28 (M-MR28)	ModularRE: Fahrzeuge (4MR)	>
Wartungstyp ModulaRe M-MR31 (M-MR31)	ModularRE: Fahrzeuge (4MR)	>
Wartungstyp ModulaRe M-MR49 (M-MR49)	ModularRE: Fahrzeuge (4MR)	>
Wartungstyp ModulaRe M-MR86 (M-MR86)	ModularRE: Fahrzeuge (4MR)	>
Wartungstyp ModulaRe M-MR87 (M-MR87)	ModularRE: Fahrzeuge (4MR)	>

SAP Wartungsplanmanagers Alle Suchen Bearbeiten

M-MR23
Wartungstyp ModulaRe M-MR23
Verwendung: ModularRE: Fahrzeuge (4MR)

[Plangruppe](#) [Anwendungsprotokolle](#)

Plangruppe (10) **Standard** ▾ Objectliste Wartungsplan ⚙️ 📄

Plangruppe	PGZ	WP Vorlage	NächstTerm	NächstTerm	Periode	IntAbr	Änderungsnr	>
<input type="checkbox"/> MR201	6	MR Plan, Meldung 10, MFZ WPLA (M-M10-01)	14/01/2024	12:42:41	7 TAG	70 TAG	20240601	>
<input type="checkbox"/> MR203	17	MR Plan, Meldung 10, MFZ WPLA (M-M10-01)	13/01/2024	12:28:22	7 TAG	70 TAG	20240901	>
<input type="checkbox"/> MR300	17	MR Plan, Meldung 10, MFZ WPLA (M-M10-01)	13/01/2024	12:28:39	7 TAG	70 TAG	20240901	>
<input type="checkbox"/> MR301	5	MR Plan, Meldung 10, MFZ WPLA (M-M10-01)	13/01/2024	15:29:03	7 TAG	70 TAG	20240901	>
<input type="checkbox"/> MR320	4	MR Plan, Meldung 10, MFZ WPLA (M-M10-01)	09/02/2024	13:40:28	7 TAG	70 TAG	20241001	>
<input type="checkbox"/> MR321	5	MR Plan, Meldung 10, MFZ WPLA (M-M10-01)	09/02/2024	10:22:42	7 TAG	70 TAG	20241001	>
<input type="checkbox"/> MR322	4	MR Plan, Meldung 10, MFZ WPLA (M-M10-01)	09/02/2024	14:44:46	7 TAG	70 TAG	20241001	>
<input type="checkbox"/> MR330	2	MR Plan, Meldung 10, MFZ WPLA (M-M10-01)	09/02/2024	16:26:08	7 TAG	70 TAG	20241001	>
<input type="checkbox"/> MR340	5	MR Plan, Meldung 10, MFZ WPLA (M-M10-01)	08/02/2025	10:00:26	7 TAG	70 TAG	20250101	>
<input type="checkbox"/> MR341	18	MR Plan, Meldung 10, MFZ WPLA (M-M10-01)	08/02/2025	12:43:07	7 TAG	70 TAG	20250101	>

Fiori UX – Mockup for win!

SAP IH-Plan Alle Suchen

Standard IH-Massnahme IH-Textbaustein

Suchen Suchen IH-Plan: Suchen IH-Planzähler: Suchen Statusbeschreibung: Suchen Angelegt von: Suchen

Angelegt am: Suchen Aktualisierung verfügbar: Suchen Start Filter anpassen

IH-Plan (2) Standard Massenänderung Anlegen Kopieren Suchen

<input type="checkbox"/> IH-Plan	IH-Planzähler	Statusbeschreibung	Angelegt von	Angelegt am
<input type="checkbox"/> Plan_fPA_Fahrschalter Mikroschalter (MR449)	2	Frei verwendbar (FREI)		28.04.2024
<input type="checkbox"/> Plan_MUP_Tausch Scheibenwischerantrieb (MR446)	1	in Arbeit (IARB)		30.04.2024

SAP IH-Plan Alle Suchen

Plan_fPA_Fahrschalter Mikroschalter (MR 449) Bearbeiten Kopieren Status wechseln

Status: Frei verwendbar (FREI) Plangruppenzähler: 2 Sicherheitsrelevant: Ja

Allgemeine Übersicht Anordnungsbeziehungen Komponenten Fertigungshilfsmittel Beziehungswissen Textbausteine Klassifizierung Objektverknüpfungen

Plangruppe: Plan_fPA_Fahrschalter Mikroschalter Werk: Betriebsunterhalt P (2110) Baugruppe: ModulaRe M-MR46 (M-MR46) Änderungskontrolle: Änderungsnummer: 120240423
IH-Planbeschreibung auf Französisch: Plan_fPA_Commuteur de marche Microrupteur IH-Plan für Technischen Platz: - Stichtag: 22.09.2025
IH-Planbeschreibung auf Italienisch: Microinterruttore Plan_fPA_Microswitch
Kommentare zu den Änderungen: new INSPEKTION 1.1 Einklemmschutz: Ausziehkraft

Administrative Informationen

Angelegt am: 08.05.2024 Angelegt von: Geändert am: 08.05.2024 Geändert von:

Vorgangsübersicht

IH-Plan Vorgang Standard Suchen Anlegen Löschen Zuweisen Suchen

<input type="checkbox"/> Vorgangsnummer	Kurztext Vorgang	Arbeit	Dauer normal	Qualifikation	IH-Massnahme
<input type="checkbox"/> 1	ADt1-1 502	120 MIN	120 MIN		-
<input type="checkbox"/> 2	Bit2-7 502	120 MIN	120 MIN		-
<input type="checkbox"/> 10	Fahrschalter	0	0	IH-Qualif. - Drehgestelltausch (QDT-0001)	Zugeordnet
<input type="checkbox"/> 20	Fahrschalter	0	0	IH-Qualif. - Drehgestelltausch (QDT-0001)	Alte Version
<input type="checkbox"/> 30	Fahrschalter	0	0	IH-Qualif. - Drehgestelltausch (QDT-0001)	Alte Version

Architecture decision

Maintenance Task Manager and Maintenance Plan Manager

Target development approach

- Frontend: Low code approach
- Backend: ABAP Cloud model + Three Tier extensibility

Technology stack

- Frontend: Fiori Elements V4 with extensions (Building Blocks)
- Backend: OData V4 using ABAP RAP

Fiori Low code extension

Fiori Elements

SAP Wartungsplanmanager

Standard*

Suchen Bearbeitungsstatus: Wartungstyp: Verwendung: Klasse:

Plangruppe: Wartungsplan Vorlage: Maintenance Plan: Equipment:

Wartungstyp (1)

Wartungstyp	Verwendung	Klasse
<input type="checkbox"/> RM-T46 RM-T46	UH T-Module MFZ RTM	APLA Class R_APLA

SAP Wartungstyp

Maintenance Type **TaskList Usage** **Class**

RM-T46 (RM-T46) UH T-Module MFZ (RTM) APLA Class (R_APLA)

Plan Group Details **Application Log** **Application Log**

Task List Groups **Standard***

Aufgabenlistengruppe	Aufgabenlistengrup...	Vorlage für einen Wartungsplan	Nächster Termin	Nächstes Semester	Zeitraum Laufzeit	Intervall vor Anrufobjektin...	Neue Startmethode	Änderungsni
<input checked="" type="checkbox"/> RPT000	47	1Tag Intervall (RPT000)	12.05.2025	08:06:42	1 STD	1 TAG	Neustart nach Beendigung	
<input checked="" type="checkbox"/> RPT001	76	35 Tage/ (RPT001)	12.05.2025	08:12:12	7 TAG	7 TAG	Neustart nach Beendigung	
<input type="checkbox"/> RPT002	41	35 Tage/ (RPT001)	12.05.2025	08:17:50	7 TAG	7 TAG	Neustart nach Beendigung	
<input type="checkbox"/> RPT200	61	30 Tage Intervall (RPT200)	12.05.2025	08:21:02	7 TAG	7 TAG	Neustart nach Beendigung	
<input type="checkbox"/> RPT205	45	75 Tage Intervall (RPT205)	12.05.2025	08:25:21	7 TAG	15 TAG	Neustart nach Beendigung	
<input type="checkbox"/> RPT207	25	60 Tage Intervall (RPT207)	12.05.2025	08:46:28	7 TAG	15 TAG	Neustart nach Beendigung	
<input type="checkbox"/> RPT221	42	75 Tage Intervall (RPT205)	12.05.2025	08:50:34	7 TAG	15 TAG	Neustart nach Beendigung	

Fiori Elements Building Block

Wartungsplan (46) RSA Activate Deactivate Restart Delete								
<input type="checkbox"/>	Maintenance Plan	Status	Tasklist Grou...	Tasklist Group	Maintenance Type	Usage	Equipment	Functional Location
<input type="checkbox"/>	700000002944	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502005-7
<input type="checkbox"/>	700000002945	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502006-5
<input type="checkbox"/>	700000002946	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502007-3
<input type="checkbox"/>	700000002947	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502008-1
<input type="checkbox"/>	700000002948	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502009-9
<input type="checkbox"/>	700000002949	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502010-7
<input type="checkbox"/>	700000002950	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502011-5
<input type="checkbox"/>	700000002951	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502012-3
<input type="checkbox"/>	700000002952	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502013-1
<input type="checkbox"/>	700000002953	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502014-9
<input type="checkbox"/>	700000002954	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502015-6
<input type="checkbox"/>	700000002955	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502016-4
<input type="checkbox"/>	700000002956	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502017-2
<input type="checkbox"/>	700000002957	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502018-0
<input type="checkbox"/>	700000002958	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502019-8
<input type="checkbox"/>	700000002959	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502020-6
<input type="checkbox"/>	700000002960	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502021-4
<input type="checkbox"/>	700000002961	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502022-2
<input type="checkbox"/>	700000002962	✓ Aktiv (01)	47	RPT000	RM-T46	RTM		94 85 0502023-0
<input type="checkbox"/>	RPT001/76 94 85 0502023-0 (700000002963)	✓ Aktiv (01)	76	RPT001	RM-T46	RTM		94 85 0502001-6

```

<macros:Table
  id="idBBTecObjTable"
  type="GridTable"
  header="{i18n>technicalObjectHeader}"
  headerVisible="true"
  variantManagement="Control"
  filterBar="idTOFilterBar"
  contextPath="/Technicalobject"
  metaPath="/Technicalobject/@com.sap.vocabularies.UI.v1.LineItem"

```


Fiori Elements Building Block UI5 version challenges

class sap.fe.macros.Table

Overview Properties Aggregations Associations **Events** | ▾ Methods | ▾

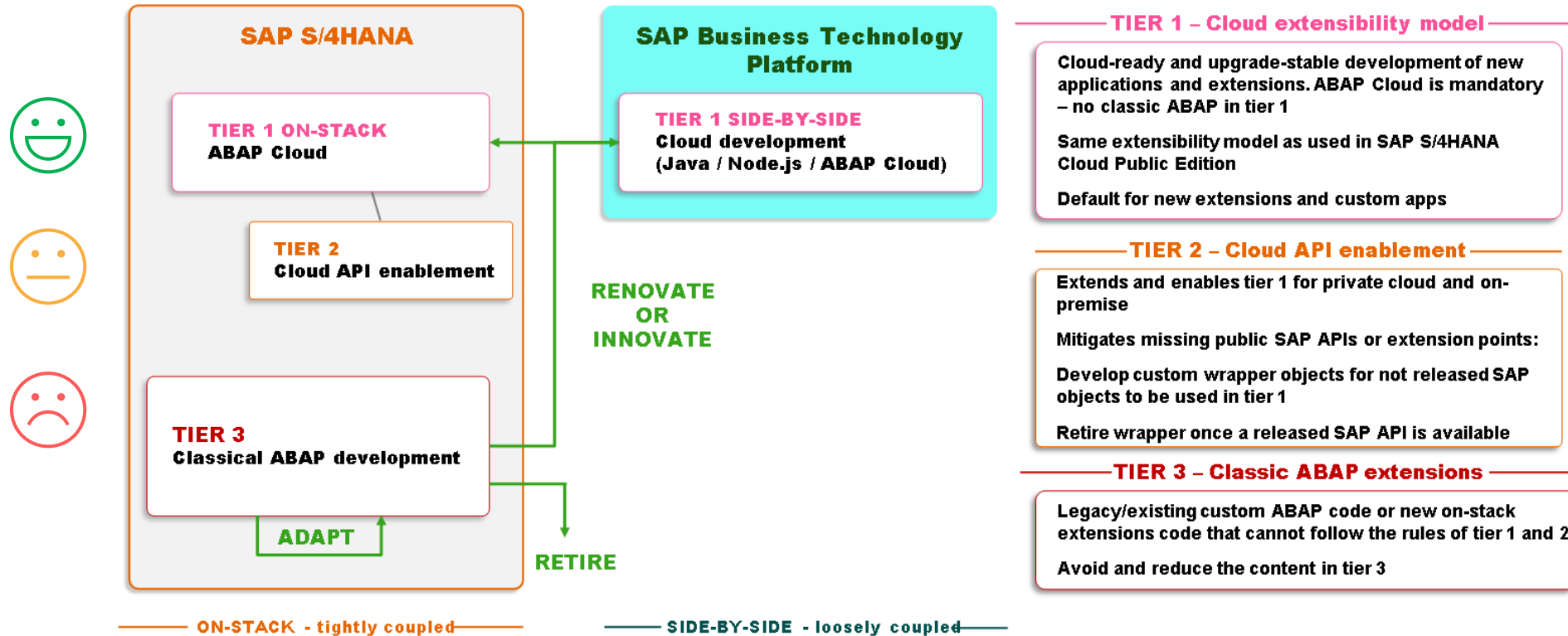
Events
Summary

Event	Description
beforeRebindTable	Before a table rebind, an event is triggered that contains information about the binding. You can use this event to add selects, and add or read the sorters and filters.

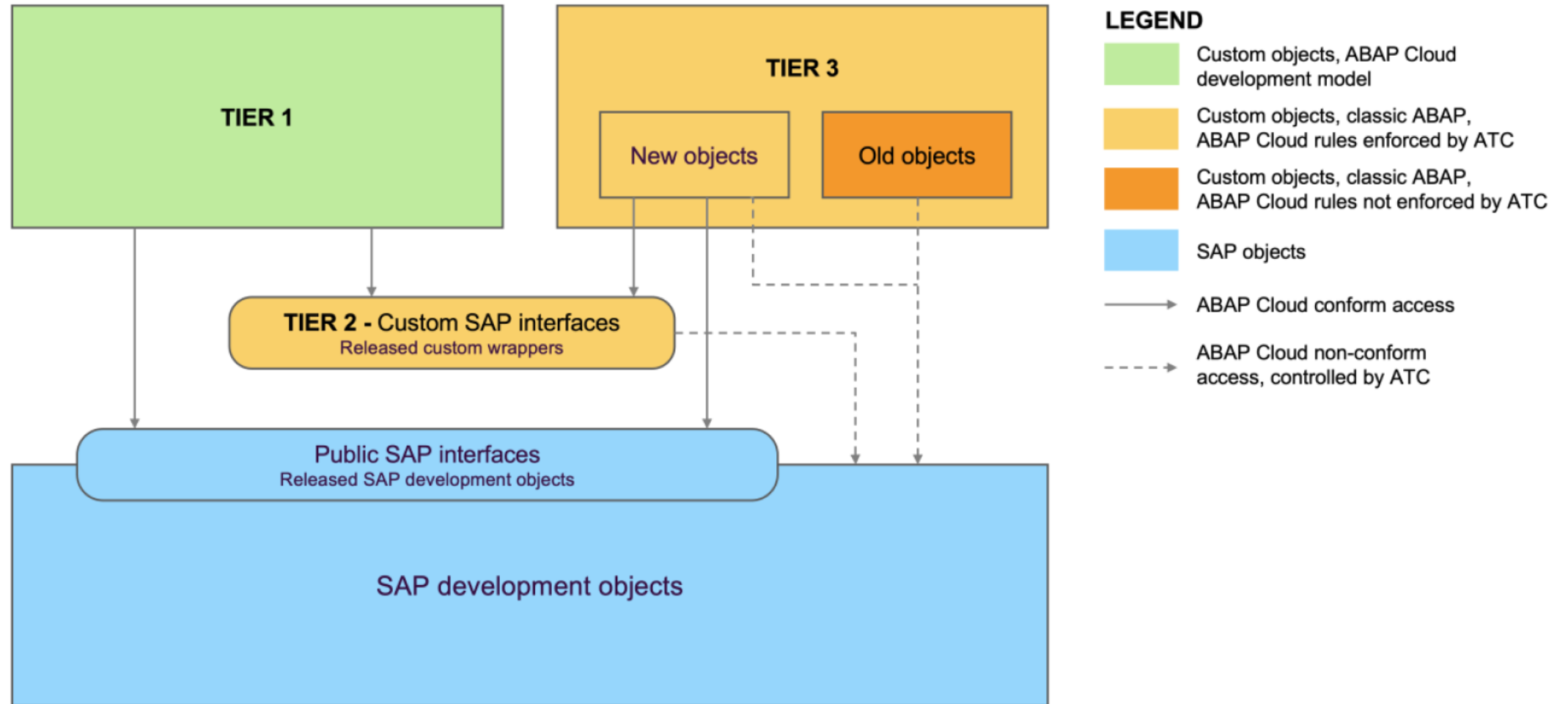
```
<macros:Table
  id="idBBTecObjTable"
  type="GridTable"
  header="{i18n>technicalObjectHeader}"
  headerVisible="true"
  variantManagement="Control"
  filterBar="idTOFilterBar"
  contextPath="/Technicalobject"
  metaPath="/Technicalobject/@com.sap.vocabularies.UI.v1.LineItem"
/>
```

ABAP Cloud model and Three Tier extensibility

Three Tier extensibility recap

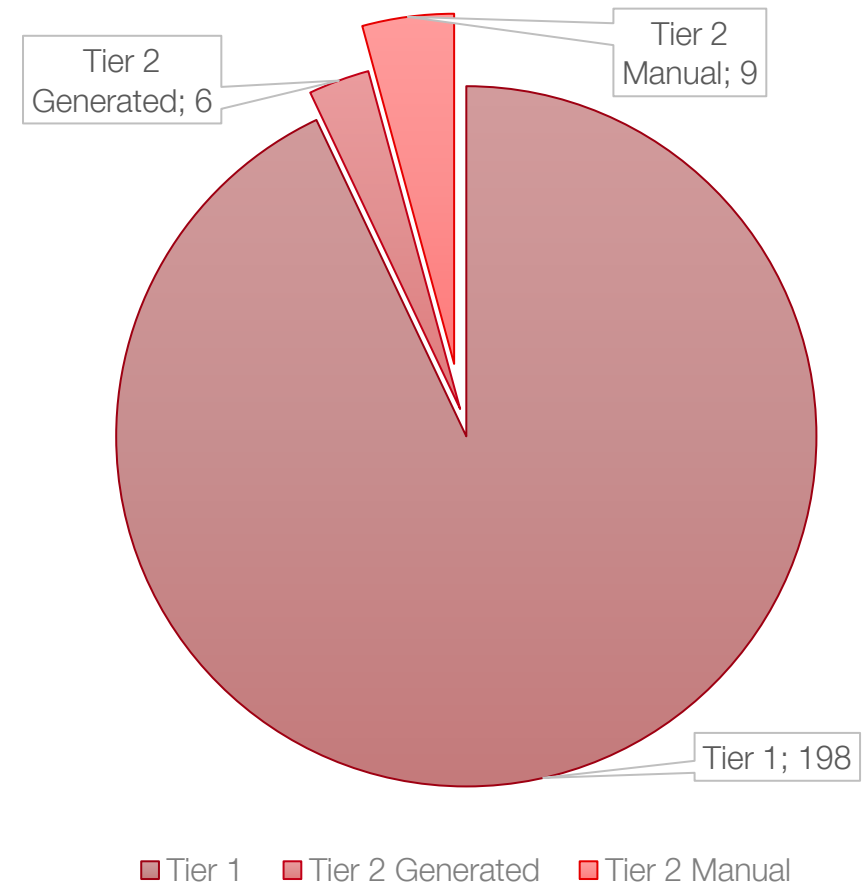


Three Tier extensibility recap



Tier breakdown - Maintenance Plan Manager

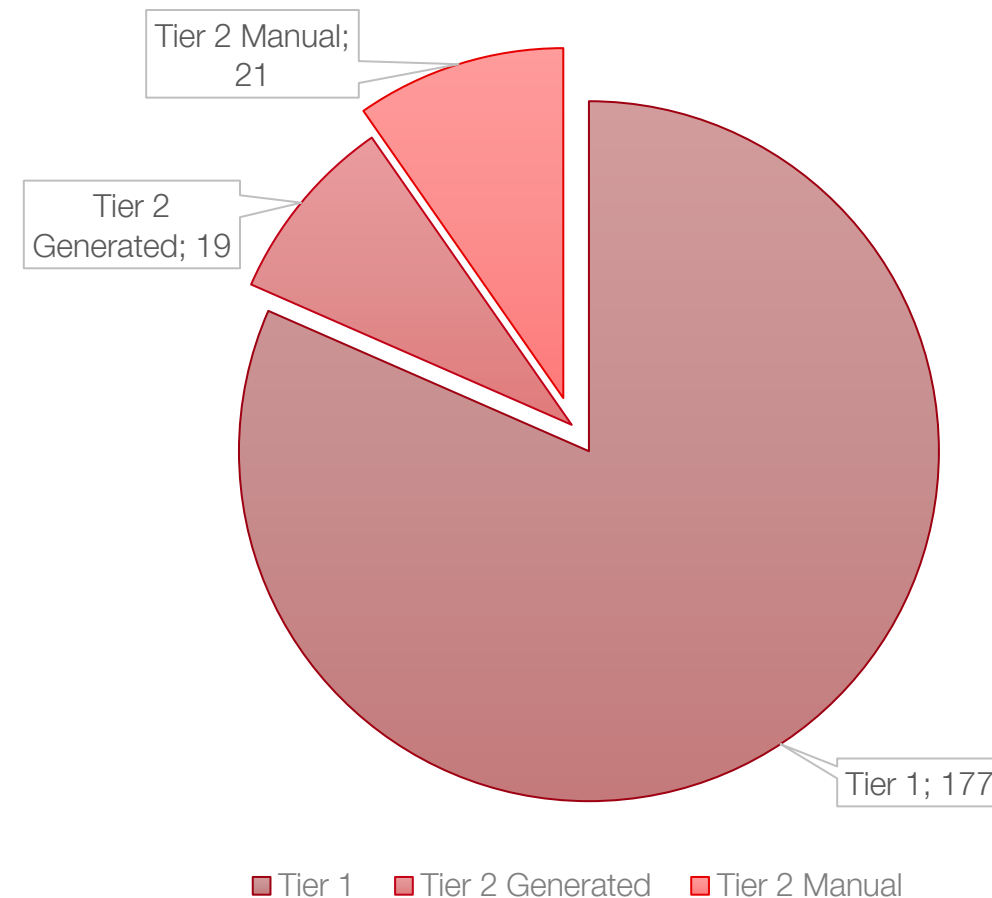
About 7% of the objects are part of Tier 2 and ideally can be swapped in further with a released object with low effort as they do not form core part of the application.



Tier breakdown - Task List Manager

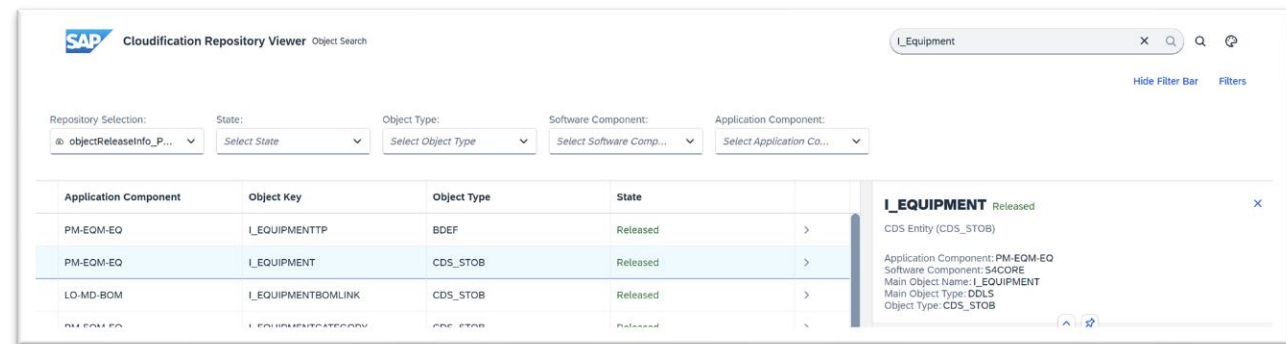
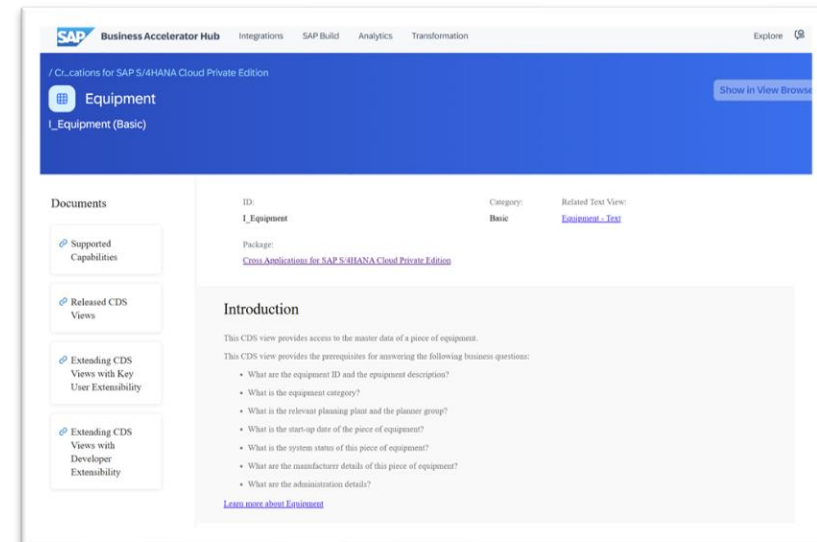
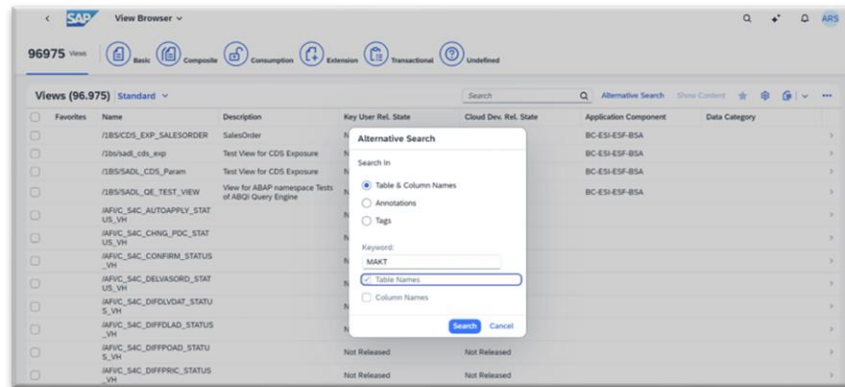
Although only 19% of development is in Tier 2 these objects are providing the core functionality e.g. The CRUD functionality is provided by unreleased/non-classic API (FM) which represents the generated portion.

Replacement of these with a Released API is considerably high effort.



Released Objects Dilemma

Navigating the maze



Data elements not released

```

4 @AbapCatalog.preserveKey: true
5 @AccessControl.authorizationCheck: #CHECK
6 @EndUserText.label: 'Description of Clfn Charc for Key Date'
7 @VDM.viewType: #COMPOSITE
8 @VDM.lifecycle.contract.type: #PUBLIC_LOCAL_API
9 @Metadata.ignorePropagatedAnnotations: true
10
11 @ObjectModel.dataCategory: #TEXT
12 @ObjectModel.representativeKey: 'CharcInternalID'
13 @ObjectModel.usageType.sizeCategory: #M
14 @ObjectModel.usageType.serviceQuality: #A
15 @ObjectModel.usageType.dataClass: #MASTER
16 @ObjectModel.modelingPattern: #LANGUAGE_DEPENDENT_TEXT
17 @ObjectModel.supportedCapabilities:
18 [ #LANGUAGE_DEPENDENT_TEXT,
19   #CDS_MODELING_DATA_SOURCE,
20   #CDS_MODELING_ASSOCIATION_TARGET,
21   #SQL_DATA_SOURCE ]
22 /*+[hideWarning] { "IDS" : [ "KEY_CHECK" ] } */
23 define view I_ClfnCharcDescForKeyDate
24   with parameters
25     @Consumption.hidden: true
26     @Environment.systemField: #SYSTEM_DATE
27     P_KeyDate : sydate
28   as select from I_ClfnCharcDesc as CharcDesc
29
30     association [1..1] to I_ClfnCharacteristicForKeyDate as _Characteristic
31       on $projection.CharcInternalID = _Characteristic.CharcInternalID
32 {
33   key CharcDesc.CharcInternalID,
34   @ObjectModel.foreignKey.association: '_Language'
35   @Semantics.language: true
36   key CharcDesc.Language,
37   @Semantics.text: true
38   CharcDesc.CharcDescription,

```

Data Element: CHARCDescription

Data Type Information

Specify the data type of the data element

Category: Domain

Type Name: * TEXT30

Data Type: * CHAR

Length: * 30

Additional Properties

Probl... Prop... x Tem... Trans... Feed... ATC ... Book... Search Dicti...

[T04] CHARCDescription

General

Use System-Internally (Contract C1)

API State

Contract C1 not yet set.

Transport

API Catalog Assignments

No assignment possible. A contract has to be added first.

Data elements not released

```
define table zir_3tl_ip_cl {
    key mandt                : mandt not null;
    key classinternalid      : clint not null;
    key tasklisttype         : abap.char(1) not null;
    key tasklistgroup        : abap.char(8) not null;
    key tasklistgroupcounter : abap.char(2) not null;
    key tasklistversioncounter : cim_count not null;
    key classtype            : abap.char(3) not null;
    key class                 : abap.char(18) not null;
    key charcinternalid      : atinn_no_conv not null;
    charcvaluepositionnumber : atzhl;
    tasklistvaliditykeydate  : pph_begda;
    startdate                : datuv;
    enddate                  : datub;
    charcvalue               : abap.char(70);
    charcpositionnumber      : kposnr;
    characteristic           : atnam;
    charcdescription          : abap.char(30);
    clifobjectid             : cuobn;
    charcvaluedescription     : atwtb;
    "%admin"                 : include sych_bdl_draft_admin_inc;
}
```

Data Element: CHARCDescription

Data Type Information

Specify the data type of the data element

Category: Domain

Type Name: * TEXT30

Data Type: * CHAR

Length: * 30

Additional Properties

Probl... Prop... x Tem... Trans... Feed... ATC ... Book... Search Dicti...

[T04] CHARCDescription

General

Use System-Internally (Contract C1)

API State

Contract C1 not yet set.

Transport

API Catalog Assignments

No assignment possible. A contract has to be added first.

Associations not released

```

11 @Metadata.ignorePropagatedAnnotations: true
12 @ObjectModel.supportedCapabilities: [ #CDS_MODELING_DATA_SOURCE ]
13 @Metadata.ignorePropagatedAnnotations: true
14
15
16
17 define view I_MaintenanceTaskList
18   as select from I_BillOfOperations
19     inner join I_BillOfOperationsChangeState on I_BillOfOperations.BillOfOperatio
20                                                    and I_BillOfOperations.BillOfOperatio
21                                                    and I_BillOfOperations.BillOfOperatio
22
23   association [0..1] to I_MaintenanceTaskListType as _TaskListType on
24
25   association [0..1] to I_PMReferenceElement as _PMReferenceElement on
26
27   association [0..1] to I_SafetyRelevance as _SafetyRelevance on
28   an
29
30   association [0..1] to P_TaskListToEquipAlloc as _TaskListEquip on
31   an
32
33   association [0..1] to P_TaskListToFuncnlLocAlloc as _TaskListFuncnlLoc on
34   an
35
36   association [0..1] to I_TechObjIsEquipOrFuncnlLoc as _TechObjIsEquipOrFuncnlLoc on
37
38   association [0..1] to I_TechnicalObject as _TechnicalObject on
39   an
40
41   association [0..*] to I_MaintTaskListOperation as _MaintTaskListOperation on
42   an
43

```

```

11 define view I_MaintTaskListOperation
12   as select from I_BillOfOperationsOpBasic as plpo
13     inner join I_B00SqncOperationAssgmtChgSt as plas
14
15
16
17
18
19

```

Probl... Prop... x Tem... Trans... Feed... ATC ... Book... Search Dicti

[T04] I_MAINTTASKLISTOPERATION

General

Specific

API State

Transport

- Extend (Contract C0) + ✎ ✕ ?
Contract C0 not yet set.
- Use System-Internally (Contract C1) + ✎ ✕ ?
Contract C1 not yet set.
- Use as Remote API (Contract C2) + ✎ ✕ ?

Released only for Key User

```
10 @ObjectModel.supportedCapabilities: [#SQL_DATA_SOURCE, #CDS_MODELING_DATA_SOURCE, #CDS_MODELING_ASSOCIATION_TARGET]
11 define view I_FunctionalLocationStatus
12   as select from P_FuncnlLocStatusAggrgn as _FuncnlLocStatus
13 {
```

Problem... Properties... × Template... Trans... Feed... ATC ... Book... Search Dicti... Cons... (x)= Varia... ABA... ABA... Quick... Prog... E

[T04] I_FUNCTIONALLOCATIONSTATUS

General

Specific

API State

Transport

▼ **Extend (Contract C0)** + ✎ ✕ ?

Contract C0 not yet set.

▼ **Use System-Internally (Contract C1)** + ✎ ✕ ?

Release State: Released

Local Comment:

Use in Cloud Development: No

Use in Key User Apps: Yes

Last Changed by: SAP

Last Changed on: May 26, 2020

Lock Objects

Lock Object: EPPLKO

Primary Table

The primary table of the lock object

Table:

Lock Mode:

Secondary Tables

The secondary tables must have a foreign key relation to the primary table

Table	Lock Mode

Lock Modules

The lock modules are generated on activation

☐ Allow RFC

Lock:

Unlock:

Lock Parameters

The lock parameter candidates are derived from the primary keys of the tables

Active	Parameter Name	Table	Field
<input checked="" type="checkbox"/>	MANDT	PLKO	MANDT
<input checked="" type="checkbox"/>	PLNTY	PLKO	PLNTY
<input checked="" type="checkbox"/>	PLNNR	PLKO	PLNNR
<input checked="" type="checkbox"/>	PLNAL	PLKO	PLNAL
<input checked="" type="checkbox"/>	ZAEHL	PLKO	ZAEHL

< > Sample Code

```

CLASS lhc_travel IMPLEMENTATION.
...

METHOD lock.
  TRY.
    "Instantiate lock object
    DATA(lock) = cl_abap_lock_object_factory=>get_instance( iv_name = '/DMO/ETRAVEL' ).
  CATCH cx_abap_lock_failure INTO DATA(exception).
    RAISE SHORTDUMP exception.
  ENDTRY.

```

Wrapper – The chosen ones

CDS wrapper - Key User objects

```

26 define view entity ZIR_CDS_I_3MP_FUNCLOCSTAT
27   as select from I_FunctionalLocationStatus
28 {
29   key FunctionalLocation,
30     MaintObjectInternalID,
31     FuncnlLocIsMarkedForDeletion,
32     FuncnlLocIsDeleted,
33     FunctionalLocationIsActive,
34     FunctionalLocationIsCreated,
35     FuncnlLocIsDeactivated
36 }
--

```

```

10 @ObjectModel.supportedCapabilities: [#SQL_DATA_SOURCE, #CDS_MODELING_DATA_SOURCE, #CDS_MODELING_ASSOCIATION_TARGET]
11 define view I_FunctionalLocationStatus
12   as select from P_FuncnlLocStatusAggrgn as _FuncnlLocStatus
13 {
14   key _FuncnlLocStatus.FunctionalLocation,
15     _FuncnlLocStatus.MaintObjectInternalID,
16     cast(_FuncnlLocStatus.FuncnlLocIsMarkedForDeletion as xfeld preserving type) as FuncnlLocIsMarkedForDeletion,
17     cast(_FuncnlLocStatus.FuncnlLocIsDeleted as xfeld preserving type) as FuncnlLocIsDeleted,
18     cast(_FuncnlLocStatus.FunctionalLocationIsActive as xfeld preserving type) as FunctionalLocationIsActive,
19     cast(_FuncnlLocStatus.FunctionalLocationIsCreated as xfeld preserving type) as FunctionalLocationIsCreated,
20     cast(_FuncnlLocStatus.FuncnlLocIsDeactivated as xfeld preserving type) as FuncnlLocIsDeactivated
21 };
22

```

Problems Properties × Templates Bookmarks Feed Rea... Transport ... Variables ABAP Inte... ATC Probl... Search ABAP Lan... Histor

[T04] I_FUNCTIONALLOCATIONSTATUS

General

Specific

API State

Transport

Extend (Contract C0)

Contract C0 not yet set.

Use System-Internally (Contract C1)

Release State: Released

Local Comment:

Use in Cloud Development: No

Use in Key User Apps: Yes

Last Changed by: SAP

CDS wrapper – Internal Private API

```

13 @VDM.viewType: #BASIC
14 @VDM.lifecycle.contract.type: #SAP_INTERNAL_API
15
16 define view I_ObjectDependency
17 as select from   cukb as Dependency
18   left outer join cukbt as DependencyText on  Dependency.adzh1      = De
19                                             and Dependency.knum       = De
20                                             and DependencyText.spras = $s
21 {
22   key Dependency.knum           as ObjectDependency,
23   key Dependency.adzh1         as TimeIntervalNumber,
24   Dependency.knnam             as ObjectDependencyName,
25   Dependency.knart             as ObjectDependencyType,
26   Dependency.knsta             as ObjectDependencyStatus,
27   Dependency.knedt             as CreationDate,
28   Dependency.kneus             as CreatedByUser,
29
30   @Semantics.systemTime.lastChangedAt: true
31   case
32   when Dependency.knadt is null or Dependency.knadt = '00000000'
33   then Dependency.knedt
34   else Dependency.knadt end as LastChangeDate,
35   @Semantics.user.lastChangedBy: true

```

[T04] I_OBJECTDEPENDENCY

General
 Specific
API State
 Transport

▾ **Extend (Contract C0)** ✚ ✎ ✕ ?
 Contract C0 not yet set.

▾ **Use System-Internally (Contract C1)** ✚ ✎ ✕ ?
 Contract C1 not yet set.

i Manual wrapper - CDS

CDS


- Use-case specific wrapper and modular when feasible.

```
define view entity ZIR_CDS_R_3MP_STATUSCODE_TEXT
as select from ZIR_CDS_I_3MP_STATUSOBJECT as statusobject
association [1..*] to I_UserStatusText as _statusText on $projection.StatusCode = _statusText
and statusobject.StatusProfile = _statusText
and _statusText.Language = $session.sy
and statusobject.StatusIsActive is not initialia
{
key StatusObject,
key StatusCode,
StatusProfile,
IsUserStatus,
StatusIsActive,
_statusText.UserStatusName,
```

```
define view entity ZIR_CDS_I_3MP_STATUSOBJECT
as select from I_StatusObjectActiveStatus
{
key StatusObject,
key StatusCode,
StatusProfile,
IsUserStatus,
StatusIsActive,
/* Associations */
_statusCode,
_statusObject,
_statusProfile
```



BO wrapper - Classic APIs

 **Cloudification Repository Viewer** Object Search

BAPI_ALM_NOTIF_CLOSE

Repository Selection:
@ objectClassifications_... ▼

State:
Select State ▼

Object Type:
Select Object Type ▼

Software Component:
Select Software Comp... ▼

Application Component:
Select Application Co... ▼

Label:
Select Label ▼

Application ...	Object Key	Object Type	State
PM-WOC-MN	BAPI_ALM_NOTIF_CLOSE	FUNC	Classic API

BAPI_ALM_NOTIF_CLOSE

 Classic API

Function Module (FUNC)

Application Component: PM-WOC-MN
Software Component: S4CORE
Main Object Name: IWOPM
Main Object Type: FUGR
Object Type: FUNC

Labels

Label

remote-enabled

transactional-consistent

BO wrapper - Classic APIs

SAP ACo Proxy Generation Utility

Get Metadata ☒ locally ☐ by RFC ☐ by Fileupload

RFC Destination

Function Modules

BAPI_PR_CREATE
BAPI_PR_CHANGE
BAPI_PR_GETDETAIL

Create ☒ Class ☐ File

Name of Proxyclass ZAF_CL_PR_BAPI_009

Package TEST_AF_ACO_009

☒ Create Interface
☒ Create Factory Class

☐ Inactive
☐ Readonly

Options

☐ Pass Destination via Constructor
☐ Create Asynchronous Call
☐ by IF RFC DEST (Cloud only)
☐ Create Retrieve Result Method
☐ Add Keep Task Option

☒ Class-Based Exceptions
☐ Classic Exceptions
☐ Bapi Exceptions

☐ bgRFC

☒ Do not Create Shadows of C1 Released Types
☒ C1 Release
☒ Create private Methods

Additional Options for Variable Functions

☐ Generate Variable Function
Allowlist Generator
Internal Information

ACO_PROXY
Blog – Andre Fischer

BO wrapper - Classic APIs

Classes (2)

- ZCL_IR_3MP_T2_FNOTIF_CLOSE *generated ACO factory class*
- ZCL_IR_3MP_T2_NOTIF_CLOSE *generated ACO class*

Interfaces (1)

- ZIF_IR_3MP_T2_NOTIF_CLOSE *generated ACO interface*

[T04] ZCL_IR_3MP_T2_FNOTIF_CLOSE	
General	Use System-Internally (Contract C1)
Specific	Release State: Released
API State	Local Comment:
Transport	Use in Cloud Development: Yes
	Use in Key User Apps: No

```

ZCL_IR_3MP_T2_NOTIF_CLOSE ▸ CALL_BAPI_ALM_NOTIF_CLOSE ▸ if
33= CLASS zcl_ir_3mp_t2_notif_close IMPLEMENTATION.
34
35
36= METHOD call_bapi_alm_notif_close.
37     DATA: _rfc_message_ TYPE aco_proxy_msg_type.
38     CALL FUNCTION 'BAPI_ALM_NOTIF_CLOSE' DESTINATION _dest_
39     EXPORTING
40         number           = number
41         syststat         = syststat
42         testrun          = testrun
43     IMPORTING
44         systemstatus     = systemstatus
45         userstatus       = userstatus
46     TABLES
47         return           = return
48     EXCEPTIONS
49         communication_failure = 1 MESSAGE _rfc_message_
50         system_failure       = 2 MESSAGE _rfc_message_
51         OTHERS               = 3.
52= IF sy-subrc NE 0.
53     DATA __sysubrc TYPE sy-subrc.
54     DATA __textid TYPE aco_proxy_textid_type.
55     __sysubrc = sy-subrc.
56     __textid-msgid = sy-msgid.
57     __textid-msgno = sy-msgno.
58     __textid-attr1 = sy-msgv1.
59     __textid-attr2 = sy-msgv2.
60     __textid-attr3 = sy-msgv3.
61     __textid-attr4 = sy-msgv4.
62= CASE sy-subrc

```

i Manual wrapper - BO

BO – BAPI/Class

- Encapsulate the types used Tier 2 for usage in Tier 1. Check the generated BO scenario as an example of best practice.

```

19  TYPES:
20  atwrt30 TYPE c LENGTH 000030 ##TYPESHADOW .
21  TYPES:
22  flinh TYPE c LENGTH 000001 ##TYPESHADOW .
23  TYPES:
24  atzis TYPE n LENGTH 000003 ##TYPESHADOW .
25  TYPES:
26  atwrt70 TYPE c LENGTH 000070 ##TYPESHADOW .
27  TYPES:
28  BEGIN OF bapi1003_alloc_values_char ,
29  charact      2 TYPE atnam,
30  value_char   TYPE atwrt30, 1
31  inherited    TYPE flinh,
32  instance     TYPE atzis,
33  value_neutral TYPE atwrt30,
34  charact_descr TYPE atbez,
35  value_char_long TYPE atwrt70,
36  value_neutral_long TYPE atwrt70,
37  END OF bapi1003_alloc_values_char ##TYPESHADOW .

```

Data Element: ATNAM

Data Type Information
Specify the data type of the data element

Category: Domain
Type Name: * ATNAM
Data Type: * CHAR
Length: * 30

Additional Properties

Problems Properti... x Templat... Bookma... Fi

[T04] ATNAM

General

API State

Transport

Use System-Internally (Contract C1)
Release State: Released 2
Local Comment:
Use in Cloud Development: Yes

Complicated life of a BO

RAP BO

- Be aware of restrictions
- Mix n match with other BOs not always feasible

Classic API – BAPI/Class

- Standalone LUW can complicate logic
 - manual commit handling
 - lock handling

Unreleased FMs

- wild west ...

SAP LUW in RAP context

Wrapping Up

Define the goal before you begin your journey.

Time to market

- Leverage modern SAP frameworks and tooling.
 - Fiori Elements, Building Blocks, RAP

Product lifecycle

- Prioritize stability, simplify governance and extensibility across releases.
 - ABAP Cloud model, Released API, Three Tier extensibility

 *Wish list*

 Influence requests

 Wrapper lifecycle management



Bon Voyage!

A person is holding a white disposable coffee cup with an orange lid. They are standing on a train platform, looking out at a train. The background is slightly blurred, showing the train tracks and the side of the train. The text "Thank you!" is overlaid in the center of the image.

Thank you!

References

- Three Tier Extensibility Model
- ABAP Cloud API Enablement Guidelines
- Wrapper generator for BAPI/RFC FM
- Classic API for Tier 2
- Cloudification Repository
- ATC and ABAP Cloud

Speaker



Archish is an SAP professional with about 20 years of experience in development and architecture, specializing in ABAP, SAP Business Technology Platform and Fiori. He is passionate about leveraging the latest technologies to drive innovation and excellence in his work.

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