Custom Code Migration nach SAP S/4HANA

Buchvorstellung und Demo

21.09.2021

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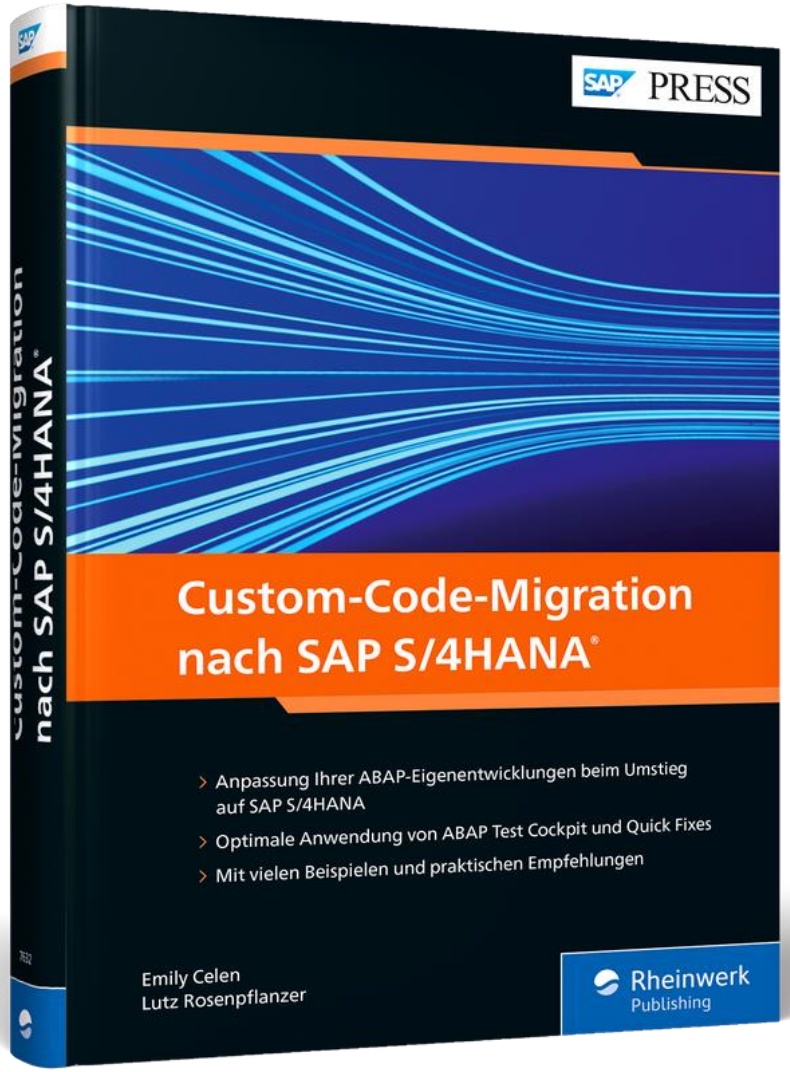
swisscom

Who am I ?

- Lead SAP Backend Development @ Swisscom
- SAP Development lead and architect, teacher, trouble shooter, …
- Developer SAP since 1995

Buch zu S/4 HANA Custom Code Migration



https://www.rheinwerk-verlag.de/custom-code-migration-nach-sap-s4hana/

Spannendes und bereicherndes Projekt mit Emily (anderes Beratungshaus) unter Unterstützung der SAP und Superlektorat durch den Verlag !

Unterstützung durch Swisscom Kollegen

Ca. 1 Jahr Arbeit seit Okt 2019

Papier und online Versionen verfügbar

Themen

- Überblick Inhalt
- Umfang / Scoping
- Analyse HANA DB Anpassungen
- Analyse SAP S/4HANA Anpassungen
- Quickfixes
- Typische manuelle Korrekturen
- Optimierung nach der Migration / neuer ABAP, CDS, RAP …
- Partnertools

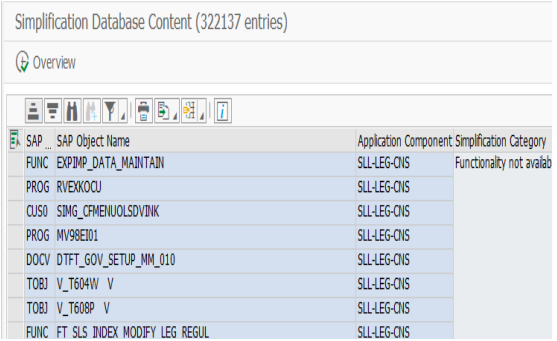
Überblick Inhalt

- Vergleich SAP ECC und SAP S/4HANA – Funktionalität
- Transformationswege (Brown, Blue, Greenfield)
- Projektablauf
- Vorbereitungen / Readynesscheck, Simplification Items
- Umfang / Scoping, Löschung obsoleter Z Objekte
- Analyse der erforderlichen Anpassungen / ATC und andere Tools

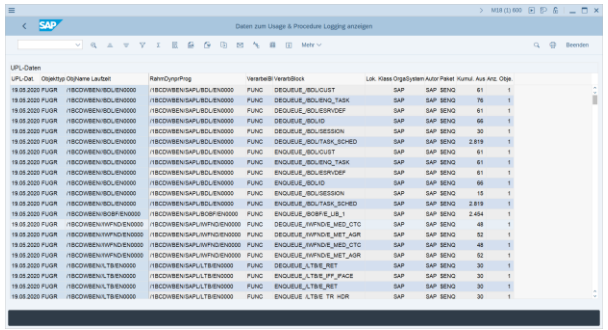
Überblick Inhalt

- Durchführung der Anpassungen und Gründe dahinter
- Quickfixes und Eclipse
- Optimierung nach der Migration
- Datenbankanalyse Tools und Anpassungsmöglichkeiten
- Neuer ABAP
- Extensibility im S/4
- Best Practises und Partnertools inkl. Swisscom S4TF Toolbox

Overview Tools



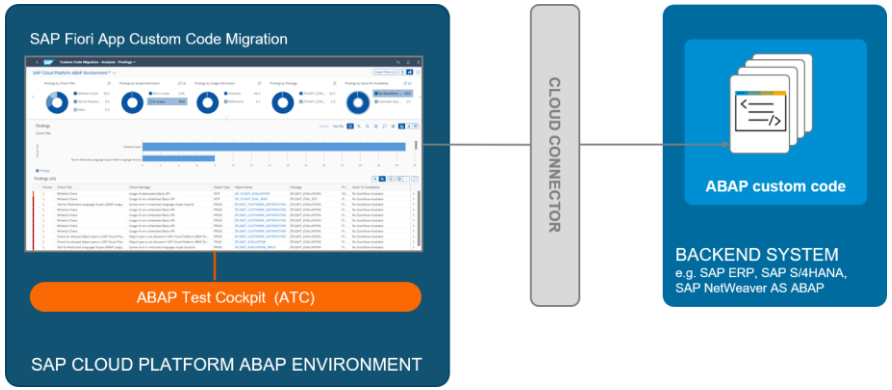
SYCM Simplification list



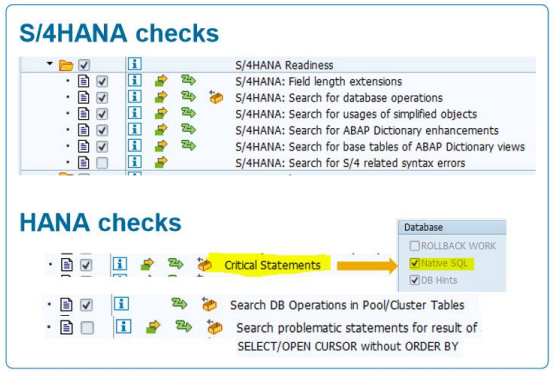
SCMON SUSG

abapGit

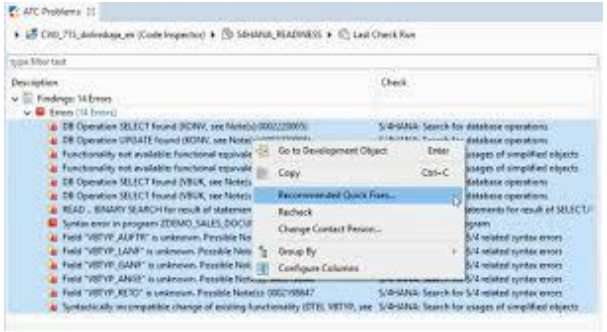
Move unused Code to abapGit



Fiori Custom Code Migration



ATC ABAP Test Cockpit



Eclipse ADT and Quickfixes

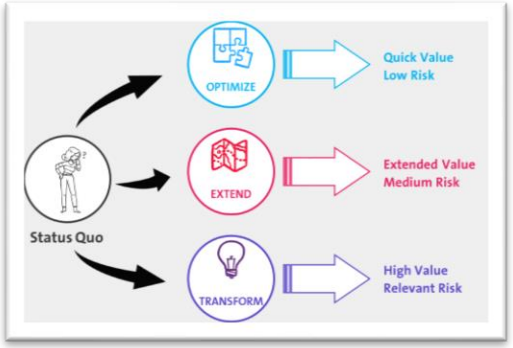
4 Main Questions for S/4 Transformation Projects

What

Why

How

When



S/4 HANA Simplification List Highlights

LOB	Function	Function	New Function
FI/SD	Customer / Vendor	XD01 usw.	Business Partner / CVI
SD	Credit Management	Replaced by new Functionality	FSCM Credit Management
MM	Material Master	New Data Model	Material Number 40 Characters
SD	Sales Activities	Replaced by C/4	S/4HANA Customer Management or C/4
SD	Foreing Trade	Some Functionalities Replaced	SAP GTS on separate Instance or 3rd Party
SD	Rebate Processing	Replaced by new Functionality	Settlement Management
MM	Classic MM Transactions ME21, ME27, ME51 etc.	Not available	Use new Transaction Codes ME21n etc.

Examples

Old Data Model

SAP S/4HANA Architecture and Components

Simplified data model

SALES

	Document Header		Document Item			
Sales Order	VBAK		VBAP		VAKPA	VAPMA
Delivery	LIKP		LIPS		VLKPA	LKPMA
Billing Document	VBRK		VBRP		VRKPA	VRPMA
Status Info	VBUK		VBUP			
Conditions		KONV			VBOX	
Document Flow		VBFA				

FINANCE

	Document Header	Document Item		Totals			Indices		
GL, AR, AP	BKPF	BSEG		GLT0	KNC1	KNC3	BSIS	BSAS	BSIK
				LFC1	LFC3		BSID	BSAD	BSAK
New GL		FAGLF LEXA*		FAGLF LEXT*			FAGL BSIS	FAGL BSAS	
CO	COBK	COEP		COSS	COSP				
AA	ANEK	ANEP	ANEA	ANLC	ANLP				
ML	MLHD...	MLIT...		MLCD...	MCLR...		BSIM*	CKMI1*	

SAP Business Suite

MATERIAL VALUES

Valuation in MM or Valuation ML

Aggregates: Hybrid: Master Data with Valuated Stock		History				ML Valuation
MBEW		MBEWH	CKMLCR	MLPP	CKMLPP	CKMLPPWIP
EBEW		EBEWH	CKMLPP	MLCR	CKMLCR	CKMLKEPH
QBEW		QBEWH	MLHD	MLCRF	MLCD	CKMLMV004
OBEW		OBEWH	MLIT	MLKEPH	CKLMMV004	

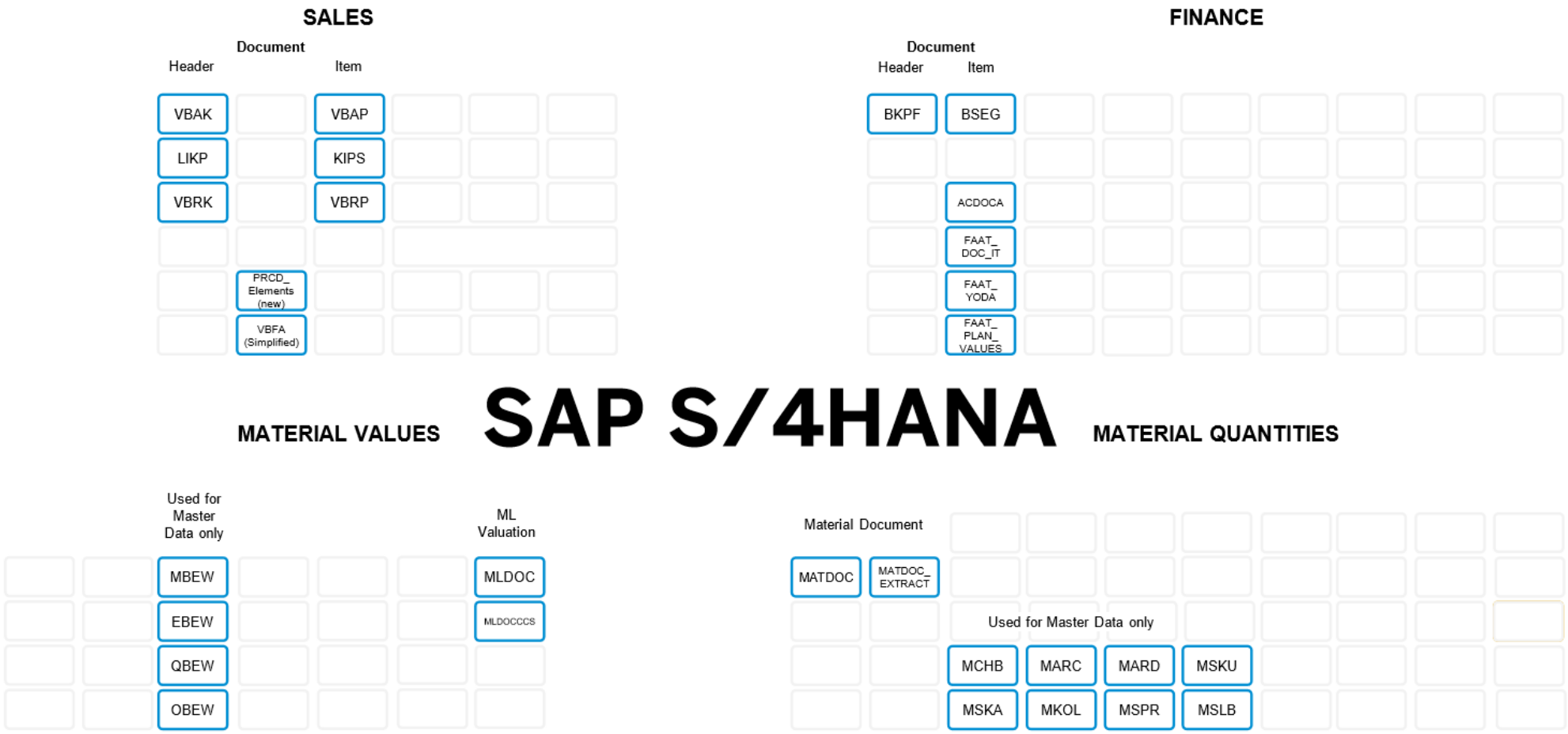
MATERIAL QUANTITIES

		Aggregates: Stock Aggregates				History		
Material Document			MSSA	MSSL	MSSQ	MSSAH	MSTBH	MSSQH
MKPF	MSEG		MSTE	MSTQ	MSTB	MSTEH	MSTQH	
Inventory Movements		Hybrid: Master Data with Stock Aggregates				MARCH	MARDH	
		MCHB	MARC	MARD	MSKU	MSLBH	MCHBH	MSKUH
		MSKA	MKOL	MSPR	MSLB	MSKAH	MSKAH	

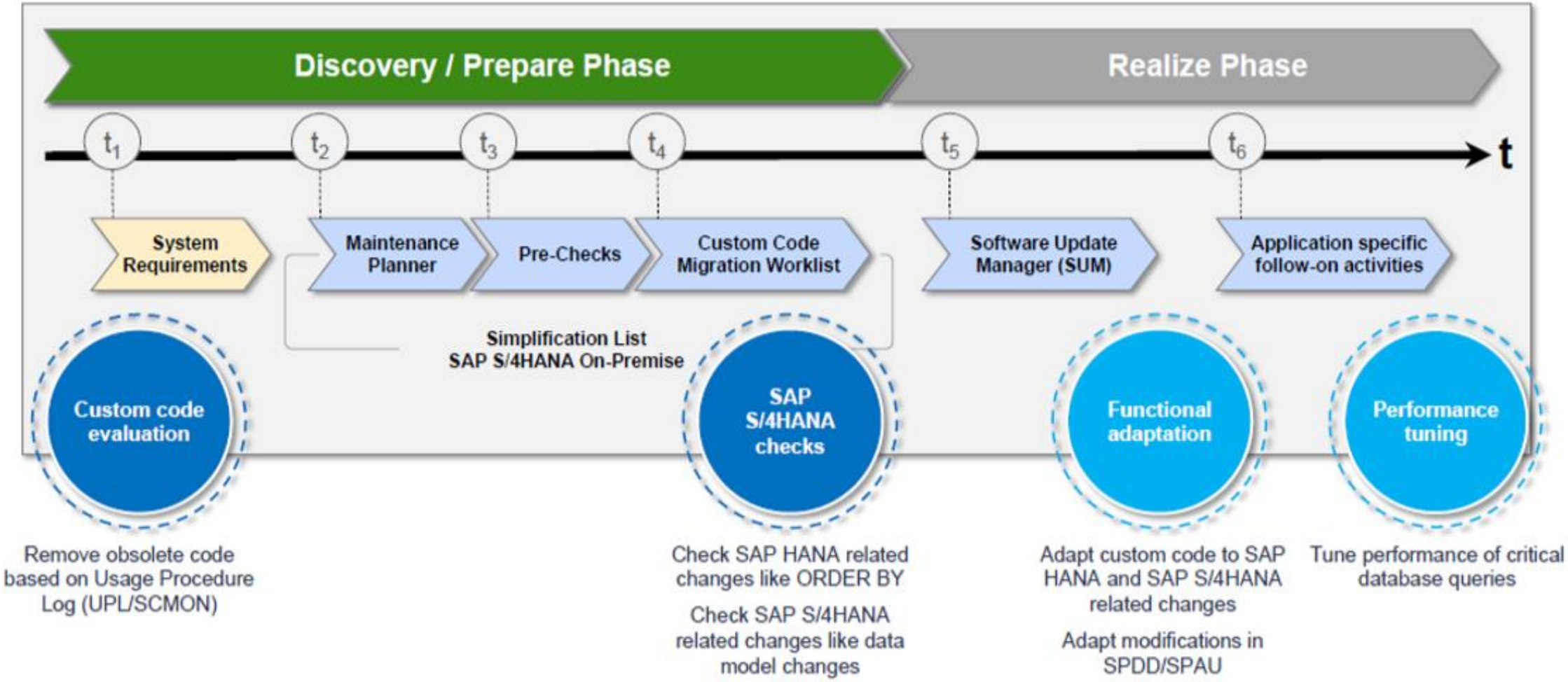
New Data Model

SAP S/4HANA Architecture and Components

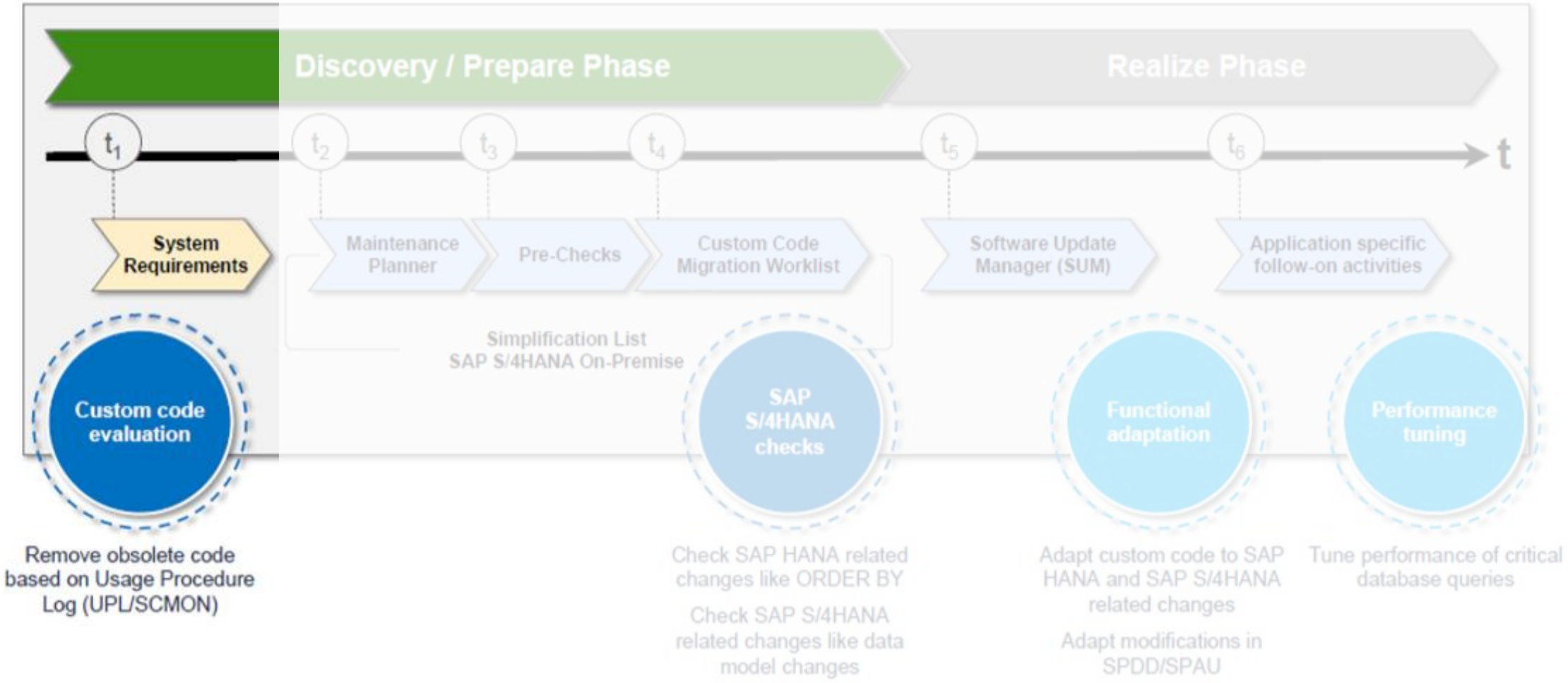
Simplified data model



Custom Code Migration Process



Umfang/ Scoping



Scoping

- Ungenutzte Objekte blähen Anpassungsaufwand unnütz auf
  - Z.T. >50% Z Coding nicht mehr genutzt (SAP Erfahrungswert)
  - Erweiterungen an Tabellen und Coding können Rückkehr zu S/4 Standard behindern

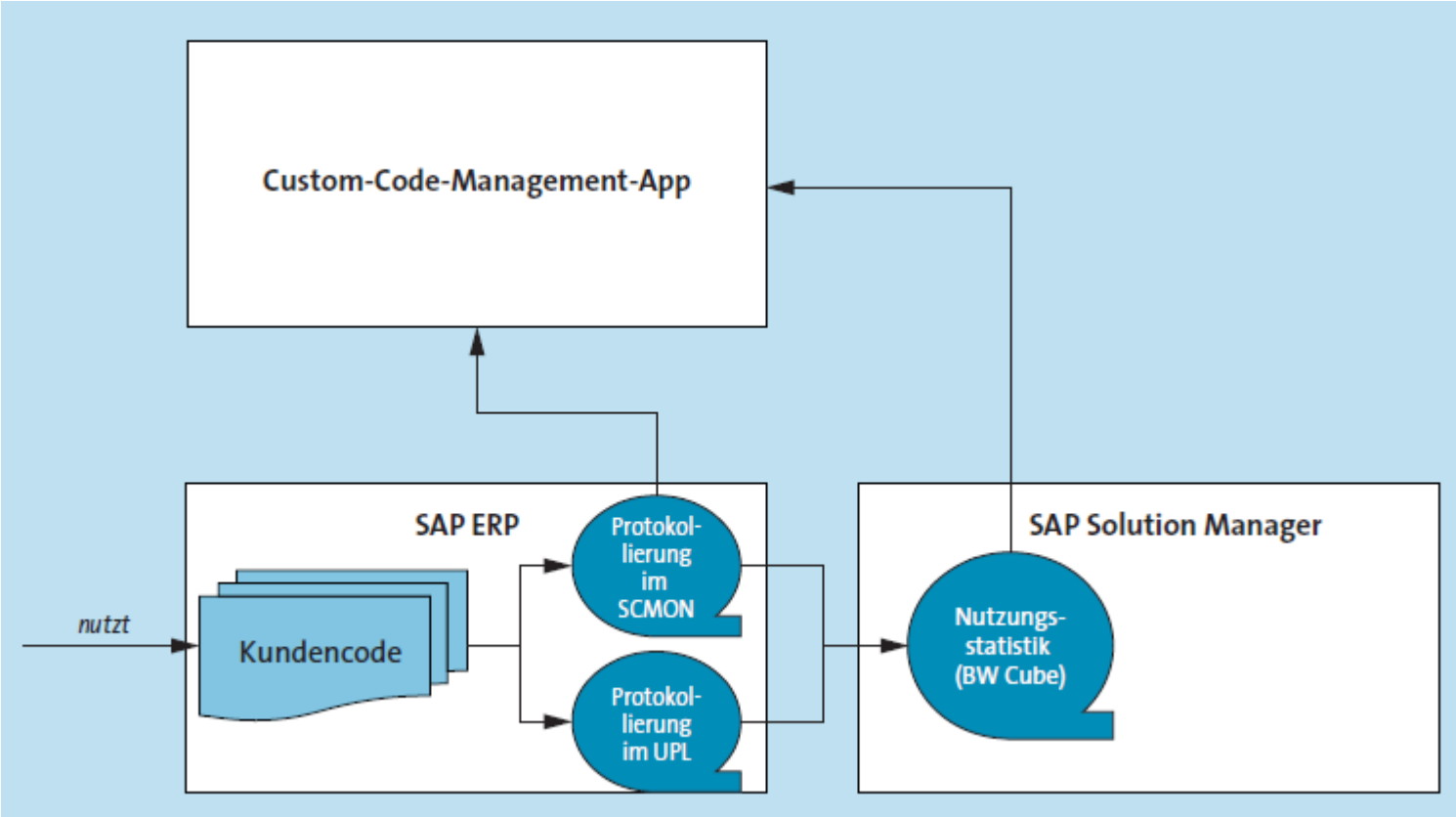
- 2 Quellen:
  - Expertenwissen über genutzte Prozesse, Interfaces, …
  - Technische Traces

Scoping Traces

- Unified Procedure Logging (UPL)
- ABAP Call Monitor (SCMON)
- Eigene

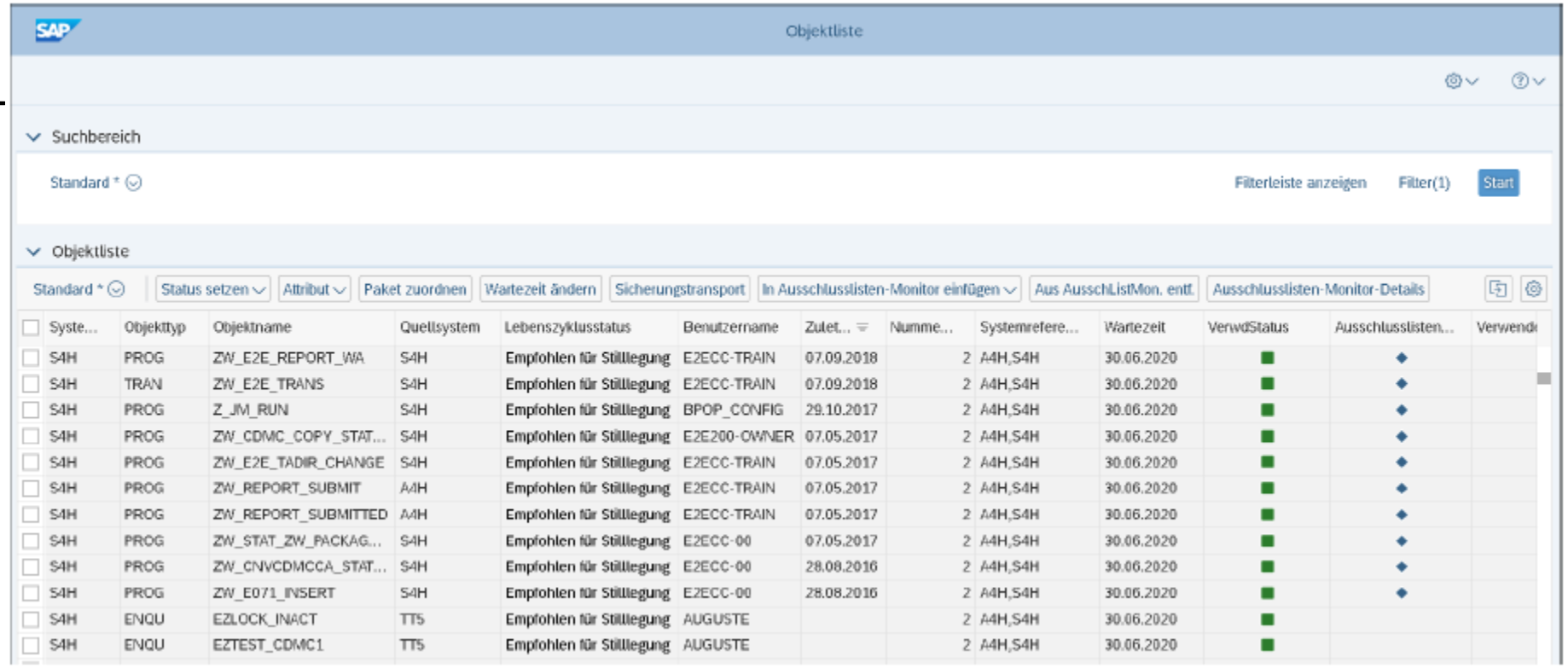
Scoping Traces

- Auswertung
  - Custom Code Migration App (CCM Fiori)



Scoping Traces

- Auswertung
  - Solution Manager – Stilllegungscockpit



Syste...	Objekttyp	Objektname	Quellsystem	Lebenszyklusstatus	Benutzername	Zulet...	Numme...	Systemrefere...	Wartezeit	VerwdStatus	Ausschlusslisten...	Verwende
S4H	PROG	ZW_E2E_REPORT_WA	S4H	Empfohlen für Stilllegung	E2ECC-TRAIN	07.09.2018	2	A4H,S4H	30.06.2020			
S4H	TRAN	ZW_E2E_TRANS	S4H	Empfohlen für Stilllegung	E2ECC-TRAIN	07.09.2018	2	A4H,S4H	30.06.2020			
S4H	PROG	Z_JM_RUN	S4H	Empfohlen für Stilllegung	BPOP_CONFIG	29.10.2017	2	A4H,S4H	30.06.2020			
S4H	PROG	ZW_CDMC_COPY_STAT...	S4H	Empfohlen für Stilllegung	E2E200-OWNER	07.05.2017	2	A4H,S4H	30.06.2020			
S4H	PROG	ZW_E2E_TADIR_CHANGE	S4H	Empfohlen für Stilllegung	E2ECC-TRAIN	07.05.2017	2	A4H,S4H	30.06.2020			
S4H	PROG	ZW_REPORT_SUBMIT	A4H	Empfohlen für Stilllegung	E2ECC-TRAIN	07.05.2017	2	A4H,S4H	30.06.2020			
S4H	PROG	ZW_REPORT_SUBMITTED	A4H	Empfohlen für Stilllegung	E2ECC-TRAIN	07.05.2017	2	A4H,S4H	30.06.2020			
S4H	PROG	ZW_STAT_ZW_PACKAG...	S4H	Empfohlen für Stilllegung	E2ECC-00	07.05.2017	2	A4H,S4H	30.06.2020			
S4H	PROG	ZW_CNVCDMCCA_STAT...	S4H	Empfohlen für Stilllegung	E2ECC-00	28.08.2016	2	A4H,S4H	30.06.2020			
S4H	PROG	ZW_E071_INSERT	S4H	Empfohlen für Stilllegung	E2ECC-00	28.08.2016	2	A4H,S4H	30.06.2020			
S4H	ENQU	EZLOCK_INACT	TT5	Empfohlen für Stilllegung	AUGUSTE		2	A4H,S4H	30.06.2020			
S4H	ENQU	EZTEST_CDMC1	TT5	Empfohlen für Stilllegung	AUGUSTE		2	A4H,S4H	30.06.2020			

Scoping Traces

- Auswertung
  - Rohdaten SCMON

Monitor usage of your custom code via ABAP Call Monitor SCMON (recommended) or Usage Procedure Logging (UPL)

ABAP Call Monitor

Activate | Collect Data | Display Data | Display Call Graph

State	
Status	Inactive
Records	0
Daily Time Slices	0 of 7 Slices Used
Scheduled Data Collection	Not scheduled
Scheduled Deactivation	Not scheduled
Deactivate Above	0

ABAP Call Monitor: Data Browser - 2533 entries

Application Help

Req. Type	Calling Request Entry Point Name	Called Program Name	Obj. Type	Called Object Name	Proc. Type	Called Procedure Name	Called Class Name	Num. Calls
Batch Job	Z_CCM_DASHB_TRANSACTIONS_00	CL_ABAP_CLASSDESCR==========CP	CLAS	CL_ABAP_CLASSDESCR	METH	CLASS_CONSTRUCTOR	CL_ABAP_CLASSDESCR	1
Batch Job	Z_CCM_DASHB_TRANSACTIONS_00	CL_ABAP_CLASSDESCR==========CP	CLAS	CL_ABAP_CLASSDESCR	METH	LOAD_CLASS	CL_ABAP_CLASSDESCR	1
Batch Job	Z_CCM_DASHB_TRANSACTIONS_00	CL_ABAP_ELEMDESCR==========CP	CLAS	CL_ABAP_ELEMDESCR	METH	CLASS_CONSTRUCTOR	CL_ABAP_ELEMDESCR	1
Batch Job	Z_CCM_DASHB_TRANSACTIONS_00	CL_ABAP_ELEMDESCR==========CP	CLAS	CL_ABAP_ELEMDESCR	METH	CREATE_ELEMDESCR_OBJECT	CL_ABAP_ELEMDESCR	10
Batch Job	Z_CCM_DASHB_TRANSACTIONS_00	CL_ABAP_ELEMDESCR==========CP	CLAS	CL_ABAP_ELEMDESCR	METH	GET_C	CL_ABAP_ELEMDESCR	1
Batch Job	Z_CCM_DASHB_TRANSACTIONS_00	CL_ABAP_ELEMDESCR==========CP	CLAS	CL_ABAP_ELEMDESCR	METH	GET_X	CL_ABAP_ELEMDESCR	3
Batch Job	Z_CCM_DASHB_TRANSACTIONS_00	CL_ABAP_ELEMDESCR==========CP	CLAS	CL_ABAP_ELEMDESCR	METH	LOAD_CLASS	CL_ABAP_ELEMDESCR	1
Batch Job	Z_CCM_DASHB_TRANSACTIONS_00	CL_ABAP_ELEMDESCR==========CP	CLAS	CL_ABAP_ELEMDESCR	METH	VAR_LEN_DESC_TO_XTYP	CL_ABAP_ELEMDESCR	4
Batch Job	Z_CCM_DASHB_TRANSACTIONS_00	CL_ABAP_INTFDESCR==========CP	CLAS	CL_ABAP_INTFDESCR	METH	CLASS_CONSTRUCTOR	CL_ABAP_INTFDESCR	1
Batch Job	Z_CCM_DASHB_TRANSACTIONS_00	CL_ABAP_INTFDESCR==========CP	CLAS	CL_ABAP_INTFDESCR	METH	LOAD_CLASS	CL_ABAP_INTFDESCR	1
Batch Job	Z_CCM_DASHB_TRANSACTIONS_00	CL_ABAP_LIST_PARSER==========CP	CLAS	CL_ABAP_LIST_PARSER	METH	CLASS_CONSTRUCTOR	CL_ABAP_LIST_PARSER	1
Batch Job	Z_CCM_DASHB_TRANSACTIONS_00	CL_ABAP_LIST_PARSER==========CP	CLAS	CL_ABAP_LIST_PARSER	METH	REFRESH_LSR_CONTAINER	CL_ABAP_LIST_PARSER	1
Batch Job	Z_CCM_DASHB_TRANSACTIONS_00	CL_ABAP_LIST_UTIL_INTERNAL====CP	CLAS	CL_ABAP_LIST_UTIL_INTERNAL	METH	LSR_INIT	CL_ABAP_LIST_UTIL_INTERNAL	1
Batch Job	Z_CCM_DASHB_TRANSACTIONS_00	CL_ABAP_REFDESCR==========CP	CLAS	CL_ABAP_REFDESCR	METH	CLASS_CONSTRUCTOR	CL_ABAP_REFDESCR	1
Batch Job	Z_CCM_DASHB_TRANSACTIONS_00	CL_ABAP_REFDESCR==========CP	CLAS	CL_ABAP_REFDESCR	METH	LOAD_CLASS	CL_ABAP_REFDESCR	1

Scoping Traces

- Auswertung
  - Eigene Liste (Ungenutzte Objekte := TADIR(Z*) minus SCMON)
  -

```
define view Zunused_obj_ddl
as select from tadir
association to susg_v_odata on tadir.obj_name = susg_v_odata.obj_name
and tadir.object = susg_v_odata.obj_type
{
max(susg_v_odata.last_used) as last_used,
tadir.object,
tadir.obj_name,
tadir.srcsystem,
tadir.author,
tadir.devclass,
tadir.created_on,
susg_v_odata.usgid,
sum(susg_v_odata.counter) ascounter
}
where
pgmid = 'R3TR' and( object = 'CLAS' or object = 'FUGR' or object = 'PROG' )
group by tadir.object, tadir.obj_name, tadir.srcsystem, tadir.author, tadir.devclass,
tadir.created_on, susg_v_odata.usgid
```

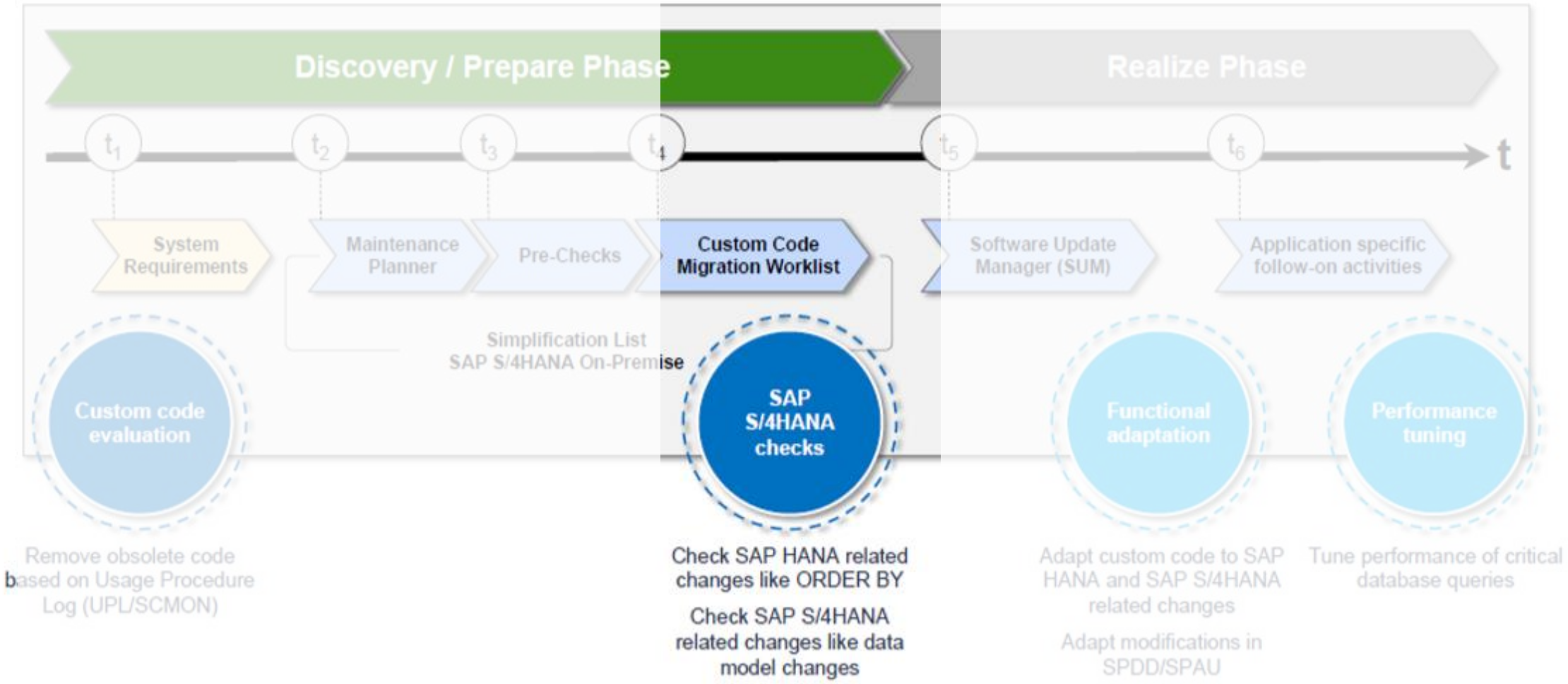
SCMON/ SUSG - DEMO

- SUSG
- SCMON
- /S4TF/I_UNUSED_V (Anzeigen)

Löschen und Archivieren

- Archivieren: ABAPGit (Format), da gut lesbar und einzeln rückladbar
- Löschen
  - Technisch per sog. Löschtransport
  - Challenge: offene Verwendungen
  - Lösung 1: Manuell und fehlerfrei -> Aufwand
  - Lösung 2: Per Toolbox / eigenem Tool und basierend Verwendungsnachweis

Analysen

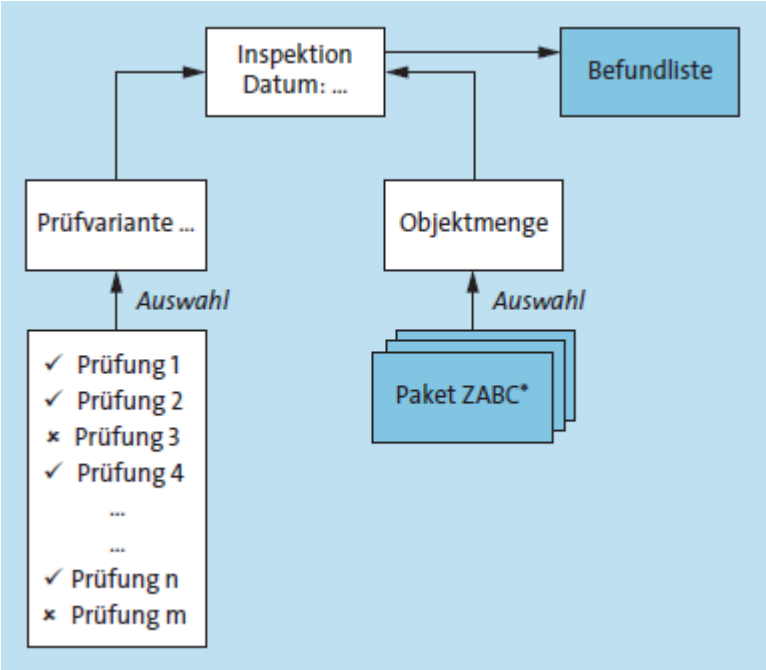

Discovery / Prepare Phase
Realize Phase
t1
t2
t3
t4
t5
t6
t
System Requirements
Maintenance Planner
Pre-Checks
Custom Code Migration Worklist
Software Update Manager (SUM)
Application specific follow-on activities
Simplification List SAP S/4HANA On-Premise
Custom code evaluation
SAP S/4HANA checks
Functional adaptation
Performance tuning
Remove obsolete code based on Usage Procedure Log (UPL/SCMON)
Check SAP HANA related changes like ORDER BY
Check SAP S/4HANA related changes like data model changes
Adapt custom code to SAP HANA and SAP S/4HANA related changes
Adapt modifications in SPDD/SPAU
Tune performance of critical database queries

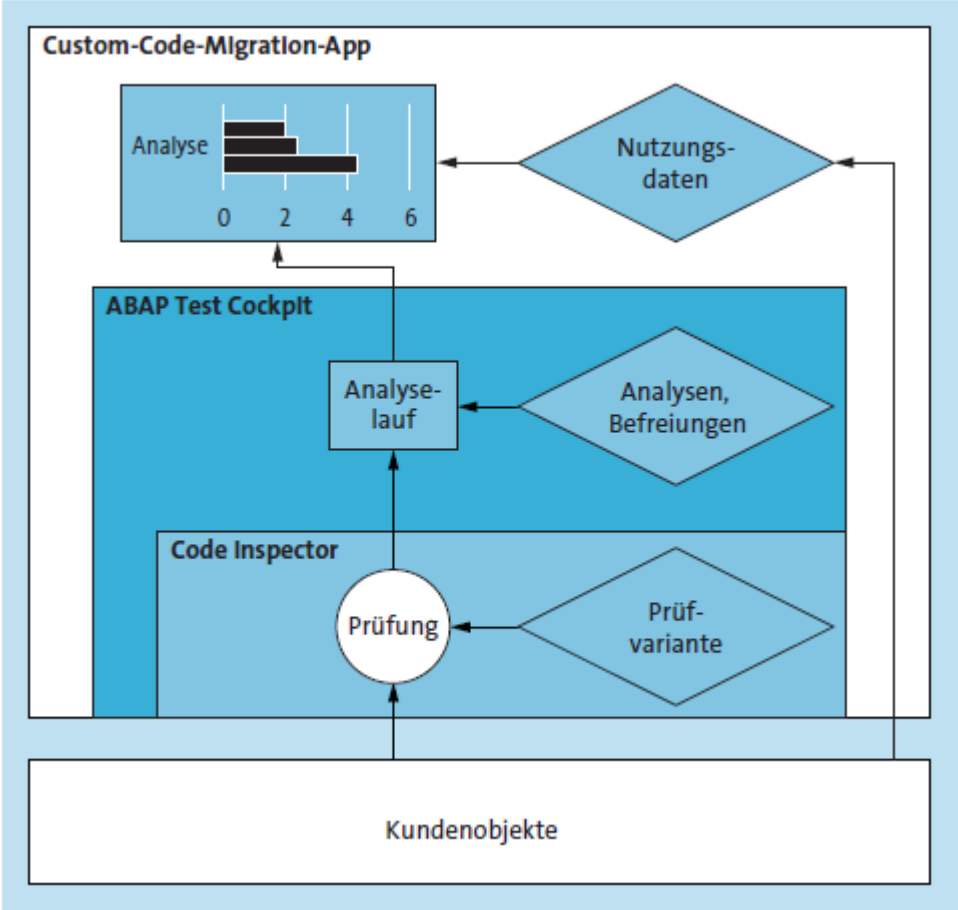
Analysen

- Welche Anpassungen müssen gemacht werden ?
- 2 Steps
  - HANA DB bezogen
  - S/4HANA bezogen
- Werkzeug der Wahl
  - ABAP Test Cockpit basierend auf Codeinspector
  - Benötigt Simplification List

Tools

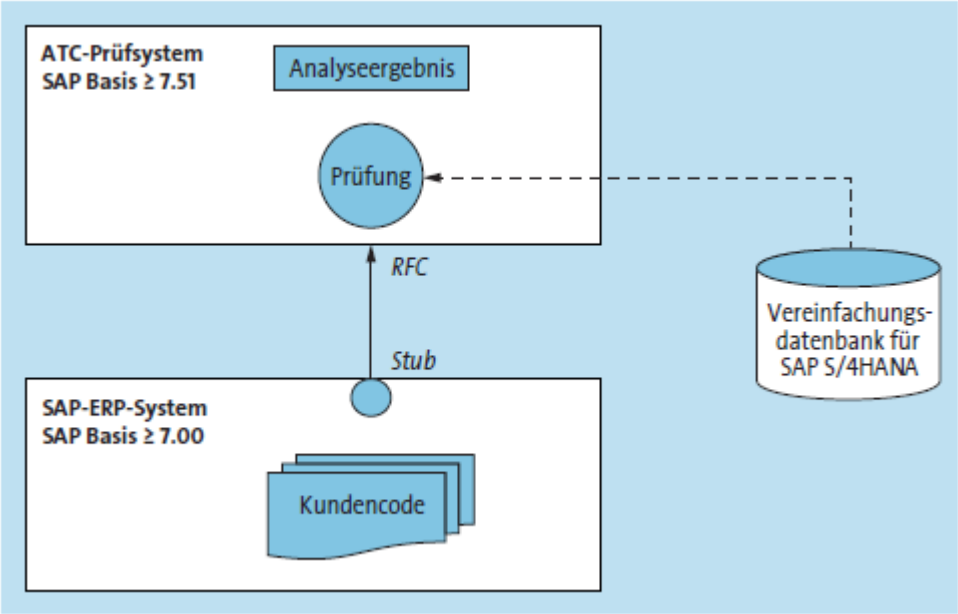
- Codeinspector -> ATC -> CCM App



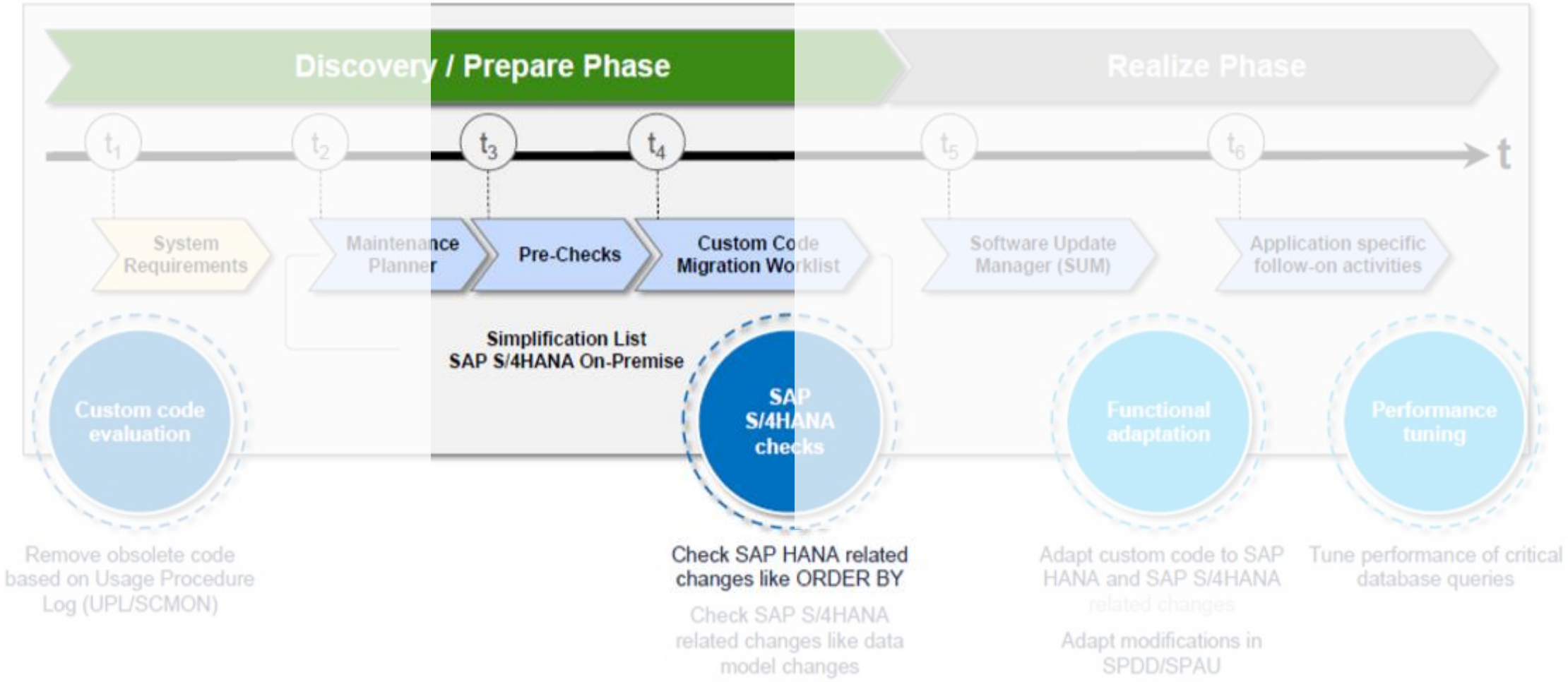


Tools

- ATC Remote Check für S/4HANA -> SAP ECC



HANA (DB) Checks and adaptation



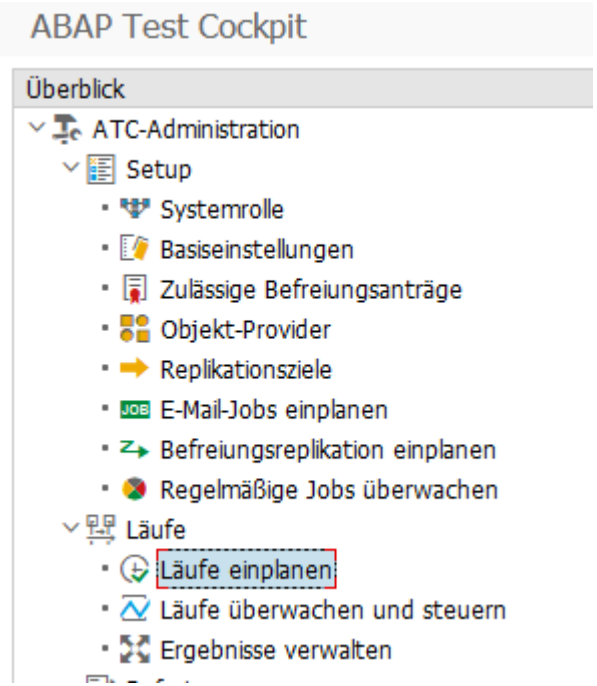
HANA DB Checks

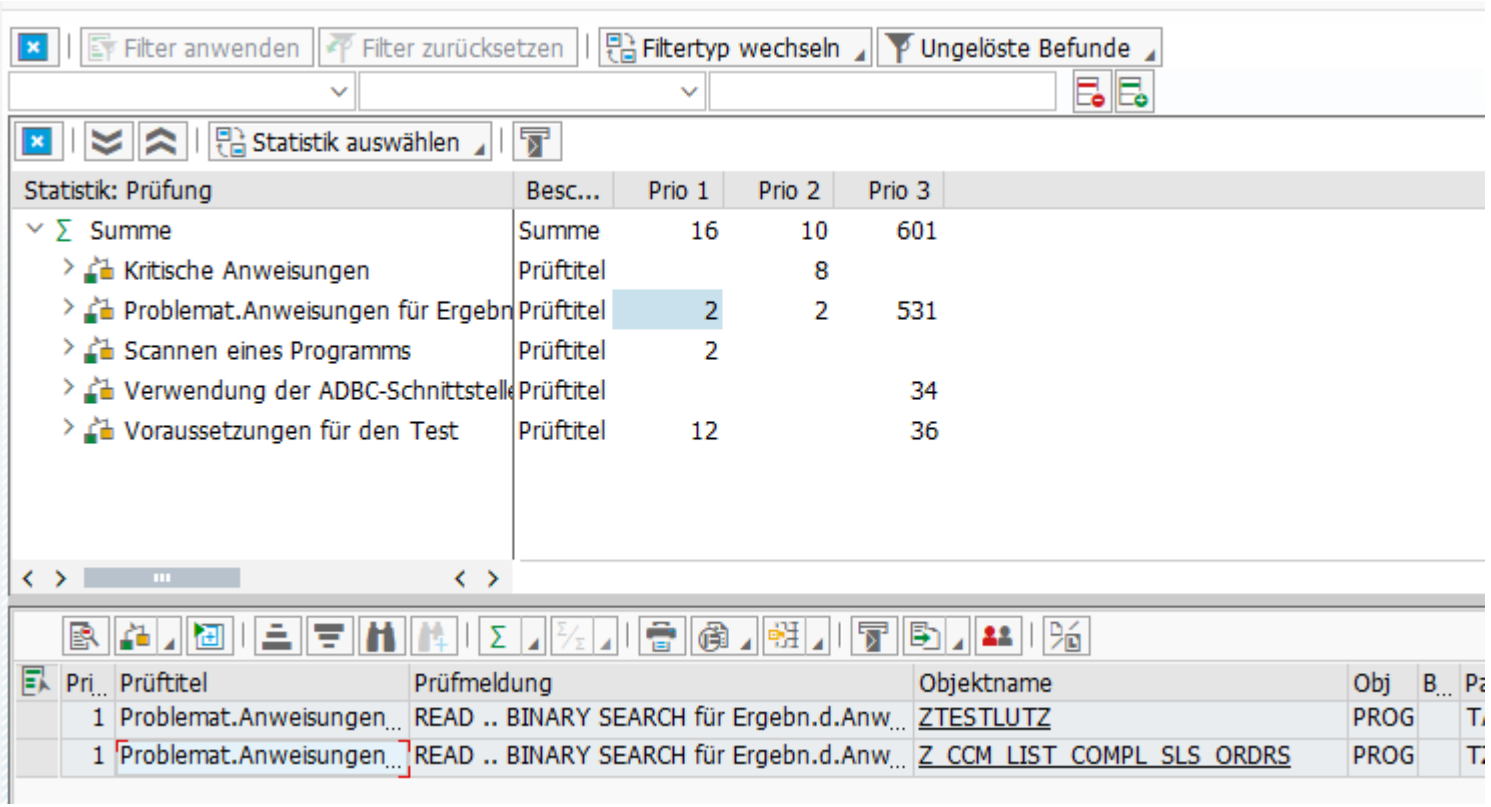
- Main Changes from AnyDB -> HANA (in memory) DB
  - No implicit sorting -> BINARY SEARCH fails
  - No / different Indizes, operations on pool / cluster tables
  - Different native SQL
  - (Performance) Select * but only a few fields needed, no WHERE clause

- Apply ATC Check with FUNCTIONAL_DB and/or FUNCTIONAL_DB_ADDITION locally in SAP ERP

ATC: Demo

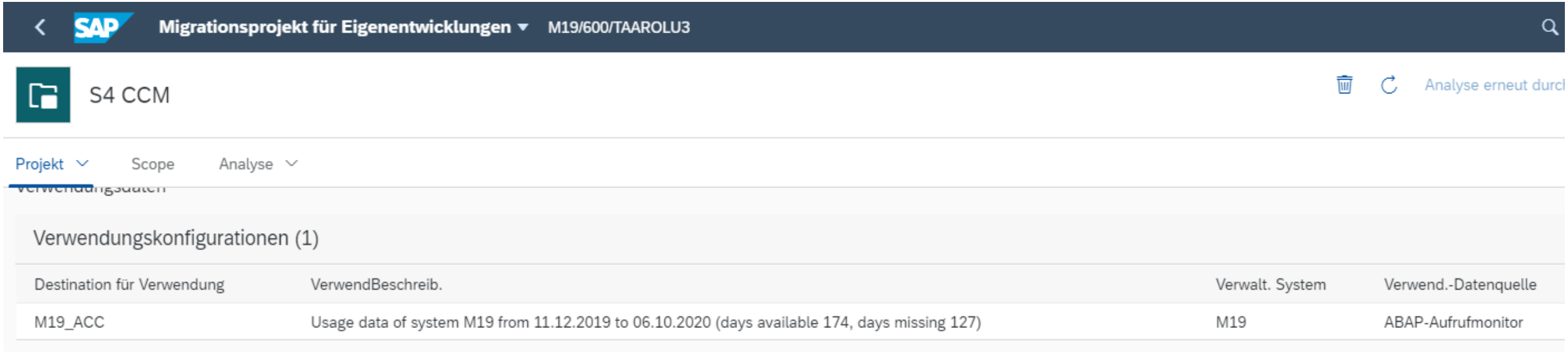
- Transaction ATC



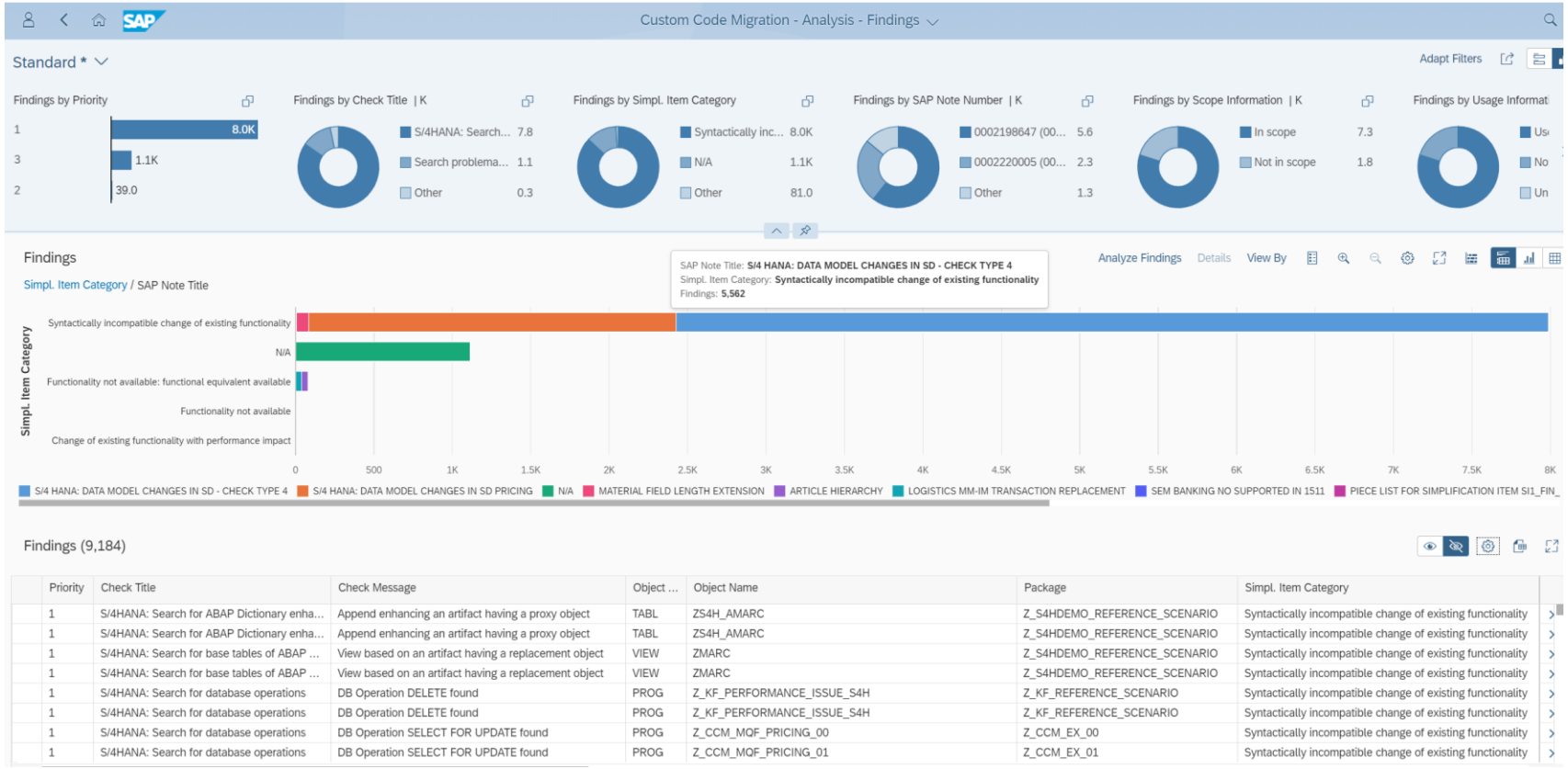


CCM App

- SUSG / SCMON is directly used in CCM App for Scoping
- Objects can be added to deletion transport -> deleted at import



Fiori Custom Code Migration



Priority	Check Title	Check Message	Object ...	Object Name	Package	Simpl. Item Category
1	S/4HANA: Search for ABAP Dictionary enha...	Append enhancing an artifact having a proxy object	TABL	ZS4H_AMARC	Z_S4HDEMO_REFERENCE_SCENARIO	Syntactically incompatible change of existing functionality
1	S/4HANA: Search for ABAP Dictionary enha...	Append enhancing an artifact having a proxy object	TABL	ZS4H_AMARC	Z_S4HDEMO_REFERENCE_SCENARIO	Syntactically incompatible change of existing functionality
1	S/4HANA: Search for base tables of ABAP ...	View based on an artifact having a replacement object	VIEW	ZMARC	Z_S4HDEMO_REFERENCE_SCENARIO	Syntactically incompatible change of existing functionality
1	S/4HANA: Search for base tables of ABAP ...	View based on an artifact having a replacement object	VIEW	ZMARC	Z_S4HDEMO_REFERENCE_SCENARIO	Syntactically incompatible change of existing functionality
1	S/4HANA: Search for database operations	DB Operation DELETE found	PROG	Z_KF_PERFORMANCE_ISSUE_S4H	Z_KF_REFERENCE_SCENARIO	Syntactically incompatible change of existing functionality
1	S/4HANA: Search for database operations	DB Operation DELETE found	PROG	Z_KF_PERFORMANCE_ISSUE_S4H	Z_KF_REFERENCE_SCENARIO	Syntactically incompatible change of existing functionality
1	S/4HANA: Search for database operations	DB Operation SELECT FOR UPDATE found	PROG	Z_CCM_MQF_PRICING_00	Z_CCM_EX_00	Syntactically incompatible change of existing functionality
1	S/4HANA: Search for database operations	DB Operation SELECT FOR UPDATE found	PROG	Z_CCM_MQF_PRICING_01	Z_CCM_EX_01	Syntactically incompatible change of existing functionality

SAP Fiori Custom Code Migration

Use display criteria ("View by"):

- SAP Note number
- Referenced simplified Object
- Application component

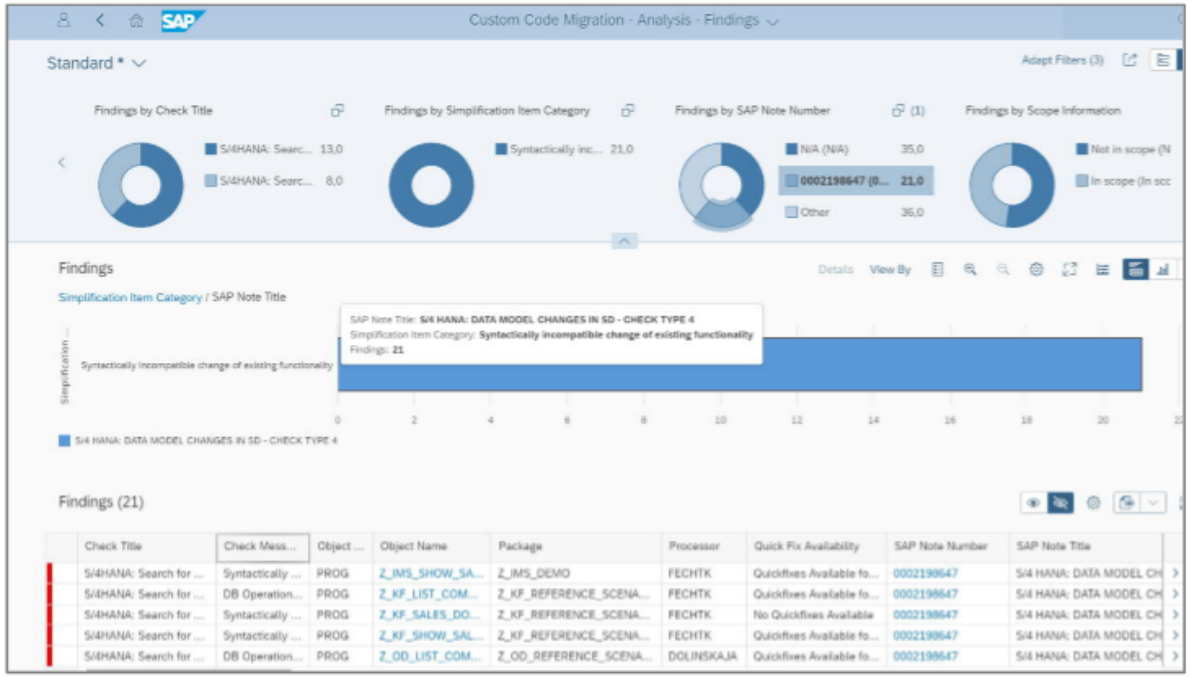
Use filters ("Findings by") and simplification information in ATC result list

- SAP Note number incl. title
- Referenced simplified object
- Application component

Use double-click navigation from ATC result

- Navigate to SAP Notes, Referenced Objects, ATC findings

Analysis in SAP Fiori Custom Code Migration App



Custom-Code-Anpassung für SAP HANA

- Beispiele für den Prüftitel »Kritische Anweisungen«
  - Verwendung von nativen SQL-Anweisungen
  - Verwendung eines Datenbank-Hints
- Beispiele für den Prüftitel »Problematische Anweisungen«
  - SELECT ... FOR-Cluster-Tabelle ohne ORDER BY
  - DELETE ADJACENT DUPLICATES
  - LOOP AT itab AT ... ENDAT
  - READ ... BINARY SEARCH
  - …
- Beispiele für den Prüftitel »DB-Operationen in Pool-/Cluster-Tabellen suchen«
  - Datenbankoperation SELECT für Tabellen-Cluster RFBLG
  - …
- Beispiele für den Prüftitel »Verwendung der ADBC-Schnittstelle«
- Suche von ABAP-Anweisungsmustern
  - 5.8.1 Aufruf des Funktionsbausteins DB_EXISTS_INDEX
  - 5.8.2 Aufruf des Funktionsbausteins DD_INDEX_NAME

Custom-Code-Anpassung für SAP HANA

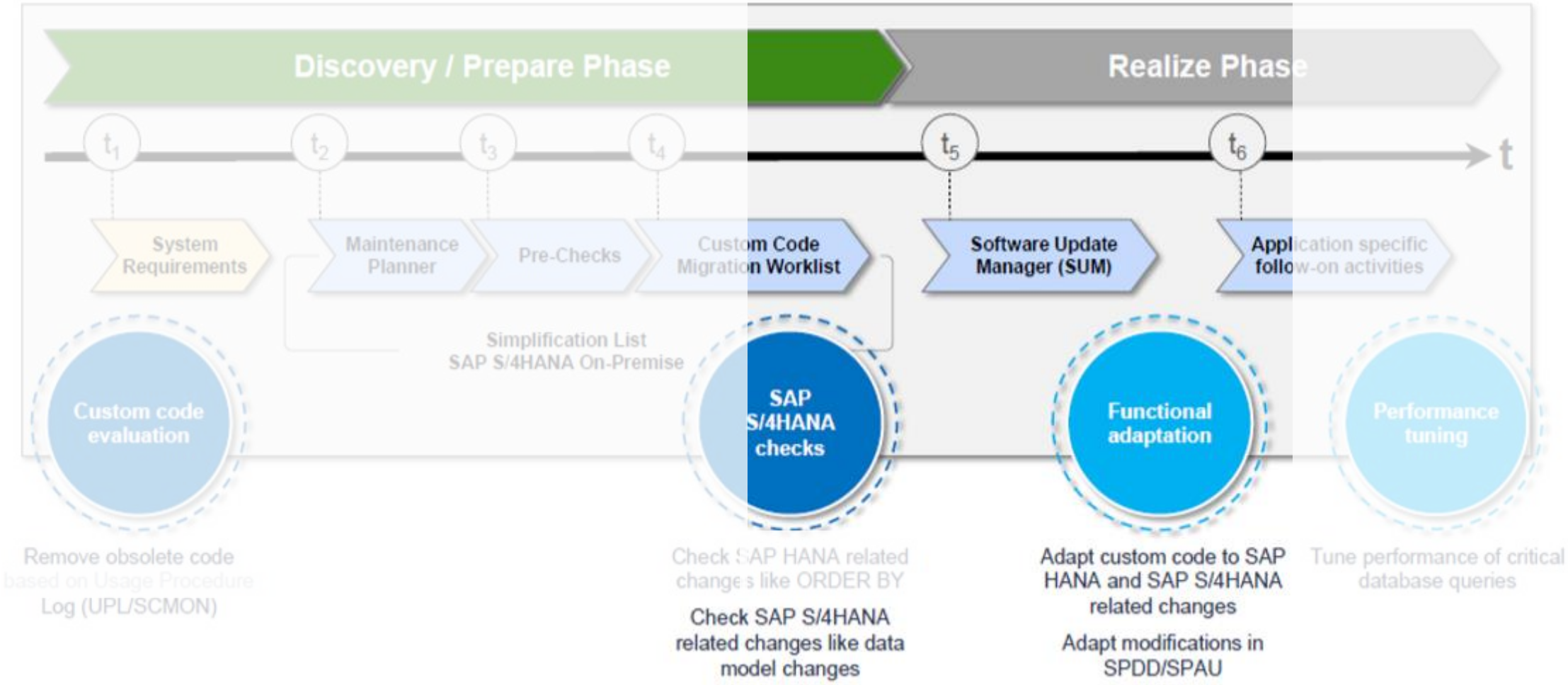
- Vorher

```
SELECT * FROM vbap
INTO TABLE @data(lt_vbap)
WHERE vbeln EQ @lv_vbeln.
READ TABLE lt_vbap INTO ls_vbap INDEX 1.
```

- Nachher

```
SELECT * FROM vbap
INTO TABLE @data(lt_vbap)
WHERE vbeln EQ @lv_vbeln
ORDER BY PRIMARY KEY.
READ TABLE lt_vbap INTO ls_vbap INDEX 1.
```

S/4HANA Checks und Anpassungen



Custom-Code-Anpassung für SAP S/4HANA

- **Beispiele für den Prüftitel »S/4HANA: Feldlängenerweiterungen«**
  - Vergleich-Längenkonflikt (Domäne MATNR)
  - Strukturkomponenten-Typkonflikt (Domäne MATNR)
  - …
- **Beispiele für den Prüftitel »S/4HANA: Nach ABAP-Dictionary-Erweiterungen suchen«**
  - Append erweitert ein vereinfachtes Artefakt (Tabelle MARC)
  - Append erweitert ein vereinfachtes Artefakt (Tabelle COEP)
- **Beispiele für den Prüftitel »S/4HANA: Nach Basistabellen der ABAP-Dictionary-Views suchen«**
  - View, basierend auf einem ersetzten Artefakt (Tabelle KONV)
  - View, basierend auf einem Artefakt mit einem Ersetzungsobjekt (Tabelle MKPF)
- **Beispiele für den Prüftitel »S/4HANA: Suche nach Datenbankoperationen«**
  - DB-Operation UPDATE wurde gefunden (Tabelle LFA1)
  - DB-Operation SELECT wurde gefunden (Tabelle KONV)
- **Beispiele für den Prüftitel »S/4HANA: Suche nach Verwendungen der vereinfachten Objekte«**
  - Syntaktisch nicht kompatible Änderung der vorhandenen Funktion (Datenelement VBTYP)
  - Semantisch nicht kompatible Änderung der vorhandenen Funktion (Transaktion XD02)
  - Verwendung eines nicht mehr verfügbaren Entwicklungsobjekts (Funktionsbaustein GET_WEEK_INFO_BASED_ON_DATE)
  - Funktion nicht verfügbar: funktionales Äquivalent verfügbar (Datenelement /BEV3/CHOBJBEZ)
  - …

Custom-Code-Anpassung für SAP S/4HANA

- **Beispiele für den Prüftitel »S/4HANA: Nach ABAP-Dictionary-Erweiterungen suchen«**
  - Append erweitert ein vereinfachtes Artefakt (Tabelle MARC)
  - Z-Felder an MARC müssen als CDS Extension zu NSDM_V_MARC erstellt werden

```
@AbapCatalog.sqlViewAppendName:'ZAMARC_V'
@EndUserText.label:'Extension view for Append ZAMARC'
@AccessControl.authorizationCheck: #NOT_REQUIRED

extend view nsdm_e_marc with ZAMARC_E
{
    zzwesch
}
```

Custom-Code-Anpassung für SAP S/4HANA

- **Beispiele für den Prüftitel »S/4HANA: Suche nach Datenbankoperationen«**
  - DB-Operation UPDATE wurde gefunden (Tabelle LFA1)
  - Statt LFA1 muss nun (per BAPI) der Business Partner aktualisiert werden, die CVI stellt die Integration nach LFA1 sicher

```
ls_lfa1-name2 = 'Test-Name 2'.

UPDATE lfa1 SET   name2 = ls_lfa1-name2
            WHERE lifnr = '0010300001'.
```

```
lv_lifnr = '0010300002'.
l_central_organ-name2 = 'Test-Name 2'.
l_central_organ_x-name2 = 'X'.

CALL FUNCTION 'BAPI_BUPA_CENTRAL_CHANGE'
  EXPORTING
    businesspartner           = lv_lifnr
    centraldataorganization   = l_central_organ
    centraldataorganization_x = l_central_organ_x
  TABLES
    return                    = lt_return.
```

Custom-Code-Anpassung für SAP S/4HANA

- **Beispiele für den Prüftitel »S/4HANA: Suche nach Verwendungen der vereinfachten Objekte«**
  - Verwendung eines nicht mehr verfügbaren Entwicklungsobjekts (Funktionsbaustein GET_WEEK_INFO_BASED_ON_DATE)

```
CALL FUNCTION 'GET_WEEK_INFO_BASED_ON_DATE'
 EXPORTING
   date          = sy-datum
 IMPORTING
   monday        = lv_start_date
   sunday        = lv_end_date.
```

```
CALL FUNCTION 'BWSO_DATE_GET_FIRST_WEEKDAY'
    EXPORTING
      date_in        = sy-datum
   IMPORTING
      date_out       = lv_start_date.

  CALL FUNCTION 'FIAPPL_ADD_DAYS_TO_DATE'
   EXPORTING
     i_date           = lv_start_date
     i_days           = 6
     signum           = '+'
   IMPORTING
     e_calc_date      = lv_end_date.
```

Quickfixes

- Halbautomatische Korrektur des Codes für S/4HANA aus Eclipse heraus
- Löst ca. 20 … 40% der Probleme
- Voraussetzungen + Guideline
- Problematik: wo gibt es Quickfixes -> nur per CCM App sichtbar
- Eigene Quickfixes entwickeln

Quick Fixes in Eclipse from ATC

workspace_2019_06 - Program Z_CCM_MQF_PRICING [M19] - active - M19_100_tzhknjo1_en - Eclipse Platform

File Edit Navigate Search Project Run Window Help

Project Explorer | CDS Navigator

- M18_600_tzhknjo1_en [M18, 600, TZHKNJO1, EN]
  - Local Objects ($TMP) (?)
  - Favorite Packages (63)
    - Z001 (63) *Customer development class*
  - System Library (?)
- M19_100_tzhknjo1_en [M19, 100, TZHKNJO1, EN]
  - Local Objects ($TMP) (?)
  - Favorite Packages (34)
    - Z_S4TF_CCM_QFIX (34) *Quickfixes Training*
      - Authorizations (1)
      - Source Code Library (33)
        - Classes (1)
        - Programs (32)
          - Z_CCM_ADJUST_CURRENCY_CODE *CustomCo*
          - Z_CCM_BSEG_DATA_CHECK *CustomCode Exar*
          - Z_CCM_LIST_COMPL_SLS_ORDRS *CustomCode*
          - Z_CCM_LIST_MARA_RECORDS *CustomCode E*
          - Z_CCM_LIST_MARC_RECORDS *CustomCode E*
          - Z_CCM_MATERIAL_EXISTS *CustomCode Examp*
          - Z_CCM_MQF_PRICING *CustomCode Example: F*
          - Z_CCM_MQF_SD *CustomCode Example: SD*
          - Z_CCM_SALES_DOCUMENTS *CustomCode Exa*

Outline

- Z_CCM_MQF_PRICING
  - TY_KONV_CUST
  - KONV
  - LS_KONV
  - LS_KONV_CUST
  - L_DATUM
  - LT_KONV_CUST
  - IV_WHERE
  - LT_KONV
  - LV_VALUE
  - LV_KONV_KRECH
  - L_KRECH
  - L_KSCHL

[M19] ZMW_S4HANA_PRICING | [M19] Z_CCM_MQF_SD | [M19] Z_CCM_MQF_PRICING

Z_CCM_MQF_PRICING

```
"Test case #21 Select Single Star No Target
SELECT SINGLE * FROM konv WHERE kposn = 3.

"Test case #22 Select Single Star No Where
SELECT SINGLE * FROM konv INTO ls_konv.

"Test case #23 Select * No Where
SELECT kschl krech FROM konv INTO TABLE lt_konv.

"Test case #24 Select * Single No Where
SELECT SINGLE kschl krech FROM konv INTO ls_konv.

"Test case #25  Select * into Table KONV APPENDING
SELECT * FROM konv APPENDING TABLE lt_konv .

*"Test case #26  Select * Up To 1 Rows into Table KONV
*select * up to 1 rows from konv into table lt_konv .

"Test case #27  Forbidden Field & Select into Table KONV
SELECT krech FROM konv INTO TABLE lt_konv_cust.

"Test case #28  Forbidden Field & Select into Table KONV APPENDING
SELECT krech FROM konv APPENDING TABLE lt_konv.

"Test case #29  Forbidden Field & Select into Table Cust APPENDING
SELECT krech FROM konv APPENDING TABLE lt_konv_cust.
```

Feature Explorer

Welcome!

This interactive view allows you to explore the features most favored by the ABAP in Eclipse development team. These are features that will help you get stuff done faster! Interested?

Click here to begin!

Problems | Properties | Task List | Feed Reader | Transport Organizer | Dictionary Log | ATC Problems

M19_100_tzhknjo1_en

type filter text

Description	Object Name	Lin...	Contact ...	Obj...
DB Operation SI	Z_CCM_MQF_PRI	93	TZHBEDUY	PROC
DB Operation SI	Z_CCM_MQF_PRI	96	TZHBEDUY	PROC
DB Operation SI	Z_CCM_MQF_PRI	99	TZHBEDUY	PROC
DB Operation SI	Z_CCM_MQF_PRI	102	TZHBEDUY	PROC
DB Operation SELECT found (KONV S/4HANA: Z_S4TF_CCI	Z_CCM_MQF_PRI	105	TZHBEDUY	PROC
DB Operation SELECT found (KONV S/4HANA: Z_S4TF_CCI	Z_CCM_MQF_PRI	108	TZHBEDUY	PROC
DB Operation SELECT found (KONV S/4HANA: Z_S4TF_CCI	Z_CCM_MQF_PRI	114	TZHBEDUY	PROC

Go to Development Object — Enter
Copy — Ctrl+C
Request Exemption
Recommended Quick Fixes...
Quick Fix... — Ctrl+1
Recheck
Change Contact Person...
Group By
Configure Columns

Details

Details of Analysis

- DB Operation SELECT found (KONV, see Note(s):0002220005)
- Finding can be suppressed with pseudo comment "#ECC CI_DB_OPERATION_OK[2220005]
- Metrics:

DEU 11:54

Quick Fix

Quick Fix

Select the fix for 'SELECT ... FOR (former) cluster table KONV without ORDER BY found: Search problematic statements for result of SELECT/OPEN CURSOR without ORDER BY'.

Select a fix:

Append ORDER BY PRIMARY KEY to the SELECT statement

Problems:

Resource	Location
☑ ZMW_S4HANA_PRICING (Program)	line 286

Select All

Deselect All

Finish

Cancel

Mass Quick Fixes (Eclipse ABAP)

ATC Problems

M19_600_taarolu3_de ▸ S4HANA_READINESS_1809 ▸ Paket: ZTAAROLU3 (Pakete Lutz)

type filter text

Description	Lin...	Contact Pe...	Obje...	Check
DB-Operation SELECT wurde gefunden (VBUP, siehe Hinweis(e):0002198647)	420	TAAROLU3	PROG	S/4HANA: Suche nach Datenbankoperationen
DB-Operation SELECT wurde gefunden (VBUP, siehe Hinweis(e):0002198647)	424	TAAROLU3	PROG	S/4HANA: Suche nach Datenbankoperationen
DB-Operation SELECT wurde gefunden (VBUP, siehe Hinweis(e):0002198647)	443	TAAROLU3	PROG	S/4HANA: Suche nach Datenbankoperationen
DB-Operation SELECT wurde gefunden (VBUP, siehe Hinweis(e):0002198647)	448	TAAROLU3	PROG	S/4HANA: Suche nach Datenbankoperationen
DB-Operation SELECT wurde gefunden (VBUP, siehe Hinweis(e):0002198647)	453	TAAROLU3	PROG	S/4HANA: Suche nach Datenbankoperationen
DB-Operation SELECT wurde gefunden (VBUP, siehe Hinweis(e):0002198647)	462	TAAROLU3	PROG	S/4HANA: Suche nach Datenbankoperationen
DB-Operation SELECT wurde gefunden (VBUP, siehe Hinweis(e):0002198647)	467	TAAROLU3	PROG	S/4HANA: Suche nach Datenbankoperationen
DB-Operation SELECT wurde gefunden (VBUP, siehe Hinweis(e):0002198647)	473	TAAROLU3	PROG	S/4HANA: Suche nach Datenbankoperationen
DB-Operation SELECT wurde gefunden (VBUP, siehe Hinweis(e):0002198647)	479	TAA		nkoperationen
DB-Operation SELECT wurde gefunden (VBUP, siehe Hinweis(e):0002198647)	490	TAA		nkoperationen
READ .. BINARY SEARCH für Ergebn.d.Anweisung in Include ZTESTLUTZ Zeile 9	11	TAA		ebnis von SELECT/OPEN CUI
Warnings (1 Warnings)				
Nicht-strategische Funktion: kein funktionales Äquivalent (TTYP TT_BAPIRET2, Siehe	74	TAA		ungen der vereinfachten Obj
Infos (2 Infos)				
SELECT SINGLE möglicherweise nicht eindeutig	36	TAA		ebnis von SELECT/OPEN CUI
SELECT SINGLE möglicherweise nicht eindeutig	50	TAA		ebnis von SELECT/OPEN CUI

Copy Ctrl+C
Recommended Quick Fixes...
Recheck
Change Contact Person...
Group By
Configure Columns

- ORDER BY PRIMARY Key
- SELECT FROM VBUK…
- SELECT FROM KONV..

https://blogs.sap.com/2018/10/02/semi-automatic-custom-code-adaptation-after-sap-s4hana-system-conversion/

Quick Fixes

- https://blogs.sap.com/2020/05/18/comments-for-the-adt-quick-fixes/

Original Source

```
11            i_kposn like konv-kposn,
12            i_stunr like konv-stunr,
13            i_zaehk like konv-zaehk.
14
15 selection-screen skip.
16
17 parameters: i_waersn like konv-waers obligatory default 'EUR'.
18
19 select single * from konv where knumv = i_knumv
20                              and kposn = i_kposn
21                              and stunr = i_stunr
22                              and zaehk = i_zaehk.
23
24 if sy-subrc = 0.
```

Refactored Source

```
19 TRY.
20
21 CL_PRC_RESULT_FACTORY=>GET_INSTANCE( )->GET_PRC_RESULT( )->GET_PRIC
22   EXPORTING IT_SELECTION_ATTRIBUTE = VALUE #(
23  ( fieldname = 'KNUMV' value = I_KNUMV )
24  ( fieldname = 'KPOSN' value = I_KPOSN )
25  ( fieldname = 'STUNR' value = I_STUNR )
26  ( fieldname = 'ZAEHK' value = I_ZAEHK )
27  )
28   IMPORTING ET_PRC_ELEMENT_CLASSIC_FORMAT = DATA(ETL19C0R7986) ).
29 KONV = ETL19C0R7986[ 1 ].
30 CATCH CX_PRC_RESULT CX_SY_ITAB_LINE_NOT_FOUND .
31   SY-SUBRC = 4.
32 ENDTRY.
```

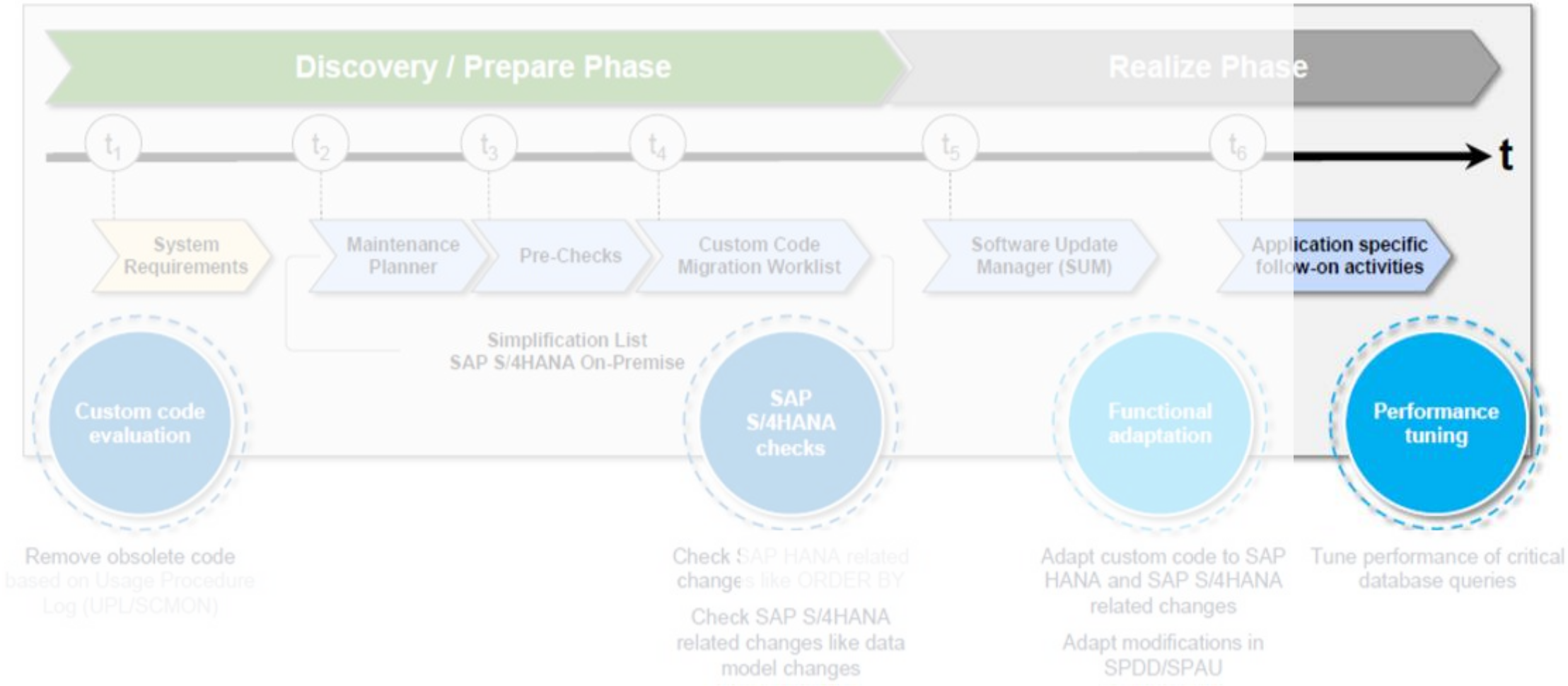
Original Source

```
28 *      where vbeln = lt_vbak-vbeln and gbstk = 'C'.
29
30
31   select * from vbuk
32       into table lt_vbuk
33       for all entries in lt_vbak
34       where vbeln = lt_vbak-vbeln and gbstk = 'C' ORDER BY PRIMARY KEY.
35 * End of Quick Fix
36
37
38   loop at lt_vbak into data(ls_vbak).
39
40     read table lt_vbuk with key vbeln = ls_vbak-vbeln binary search transporting no fi
```

Refactored Source

```
31
32 * Quick Fix Replace VBUK table access with the access of compatibility view V_VBUK_S4
33 * Transport CWJK900919 Demos
34 * Replaced Code:
35 *   select * from vbuk
36 *       into table lt_vbuk
37 *       for all entries in lt_vbak
38 *       where vbeln = lt_vbak-vbeln and gbstk = 'C' ORDER BY PRIMARY KEY.
39
40 SELECT FROM V_VBUK_S4 FIELDS * FOR ALL ENTRIES IN @LT_VBAK WHERE VBELN = @LT_VBAK-VBELN AND GBSTK = 'C' ORD
41 * End of Quick Fix
42
43 * End of Quick Fix
44
```

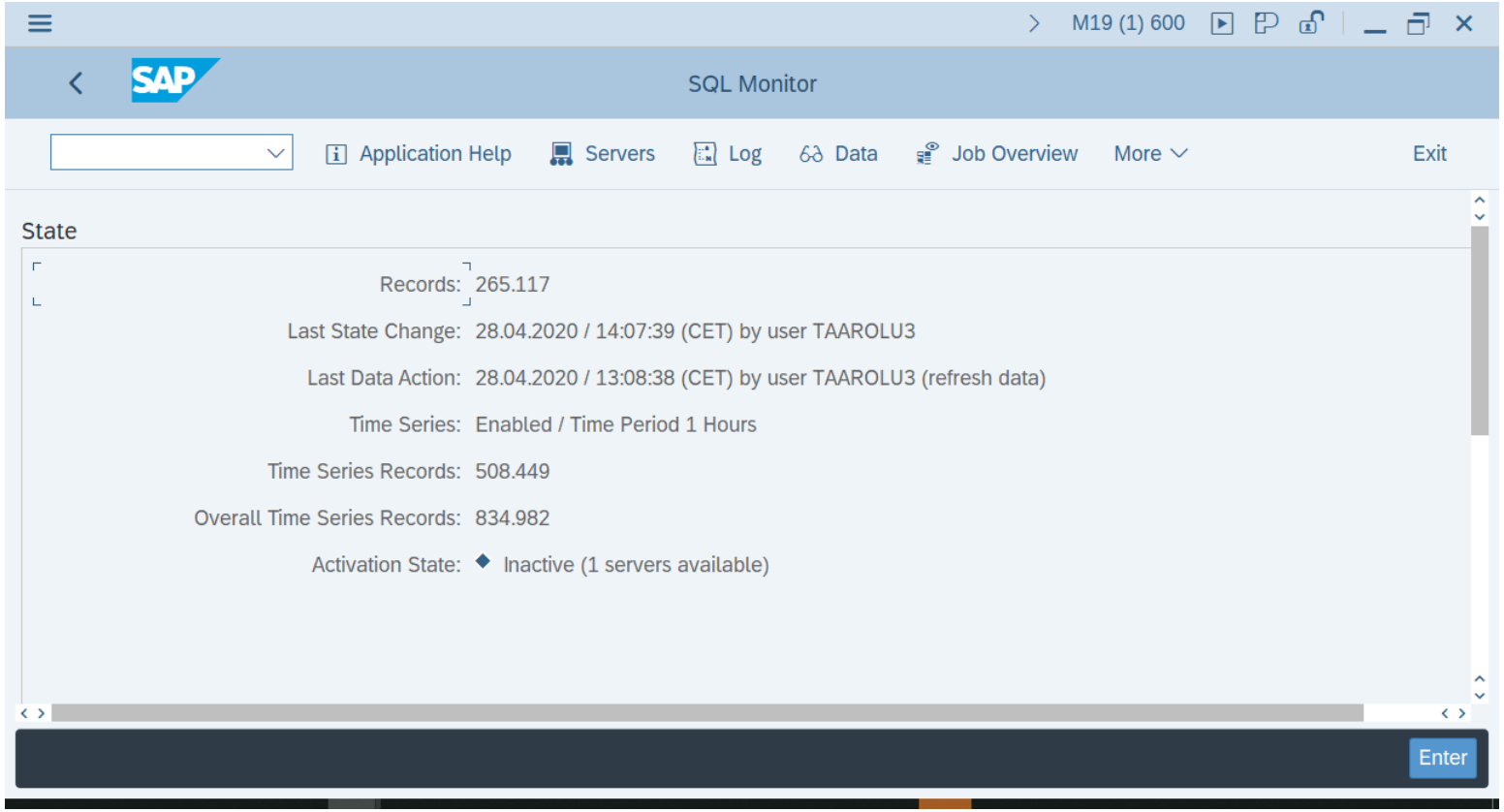
S/4HANA Optimierung



S/4HANA Optimierung

- Optimierungswerkzeuge / DB
  - SQL Monitor
  - SQL Performance Tuning Worklist
  - ATC / Performance Checks
  - Runtime Check Monitor
- Technische Neuerungen im ABAP und S/4HANA
  - Code Push Down Principle / Golden Rules DB
  - Core Data Services/ AMDP
  - Neuer ABAP
  - ABAP RESTFUL
  - Extensibility im S/4HANA

SQLM: SQL Monitor



Performance Tuning

Also for Dynamic Statements

SWLT: SQL Monitor & ATC combined

Arbeitsvorrat für SQL-Performanceoptimierung

Hilfe zur Anwendung

Ergebnisübersicht: 13 Befunde

Reportname	Include-Name	InclZeile	ABAP-Quelltextfragment	Anz...	Befu...	Maximale DB-Zeit	Min.DB-Z.	DB-AbwZeit	Sätze	Max. Sät...	Min. S
ZTEMP	ZTEMP	10	SELECT SINGLE LANDX FROM T005T INTO @DATA(LV_...	1	1	2,449	0,251	0,111	1.530	255	
ZS4TFFIORIMENU	ZS4TFFIORIMENU	26	SELECT SINGLE * FROM /UI2/PB_C_PAGEM INTO @DA...	2	2	8,485	0,528	1,788	2	1	
ZS4TFFIORIMENU	ZS4TFFIORIMENU	38	SELECT SINGLE * FROM /UI2/PB_C_CHIPM INTO @DAT...	2	2	8,115	0,387	2,599	6	1	
ZS4TFFIORIMENU	ZS4TFFIORIMENU	36	SELECT SINGLE * FROM /UI2/PB_C_CHIPM INTO @DAT...	2	2	1,066	0,685	0,129	8	1	
ZS4TFFIORIMENU	ZS4TFFIORIMENU	50	SELECT SINGLE * FROM /UI2/PB_C_PROPMT INTO @D...	1	1	16,544	0,857	5,314	0	0	
ZS4TFFIORIMENU	ZS4TFFIORIMENU	47	SELECT SINGLE * FROM /UI2/PB_C_CHIPMT INTO @DA...	1	1	7,701	0,717	2,434	0	0	
ZSWLT_EXAMPLE	ZSWLT_EXAMPLE	11	SELECT * FROM BUT000 INTO @DATA(LV_BUT000).	3	3	172,684	4,334	63,508	1.407	210	
ZS4TFEXAMPLEABAP	ZS4TFEXAMPLEABAP	62	SELECT FROM BUT000 FIELDS PARTNER , TYPE , BU_S...	1	1	0,689	0,587	0,051	567	189	
ZS4TFEXAMPLEABAP	ZS4TFEXAMPLEABAP	108	SELECT * FROM TBTCJOBLOG0 INTO TABLE @DATA(L...	2	2	113,121	109,836	1,670	247.542	82.560	82.

SQL-Monitor-Ergebnisse für SSEL START-OF-SELECTIO...

Anfragetyp	Anfrageeinstiegspkt.	SQL-Operationstyp	Tabellennar
Report starten	ZSWLT_EXAMPLE	SELECT (Open SQL)	BUT000

Prüfdokumentation anzeigen

Befunde der statischen Prüfung für SSEL START-OF-SELECTION:00 (Z...

Prüftitel	Prüfmeldung	Zusatzinformationen
Analyse der WHERE-Bedingung für S...	Große Tabelle ..: Keine WHERE-Bedin...	
SELECT-Anweisungen mit anschließe...	SELECT auf Tabelle .. mit anschließe...	
Problemat.SELECT *-Anweisungen s...	SELECT-Anweisung kann transf.werd...	SELECT * FROM BUT000 [ZS...

Performance Tuning

Icon	Rule	Details / Examples
	Keep the result sets small	• Do not retrieve rows from the database and discard them on the application server using CHECK or EXIT, e.g. in SELECT loops • Make the WHERE clause as specific as possible
	Minimize amount of transferred data	• Use SELECT with a field list instead of SELECT * in order to transfer just the columns you really need • Use aggregate functions (COUNT, MIN, MAX, SUM, AVG) instead of transferring all the rows to the application server
	Minimize the number of data transfers	• Use JOINs and / or sub-queries instead of nested SELECT loops • Use SELECT ... FOR ALL ENTRIES instead of lots of SELECTs or SELECT SINGLEs • Use array variants of INSERT, UPDATE, MODIFY, and DELETE
	Minimize the search overhead	• Define and use appropriate secondary indexes
	Keep load away from the database	• Avoid reading data redundantly • Use table buffering (if possible) and do not bypass it • Sort Data in Your ABAP Programs

Most important in SAP HANA

Less important in SAP HANA

But use database instead of ABAP for calculations

Performance Tuning: Code Push Down

- HANA DB can much more now:
  - Inner/ Outer/ Cross JOINs
  - Various field calculations (virtual fields)
  - Functions / IF /CASE
  - More
- Replace
- SELECT into ITAB.

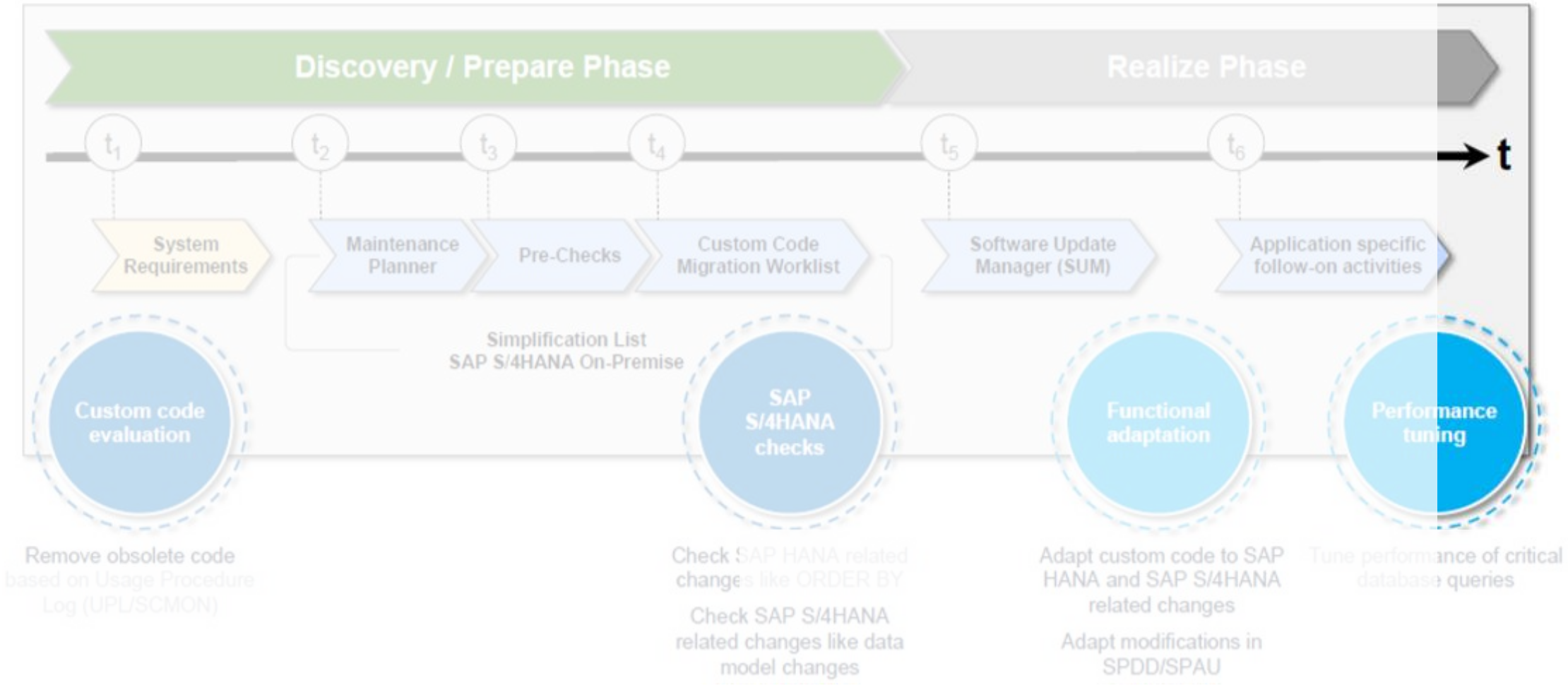
```
        LOOP AT ITAB.
                Do sth.
        ENDLOOP.
```

- -> By (complexer) SELECTs or Core Data Services + Select

Performance Tuning: Code Push Down

```
SELECT FROM but000 AS bupa LEFT OUTER JOIN but021_fs AS link  ON bupa~partner = link~partner
            LEFT OUTER JOIN adrc AS adresse "Join BUT000->BUT021_FS->ADRC
            ON link~addrnumber = adresse~addrnumber AND  adresse~city1 <> '"Adresse ohne Stadt -> NULL
FIELDS
            bupa~partner AS partner,
            bupa~bu_sort1 AS bu_sort1,
            bupa~type AS type,
CASE bupa~type "case 1=Person, 2=Organisation
            WHEN '2' THEN bupa~name_org1 "Namen übernehmen
            WHEN '1' THEN concat_with_space( "Namen zusammensetzen
                        bupa~name_first ,  bupa~name_last , 1 )
END AS bupa_name , "neues berechnetes Namensfeld
coalesce( adresse~city1, 'keine Adresse' ) AS city1 "leere Stadt oder keine Adresse ->
```

S/4HANA – how to develop now ?

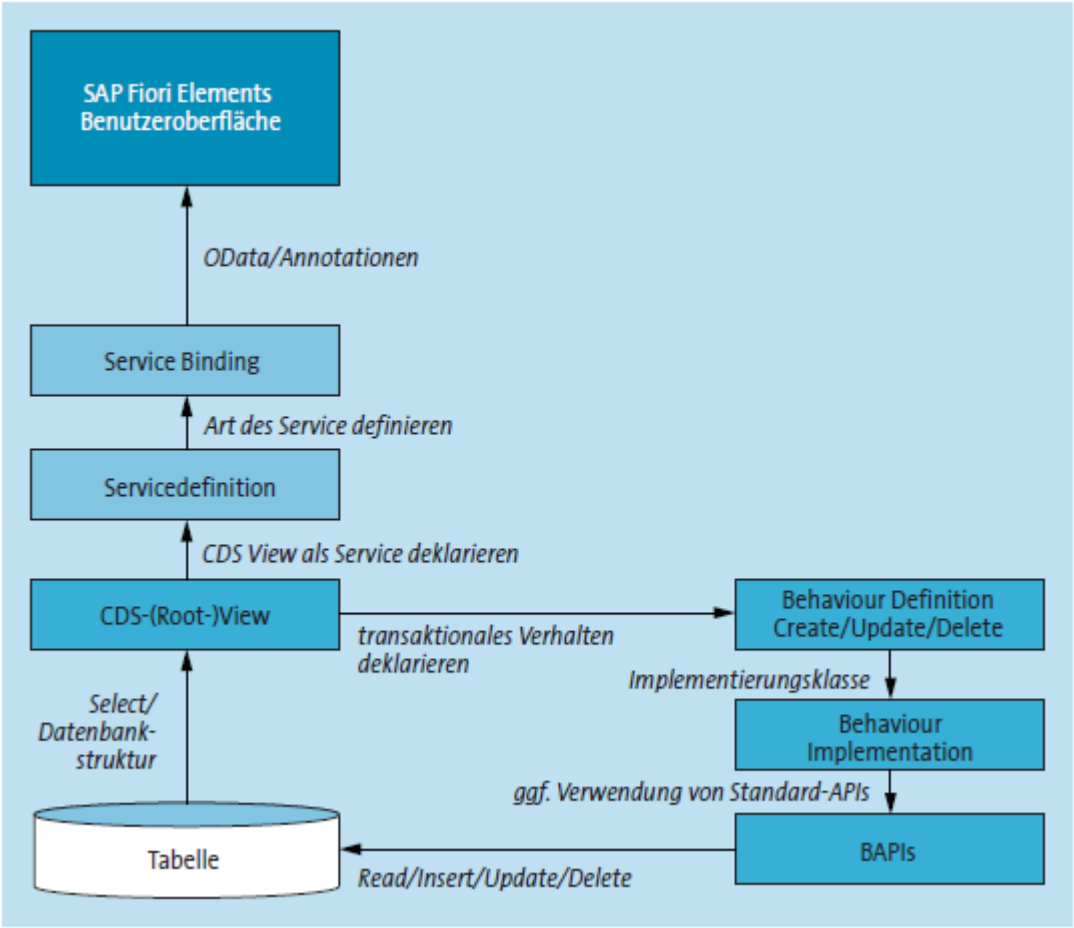


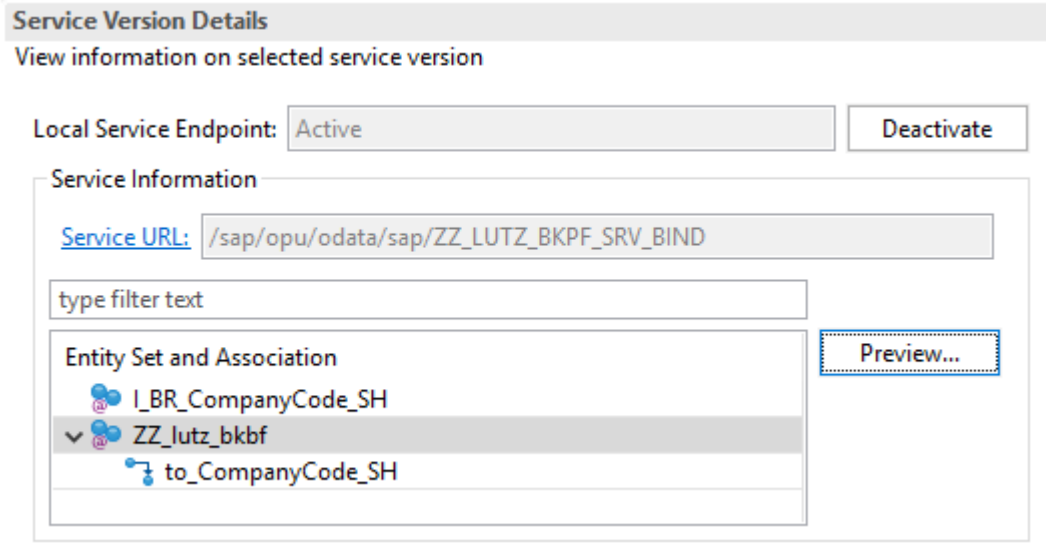
What's cool & new ?

- No obsolete statements
- Real ABAP OO
- New ABAP Syntax, some examples
  - Inline declarations
  - NEW
  - VALUE
  - CAST / CONF
  - COND/ SWITCH
  - String functions
  - Internal table functions
  - more

What's cool & new ?

- ABAP Restful model (from CDS via objects to Fiori) even without WEBIDE



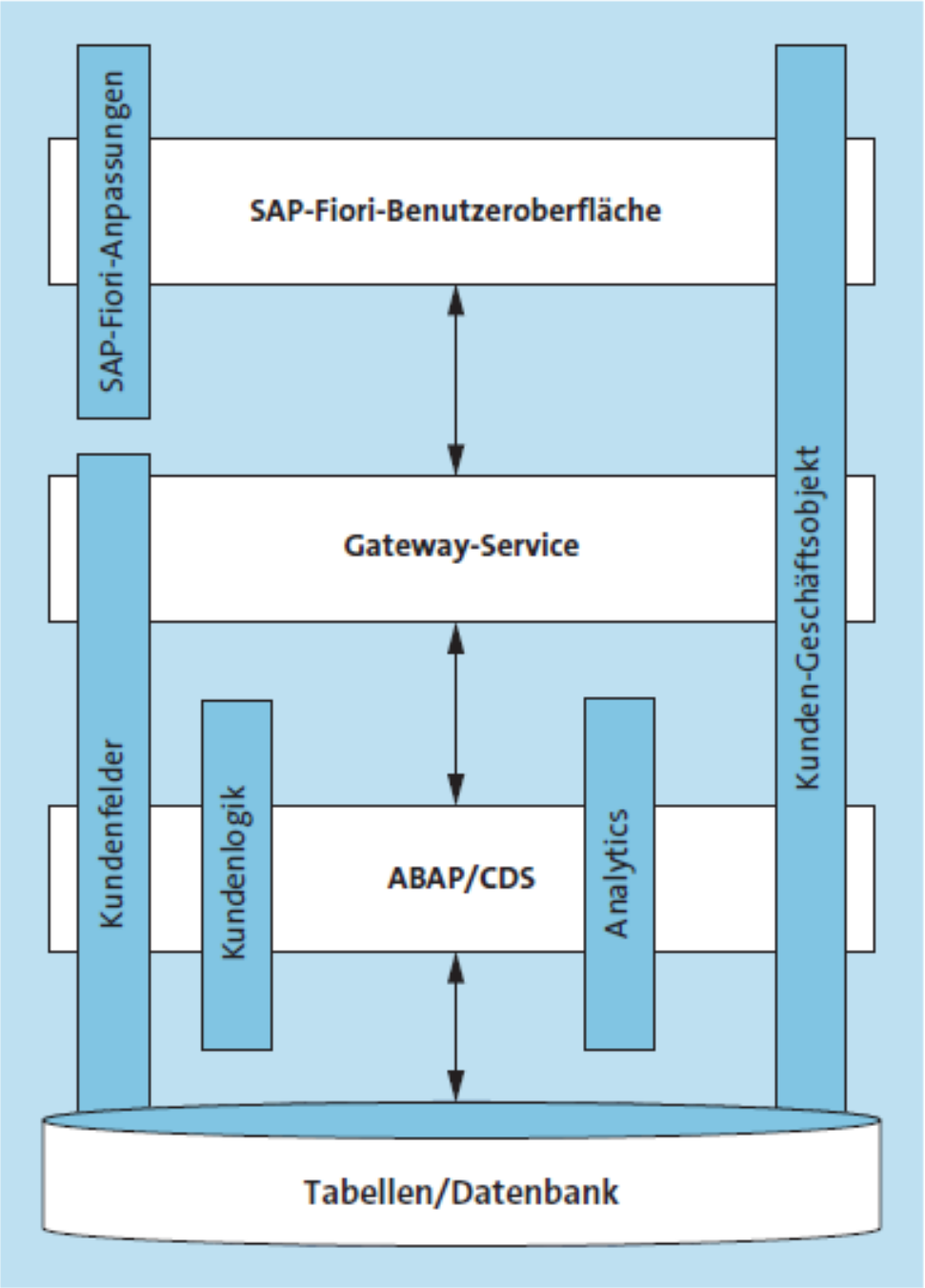


What's cool & new ?

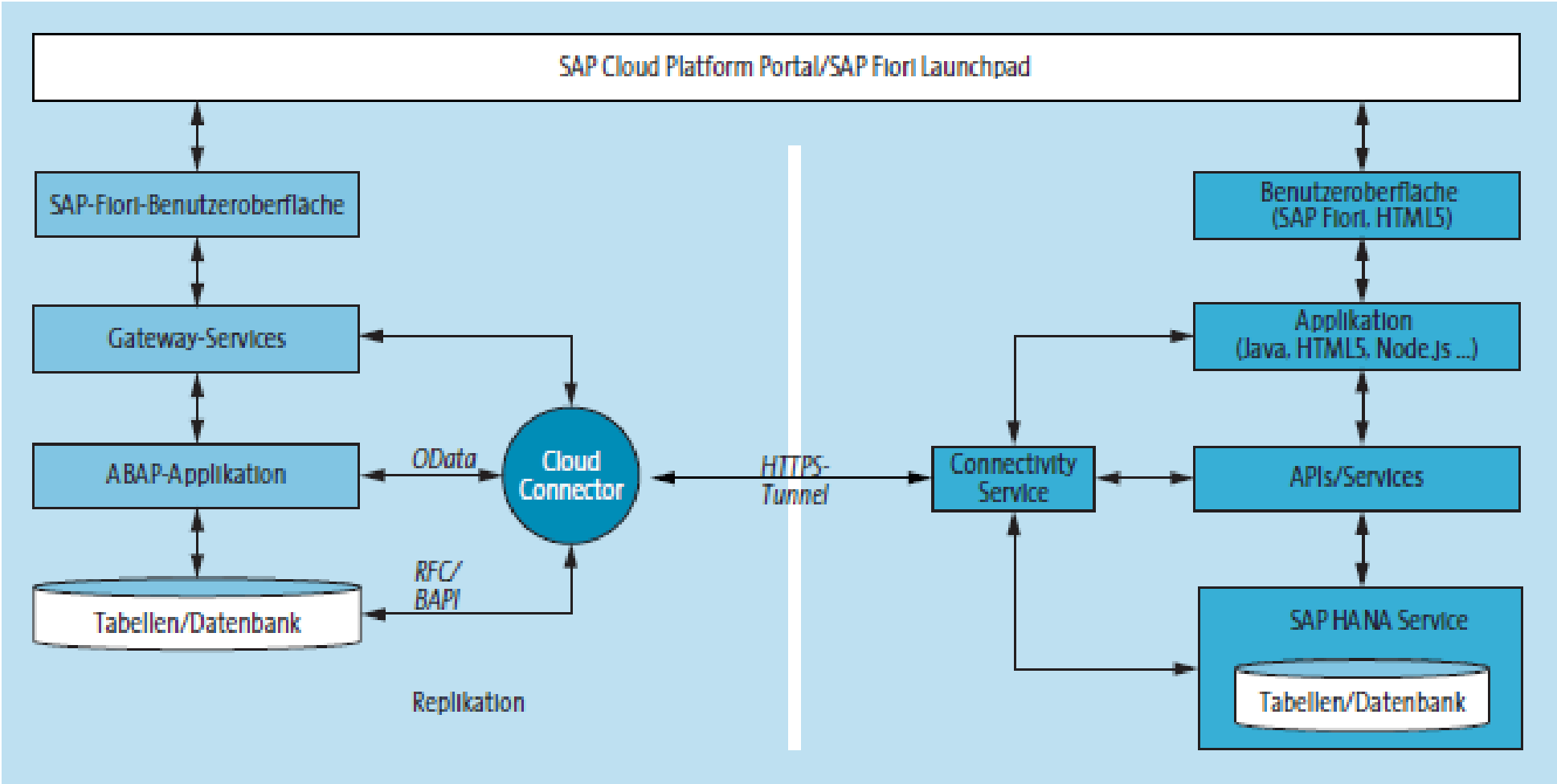
- New Extensibility Options
  - In App: integrated modelbased approach
    - Example: Sales Order

  - Side By Side: backend + cloud loosly coupled
  - Clean Core: develop clould like ABAP (whitelisted objects, service architecture, no old dynpro/ lists)

In App

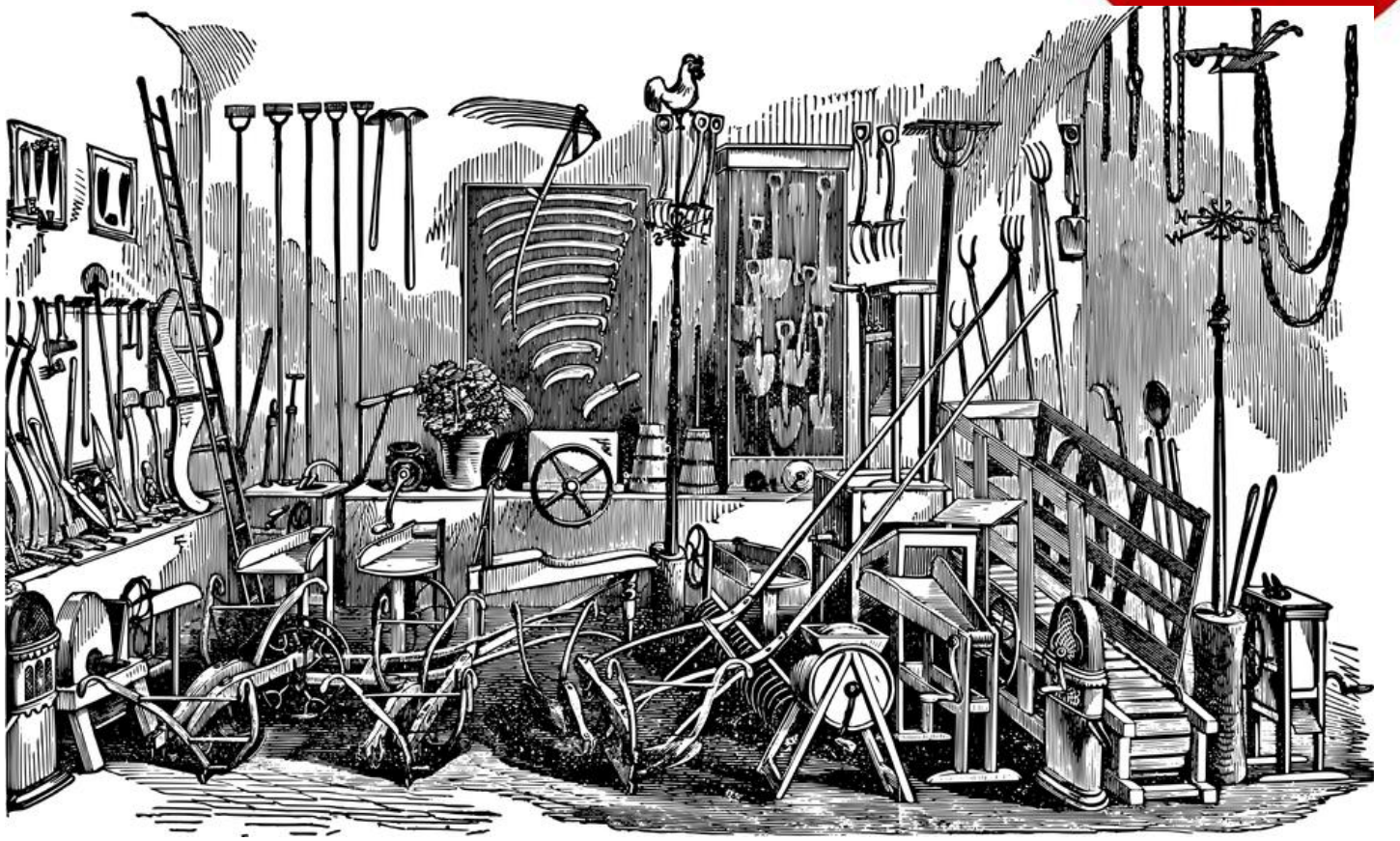

SAP-Fiori-Anpassungen
SAP-Fiori-Benutzeroberfläche
Kunden-Geschäftsobjekt
Gateway-Service
Kundenfelder
Kundenlogik
ABAP/CDS
Analytics
Tabellen/Datenbank

SideBySide


SAP Cloud Platform Portal/SAP Fiori Launchpad
SAP-Fiori-Benutzeroberfläche
Gateway-Services
ABAP-Applikation
Tabellen/Datenbank
OData
RFC/
BAPI
Cloud
Connector
HTTPS-
Tunnel
Replikation
Connectivity
Service
Benutzeroberfläche
(SAP Fiori, HTML5)
Applikation
(Java, HTML5, Node.js ...)
APIs/Services
SAP HANA Service
Tabellen/Datenbank

Partnertools

- SNP
- All for One Group
- Swisscom S4TF Toolbox
- smartShift



Swisscom S4TF Toolbox

- Im Beratungsalltag enstanden
- Analyse für Löschungen / Verwendungen
- Transportstücklisten vereinfachtes Handling
- Selektive Migration ab Einstiegsobjekt
- U.v.a.m.

Objektname	Beschreibung
ZS4TF_CUSTOM_CODE	S4TF Toolbox, Z Namenskopie für Kundeneinsatz
Dictionary-Objekte	
Klassenbibliothek	
Programme	
ZS4TF_CHECK_BP_NR	Check BP Number Ranges
ZS4TF_COPY_DDIC_SUM_FIX	Programm /S4TF/COPY_DDIC_SUM_FIX
ZS4TF_CORRECT_CORRECT_TDEVC	Setzte TDEVC Transportlayer und leere Felder
ZS4TF_CORRECT_TADIR	Setze TADIR auf lokales System
ZS4TF_CREATE_TOC_FROM_CORR	Erzeuge Transport of Copies von Vorlage
ZS4TF_CREATE_TOC_FROM_DATE	Erzeuge Transport of Copies von Transporten ab Datum
ZS4TF_CREATE_TOC_FROM_DIFF	Erzeuge Transport of Copies/ Differenz 2 Aufträge
ZS4TF_CREATE_TOC_FROM_SELOPT	Erzeuge Transport of Copies von Eingabe
ZS4TF_CREATE_TOC_FROM_STRING	Erzeuge Transport of Copies von Eingabe
ZS4TF_DELETION_TRANSPORT	Erstellen Löschtransport (löscht bei Import)
ZS4TF_DISPLAY_SUSG_COMPRESSED	SUSG Daten komprimiert anzeigen für Weiterverarbeitung
ZS4TF_DISPLAY_SUSG_TADIR	Anzeige TADIR und SUSG Zuordnungen für Nutzungsstatistik
ZS4TF_EVALUATE_TOC_OBJS	ToC auswerten und Masterobjekte bestimmen
ZS4TF_EXCLUSIVE_USAGES	EXCLUSIVE USAGES
ZS4TF_EXPORT_USAGE_OF_OBJECT	S4TF: Verwendete Z Objekte zu Startobjekt
ZS4TF_EXPORT_USAGE_OF_OBJECTM	S4TF: Verwendete Z Objekte zu Startobjekten
ZS4TF_GEN_ABAP_DDIC_INCLUDE	Generieren von Include mit (obsoleten) Datentypen
ZS4TF_ORPHANED_FINDER	Orphaned (DDIC) Objects
ZS4TF_P_VOFM_CHECK_ALL	S/4-TF - Syntax Mass Check for VOFM

Danke

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