

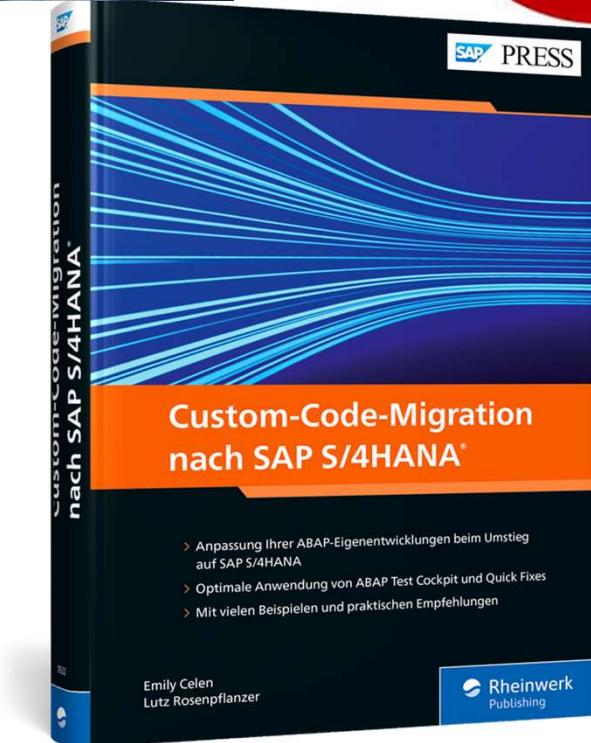
SAP Custom Code Migration – Workshop with live demos



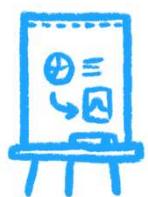
- Introduction
- S/4 Transformation and Custom Code Migration Process
- Scoping
- Checks
- Correction
- Optimization

Who am I ?

- Lead SAP Backend Development @ Swisscom
- SAP Development lead and architect, teacher, trouble shooter, ...
- <https://www.rheinwerk-verlag.de/custom-code-migration-nach-sap-s4hana/>



4 Main Questions for S/4 Transformation Projects



What



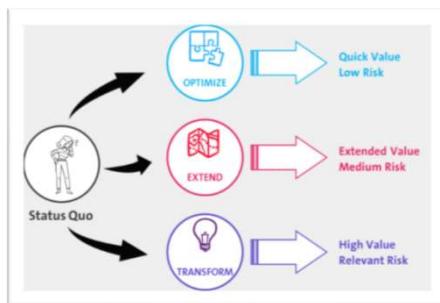
Why



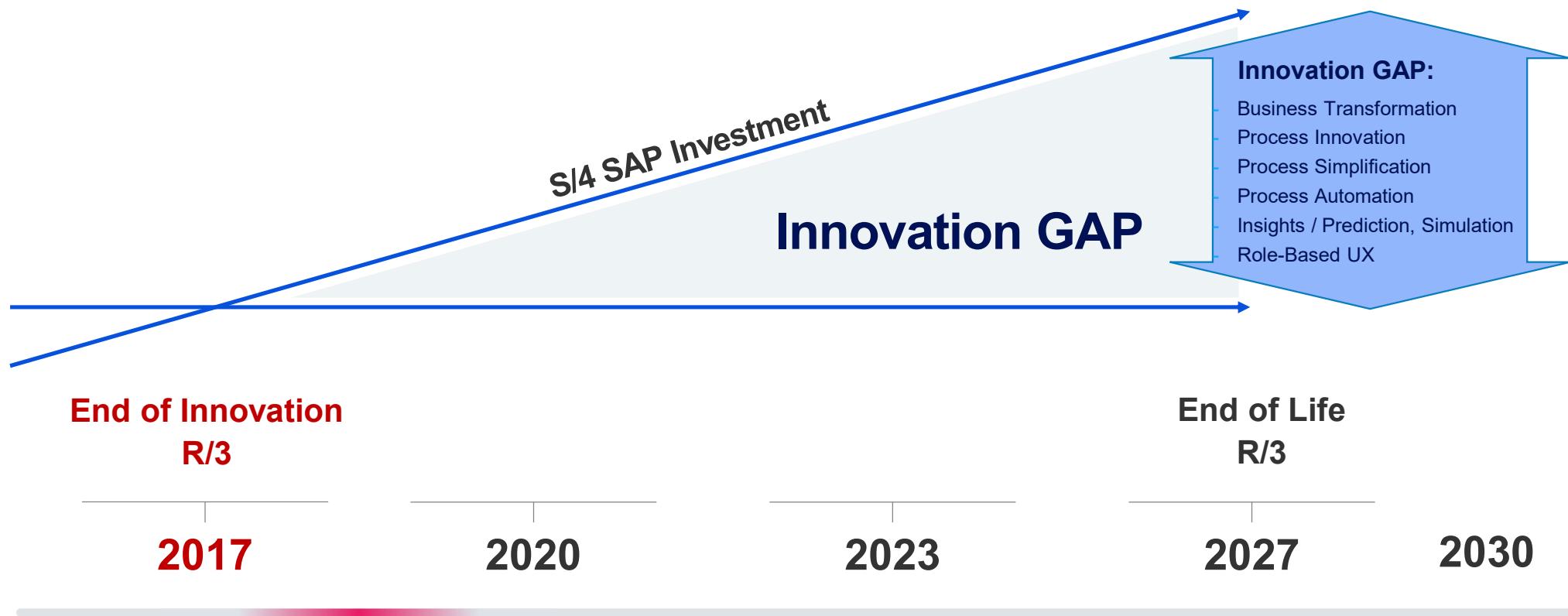
How



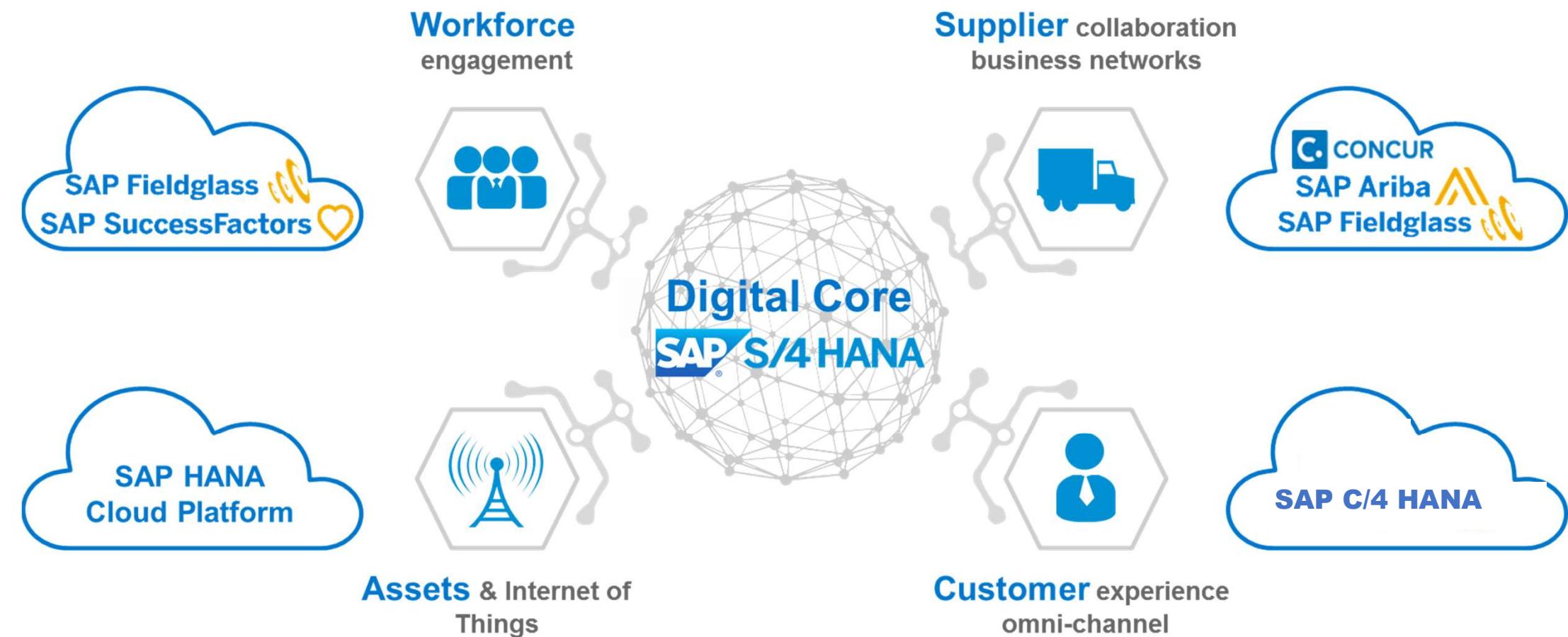
When



It's not only 2027...



SAP S/4HANA, the next generation business suite



S/4 HANA Simplification List Highlights

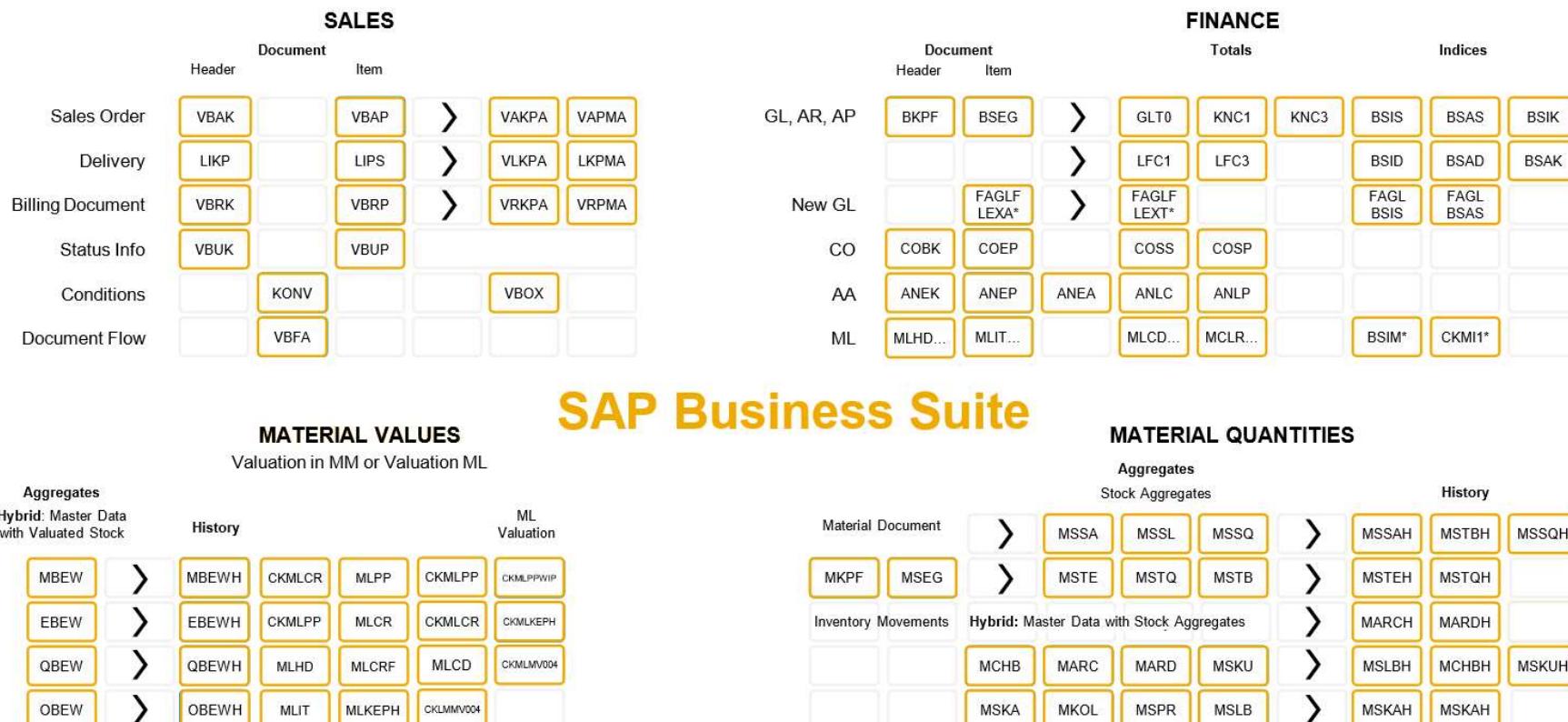
LOB	Function	Function	New Function
FI/SD	Customer / Vendor	XD01 usw.	Business Partner / CVI
SD	Credit Management	Replaced by new Functionality	FSCM Credit Management
MM	Material Master	New Data Model	Material Number 40 Characters
SD	Sales Activities	Replaced by C/4	S/4HANA Customer Management or C/4
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

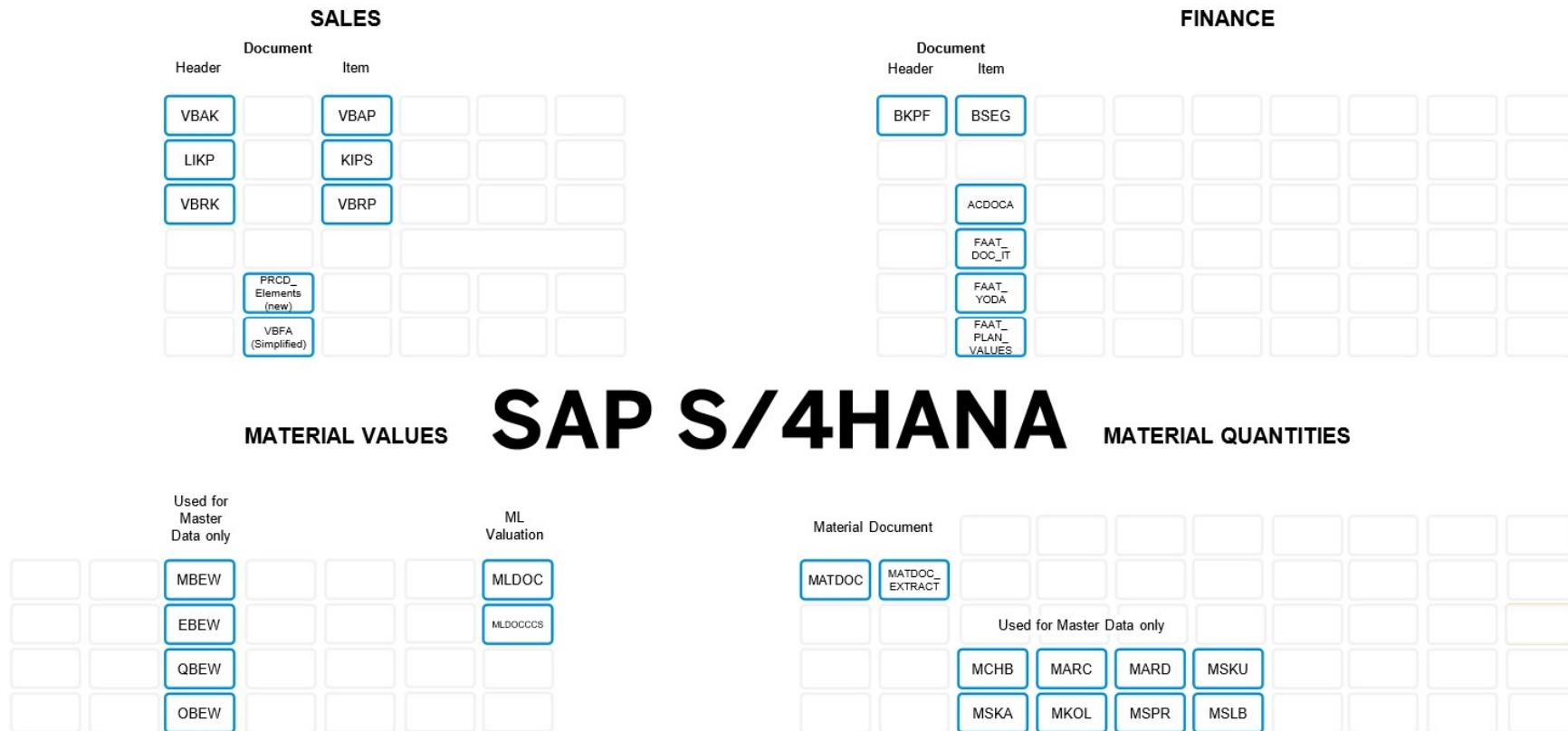
Simplified data model



New Data Model

SAP S/4HANA Architecture and Components

Simplified data model





Compatibility Views

- V1:
 - table is replaced by a DB view (CDS) with the same name
 - Data is backed up during SUM in a table with suffix _BCK
 - Example BSAD, BSAD_BCK
- V2:
 - Table still exists but selects are redirected to a new CDS
 - No inserts / updates to old table

Compatibility View



- Example: Select on MSEG uses Compatibility CDS View (Proxy) to read data from MATDOC Table

SAP General Table Display

SE16H | Background | Number of Entries | All Entries | Search

Database Connection: [] Outer Join De

Table: **MSEG** Document Segment: Material

Text table: No texts

Layout: Maintain entries

Maximum no. of hits: **500** MSEG Compatibility View

Proxy Object: **NSDM_V_MSEG**

SE11 | Technical Settings | Append Structure... | More | Exit

Transparent Table: **MSEG** Active

Short Description: Document Segment: Material

Attributes Delivery and Maintenance Fields Input Help/Check Currency/Quantity Fields Indexes

M19(1)/600 Display Replacement Object for MSEG

Table: **MSEG**

Replacement Object: **NSDM_E_MSEG**

Cancel (F12)

Table >

Edit >

Goto >

Utilities >

Extras >

Table Length...

Environment >

System >

Help >

SAP GUI settings and actions >

Activation Type...

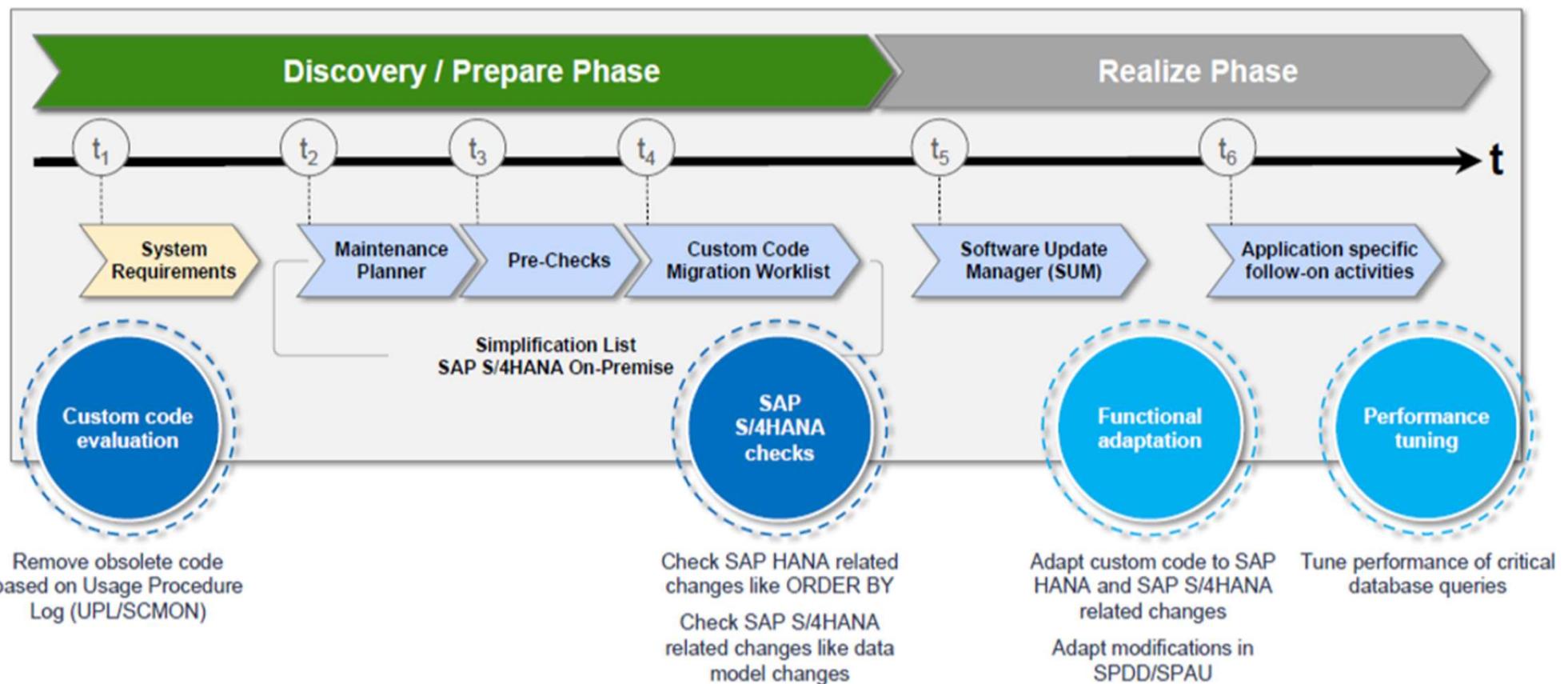
Change/Display Table Category

Enhancement Category...

Replacement Object...

Inverted Hash/Individual

Custom Code Migration Process

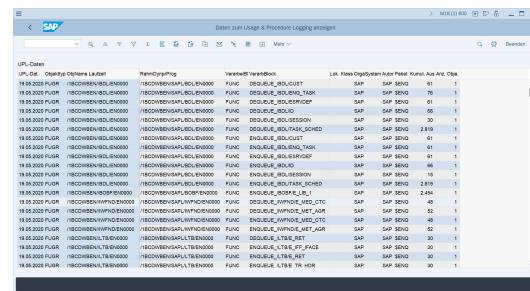


Overview Tools



Simplification Database Content (322137 entries)			
Overview			
		Application Component: Simplification Category	Functionality not available
SAP ... SAP Object Name		SLL-LEG-OIS	
FUNC EXPIMP_DATA_MAINTAIN		SLL-LEG-OIS	
PROG RVEKOCU		SLL-LEG-OIS	
CUSO SIMG_CHEMIOLOSDVINK		SLL-LEG-OIS	
PROG MV98E101		SLL-LEG-OIS	
DOCV DTFT_GOV_SETUP_MM_010		SLL-LEG-OIS	
TOBJ V_T604W V		SLL-LEG-OIS	
TOBJ V_T608P V		SLL-LEG-OIS	
FUNC FT SLS INDEX MODIFY LEG REGUL		SLL-LEG-OIS	

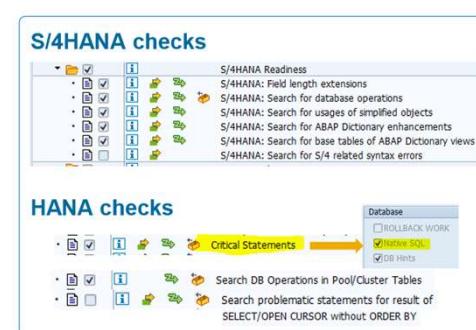
SYCM Simplification list



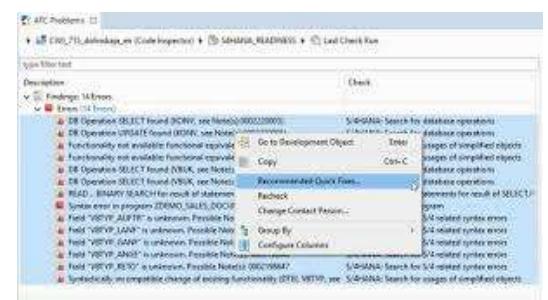
SCMON SUSG



Fiori Custom Code Migration

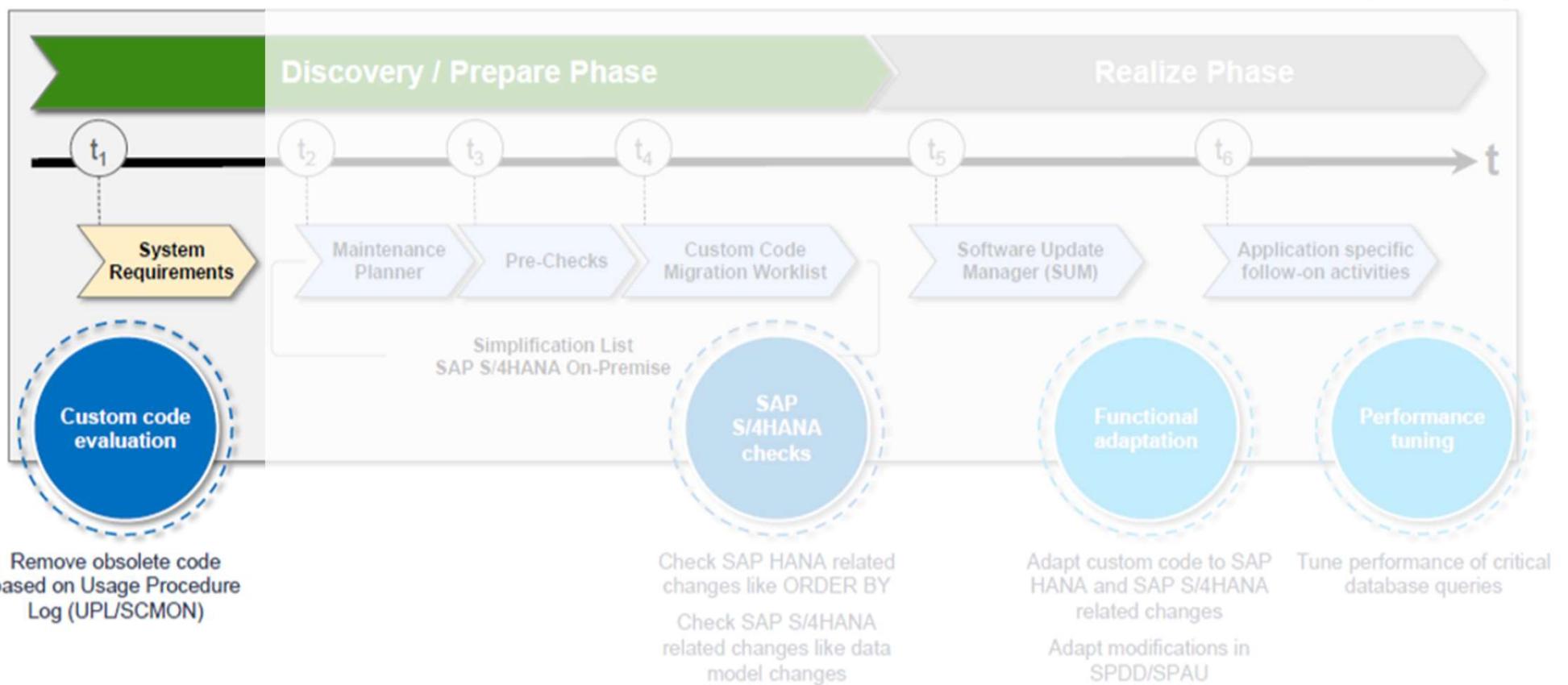


ATC ABAP Test Cockpit



Eclipse ADT and Quickfixes

Scoping



Scoping



- Between 30 and 70% of old ABAP code resides in typical customer installations !
 - Generates unnecessary correction effort for S/4HANA upgrades
 - Often old school ABAP (obsolete statements, select *, ...)
- Identification
 - V1: ask business users about (executable) objects
 - V2: trace usage (13 months)

Scoping – usage trace

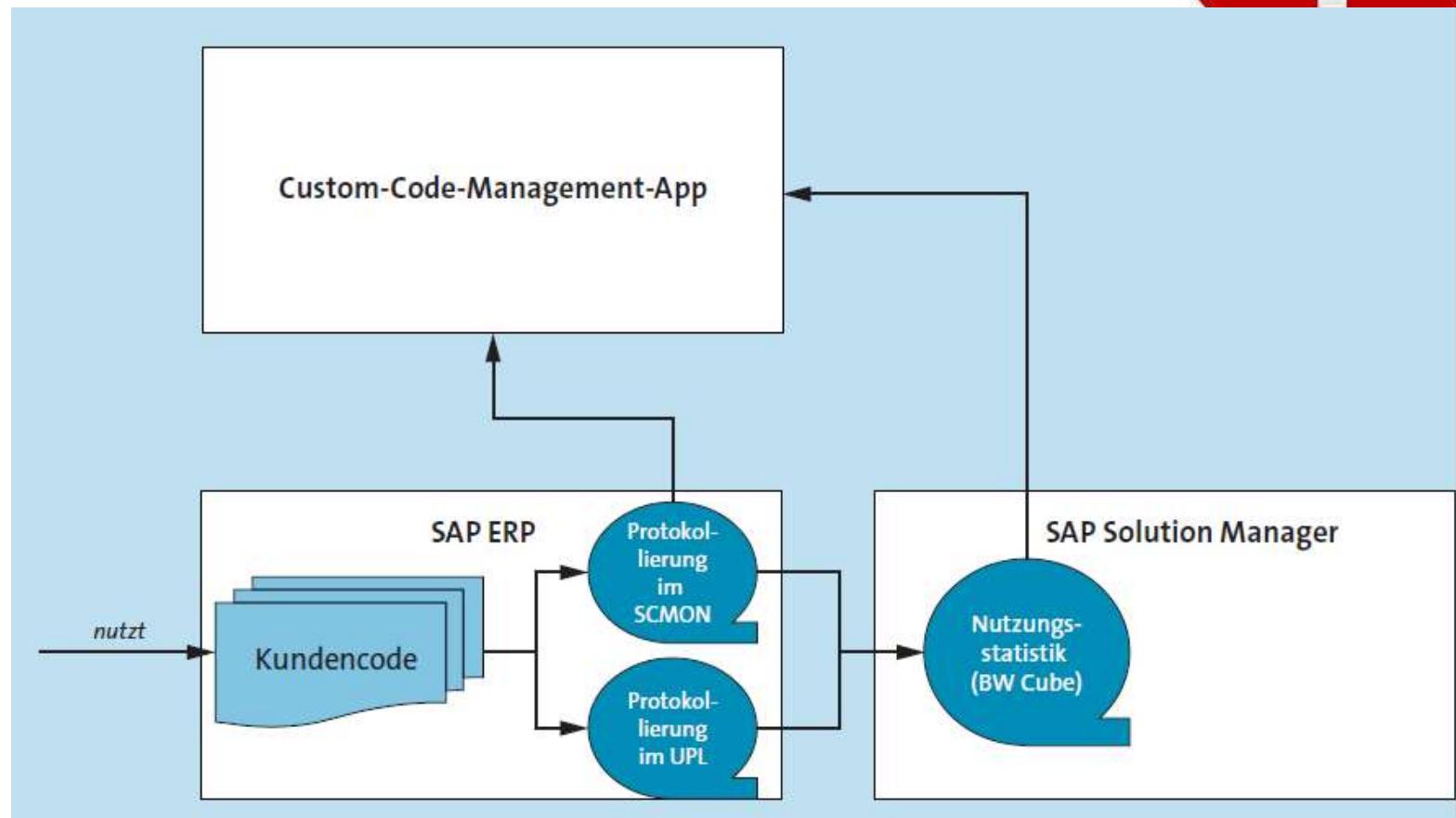


- With Solution Manager
- With Custom Code Migration App
- Without (manually)
- SCMON / SUSG
 - Old tool: UPL

Scoping – usage trace



- With Solution Manager





Scoping – usage trace

- Demo Solution Manager – Decommission Cockpit

- <https://support.sap.com/en/alm/demo-systems/internet-demo-system.html>

- https://www.sapsolutionmanagerdemo.com/sap/bc/ui5_ui5/ui2/ushell/shells/abap/FioriLaunchpad.html?sap-client=001&sap-language=DE#Action-DecommissionCockpit
- https://www.sapsolutionmanagerdemo.com/sap/bc/webdynpro/sap/wdc_agc_cc_decom_objlist?sap-language=D&SAP-WD-CONFIGID=WDC AGC CC DECOM OBJLIST&PROJECT ID=Z TEST#

Objektliste										
Standard		Status setzen	Attribut	Paket zuordnen	Wartezeit ändern	Sicherungstransport	In Ausschlusslisten-Monitor einfügen	Aus AusschListMon. entf.	Ausschlusslisten-Monitor-Details	
<input type="checkbox"/>	System...	Wird referenziert	Objekttyp	Objektname	Quellsystem	SAP-Gewichtungswertung	SAP-Schw...	Lebenszyklusstatus	In andere...	Benutz...
<input type="checkbox"/>	S4H	Wird referenziert	XSLT	Y_SAP_RSWAD_GEN_XRE_1	S4H	Nicht relevant	Kundeneig.	Entw.	Empfohlen für Stilllegu...	
<input type="checkbox"/>	S4H		IWSG	ZPAGE_BUILDER_CONF_00...	S4H	Nicht relevant	Kundeneig.	Entw.	Empfohlen für Stilllegu...	
<input type="checkbox"/>	S4H		IWSG	ZPAGE_BUILDER_CUST_0001	S4H	Nicht relevant	Kundeneig.	Entw.	Empfohlen für Stilllegu...	
<input type="checkbox"/>	S4H		IWOM	ZPB_MODEL_0001_BE	S4H	Nicht relevant	Kundeneig.	Entw.	Empfohlen für Stilllegu...	
<input type="checkbox"/>	S4H		IWSG	ZTRANSPORT_0001	S4H	Nicht relevant	Kundeneig.	Entw.	Empfohlen für Stilllegu...	
<input type="checkbox"/>	S4H		IWOM	ZTRANSPORT_MODEL_000...	S4H	Nicht relevant	Kundeneig.	Entw.	Empfohlen für Stilllegu...	
<input type="checkbox"/>	S4H		PROG	Z_DFI_AGR	S4H	Nicht relevant	Kundeneig.	Entw.	Empfohlen für Stilllegu...	
<input type="checkbox"/>	S4H								Empfohlen für Stilllegu...	

SCMON (ABAP Call Monitor)



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

Rec. 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_COM_DASHB_TRANSACTIONS_00	CL_ABAP_CLASSDESCR	CL_ABAP_CLASSDESCR	METH CLASS_CONSTRUCTOR	CL_ABAP_CLASSDESCR	1
Batch Job Z_COM_DASHB_TRANSACTIONS_00	CL_ABAP_CLASSDESCR	CL_ABAP_CLASSDESCR	METH LOAD_CLASS	CL_ABAP_CLASSDESCR	1
Batch Job Z_COM_DASHB_TRANSACTIONS_00	CL_ABAP_ELEMDESC	CL_ABAP_ELEMDESC	METH CLASS_CONSTRUCTOR	CL_ABAP_ELEMDESC	1
Batch Job Z_COM_DASHB_TRANSACTIONS_00	CL_ABAP_ELEMDESC	CL_ABAP_ELEMDESC	METH CREATE_ELEMDESC_OBJECT	CL_ABAP_ELEMDESC	10
Batch Job Z_COM_DASHB_TRANSACTIONS_00	CL_ABAP_ELEMDESC	CL_ABAP_ELEMDESC	METH GET_C	CL_ABAP_ELEMDESC	1
Batch Job Z_COM_DASHB_TRANSACTIONS_00	CL_ABAP_ELEMDESC	CL_ABAP_ELEMDESC	METH GET_X	CL_ABAP_ELEMDESC	3
Batch Job Z_COM_DASHB_TRANSACTIONS_00	CL_ABAP_ELEMDESC	CL_ABAP_ELEMDESC	METH LOAD_CLASS	CL_ABAP_ELEMDESC	1
Batch Job Z_COM_DASHB_TRANSACTIONS_00	CL_ABAP_ELEMDESC	CL_ABAP_ELEMDESC	METH VAR_LEN_DESC_TO_XTYP	CL_ABAP_ELEMDESC	4
Batch Job Z_COM_DASHB_TRANSACTIONS_00	CL_ABAP_INFODESCR	CL_ABAP_INFODESCR	METH CLASS_CONSTRUCTOR	CL_ABAP_INFODESCR	1
Batch Job Z_COM_DASHB_TRANSACTIONS_00	CL_ABAP_INFODESCR	CL_ABAP_INFODESCR	METH LOAD_CLASS	CL_ABAP_INFODESCR	1
Batch Job Z_COM_DASHB_TRANSACTIONS_00	CL_ABAP_LIST_PARSER	CL_ABAP_LIST_PARSER	METH CLASS_CONSTRUCTOR	CL_ABAP_LIST_PARSER	1
Batch Job Z_COM_DASHB_TRANSACTIONS_00	CL_ABAP_LIST_PARSER	CL_ABAP_LIST_PARSER	METH REFRESH_LSR_CONTAINER	CL_ABAP_LIST_PARSER	1
Batch Job Z_COM_DASHB_TRANSACTIONS_00	CL_ABAP_LIST_UTBL_INTERNAL	CL_ABAP_LIST_UTBL_INTERNAL	METH LSR_INIT	CL_ABAP_LIST_UTBL_INTERNAL	1
Batch Job Z_COM_DASHB_TRANSACTIONS_00	CL_ABAP_REFDESCR	CL_ABAP_REFDESCR	METH CLASS_CONSTRUCTOR	CL_ABAP_REFDESCR	1
Batch Job Z_COM_DASHB_TRANSACTIONS_00	CL_ABAP_REFDESCR	CL_ABAP_REFDESCR	METH LOAD_CLASS	CL_ABAP_REFDESCR	1

<https://blogs.sap.com/2017/04/06/abap-call-monitor-scmmon-analyze-usage-of-your-code/>

SUSG



Aggregate Usage Data

Transaction SUSG aggregates usage data collected by ABAP Call Monitor (transaction SCMON) within production system

- No Solution Manager system is necessary
- Aggregated usage data can be transferred between ABAP systems via remote function calls or file download/upload
- Downport to releases >= SAP_BASIS 7.00 available

<https://launchpad.support.sap.com/#/notes/2643357>

<https://blogs.sap.com/2019/02/25/susg-how-to-aggregate-and-analyze-the-results-of-scmon-abap-call-statistics-to-do-s4hana-custom-code-housekeeping/>

SUSG Transaction

The screenshot shows the 'Usage Data' section of the SUSG transaction. It displays the following information:

- State: Active (Aggregation scheduled at: 26.07.2018 02:30:00)
- From: 16.07.2018 To: 24.07.2018
- Days available: 9, Days missing: 0
- Data records: 2.796.850, Object data records: 540.314, Request data records: 8.456
- Errors: 3, Warnings: 4, Deactivation Warnings: 1
- ABAP Call Monitor: Active (Errors exists in ABAP Call Monitor Log)

SCMON: errors and warnings in the log

The screenshot shows the 'ABAP Call Monitor' log interface. It displays the following summary:

- Activation: Active
- Status of Records: Errors exist in Log
- Records: 7.702.152
- Daily Time Slices: 8 of 8 Slices Used

Below this, a detailed log table is shown:

Date	Time	Type	Message	User	Records
24.07.2018	09:02:11	Info	Delete data from 2018-07-16.	BRESCH	7.702.152
24.07.2018	09:02:13	Info	Ending data collection from all servers	BRESCH	7.874.398
24.07.2018	09:02:26	Warning	Server klaus_usa_00 cannot be reached or is not available	BRESCH	7.836.799
24.07.2018	09:03:53	Info	Starting data collection from all servers	BRESCH	7.679.587
24.07.2018	09:03:53	Error	Server klaus_usa_00 has error state: Can't free EG memory	BRESCH	7.679.587
24.07.2018	09:03:53	Info	Collected 0 data records on server klaus_usa_00	BRESCH	7.679.587
23.07.2018	23:45:26	Error	Server klaus_usa_00 has error state: Can't free EG memory	BRESCH	7.679.587
23.07.2018	23:45:26	Info	Collected 0 data records on server klaus_usa_00	BRESCH	7.679.587
23.07.2018	23:45:26	Info	Ending data collection from all servers	BRESCH	7.679.587
23.07.2018	23:45:24	Error	Server klaus_usa_00 cannot be reached or is not available	BRESCH	7.679.587
23.07.2018	23:45:16	Info	Starting data collection from all servers	BRESCH	7.677.296

SCMON/ SUSG - DEMO



ABAP Call Monitor: Data Browser (07.10.2020) (#1)

 Application Help

Request Ty...	Req. Na...	Progra...	Obj. Ty...	Obj. Na...	Proc. Ty...	Called Proc. Name	Class Na...	Σ Num. C...	Σ Summati...
Submit Report	ZTEMP2	ZTEMP2	PROG	ZTEMP2	SSEL	START-OF-SELECTION		1	1



SCMON Usage of Code

- **Monitor** usage of your custom code via the ABAP call monitor (transaction [SCMON](#))
- **Aggregate** usage data in your production system with transaction [SUSG](#) (without SAP Solution Manager *)
- **Analyze** usage data in SAP Fiori Custom Code Migration app to define custom code migration scope
- **Remove** unused code during the SAP S/4HANA conversion automatically via SUM

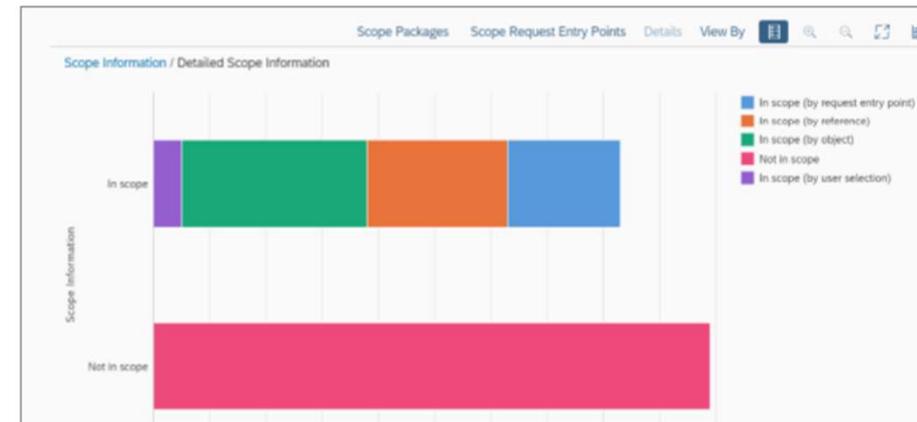
* Custom code evaluation with CCLM/UPL tools of SAP Solution Manager is still possible

<https://blogs.sap.com/2019/02/25/susg-how-to-aggregate-and-analyze-the-results-of-scmmon-abap-call-statistics-to-do-s4hana-custom-code-housekeeping/>

Aggregate usage data in SUSG transaction

The screenshot shows the 'Usage Data: Aggregation State' screen. It displays an active aggregation period from 13.12.2018 to 24.02.2019. Key statistics include 191.508 data records, 41.576 object data records, and 1.017 request data records. There are 74 aggregated days and 0 missing days. Error and warning counts are also listed. Navigation tabs at the top include Activate, Deactivate, Create Snapshot, Manage Snapshots, Display Log, and Application Help.

Scoping in SAP Fiori Custom Code Migration app



CCM App – Demo SCMON

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



SAP Migrationsprojekt für Eigenentwicklungen ▾ M19/600/TAAROLU3

S4 CCM Analyse erneut durchgeführt

Projekt Scope Analyse

Verwendungskonfigurationen (1)

Destination für Verwendung	VerwendBeschreib.	Verwalt. System	Verwend.-Datenquelle
M19_ACC	Usage data of system M19 from 11.12.2019 to 06.10.2020 (days available 174, days missing 127)	M19	ABAP-Aufrufmonitor

Enable Fiori



Enable App for Access in SAP Fiori Launchpad

1. Add business catalog **SAP_BASIS_TCR_T** to the user roles that will use the Custom Code Migration app (PFCG)
2. Assign the user role to all users that will use the Custom Code Migration app.
3. Activate ODATA Services:

Component	External Service Name
Custom code migration projects	SYCM_APS_C_PROJECT_CDS
Analysis of SAP S/4HANA custom code check findings	SYCM_APS_C_ATC_FIND_ALP_CDS
Custom code scoping by request entry points	SYCM_APS_C_SCP_BY_EP_CDS
Custom code scoping by packages	SYCM_APS_C_SCP_BY_PK_CDS

Demo: Archiving with ABAP GIT



- <https://docs.abapgit.org/>
- Download ZABAPGIT_FULL
- Create Offline/ Online Project
- Nice search capabilities in Githubs: https://github.com/Lutzi3/abap_workflow/search?q=usr

abapGit installation

abapGit ► HOME + Online + Offline

abap_workflow abap_workflow abap2xlsx Z_CODEJAM_CDS ZABAPGIT_PACKAGE

Z_CODEJAM_CDS

Import zip Export zip

DDLS ZCDS_01
DDLS ZCDS_02
DDLS ZCDS_03
DDLS ZCDS_04
DDLS ZCDS_05
DDLS ZCDS_06
PROG ZR_API_HUB_DEMO
PROG ZR_CDSV_OUTPUT
PROG ZR_CDSV_WITH_PARAMETER
PROG ZR_CDS_ALV_IDA
DEVZ Z_CODEJAM_CDS

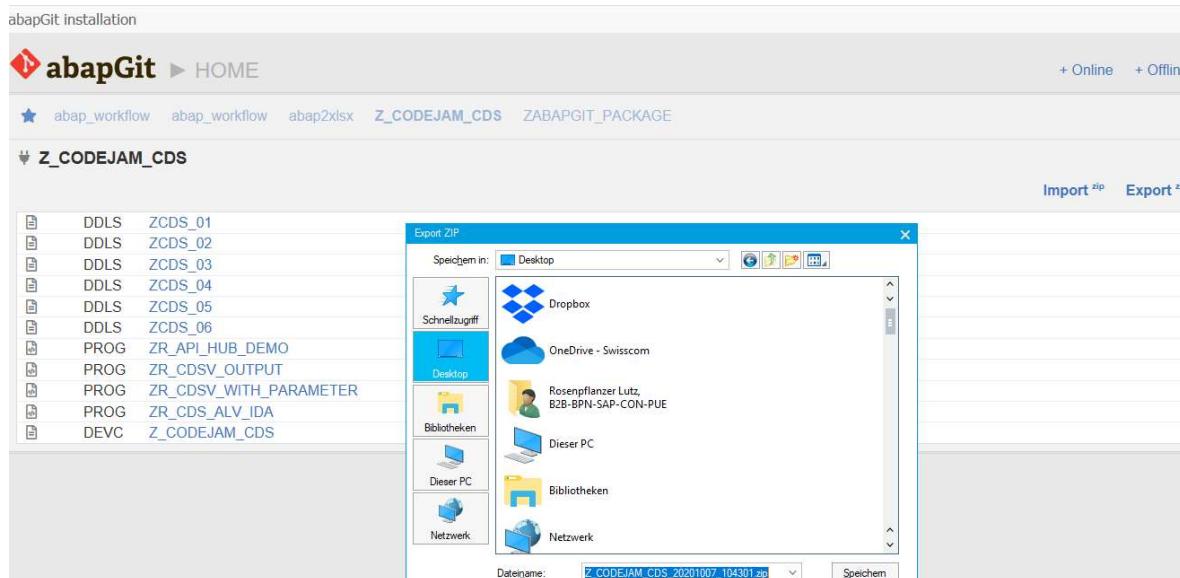
Export ZIP

Speichern in: Desktop

Schnellzugriff: Desktop, Bibliotheken, Dieser PC, Netzwerk

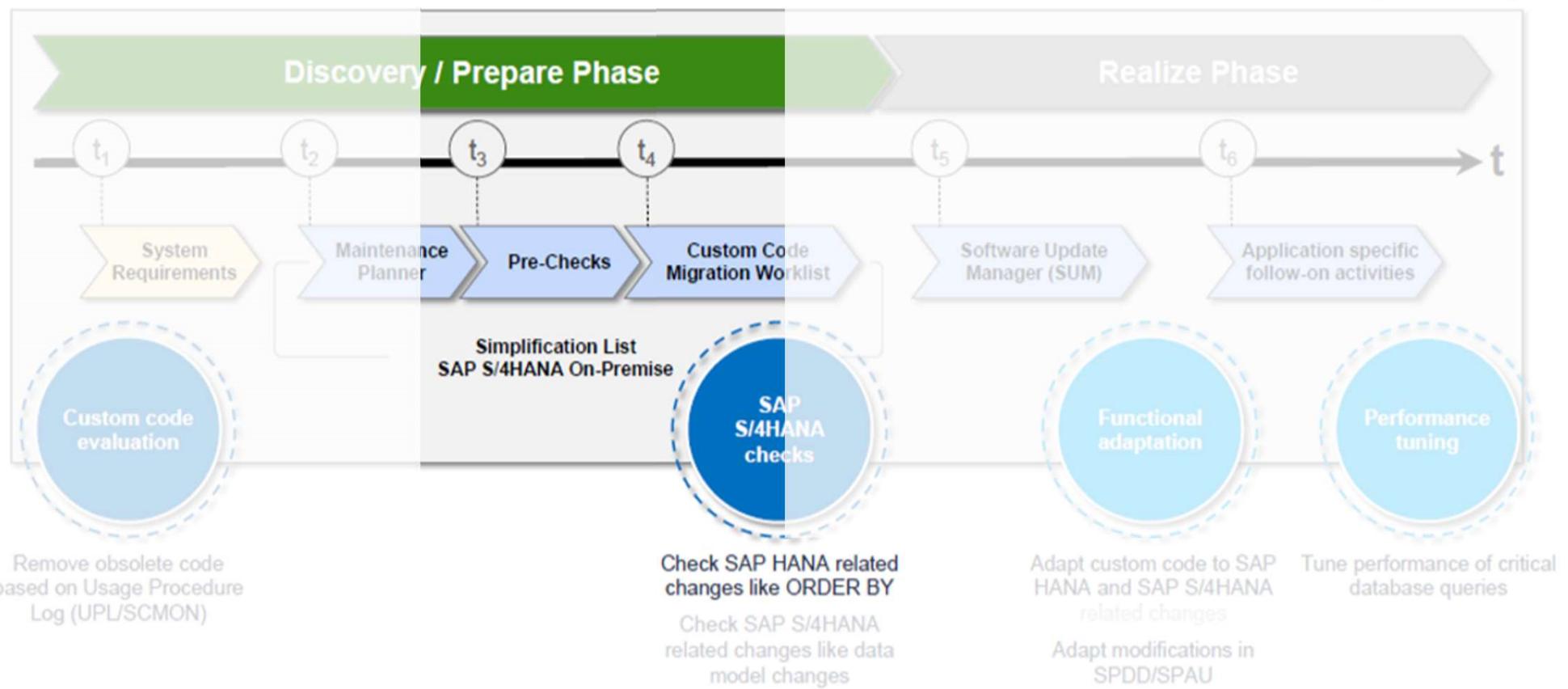
Dropbox, OneDrive - Swisscom, Rosenplanzer Lutz, B2B-BPN-SAP-CON-PUE, Dieser PC, Bibliotheken, Netzwerk

Dateiname: Z_CODEJAM_CDS_202007_104301.zip Speichern



Many but not all object types
(BOR objects ...)

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

ABAP Test Cockpit

Überblick

- ATC-Administration
 - Setup
 - Systemrolle
 - Basiseinstellungen
 - Zulässige Befreiungsanträge
 - Objekt-Provider
 - Replikationsziele
 - E-Mail-Jobs einplanen
 - Befreiungsreplikation einplanen
 - Regelmäßige Jobs überwachen
 - Läufe
 - Läufe einplanen
 - Läufe überwachen und steuern
 - Ergebnisse verwalten

Filter anwenden | Filter zurücksetzen | Filtertyp wechseln | Ungelöste Befunde

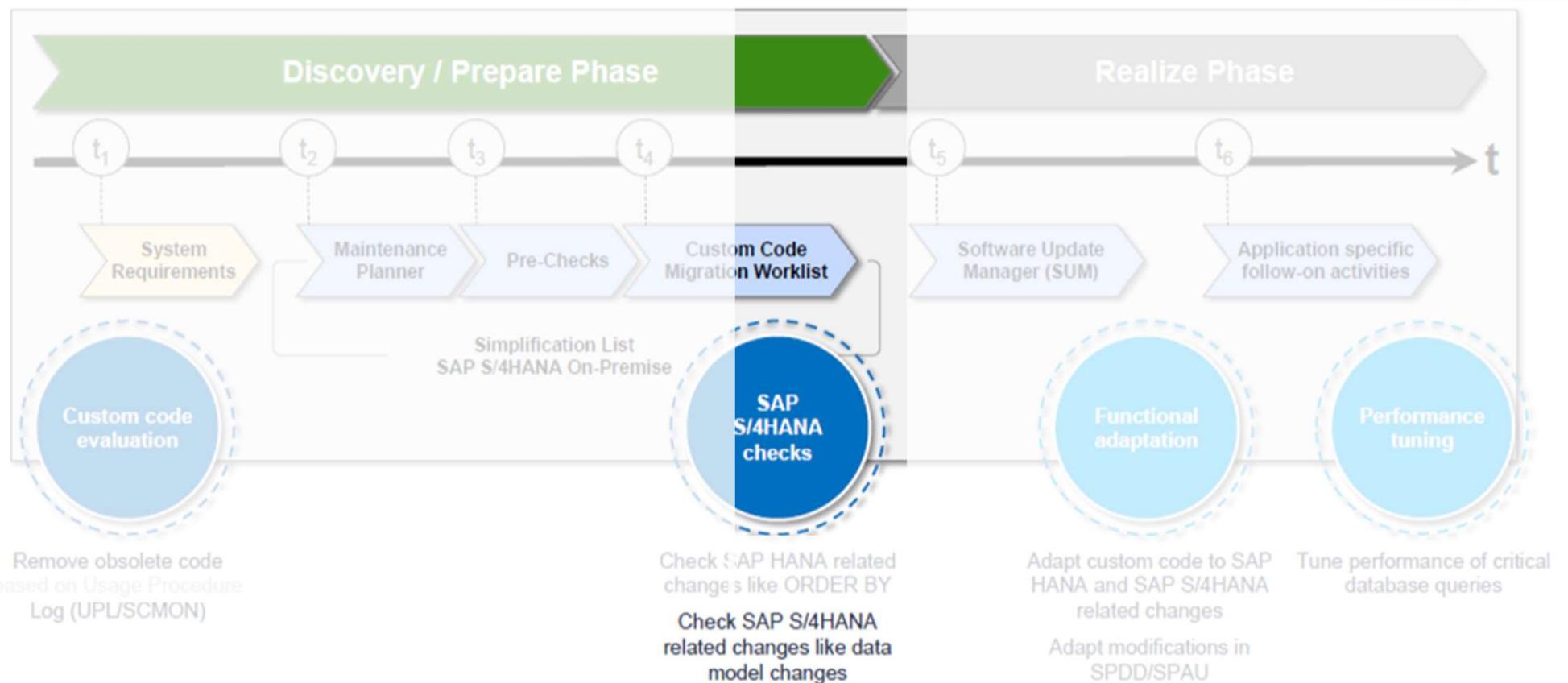
Statistik auswählen

Statistik: Prüfung	Besc...	Prio 1	Prio 2	Prio 3
• Summe	Summe	16	10	601
> Kritische Anweisungen	Prüftitel		8	
> Problemat.Anweisungen für Ergebnis	Prüftitel	2	2	531
> Scannen eines Programms	Prüftitel	2		
> Verwendung der ADBC-Schnittstelle	Prüftitel		34	
> Voraussetzungen für den Test	Prüftitel	12		36

Pr... Prüftitel Prüfmeldung Objektname Obj... B... P...

1 Problemat.Anweisungen...	READ .. BINARY SEARCH für Ergebn.d.Anw...	ZTESTLUTZ	PROG	T...
1 Problemat.Anweisungen...	READ .. BINARY SEARCH für Ergebn.d.Anw...	Z_CCM_LIST COMPL_SLS_ORDRS	PROG	T...

S/4HANA Checks and adaptation before upgrade



S/4 HANA Checks

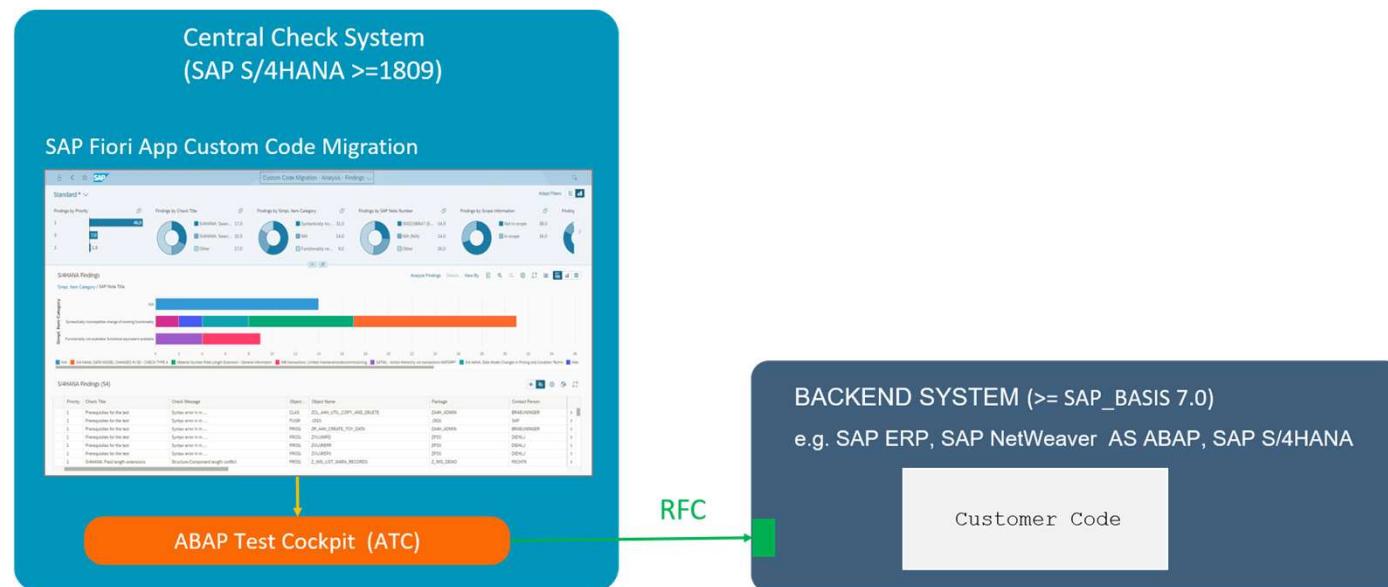


- Incompatible changes from ERP → S/4HANA
 - Obsolete applications
 - /BEV3/ deleted
 - Data model changes
 - FI, SD. Example VBUP, VBUK
 - Data type changes
 - Material number → 40, Curr (DMBTR) → 23
- ATC Variant S4HANA_READINESS_**

S/4 HANA Checks



- Checks need simplification list and a newer (NW) system >= 7.52
- Recommended by SAP:



<https://blogs.sap.com/2017/02/27/remote-code-analysis-in-atc-for-developers/>

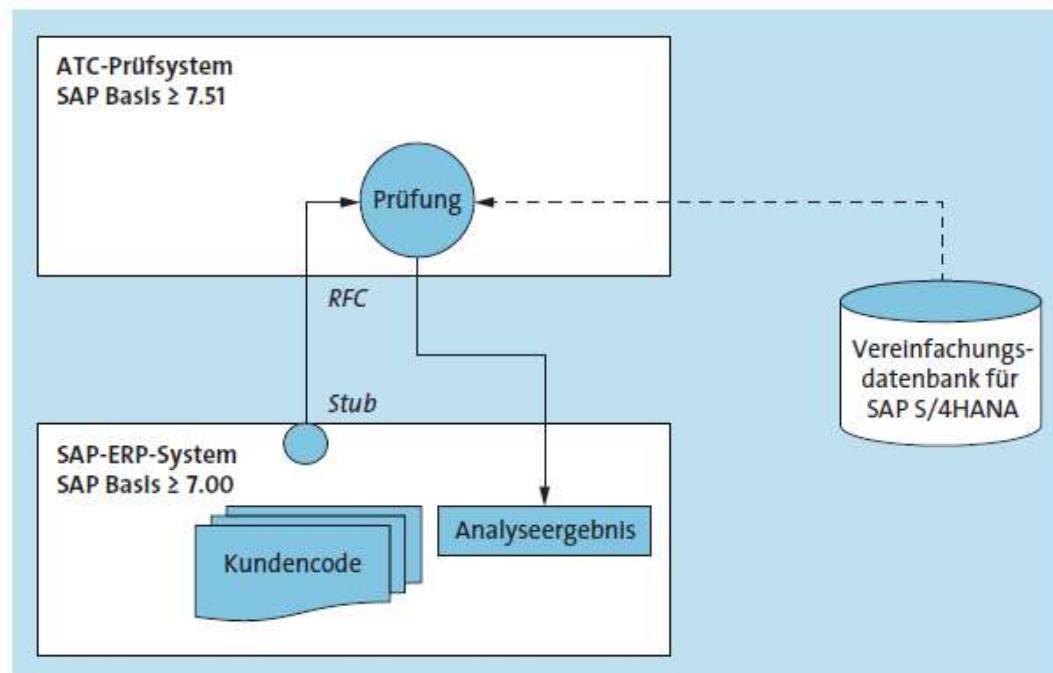
S/4 HANA Checks



Other options:

- CCM App on cloud platform → cloud connector → SAP ERP
- ATC SAPGUI 7.52 → RFC → SAP ERP

Results can be brought back to SAP ERP if remote check variant is used



<https://blogs.sap.com/2017/02/27/remote-code-analysis-in-atc-for-developers/>

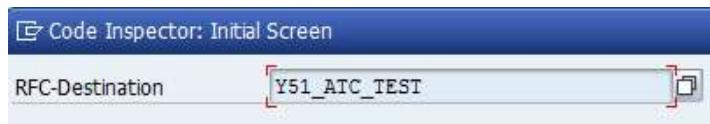


Setup Remote Checks

- <https://launchpad.support.sap.com/#/notes/0002241080> Download CCMSIDB
- /NSYCM Choose Simplification Database Import from ZIP File
- ATC Setup <https://blogs.sap.com/2016/12/13/remote-code-analysis-in-atc-technical-setup-step-by-step/>

Change View "RFC Object Providers": Overview				
New Entries				
Dialog Structure		RFC Object Providers		
ID	Description	System Group	RFC Destination	
LOCAL		CURRENT	NONE	
Y5R	Y5R	BASIS_751	Y5R_ATC	
Y7A	Test System 7.02	702	Y7A_SLIN_RMT_700	
Y7B			Y7B_ATC	

- Note [2364916](#) remote functionality
- In your local system the ATC central check system must be maintained by your administrator in the Code Inspector (*Goto->Management of-> Reference check system*):

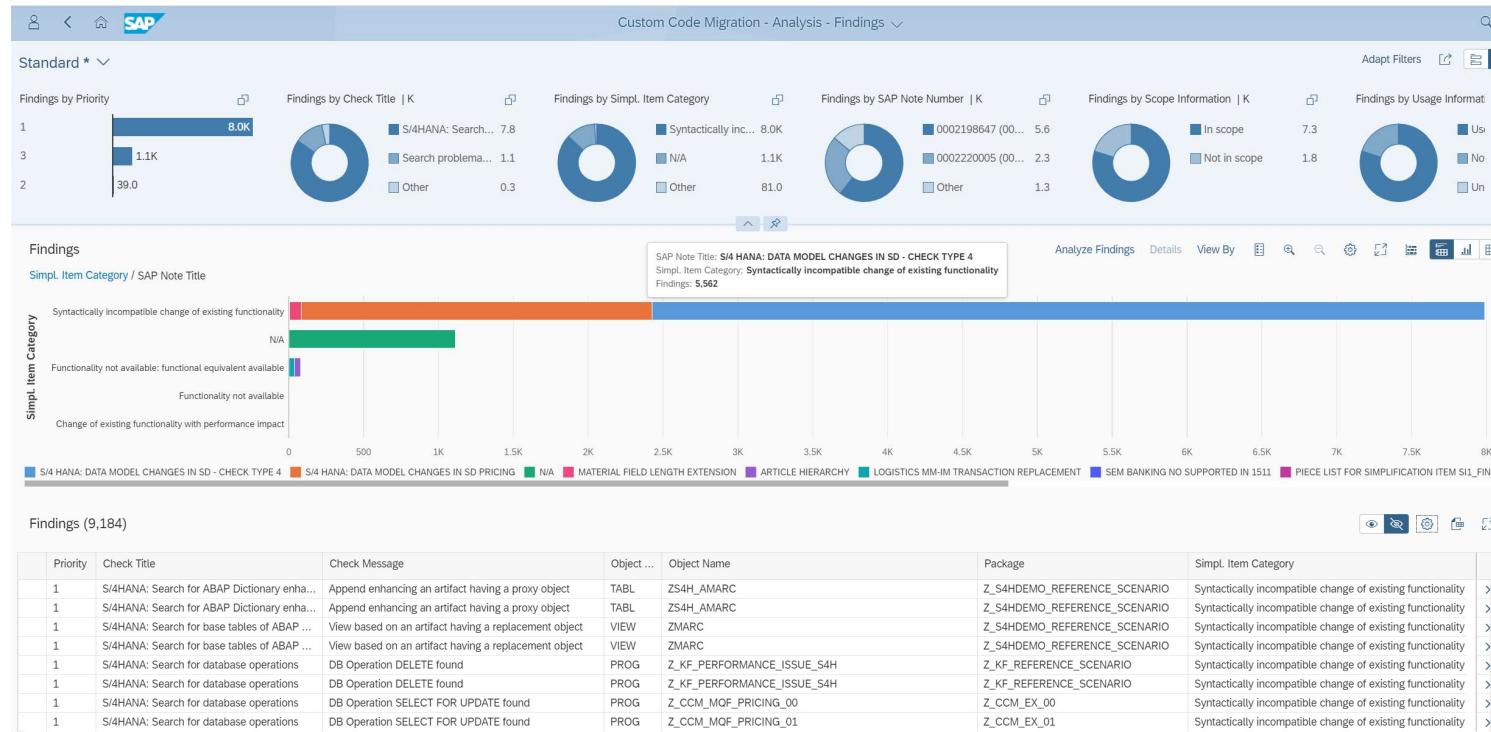


S/4 HANA Checks

Demo CCM App (ctd.)



Fiori Custom Code Migration



<https://blogs.sap.com/2019/02/27/custom-code-analysis-for-sap-s4hana-with-sap-fiori-app-custom-code-migration/>

SAP Fiori Custom Code Migration



Use display criteria (“View by”):

- SAP Note number
- Referenced simplified Object
- Application component

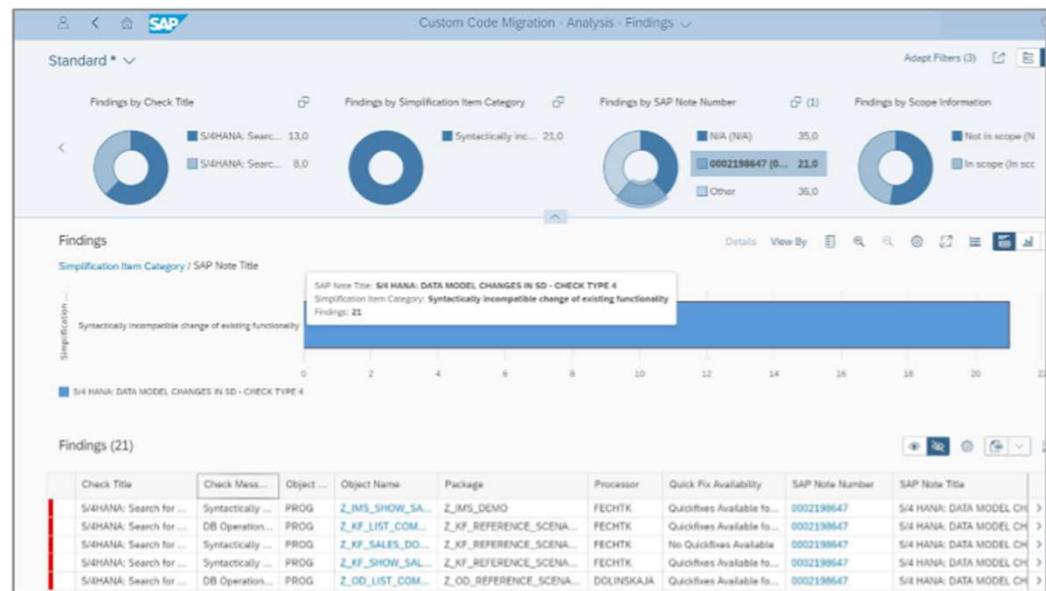
Use filters (“Findings by”) and simplification information in ATC result list

- 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



S/4HANA checks and 1st adaptations



SAP Dictionary: Change Table

Transparent Table: ZCUST_TABLE New(Revised)

* Short Description: Customer Table

Attributes Delivery and Maintenance Fields Input Help/Check Currency/Quantity Fields Indexes

Field	Key	Initi...	Data element	Data Type	Length	Decima...	Coordinate	Short Description
MANDT	<input checked="" type="checkbox"/>		MANDT	CLNT	3	0		0 Client
MATNR	<input checked="" type="checkbox"/>		MATNR	CHAR	40	0		0 Material Number
MYDATE	<input type="checkbox"/>		/BEV2/EDZDATA		0	0		0
MATKL	<input type="checkbox"/>		MATKL	CHAR	9	0		0 Material Group
ERNAME	<input type="checkbox"/>		ERNAME	CHAR	12	0		0 Name of Person who Created the

Save Cancel

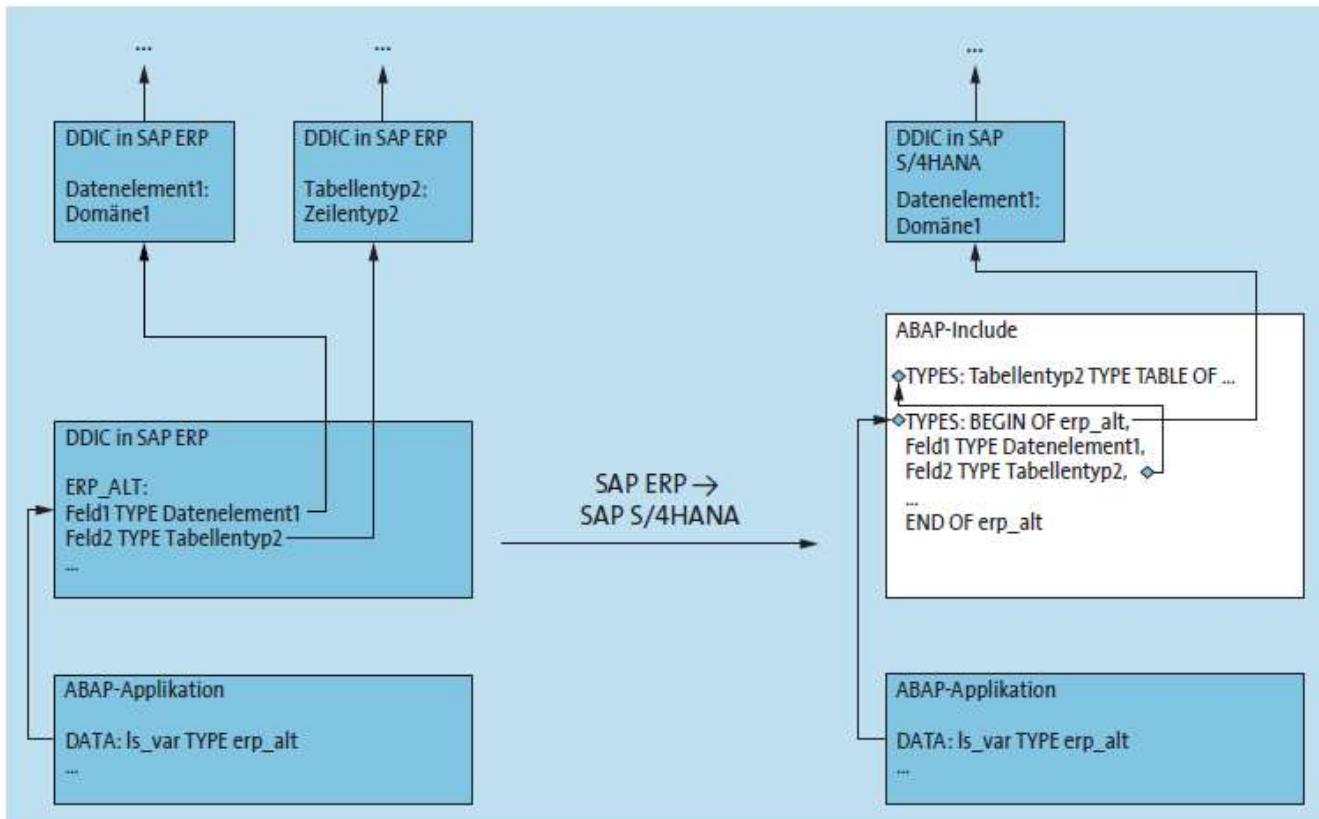
In Custom Tables and elsewhere, sometimes there have been Data Elements been used, which don't exist any more. For Example from the /BEV/ Beverage Solution

S/4HANA checks and 1st adaptations



- Many of the obsolete DDIC objects are used as type references only
 - Examples: DTEL FILE, DTEL AENDATE, TABL /SAPDII/DWB_BAPIRET2
 - Find: Transaction SYCM
- (copy and) replace them already now
- Possibility 1: search for replacement in S/4 or ERP -> replace if already available
 - Possibility 2: copy to Z .. (by hand or by tool)
 - Possibility 3: use INCLUDE technique and local types to keep current name and reduce adaptation effort

S/4HANA checks and 1st adaptations



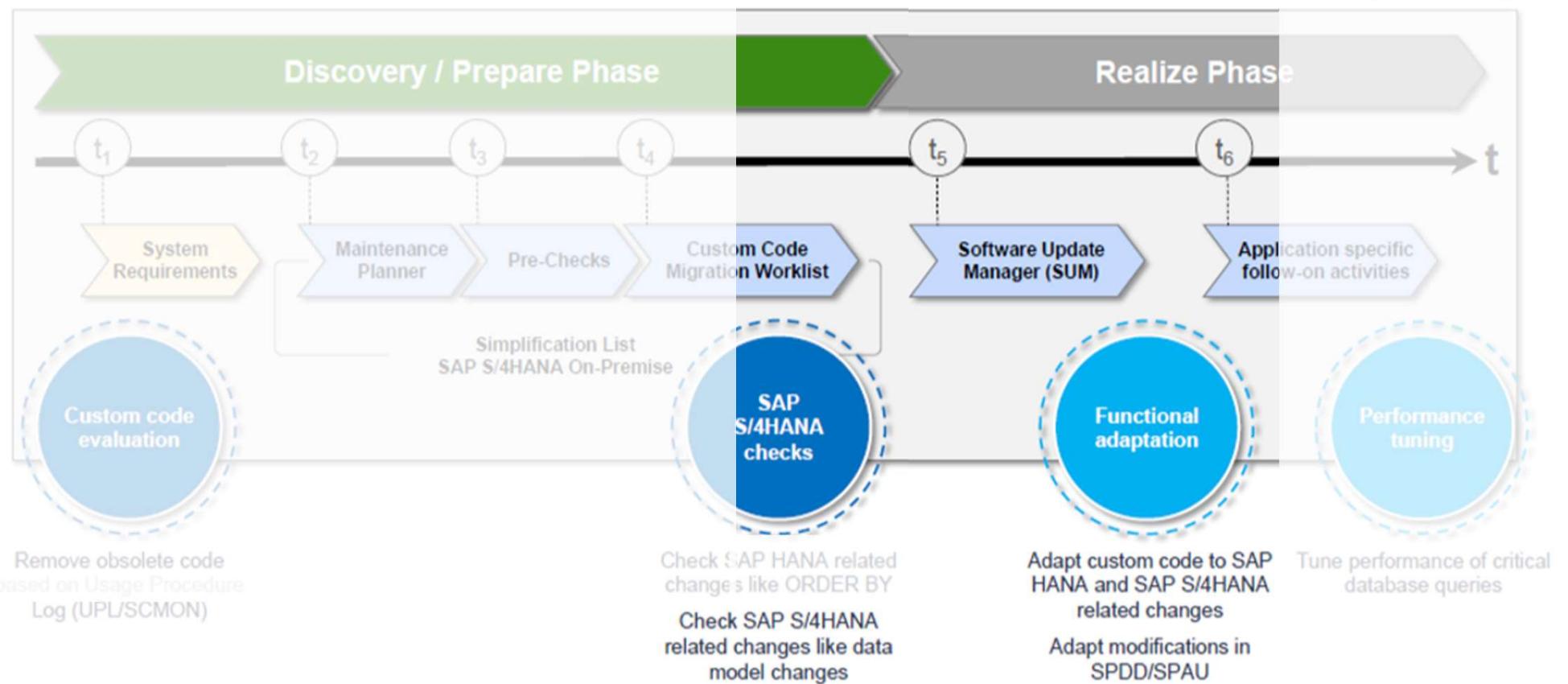
Report	INCLUDE ...	After REPORT/PROGRAM
Function Pool	INCLUDE ...	In TOP Include
Classes / Interfaces	INCLUDE ...	In Local Types

S/4HANA checks and 1st adaptations



- Avoid new direct accesses to changed tables
 - Encapsulate access in a class or (CDS) view
 - Use BAPIs

S/4HANA adaptation after upgrade



S/4HANA adaptation after upgrade



- Run ATC Checks again in new S/4 system locally and correct all Prio1/2 issues
 - Attention: no syntax error <> program works again
 - Use Quick Fixes if available (demo)

Error Categories



Error	Example
S/4HANA: ABAP-Dictionary-Enhancements	Append structures
S/4HANA: Base Tables of ABAP-Dictionary-Views	If a Table is now a Redirect View itself, avoid views on views
S/4HANA: Field Length changes	MATNR = 40 Characters, Currency Fields are longer
S/4HANA: unsupported Database Operations	UPDATE/INSERTS to compatibility Views not possible
S/4HANA: Simplified Objects / Simplification List	find missing or unsupported Objects (Transactions, Functions, Structures...)
Critical SQL Statements	Adopt SQL Statements to HANA (Native DB Statements)
SQL Statements with Missing order by	Column-Store might result in different sorting, add Order by Primary Key if needed
Objects with Syntax Errors	If already a syntax error, code cannot be checked

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) (3)
Favorite Packages (63)
Z001 (63) Customer development class
System Library (?)

M19_100_tzhknjo1_en [M19, 100, TZHKNJO1, EN]
Local Objects (\$TMP) (7)
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 CustomCode
Z_CCM_BSEG_DATA_CHECK CustomCode Exar
Z_CCM_LIST_COMPL_SLS_ORDRS CustomCode
Z_CCM_LIST_MARA_RECORDS CustomCode Ex
Z_CCM_LIST_MARC_RECORDS CustomCode Ex
Z_CCM_MATERIAL_EXISTS CustomCode Exam
Z_CCM_MQF_PRICING CustomCode Example: I
Z_CCM_MOF_SD CustomCode Example: SD
Z_CCM_SALES_DOCUMENTS CustomCode Fyn

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 konv FROM konv APPENDING TABLE lt_konv_cust.

Problems Properties

M19_100_tzhknjo1_en

Description

- DB Operation SELECT found (KONV, see Note(s) 0002220005)
- DB Operation SELECT found (KONV, see Note(s) 0002220005)
- DB Operation SELECT found (KONV, see Note(s) 0002220005)
- DB Operation SELECT found (KONV, see Note(s) 0002220005)
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- DB Operation SELECT found (KONV, see Note(s) 0002220005)
- DB Operation SELECT found (KONV, see Note(s) 0002220005)
- DB Operation SELECT found (KONV, see Note(s) 0002220005)
- DB Operation SELECT found (KONV, see Note(s) 0002220005)

Task List Feed Reader Transport Organizer Dictionary Log ATC Problems

Quick Access

Welcome!

Click here to begin!

Details

Object Name	Lin...	Contact ...	Obj. ^
Z_CCM_MQF_PRK 93	TZHBEDUY	PROK	
Z_CCM_MQF_PRK 96	TZHBEDUY	PROK	
Z_CCM_MQF_PRK 99	TZHBEDUY	PROK	
Z_CCM_MQF_PRK 102	TZHBEDUY	PROK	
Z_CCM_MQF_PRK 105	TZHBEDUY	PROK	
Z_CCM_MQF_PRK 108	TZHBEDUY	PROK	
Z_CCM_MQF_PRK 114	TZHBEDUY	PROK	

Details of Analysis

- DB Operation SELECT found (KONV, see Note(s) 0002220005)
- Finding can be suppressed with pseudo comment "#EC CI_DB_OPERATION_OK(222005)
- Metrics:

 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	
<input checked="" type="checkbox"/> ZMW_S4HANA_PRICING (Program)	 line 286	Select All
		Deselect All

?

[Finish](#) [Cancel](#)

Mass Quick Fixes (Eclipse ABAP)



The screenshot shows the Eclipse ABAP IDE's ATC Problems view. The navigation bar indicates the current location: ATC Problems > M19_600_taarolu3_de > S4HANA_READINESS_1809 > Paket: ZTAAROLU3 (Pakete Lutz). The main area displays a table of problems, with the first few rows being DB-operation SELECT warnings. A context menu is open over one of these rows, with 'Recommended Quick Fixes...' selected. Other options in the menu include Copy (Ctrl+C), Recheck, Change Contact Person..., Group By, and Configure Columns.

Description	Lin...	Contact Pe...	Obj...	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	Copy Ctrl+C	nkoperationen
DB-Operation SELECT wurde gefunden (VBUP, siehe Hinweis(e):0002198647)	490	TAA	Recommended Quick Fixes...	nkoperationen
DB-Operation SELECT wurde gefunden (VBUP, siehe Hinweis(e):0002198647)	491	TAA	Recheck	lebnis von SELECT/OPEN CUI
READ .. BINARY SEARCH für Ergebn.d.Anweisung in Include ZTESTLUTZ Zeile 9	11	TAA	Change Contact Person...	ungen der vereinfachten Obj
Warnings (1 Warnings)		TAA	Group By	lebnis von SELECT/OPEN CUI
Nicht-strategische Funktion: kein funktionales Äquivalent (TTYP TT_BAPIRET2, Siehe 74		TAA	Configure Columns	lebnis von SELECT/OPEN CUI
Infos (2 Infos)				
SELECT SINGLE möglicherweise nicht eindeutig	36	TAA		
SELECT SINGLE möglicherweise nicht eindeutig	50	TAA		

- > 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: Demo

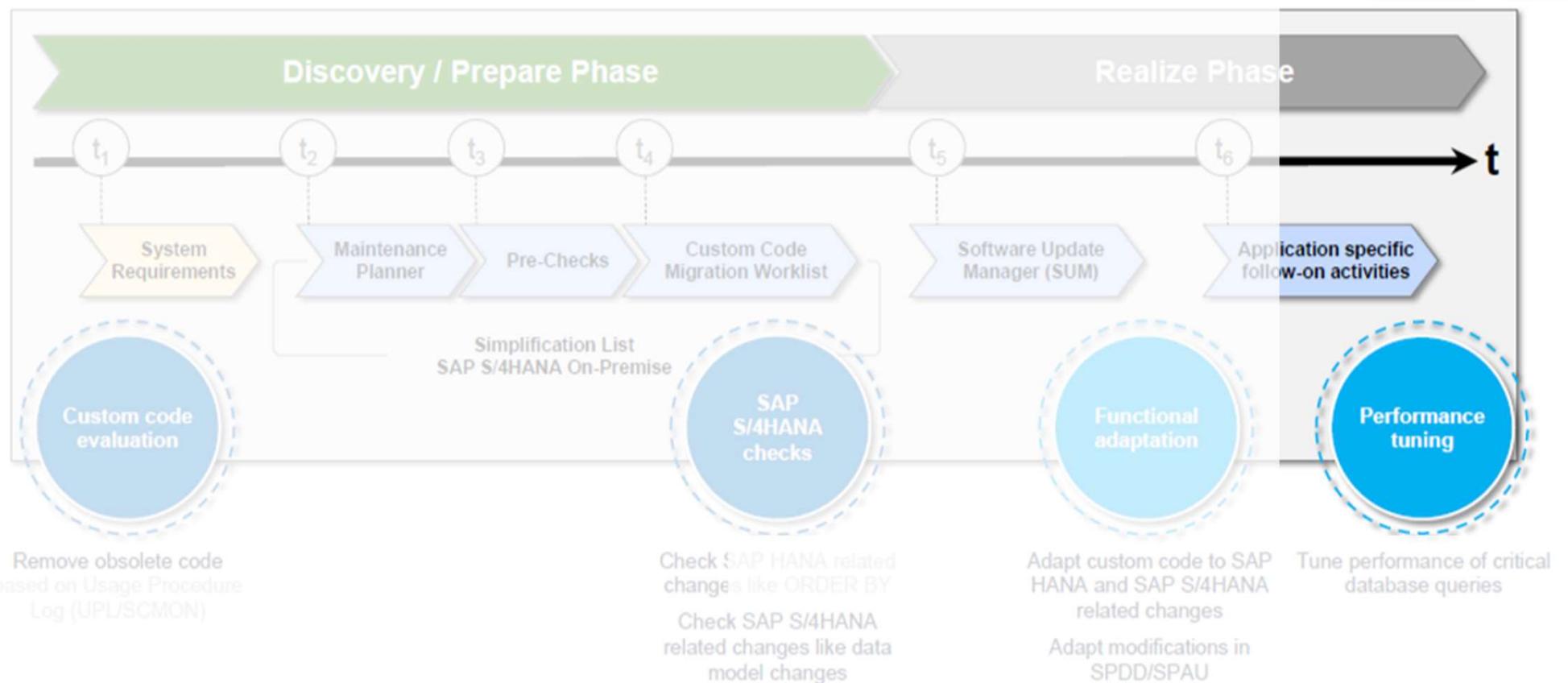


- <https://blogs.sap.com/2020/05/18/comments-for-the-adt-quick-fixes/>

Original Source	Refactored Source
<pre>11 i_kposn like konv-kposn, 12 i_stunn like konv-stunn, 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 stunn = i_stunn 22 and zaehk = i_zaehk. 23 24 if sy-subrc = 0.</pre>	<pre>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.</pre>

Original Source	Refactored Source
<pre>27 " for all entries in lt_vbak 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</pre>	<pre>31 32 " Quick Fix Replace VBUK table access with the access of compatibility view V_VBUK_S4 33 " Transport CuJK900919_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</pre>

S/4HANA tuning



Performance Tuning



- SQL Monitor & Performance Tuning Worklist
- Apply 5 (updated) Golden Rules (e.g.
<https://blogs.sap.com/2013/03/24/performance-guidelines-for-abap-development-on-the-sap-hana-database/>)
- Use Push Down to Database principle and Core Data Services
- Use new ABAP

SQLM: SQL Monitor



The screenshot shows the SAP SQL Monitor application window. The title bar reads "SQL Monitor". The menu bar includes "Application Help", "Servers", "Log", "Data", "Job Overview", "More", and "Exit". The main area is titled "State" and displays the following information:

- Records: 265.117
- Last State Change: 28.04.2020 / 14:07:39 (CET) by user TAAROLU3
- Last Data Action: 28.04.2020 / 13:08:38 (CET) by user TAAROLU3 (refresh data)
- Time Series: Enabled / Time Period 1 Hours
- Time Series Records: 508.449
- Overall Time Series Records: 834.982
- Activation State: ♦ Inactive (1 servers available)

At the bottom right of the window is a blue "Enter" button.

Performance Tuning
Also for Dynamic Statements

SWLT: SQL Monitor & ATC combined / Demo



Arbeitsvorrat für SQL-Performanceoptimierung

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_PROMPT 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.
ZS4TFEXAMPLEABAP	ZS4TFEXAMPLEABAP	42	SELECT FROM BUT000 FIELDS PARTNER , TYPE , BU_S...	1	1	2,422	0,976	1,444	567	189	

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

Anfragetypr	Anfrageeingangspkt.	SQL-Operationstyp	Tabellennam
Report starten	ZSWLT_EXAMPLE	SELECT (Open SQL)	BUT000

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...

Thank you



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