



Custom code migration to SAP S/4HANA Cloud

Mani P S, SAP
July 12, 2023

Public

Disclaimer

The information in this presentation is confidential and proprietary to SAP and may not be disclosed without the permission of SAP. Except for your obligation to protect confidential information, this presentation is not subject to your license agreement or any other service or subscription agreement with SAP. SAP has no obligation to pursue any course of business outlined in this presentation or any related document, or to develop or release any functionality mentioned therein.

This presentation, or any related document and SAP's strategy and possible future developments, products and or platforms directions and functionality are all subject to change and may be changed by SAP at any time for any reason without notice. The information in this presentation is not a commitment, promise or legal obligation to deliver any material, code or functionality. This presentation is provided without a warranty of any kind, either express or implied, including but not limited to, the implied warranties of merchantability, fitness for a particular purpose, or non-infringement. This presentation is for informational purposes and may not be incorporated into a contract. SAP assumes no responsibility for errors or omissions in this presentation, except if such damages were caused by SAP's intentional or gross negligence.

All forward-looking statements are subject to various risks and uncertainties that could cause actual results to differ materially from expectations. Readers are cautioned not to place undue reliance on these forward-looking statements, which speak only as of their dates, and they should not be relied upon in making purchasing decisions.

Agenda

Custom code transformation in
SAP S/4HANA on premise and SAP S/4HANA, Private Cloud Edition

Custom code analysis tools

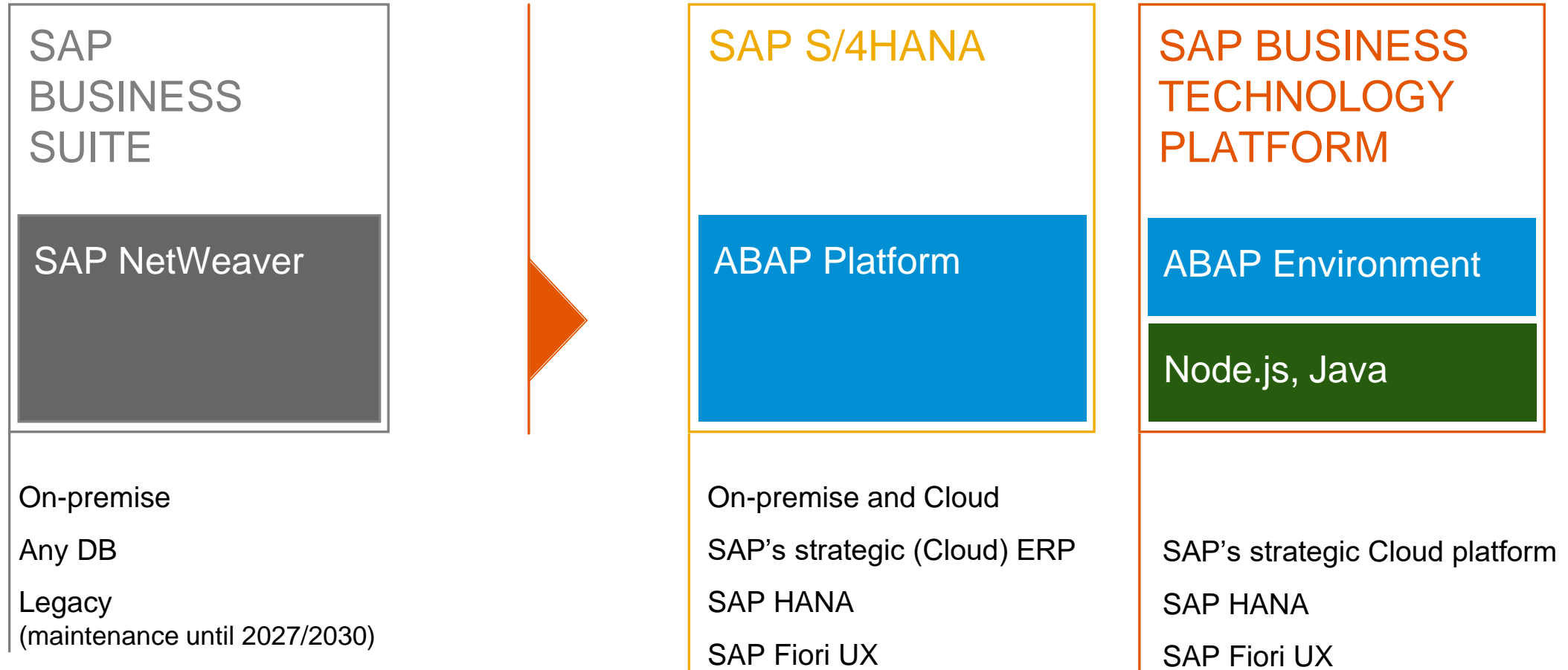
Custom code migration to SAP S/4HANA Public Cloud

Outlook

Custom code transformation in **SAP S/4HANA on premise** and **SAP S/4HANA, Private Cloud Edition**



ABAP Platform – Transformation to SAP S/4HANA and SAP BTP



From classic ABAP to ABAP Cloud

The screenshot shows the classic ABAP development environment. The top pane displays an ABAP program with the following code:

```
18 *  
19 *      This form is called from form FV45PF0K  
20 *  
21 *-----  
22 FORM USEREXIT_MOVE_FIELD_TO_KOMK.  
23   {  INSERT      &S&S&S&S  
24   If...here I modify the SAP code ...*  
25   }  INSERT  
26  
27   KOMK-zzfield = xxxx-zzfield2.  
28  
29   ENDFORM.  
30   *eject  
31
```

The middle pane shows the 'Organizational Data' section with fields for Sales Organization, Distribution Channel, Division, Sales Office, Sales Group, and IDoc Number.

The bottom pane shows a data table with the following code:

```
23 perform berechting  
24  
25  
26  
27 if sy-subrc = 0.  
28   perform xvbap_loe  
29   enhancement-point bel  
30   case sy-subrc.  
31     when 0.  
32       da_answer = c  
33       " Note 2584372  
34       perform xvbfa_lesen_nachfolger(sapfv45c) using posnr_low  
35       sy-subrc.  
36  
37       if sy-subrc = 0.  
38         da_answer = charn.  
39         message s006.  
40         message_collect_lord.  
41       endif.  
42     when 4.  
43       data mstart type mara mstart.  
44       if ca  
45       da  
46       mes  
47       else.  
48         call function 'POPUP_TO_CONFIRM_WITH_MESSAGE'  
49         exporting
```

The screenshot shows the ABAP Cloud development environment. The top pane displays the 'BAdI Enhancement Spot: ES_SD_SLS_EXTEND' with the following BAdI Definitions:

BAdI Definition	Description
SD_SLS_MODIFY_HEAD	Sales Header Modification
SD_SLS_MODIFY_ITEM	Sales Item Modification
SD_SLS_CHECK_HEAD	Sales Header Check
SD_SLS_CHECK_ITEM	Sales Item Check
SD_SLS_FIELDPROP_HEAD	Sales Header Field Prop
SD_SLS_FIELDPROP_ITEM	Sales Item Field Prop
SD_SLS_CHECK_BEFORE_SAVE	Sales Document Ch
SD_SLS_CHECK_DELETE_ITEM	Sales Item Deletion
SD_APM_SET_APPROVAL_REASON	Set Approval Re

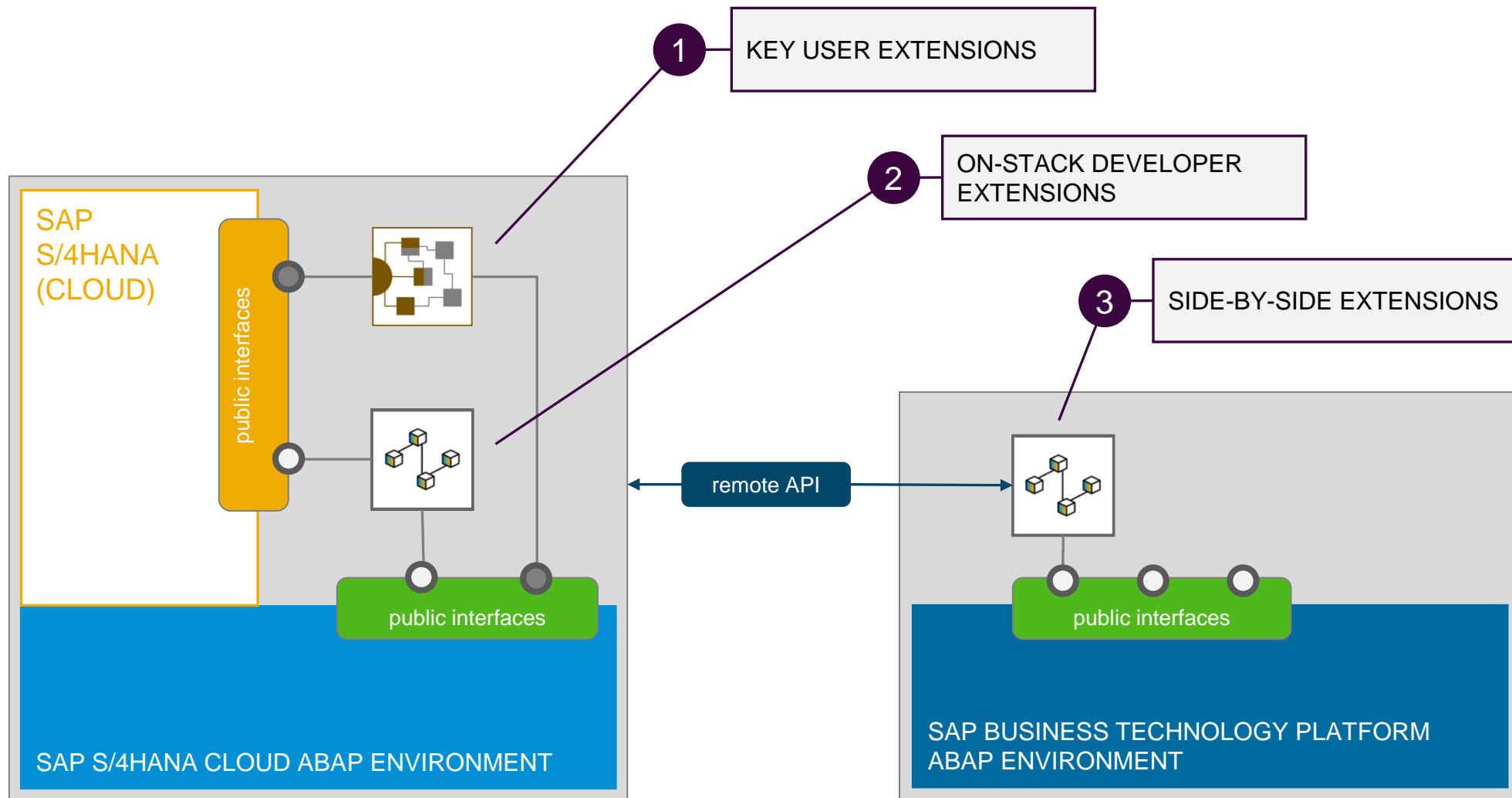
The right pane shows the 'BAdI Definition Details' for 'SD_SLS_MODIFY_HEAD':

- Name: SD_SLS_MODIFY_HEAD
- Description: Sales Header Modification
- Interface: IF_SD_SLS_MODIFY_HEAD
- Configuration: Creating New Instances
- Multiple use: ☒

The bottom pane shows the 'API State' for the 'CWR' product, with the following state:

- General: Use System-Internally (Contract C1)
- Specific: Release state: Released
- API State: Visibility: ☒ Use in Cloud Development, ☒ Use in Key User Apps
- Transport: update, acceptTravel, rejectTravel

One common extensibility model for cloud and on premise



Key-user extensions
low-code/no-code extensions



ABAP custom code or partner extensions
following the cloud extensions model

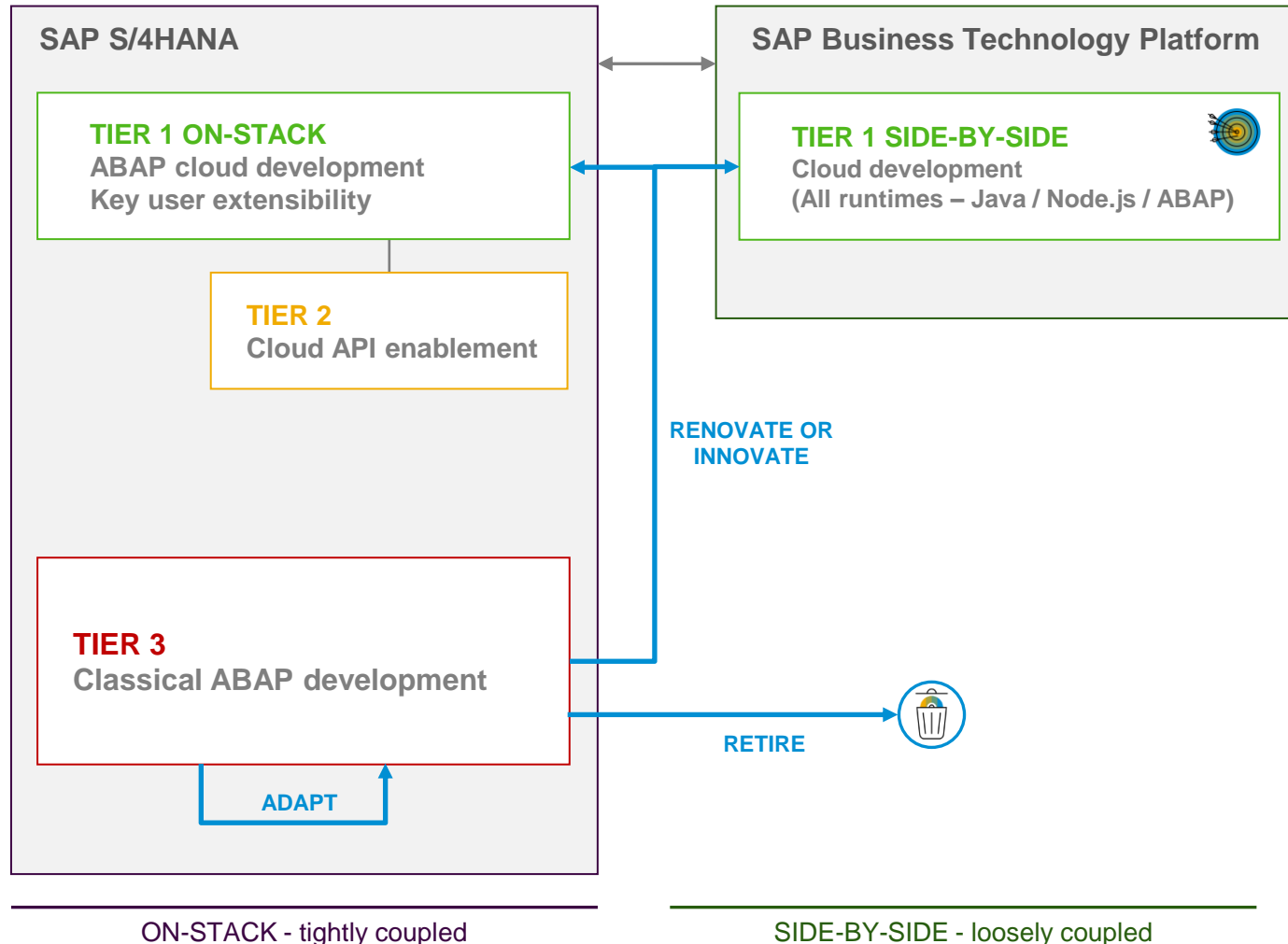


Public interfaces *released for developer extensibility*



Public interfaces *released for key-user extensibility*

Custom code transformation after SAP S/4HANA system conversion



TIER 1 – Cloud extensibility model

Cloud-ready and upgrade-stable development of new applications and extensions

Same development model as used in SAP S/4HANA Cloud

Default for new extensions and custom apps

TIER 2 – Cloud API enablement

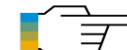
Extends and enables tier 1 for private cloud and on-premise
Mitigates missing public SAP APIs or extension points:

- ❖ Develop custom wrapper objects for not released SAP objects to be used in tier 1
- ❖ Retire wrapper once a released SAP API is available

TIER 3 – Classic ABAP extensions

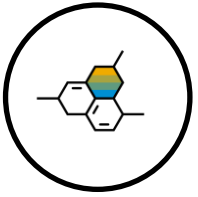
Legacy/existing custom ABAP code or new on-stack extensions code that cannot follow the rules of tier 1 and 2

Avoid and reduce the content in tier 3



Check out the new [ABAP Extensibility Guide](#)

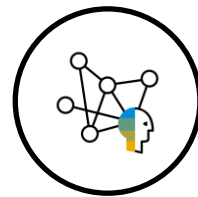
Main principles of development with ABAP cloud development model



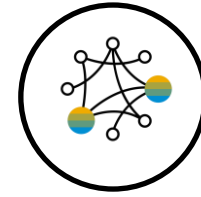
Use only RELEASED APIs from
ABAP Platform and SAP
S/4HANA solution



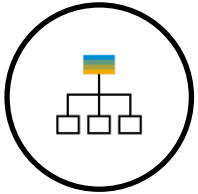
Use of RELEASED APIs is checked by
ABAP compiler
(ABAP LANGUAGE VERSION CLOUD)



Create CUSTOM APIs
(controlled by ATC checks) for
not released SAP APIs



Use only RELEASED
EXTENSION POINTS (BAIs) to
extend SAP objects



ABAP RESTful Application
Programming Model (RAP) with
SAP Fiori Elements



Utilize SAP HANA by using CDS,
AMDP and ABAP SQL



ABAP DEVELOPMENT TOOLS
in ECLIPSE as IDE



Use ABAP TEST COCKPIT to
make legacy custom code
cloud-ready

Custom code **analysis** tools

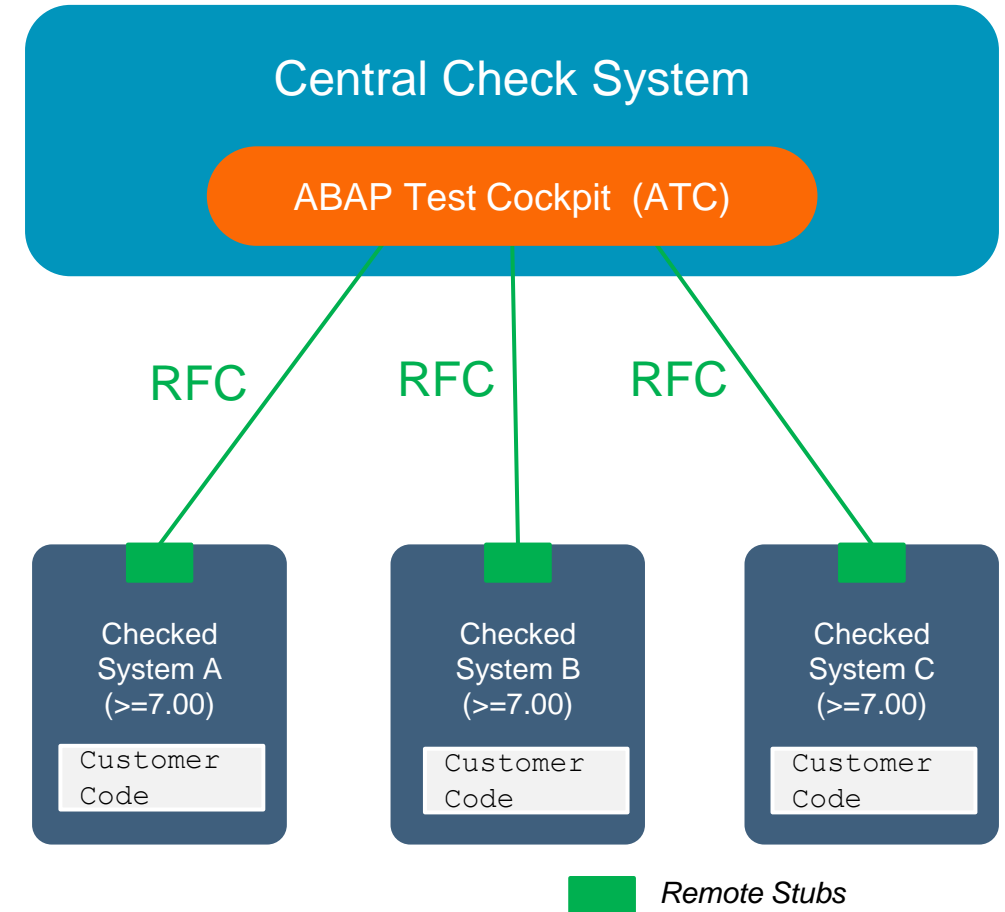


Technical infrastructure for custom code analysis

CENTRAL ATC SYSTEM TO ANALYZE CUSTOM CODE

in whole system landscape

- **REMOTE** stubs return a model from custom code
- **CHECK LOGIC** is executed on central system
- **RESULT** is analyzed in central system
- **INTEGRATED** in development environment
- **MOST KINDS OF CUSTOM CODE** are supported (incl. modifications and enhancements, SAP Queries, Smart Forms, Adobe Forms)
- **SUPPRESS** false-positive findings with pseudo-comments, e.g. for MATNR findings
- **ESSENTIAL** for custom code migration to SAP S/4HANA and cloud

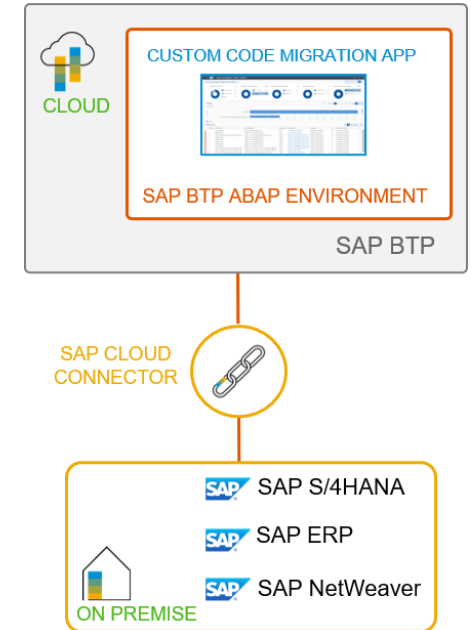


Check out [Remote code analysis with ATC](#)

Custom code analysis with Custom Code Migration app

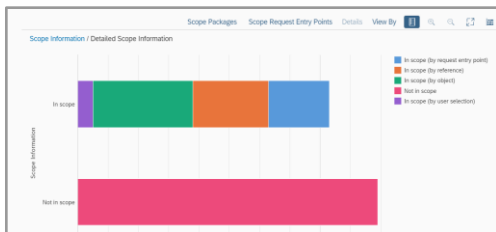
OVERVIEW

- Technically based on remote ABAP Test Cockpit (ATC) infrastructure
- Automated setup in SAP BTP ABAP Environment (or SAP S/4HANA on-premise)
- Custom code analysis for SAP S/4HANA and SAP BTP migration, classic ATC use cases
- Automatic scoping of custom code for migration based on usage data
- Identification and removal of obsolete code
- Complexity dashboard and dependency analysis with SAP standard
- Extensive compact and visual filters to customize analysis results view
- Detailed analysis of a custom code finding incl. direct navigation to source code
- Evaluation of custom code for semi-automated adaptation (Quick Fixes in ADT in Eclipse)

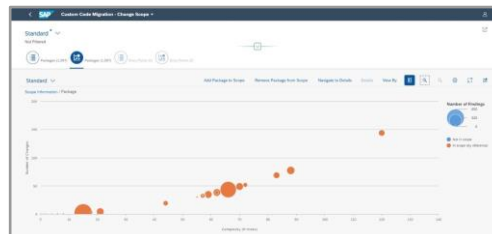


HIGH LEVEL FEATURES:

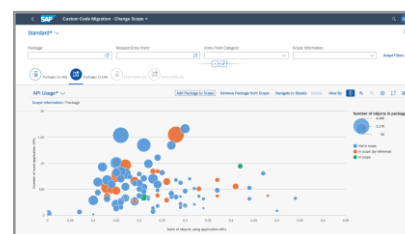
SCOPING



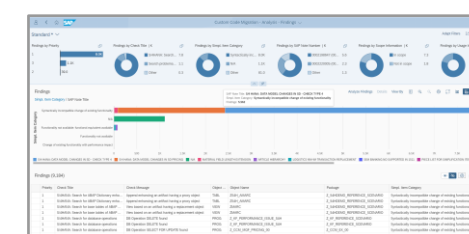
COMPLEXITY DASHBOARD



DEPENDENCY ANALYSIS



ANALYSIS RESULTS VIEW



Custom code analysis in ABAP Development Tools in Eclipse

ABAP TEST COCKPIT IN ADT

- Tightly integrated in development (“Run As...” menu)
- ATC check runs results are displayed in the ATC Problems View
- Use ABAP_CLOUD_READINESS check variant

Run ATC in ABAP Development Tools in Eclipse



CLOUD READINESS CHECKS

- Detect usage of not supported technologies (e.g. Dynpro)
- Detect usage of not released objects
- Detect incompatibilities with ABAP Language Version Cloud
- Evaluation for automated code adaptation (Quick Fixes in ADT in Eclipse)

ATC result of cloud readiness checks

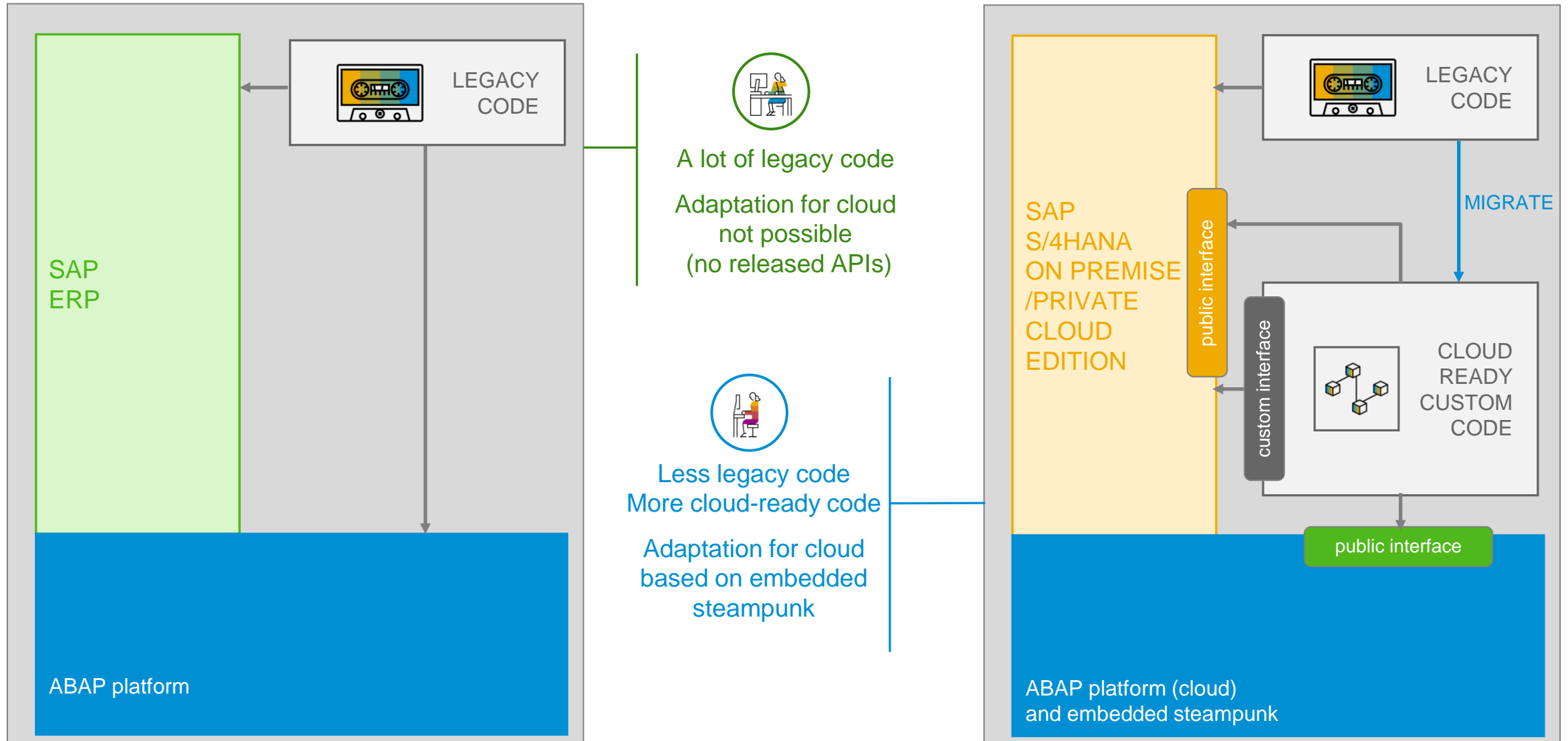
The screenshot shows the 'ATC Problems' view in Eclipse ADT. The view displays a table of findings from the ATC check. The table has columns for 'Description', 'Line Number', 'Object Type', 'Check', and 'Package'. The findings are categorized into 'Errors (5 Errors)' and 'Warnings (2 Warnings)'. The 'Errors' section includes four items related to 'Usage of not released application API' and one 'Syntax error in restricted language scope (Open SQL)'. The 'Warnings' section includes one 'Usage of deprecated API' and one 'Syntax warning in restricted language scope (SY fields)'.

Description	Line Number	Object Type	Check	Package
Findings: 5 Errors, 2 Warnings				
Errors (5 Errors)				
Usage of not released application API.	2 (GET_MATERIAL_ART)	CLAS	Check Usage of Released Objects	ZMATERIAL_ADD
Usage of not released API.	6 (ZCL_MATERIAL_INFORMI)	CLAS	Check Usage of Released Objects	ZMATERIAL_ADD
Usage of not released application API.	8 (GET_MATERIAL_ART)	CLAS	Check Usage of Released Objects	ZMATERIAL_ADD
Syntax error in restricted language scope (Open SQL)	8 (GET_MATERIAL_ART)	CLAS	Test for Restricted Language Scope (ABAP Language Version)	ZMATERIAL_ADD
Syntax error in restricted language scope	10 (GET_MATERIAL_ART)	CLAS	Test for Restricted Language Scope (ABAP Language Version)	ZMATERIAL_ADD
Warnings (2 Warnings)				
Usage of deprecated API.	4 (GET_MATERIAL_ART)	CLAS	Check Usage of Released Objects	ZMATERIAL_ADD
Syntax warning in restricted language scope (SY fields)	6 (GET_MATERIAL_ART)	CLAS	Test for Restricted Language Scope (ABAP Language Version)	ZMATERIAL_ADD

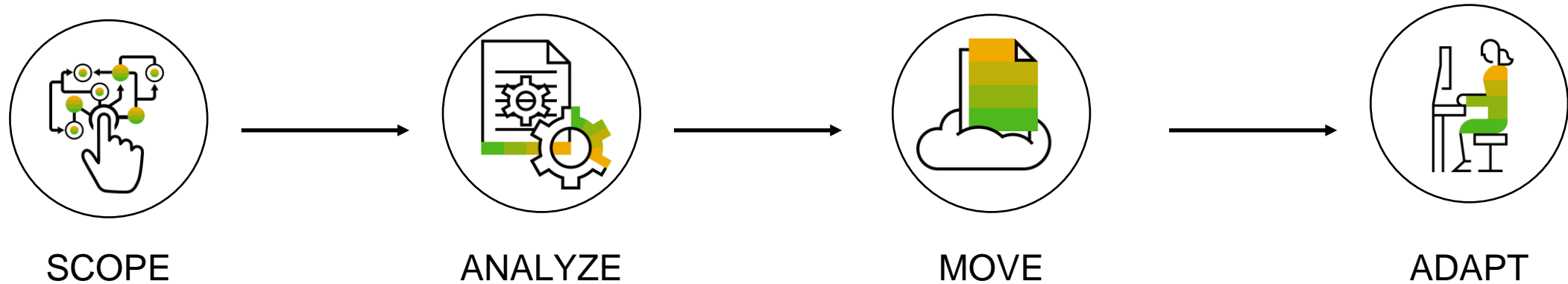
Custom code migration to **SAP S/4HANA, Public Cloud Edition**



Custom code migration from SAP S/4HANA versus SAP ERP



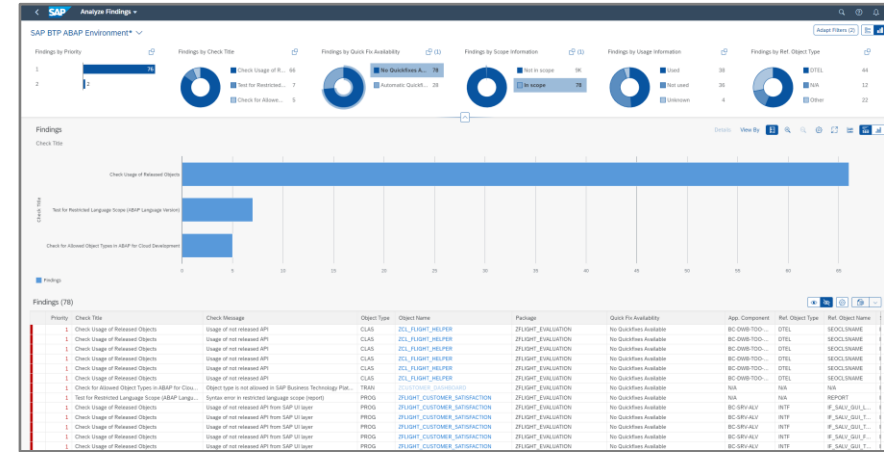
Custom code migration to SAP S/4HANA, Public Cloud Edition – The process



Analyze custom code for cloud

- Custom code analysis tools
- ERP system:** Custom code migration app and cloud project
- SAP S/4HANA system:** ADT in Eclipse with ABAP Test Cockpit and ABAP_CLOUD_READINESS check variant
- Outcome: analysis results of execution of cloud readiness checks over custom code

Analysis for cloud with Custom Code Migration app



Analysis for cloud in ADT in Eclipse

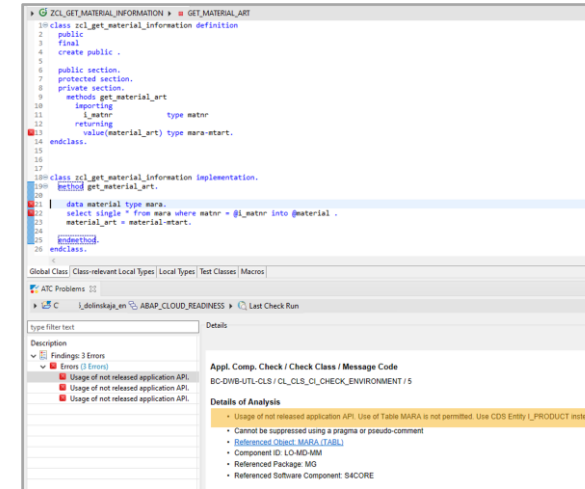
The screenshot shows the ADT in Eclipse interface. The 'Project Explorer' on the left displays the project structure, including 'ZCL_MATERIAL_INFORMATION'. The 'Outline' view on the right shows the class definition for 'ZCL_MATERIAL_INFORMATION'. A 'Run ABAP Test Cockpit With...' dialog box is open, showing the 'Check Variant: ABAP_CLOUD_READINESS'. Below the dialog, the 'ATC Problems' view displays the results of the analysis, categorized by 'Findings: 5 Errors, 2 Warnings'.

Description	Line Number	Object Type	Check	Package
Usage of not released application API.	2 (GET_MATERIAL_ART)	CLAS	Check Usage of Released Objects	ZMATERIAL_ADD
Usage of not released API.	6 (ZCL_MATERIAL_INFORMATION)	CLAS	Check Usage of Released Objects	ZMATERIAL_ADD
Usage of not released application API.	8 (GET_MATERIAL_ART)	CLAS	Check Usage of Released Objects	ZMATERIAL_ADD
Syntax error in restricted language scope (Open SCL)	8 (GET_MATERIAL_ART)	CLAS	Test for Restricted Language Scope (ABAP Language Version)	ZMATERIAL_ADD
Syntax error in restricted language scope	10 (GET_MATERIAL_ART)	CLAS	Test for Restricted Language Scope (ABAP Language Version)	ZMATERIAL_ADD
Usage of deprecated API.	4 (GET_MATERIAL_ART)	CLAS	Check Usage of Released Objects	ZMATERIAL_ADD
Syntax warning in restricted language scope (SY fields)	6 (GET_MATERIAL_ART)	CLAS	Test for Restricted Language Scope (ABAP Language Version)	ZMATERIAL_ADD

Recommendations for custom code analysis

- First focus your analysis on use of released APIs
- Verify if publicly released APIs are available in SAP S/4HANA, Public Cloud Edition
 - In SAP S/4HANA 2022 successor released APIs are displayed in the ATC result in ADT in Eclipse
 - In older SAP S/4HANA releases look up the SAP Note [3088062 – Identifying local APIs for S/4HANA Cloud](#)
- Missing publicly released APIs can be requested at the SAP Influence campaign:
[SAP S/4HANA Cloud & SAP S/4HANA for On-stack API](#)

Released API in the ATC result



```
1 class zcl_get_material_information definition
2 public
3 final
4 create public .
5
6 public section.
7 protected section.
8 private section.
9 methods get_material_art
10 importing
11     type material
12     returning
13         value(material_art) type maria-entst.
14 endclass.
15
16
17
18
19 class zcl_get_material_information implementation.
20 method get_material_art.
21
22     data material type maria.
23     select single * from maria where matnr = @i_matnr into @material .
24     material_art = material-entst.
25 endmethod.
26 endclass.
```

Global Class: Class-relevant Local Types: Local Types: Test Classes: Macros

ATC Problems: 1

Type filter text: Details

Description: 3 Errors

- Usage of not-released application API
- Usage of not-released application API
- Usage of not-released application API

Appl. Comp. Check / Check Class / Message Code

BC-DWB-UTL-CLS / CL_CLS_O_CHECK_ENVIRONMENT / S

Details of Analysis

- Usage of not-released application API. Use of Table MARIA is not permitted. Use CDS Entity L_PRODUCT instead.
- Cannot be suppressed using a pragma or pseudo comment
- Referenced Object: MARIA (TABLE)
- Component ID: LO-MD-MM
- Referenced Package: MD
- Referenced Software Component: S4CORE

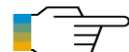
Request a missing released API



Customer Influence opportunity

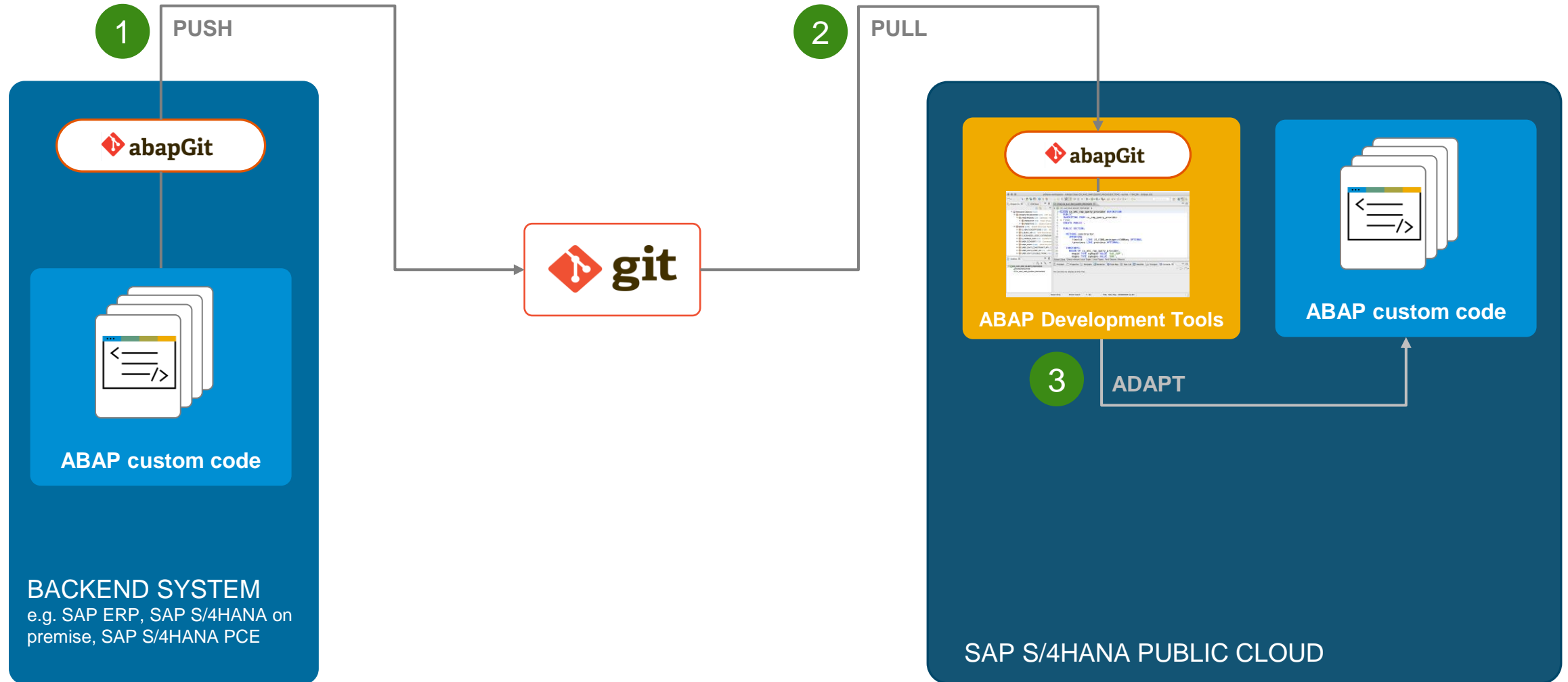
Give us your feedback! We will accept requests for new APIs, enhancements on existing APIs for the SAP S/4HANA Cloud and SAP S/4HANA product family.

Influence campaign: [SAP S/4HANA Cloud & SAP S/4HANA for On-stack API](#)



Check out [How to make your custom code cloud-ready and upgrade-stable](#)

How to bring your custom code to SAP S/4HANA, Public Cloud Edition



Semi-automatic code adaptation for cloud in ADT in Eclipse

MASS-ENABLED QUICK FIXES IN ADT IN ECLIPSE TO MINIMIZE ADAPTATION EFFORTS

- Adapt to ABAP Language Version Cloud
- Adapt to usage of released objects
- API calls instead of direct access to SY fields

EXAMPLES: USE CASES FOR QUICK FIXES

- Replace Data Element by released Data Element (->**ABAP_BOOLEAN**)
- Replace syntax element by new syntax element (e.g. **MOVE**)

ADAPT TO USAGE OF RELEASED APIs

- Run ATC with ABAP_CLOUD_READINESS check variant
- **SAP S/4HANA 2022:** Use successor APIs displayed the details of analysis results
- **SAP S/4HANA < 2022:** Use the SAP Note [3088062 – Identifying local APIs for S/4HANA Cloud](https://www.sap.com/support/3088062)

Quick Fixes in ADT in Eclipse

The screenshot shows the Eclipse IDE with the ATC Problems view open. The 'Findings: 5 Errors, 2 Warnings' section is expanded, showing a list of errors. The 'Recommended Quick Fixes' dialog is open, showing the changes to be performed for the selected objects. The dialog includes a table with 'Original Source' and 'Refactored Source' columns, showing the transformation of the code to use released APIs and syntax elements.

Description	Line Number	Object Type	Check
Use of not released application API.	2 (GET_MATERIAL_ART)	CLAS	Check Usage of Released Objects
Use of not released API.	6 (ZCL_MATERIAL_INFORMATION)	CLAS	Check Usage of Released Objects
Use of not released application API.	8 (GET_MATERIAL_ART)	CLAS	Check Usage of Released Objects
Syntax error in restricted language		CLAS	Test for Restricted Language Scope (ABAP Language Version)
Syntax error in restricted language		CLAS	Test for Restricted Language Scope (ABAP Language Version)
Use of deprecated API.		CLAS	Check Usage of Released Objects
Syntax warning in restricted language		CLAS	Test for Restricted Language Scope (ABAP Language Version)

Recommended Quick Fixes

The following changes for the selected objects will be applied. Deselect objects which should not be changed.

Changes to be performed
Original Source
22 method get_material_art.
23 data material type mara.
24 data production_date type datn.
25 data bool_tmp type boolean.
26 production_date = sy-datum.
27
28 select single mtart from mara into corresponding fields of material where matnr = matnr.
29
30 move material-mtart to material-art.
31
32
33
34 endmethod.

Refactored Source
22 method get_material_art.
23 data material type mara.
24 data production_date type datn.
25 data bool_tmp type ABAP_BOOLEAN.
26 PRODUCTION_DATE = cl_abap_context_info->get_system_date().
27
28 SELECT SINGLE FROM MARA FIELDS MTART WHERE MATNR = @MATNR INTO CORRESPONDING FIELDS OF @MATERIAL.
29
30 MATERIAL_ART = MATERIAL-MTART.
31
32
33
34 endmethod.

Adapt to usage of released API

The screenshot shows the Eclipse IDE with the ATC Problems view open. The 'Findings: 3 Errors' section is expanded, showing a list of errors. The 'Details of Analysis' dialog is open, showing the details of the analysis results, including the use of the API and the recommended successor API.

Global Class: Class-relevant Local Types | Local Types | Test Classes | Macros

ATC Problems

type filter text

Description

Findings: 3 Errors

Errors (3 Errors)

Use of not released application API.

Use of not released API.

Use of not released application API.

Details

Appl. Comp. Check / Check Class / Message Code

BC-DWB-UTL-CLS / CL_CLS_CHECK_ENVIRONMENT / NOT_TO_REL

Details of Analysis

- Use of API that will not be released. The use of Table T006 is not permitted. Use CDS Entity L_UNITOFMEASURE instead.
- Cannot be suppressed using a pragma or pseudo-comment.
- Referenced Object: T006 (TABLE).
- Additional Info: DB_ACCESS - Table is accessed on database.
- Referenced Application Component: BC-SRV-ASF-UOM
- Referenced Package: SZME
- Referenced Software Component: SAP_BASIS

Description

You use an API that will not be released for ABAP cloud development.

Notes

There might be already an API available that you can use instead. The list of successor APIs can be found via SAP Note 3088062 - Identifying local APIs for S/4HANA Cloud - SAP ONE Support Launchpad.

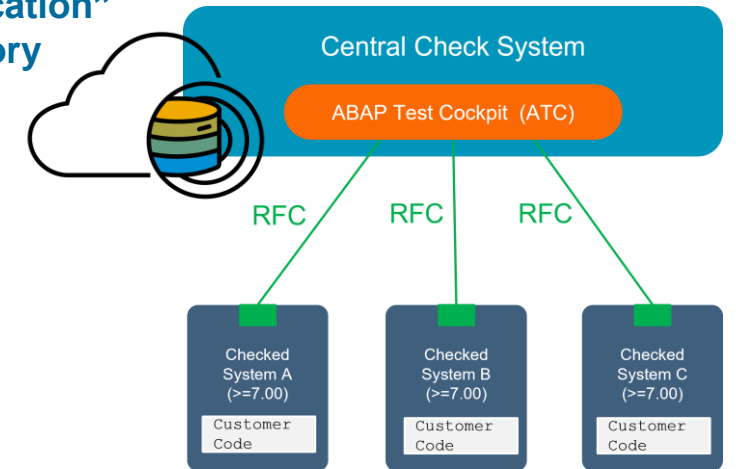
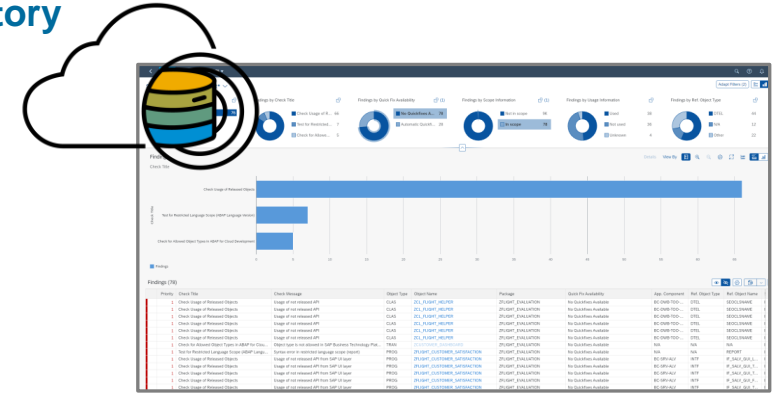
Outlook



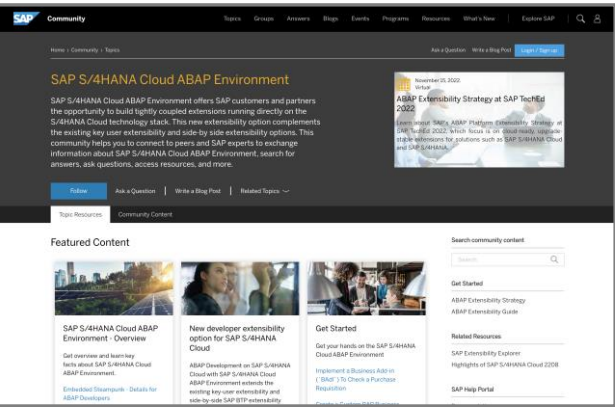
Outlook - Support for custom code analysis for SAP S/4HANA Cloud ABAP Environment

“CLOUDIFICATION” REPOSITORY AS INPUT FOR CLOUD READINESS CHECKS

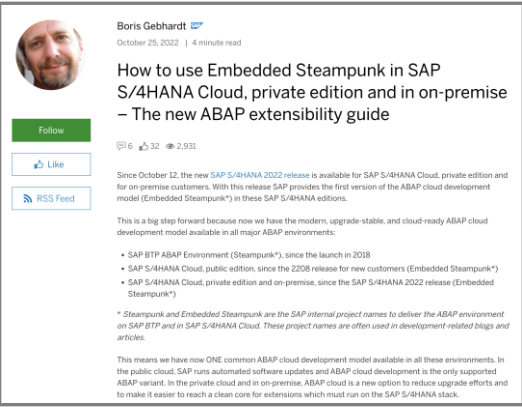
- Provide custom code adaptation recommendations (which released APIs and cloud-like SAP successor objects to use)
- Ideally to use in Custom Code Migration app on SAP BTP (within a new SAP S/4HANA Cloud migration project)
- Also possible to use with remote ATC for on-premise checks of ERP systems for SAP S/4HANA Cloud (“Embedded Steampunk”) readiness



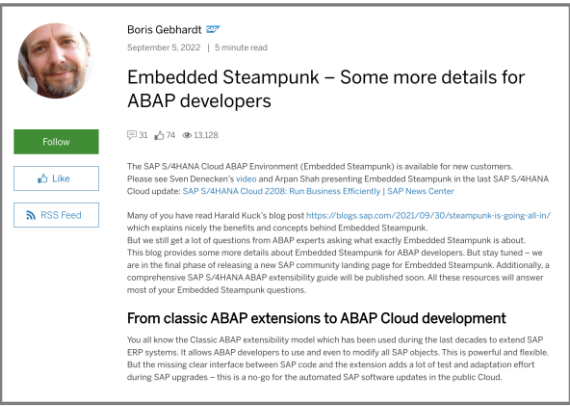
More information



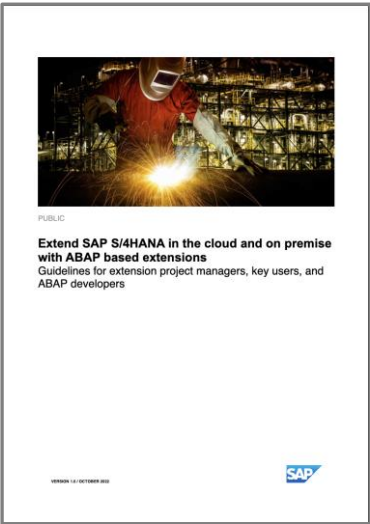
SAP Community



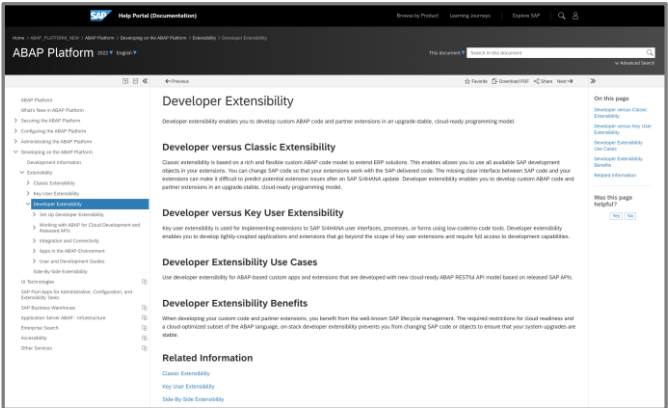
How to use Embedded Steampunk in SAP S/4HANA Cloud, private edition and in on-premise – The new ABAP extensibility guide | SAP Blogs



Embedded Steampunk – Some more details for ABAP developers | SAP Blogs



The new ABAP extensibility guide



SAP documentation



Developer Discussion: ABAP Cloud

Thank you.

Contact information:

Mani P S
Mani.p.s@sap.com