

# ABAP-based Extensibility Options

Safa Golrokh Bahoosh, Product Management ABAP Platform, SAP SE

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.

# Overview



# SAP S/4HANA extensibility today

User Interface Layer



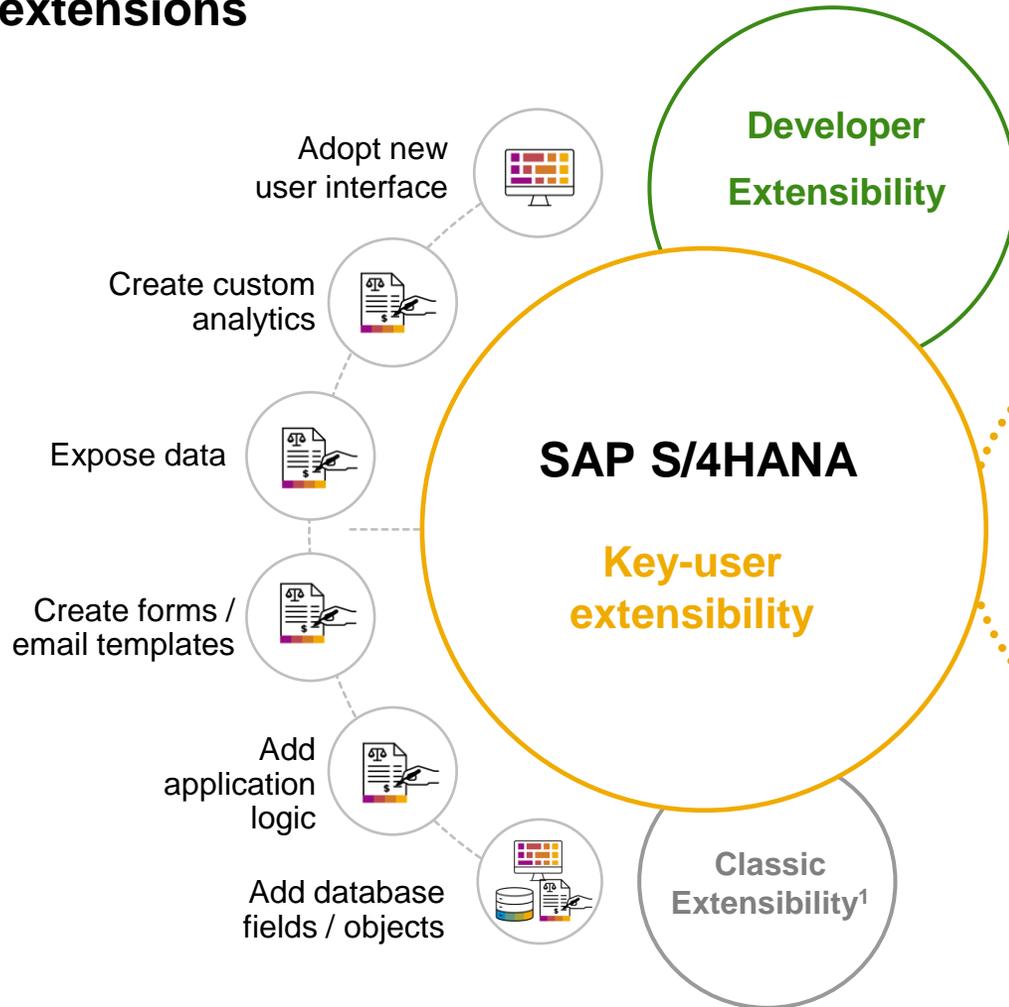
Application Layer



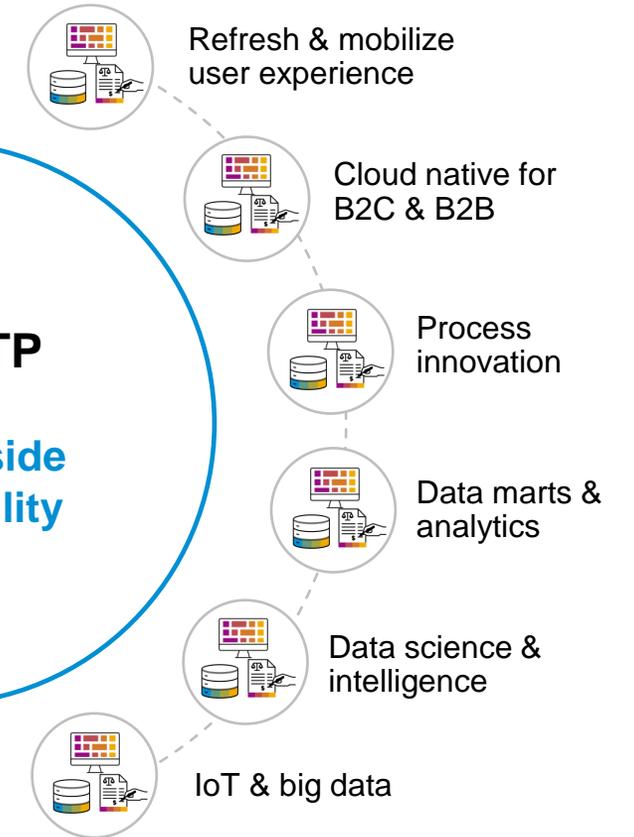
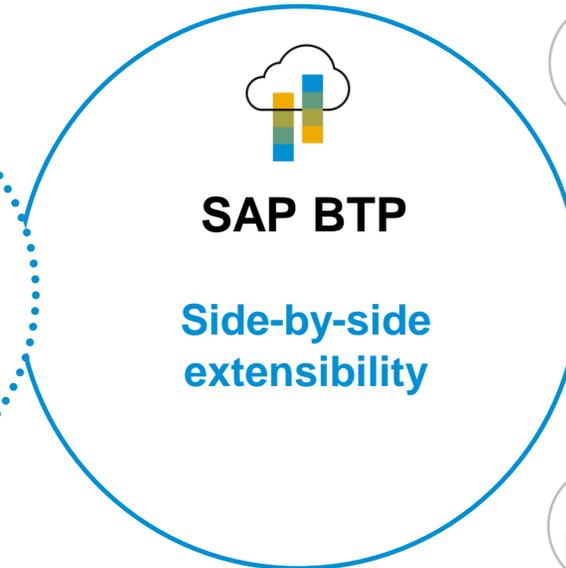
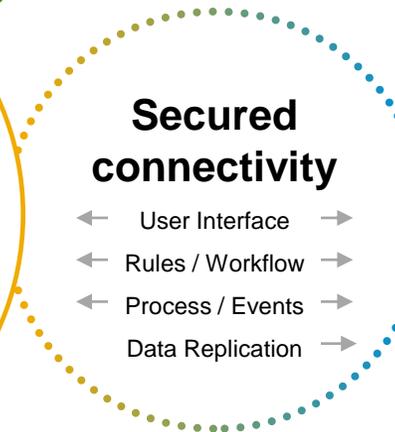
Database Layer



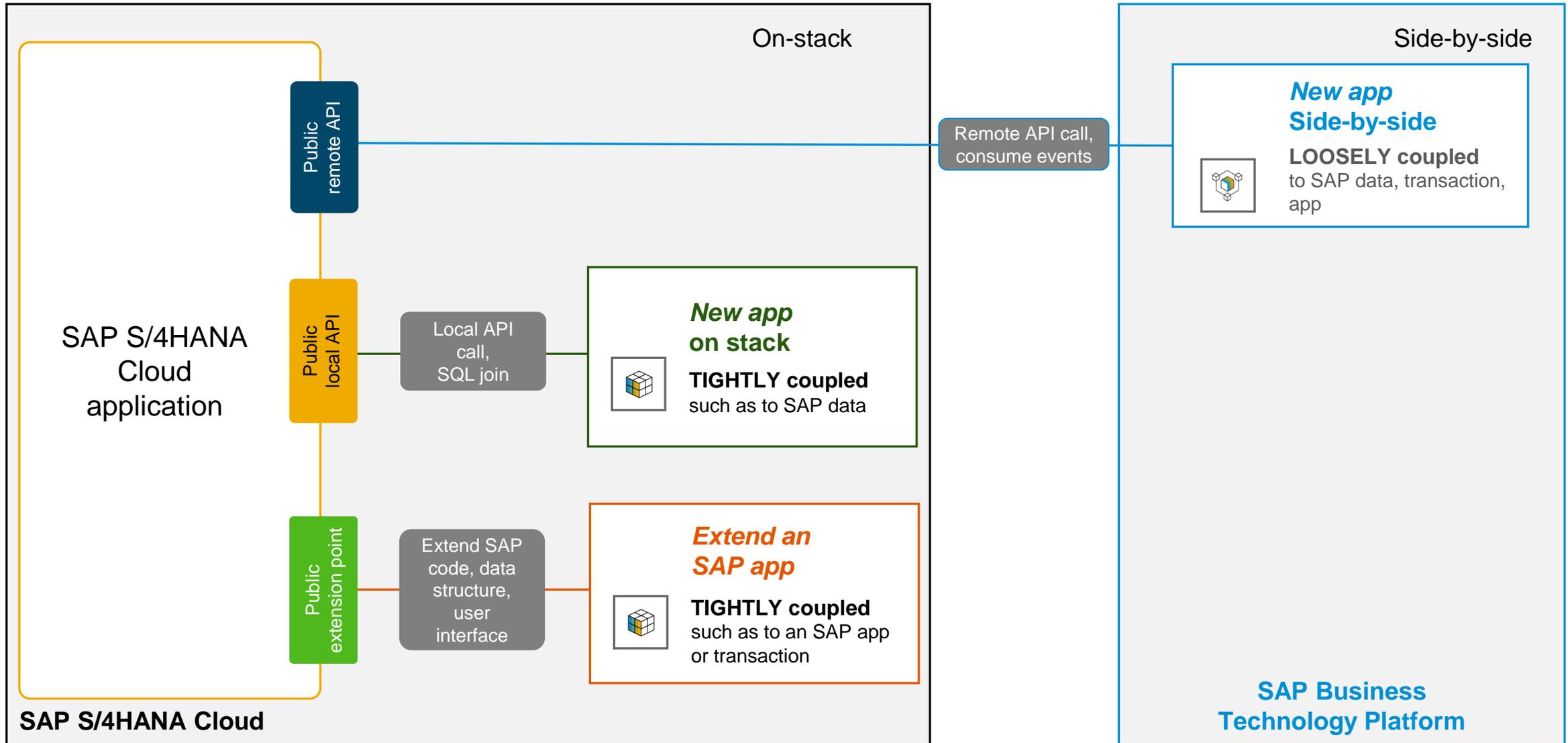
## Core solution extensions



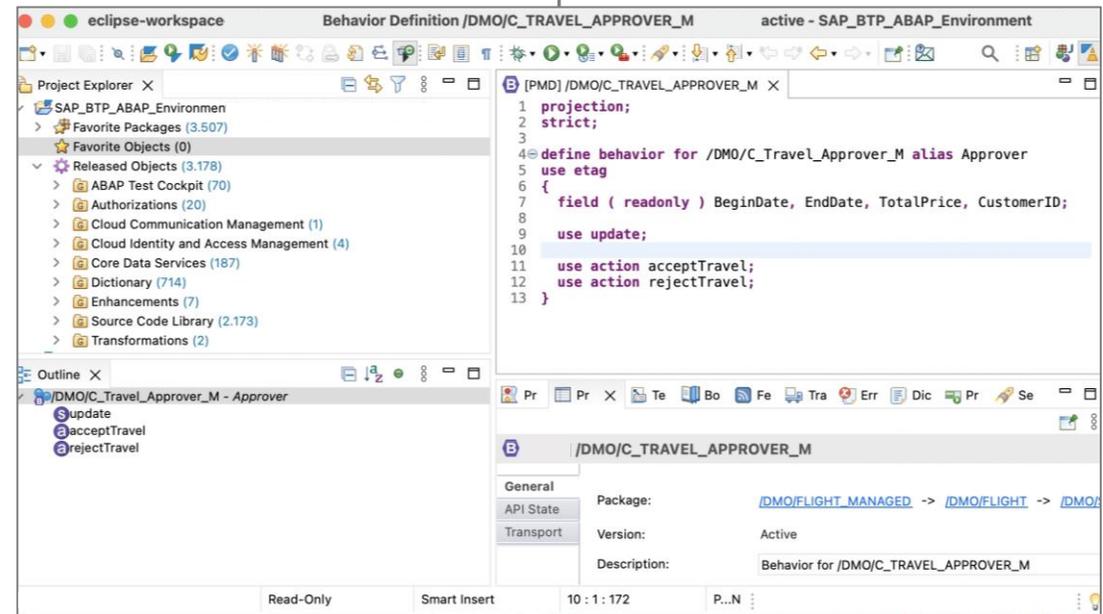
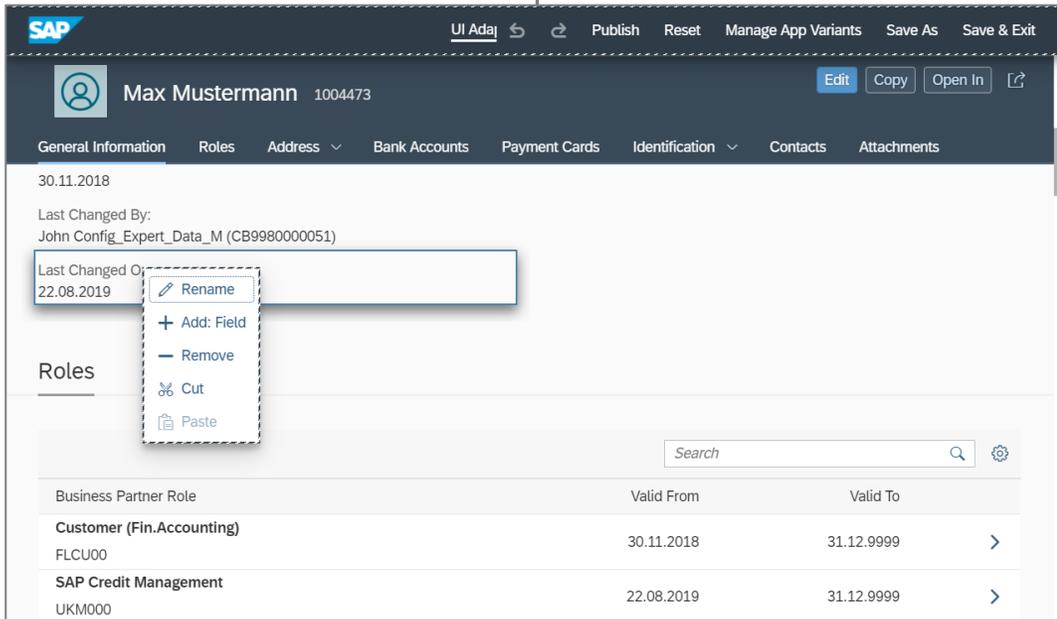
## Side-by-side Extensions



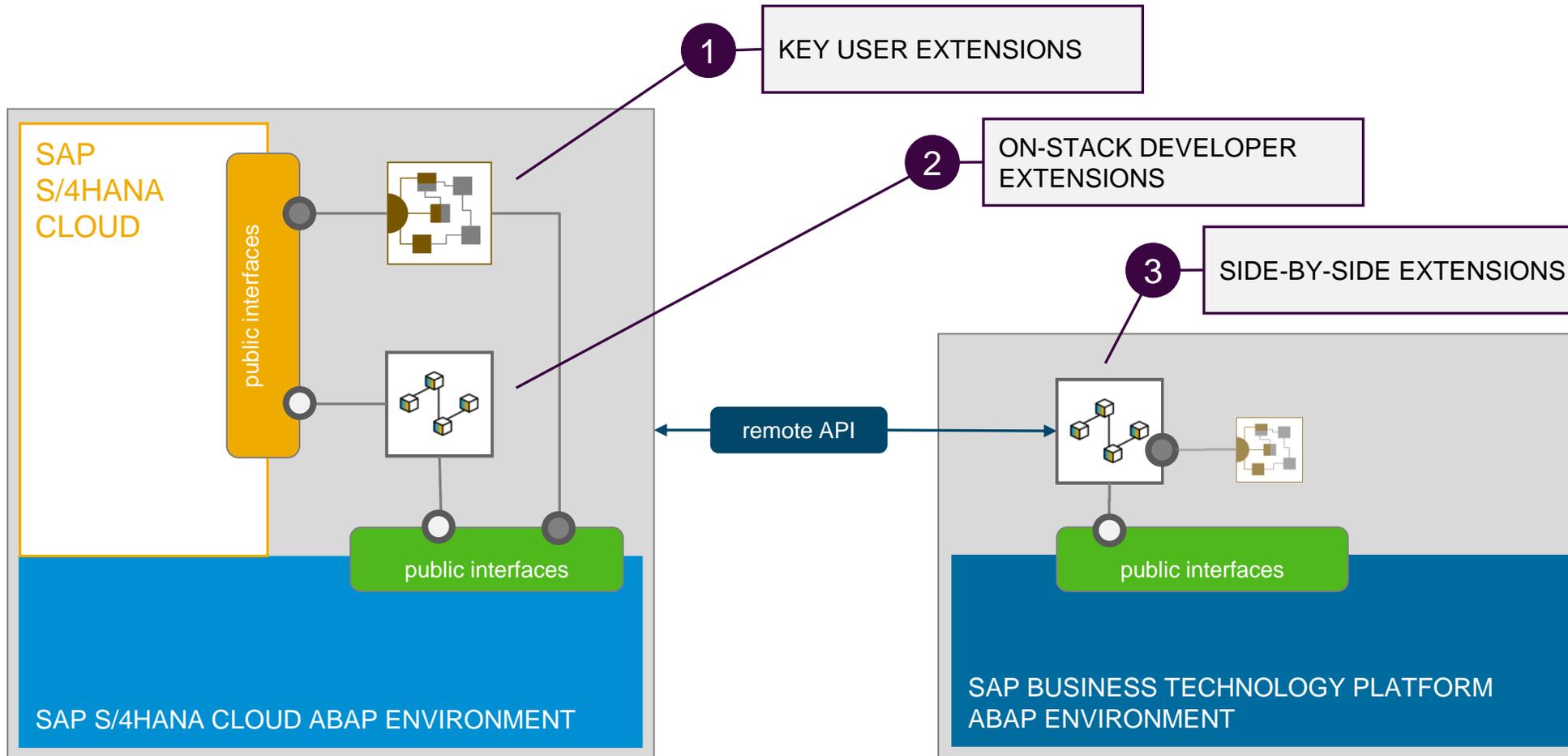
# SAP S/4HANA Cloud extensibility patterns



# Extensibility personas



# Overview of extensibility options

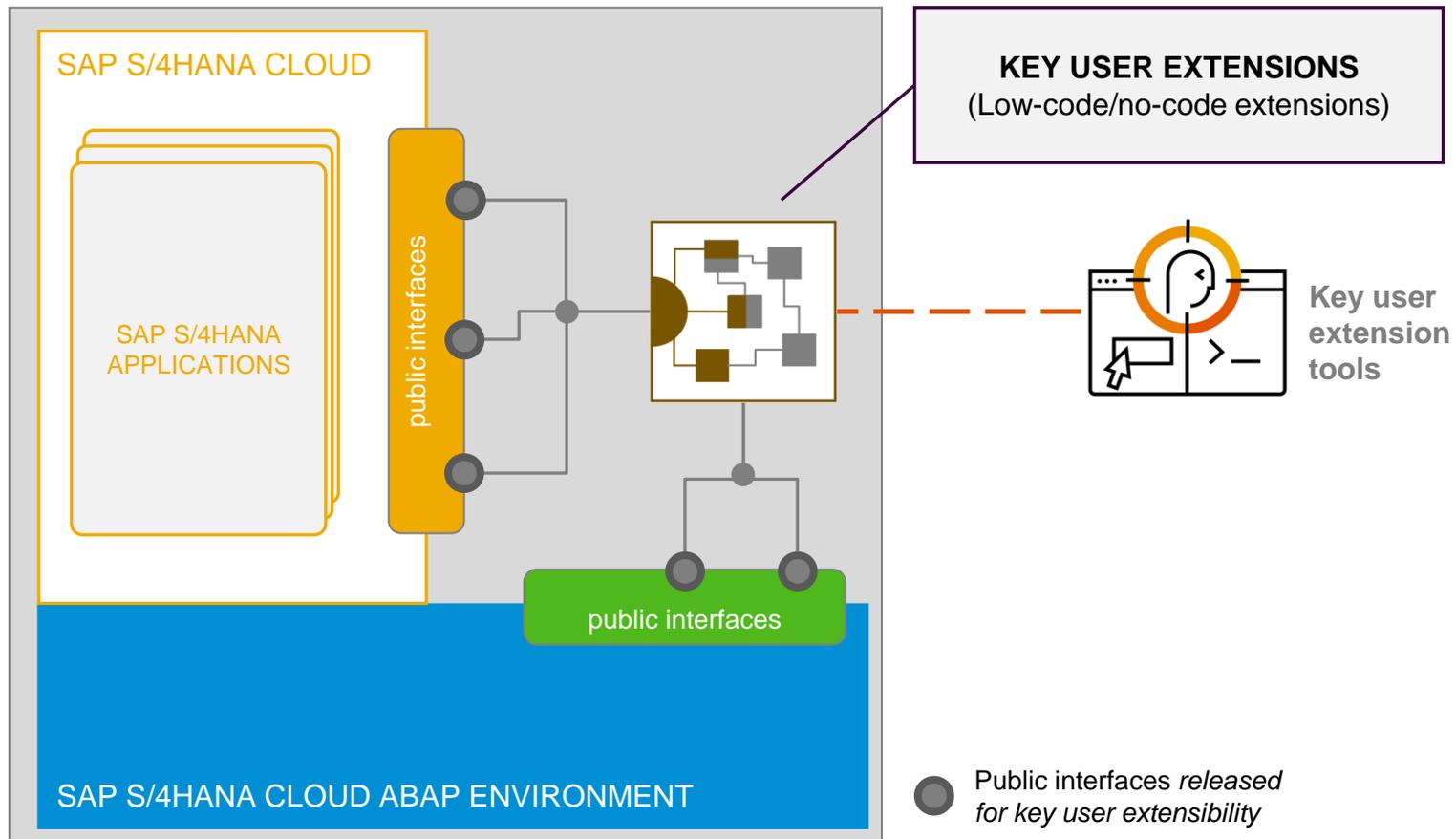


 Key-user extensions  
low-code/no-code extensions

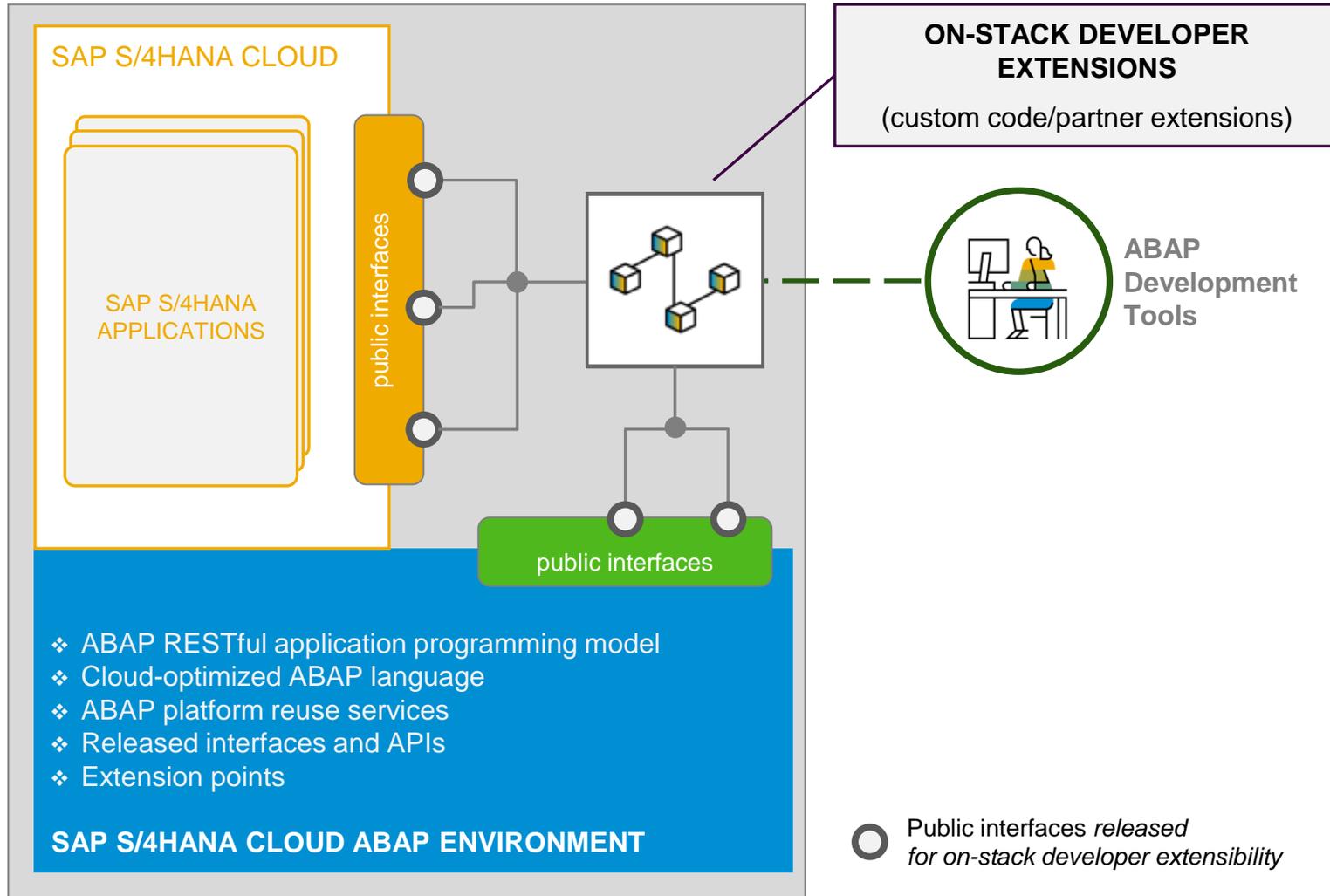
 ABAP custom code or partner extensions  
following the cloud extensions model

 Public interfaces *released for developer extensibility*  
 Public interfaces *released for key-user extensibility*

# Key user extensibility 1



# On-stack developer extensibility 2



**ENABLE CUSTOM ABAP DEVELOPMENT DIRECTLY ON SAP S/4HANA CLOUD STACK**

## MODERN ABAP DEVELOPMENT

**SAP, customers and partners use the same development model**

**High developer productivity**

**ABAP RESTful application programming model**

- Development of SAP HANA-optimized apps and services
- Eclipse-based ABAP development tools

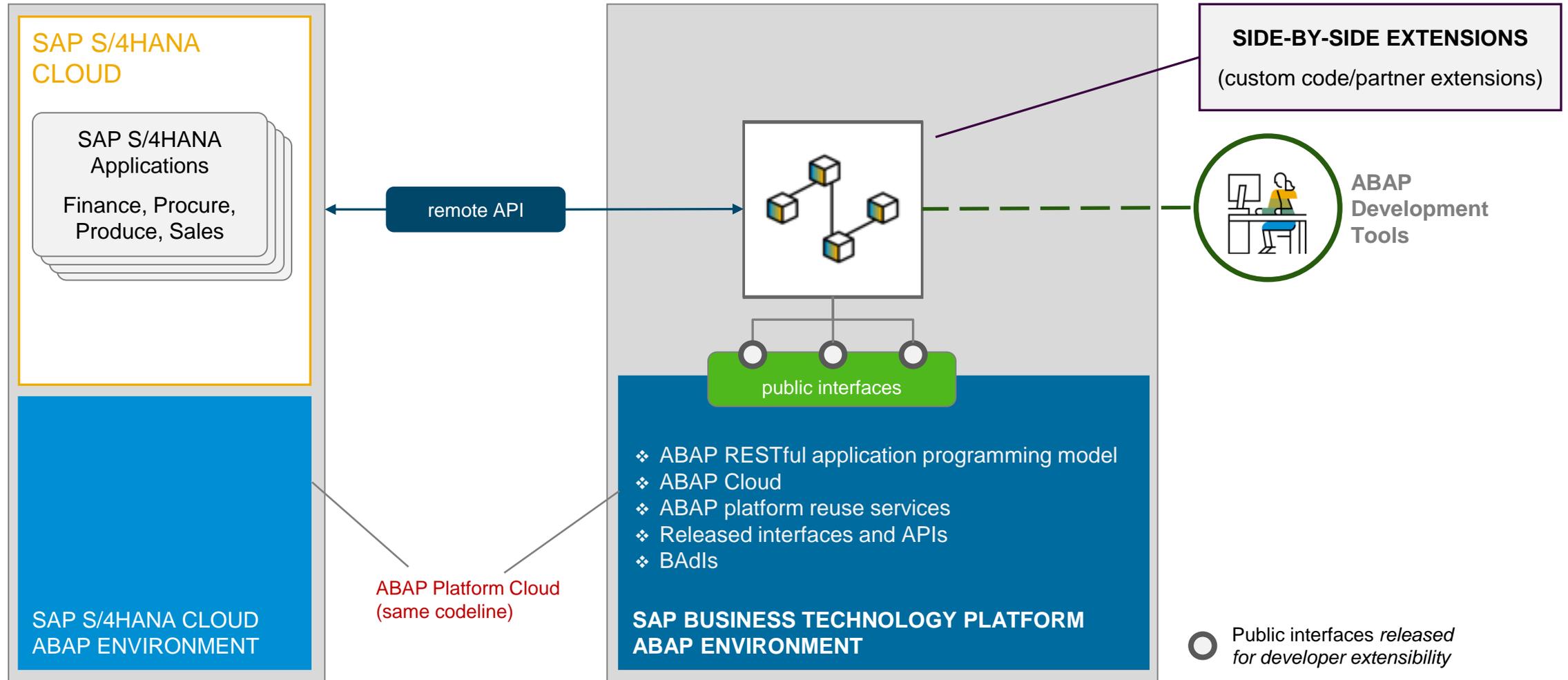
**SAP Fiori tools for UI Development**

**Proven Lifecycle Management**

## RULES OF THE GAME

- Clear separation between SAP solutions and extensions
- Only stable and reliable public interfaces and released objects from both ABAP platform and SAP S/4HANA Cloud applications can be used
- No modifications

# Side-by-side extensibility 3



# Summary of ABAP-related extensibility options in SAP S/4HANA Cloud

	<b>KEY USER EXTENSIBILITY</b>  Business expert, implementation consultant, citizen developer, key user	<b>ON-STACK DEVELOPER EXTENSIBILITY</b>  ABAP developer	<b>SIDE-BY-SIDE EXTENSIBILITY</b>  ABAP developer
SCENARIO	Low-code/no-code adaptations and extensions of SAP S/4HANA applications	Custom ABAP development projects that need proximity or coupling to SAP S/4HANA data, transactions, or apps	Loosely-coupled applications and partner SaaS solutions
USE CASES	Adapting UIs, adding custom fields, adding custom business objects etc.	Custom applications with frequent or complex SQL access to SAP S/4HANA data Custom extensions running in the same logical unit of work (LUW) as SAP applications Tailored custom remote APIs or services which serve side-by-side SAP BTP apps	Custom applications for a separate target group (no ERP users) Custom application workload that shall run separated from ERP Custom applications needing proximity to intelligent SAP BTP services like machine learning, AI etc. Solutions integrating with several ERP systems and cloud services SaaS applications provided by partners
BENEFIT	Fully managed and integrated in SAP S/4HANA Cloud No or only very basic development skills required	Development of extensions inside the SAP S/4HANA Cloud system No remote access or data replication Use and extend released SAP S/4HANA Cloud objects	Decoupled extensions independent of SAP S/4HANA Cloud operation and lifecycle management
	On-stack extension domain		Side-by-side extension domain

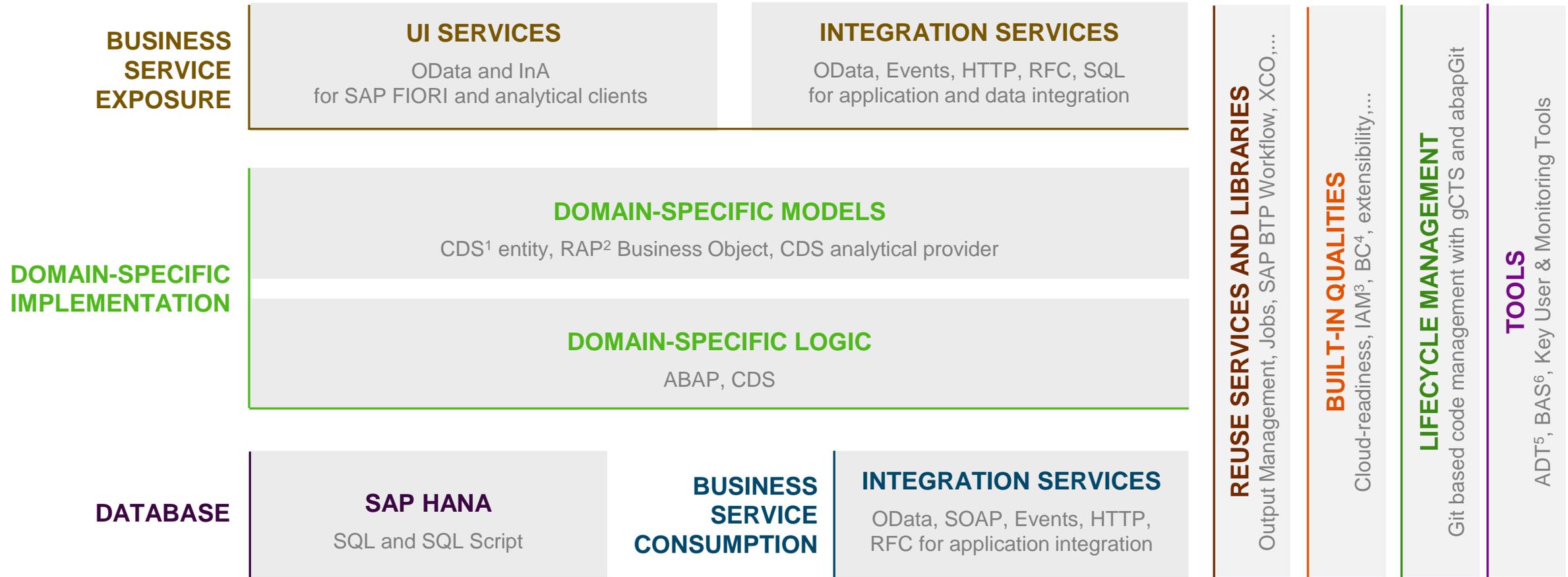
# ABAP Cloud



## ABAP Cloud

- ... is the ABAP **development model** to build cloud-ready business apps, services or extensions
- ... comes with SAP BTP and SAP S/4HANA
- ... works with public or private cloud, and even on-premise

# ABAP Cloud map



<sup>1</sup> Core Data Services

<sup>2</sup> ABAP RESTful application programming model

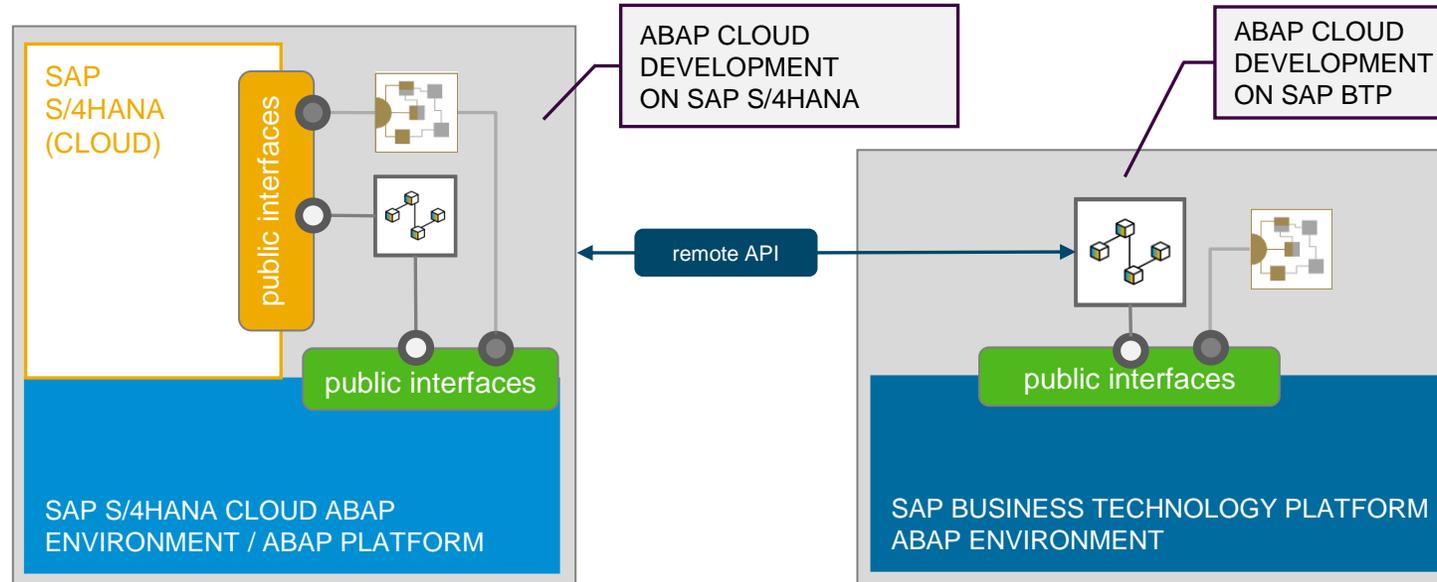
<sup>3</sup> Identity & Access Management

<sup>4</sup> Business Configuration

<sup>5</sup> ABAP Development Tools

<sup>6</sup> Business Application Studio

# Availability of ABAP Cloud



## ABAP CLOUD IS AVAILABLE IN THE FOLLOWING PRODUCTS

PRODUCT	RELEASE	ABAP CLOUD USAGE
SAP BTP ABAP Environment	All	<b>Mandatory</b>
SAP S/4HANA Cloud, public edition	≥ 2208 (new customers)	<b>Mandatory</b>
SAP S/4HANA Cloud, private edition and SAP S/4HANA on-premise	≥ 2022	<b>Recommended *</b>

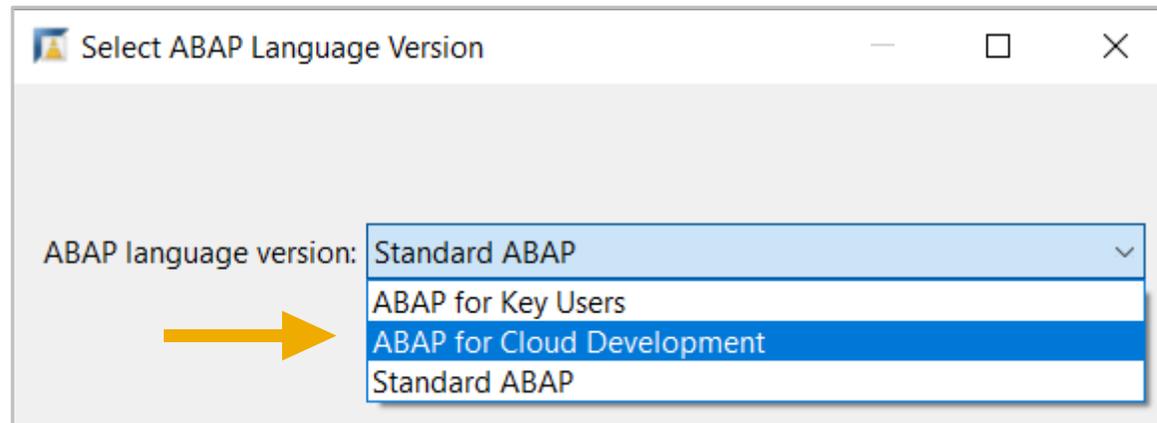
\* Classic ABAP can still be used

# SAP S/4HANA, private cloud and on-premise editions

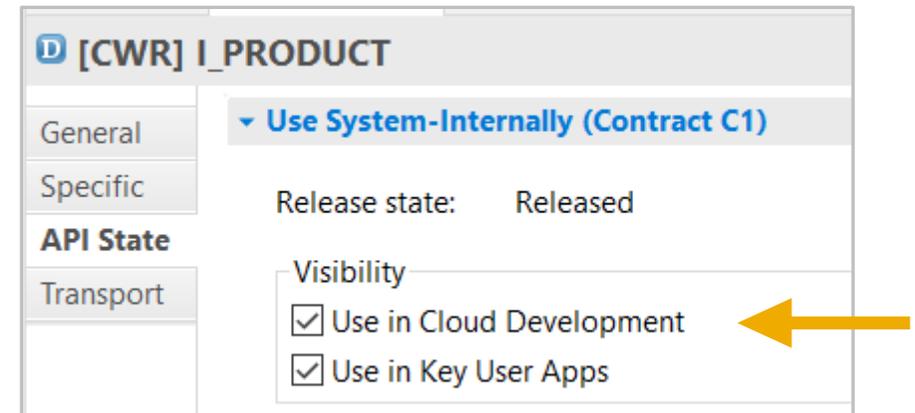
## ABAP cloud development – ABAP language version and public SAP APIs

How will I use **ABAP Cloud** in the private cloud and on-premise editions of SAP S/4HANA?

- ❖ Switch on the strict ABAP Cloud syntax check for the selected custom ABAP objects (such as a new Z-class)
- ❖ Use the public APIs that SAP released for ABAP cloud development (such as the CDS view I\_PRODUCT)

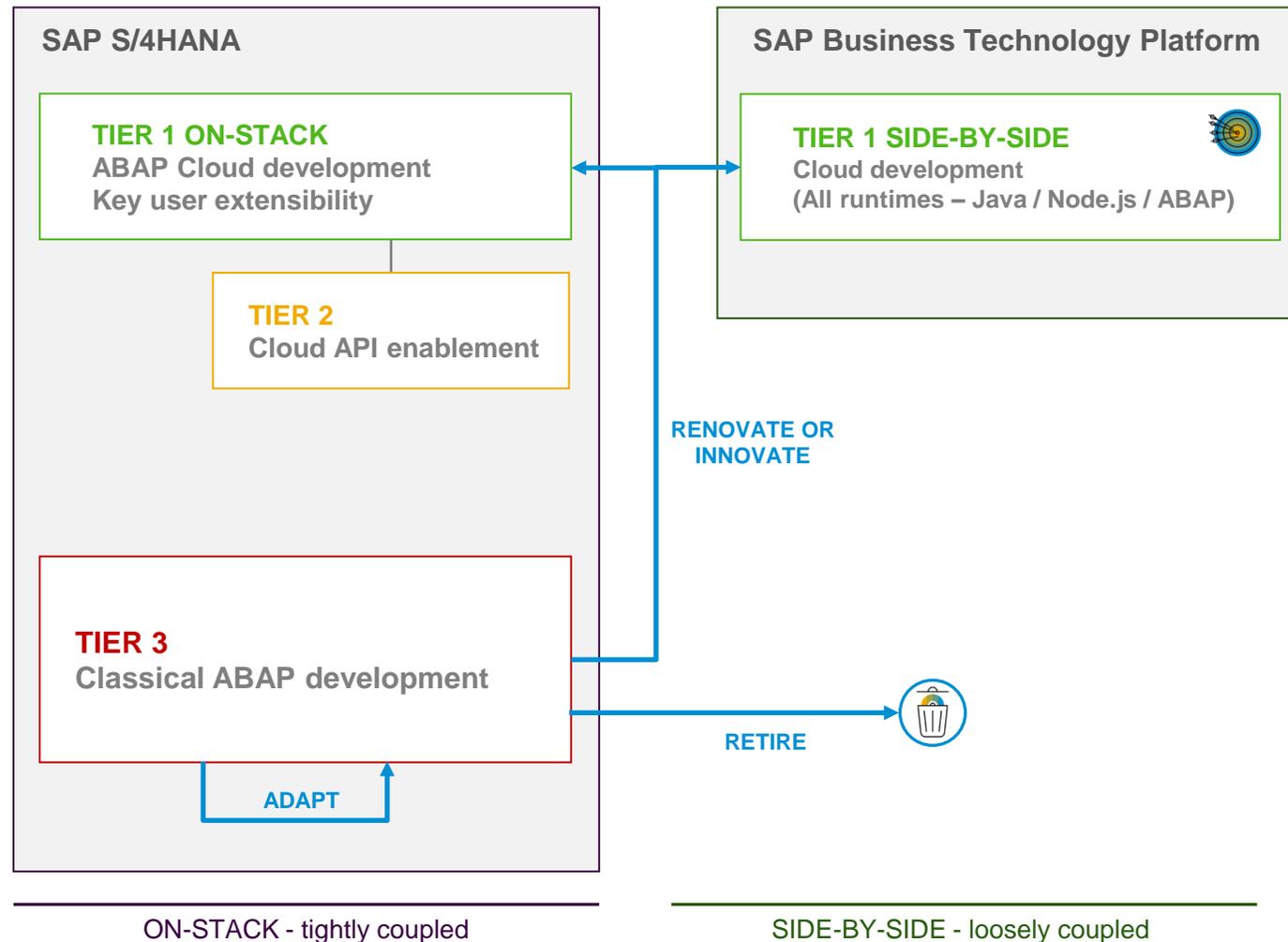


Switch from classic ABAP extensibility (Standard ABAP) to ABAP Cloud (ABAP for cloud development)



SAP released the CDS view for *ABAP Cloud development*

# 3-tier extensibility model for SAP S/4HANA private cloud and on-premise



## TIER 1 – Cloud extensibility model

Development of cloud-ready and upgrade-stable applications and extensions

**Same development model as used in SAP S/4HANA Cloud, public edition**

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:

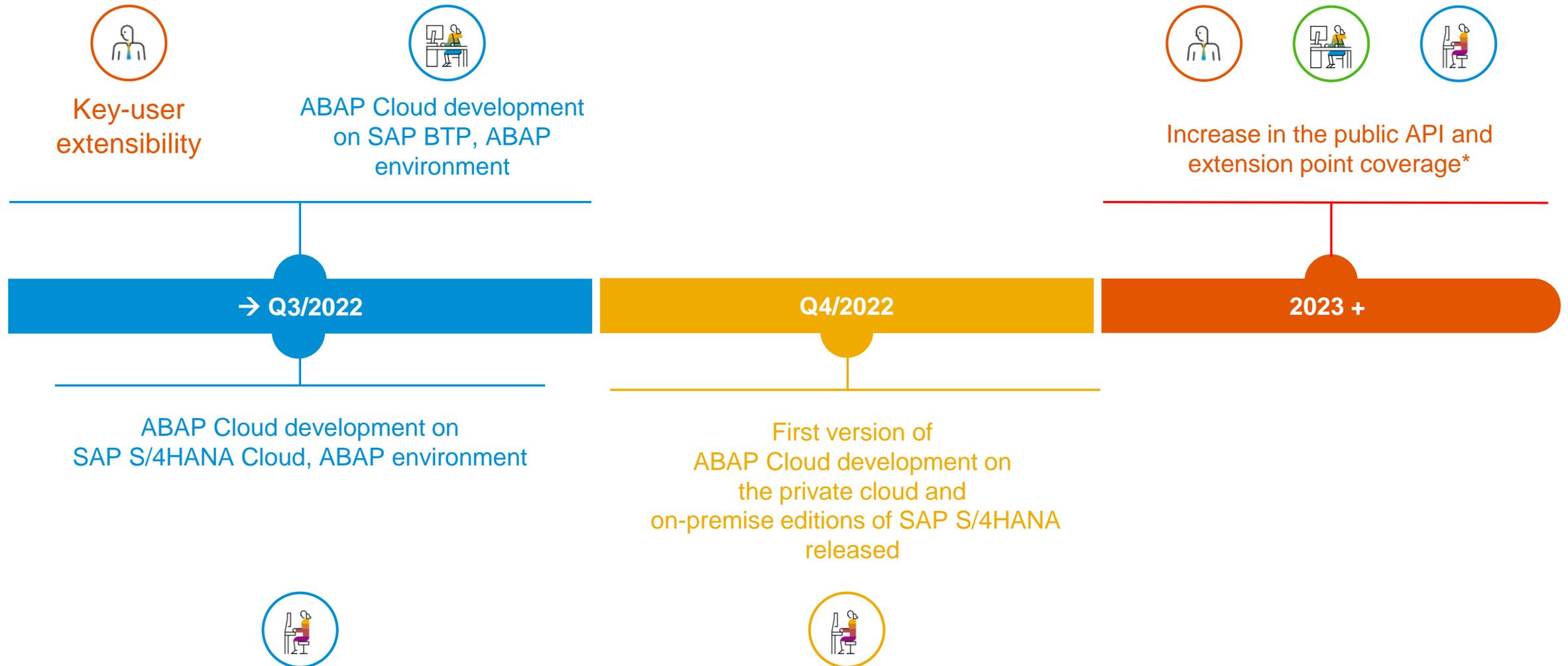
- Develop custom wrapper objects for not released SAP objects to be used in tier 1
- Retire wrapper once a released SAP API is available

## 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

# Road map – ABAP extensibility options



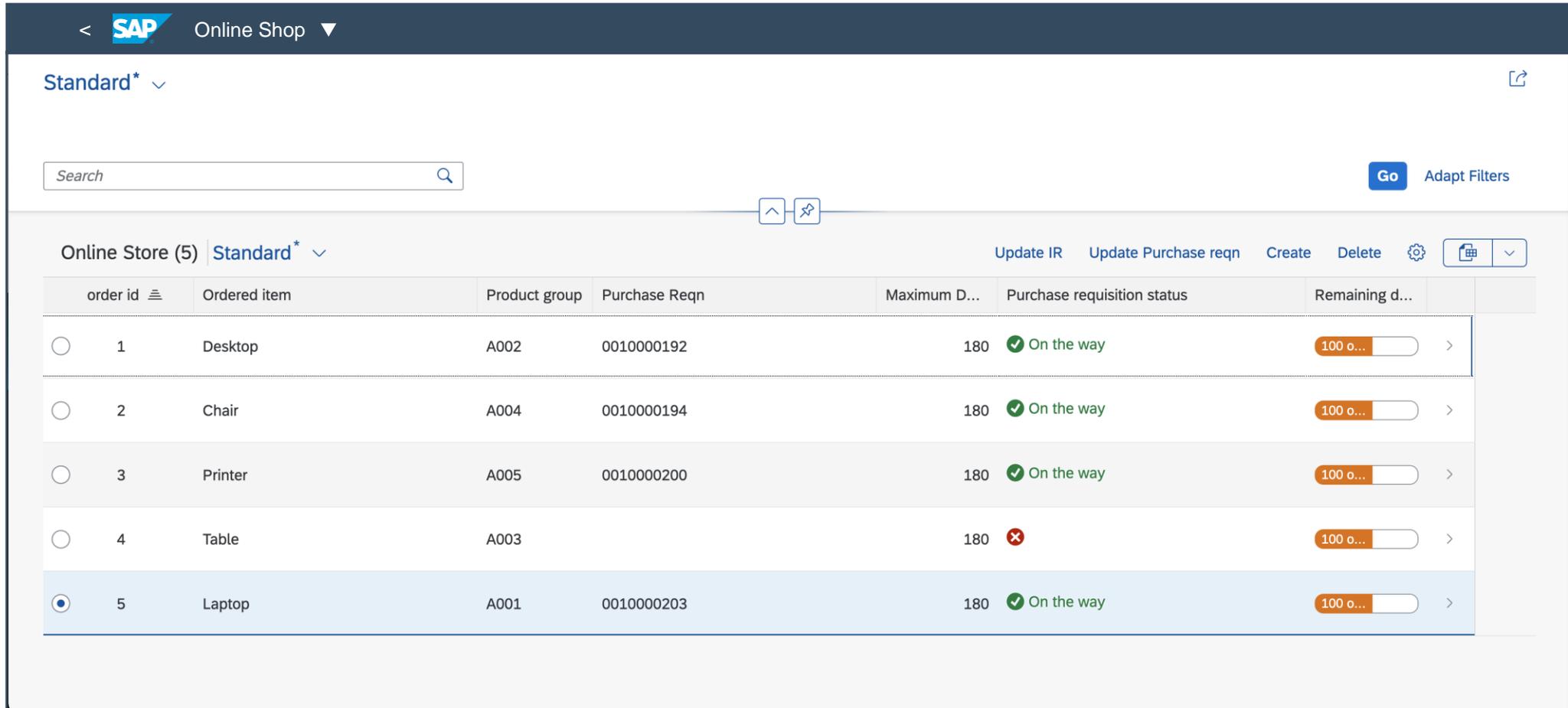
# Demo





# Demo

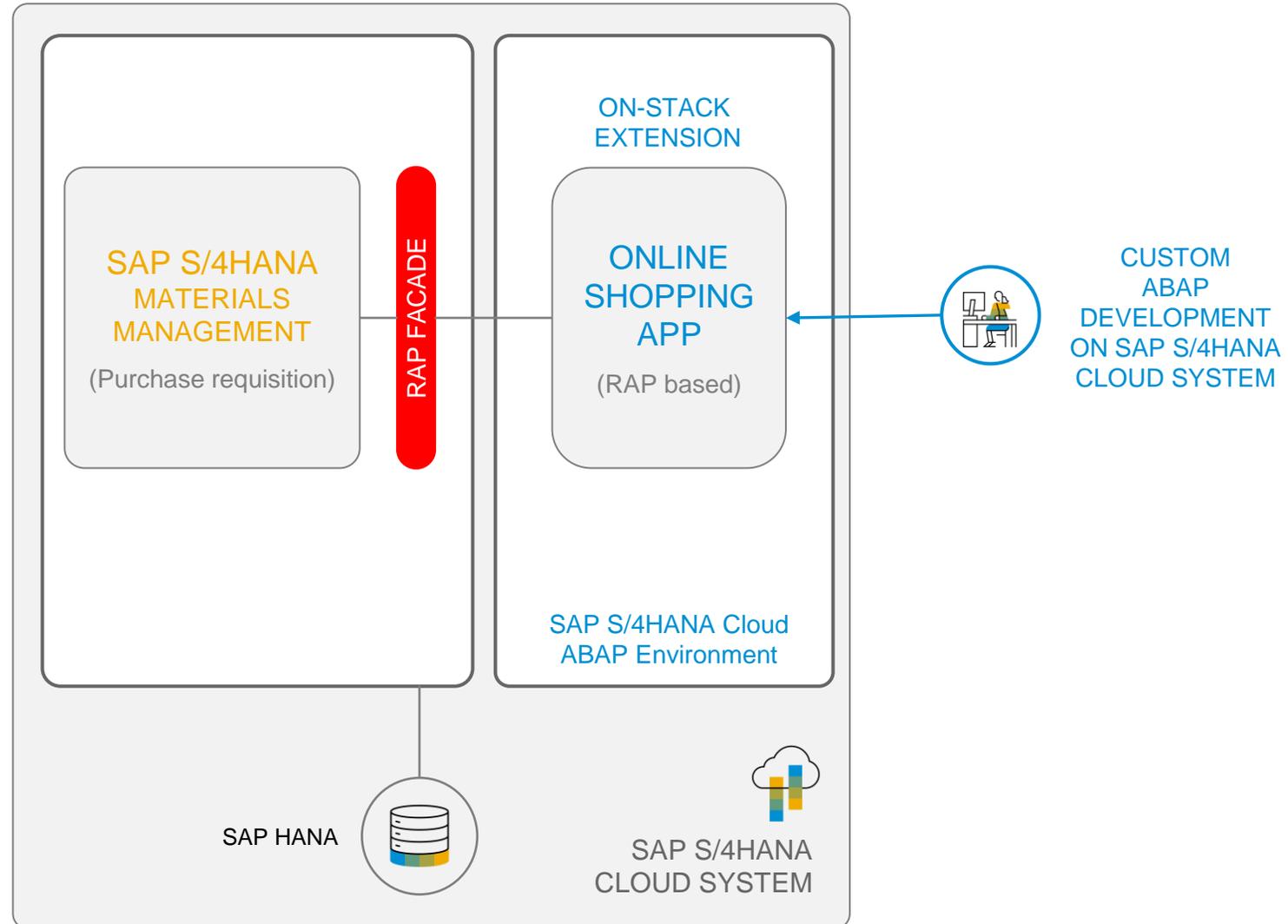
## Trigger Purchase Requisition creation in SAP S/4HANA using RAP facades and EML



The screenshot displays the SAP Online Shop interface. At the top, there is a navigation bar with the SAP logo and 'Online Shop'. Below this, a search bar is visible with the text 'Search' and a magnifying glass icon. To the right of the search bar are buttons for 'Go' and 'Adapt Filters'. The main content area shows a list of 5 items under the heading 'Online Store (5) Standard\*'. The list is presented in a table format with columns for 'order id', 'Ordered item', 'Product group', 'Purchase Reqn', 'Maximum D...', 'Purchase requisition status', and 'Remaining d...'. The items are: 1. Desktop (A002, 0010000192, 180, On the way), 2. Chair (A004, 0010000194, 180, On the way), 3. Printer (A005, 0010000200, 180, On the way), 4. Table (A003, 180, status with a red X), and 5. Laptop (A001, 0010000203, 180, On the way). The 5th item, 'Laptop', is selected with a radio button. To the right of the table, there are action buttons: 'Update IR', 'Update Purchase reqn', 'Create', 'Delete', a settings gear icon, and a table view icon.

order id	Ordered item	Product group	Purchase Reqn	Maximum D...	Purchase requisition status	Remaining d...
1	Desktop	A002	0010000192	180	✓ On the way	100 o...
2	Chair	A004	0010000194	180	✓ On the way	100 o...
3	Printer	A005	0010000200	180	✓ On the way	100 o...
4	Table	A003		180	✗	100 o...
5	Laptop	A001	0010000203	180	✓ On the way	100 o...

# Demo scenario



# RAP facades

The screenshot shows the Eclipse IDE interface with the following components:

- Project Explorer:** Displays a tree view of released objects, including ABAP Test Cockpit, Authorizations, Cloud Communication Management, Cloud Identity and Access Management, Core Data Services, Behavior Definitions, and Data Definitions. The 'Purchase Requisition - TP' object is selected under MM-PUR-REQ.
- Editor:** Shows the source code for the facade definition. The code includes annotations for user text, authorization checks, lifecycle types, and modeling patterns. It defines a root view entity for the purchase requisition with a contract type of 'transactional\_interface' and a projection on the 'R\_PurchaseRequisitionTP' table. The entity includes fields for purchase requisition, type, description, source determination, and last change date time.
- Outline:** Shows the structure of the facade, including the 'select' statement, the 'from' clause, and the 'elements' list.
- Properties:** Shows the 'General' properties of the facade, including the release state (Released) and visibility settings (Use in Cloud Development, Use in Key User Apps).

## RAP FACADES

Modification free access to functionality of stable core

Released and stable API

Local (non-remote) access

Based on ABAP Core Data Services

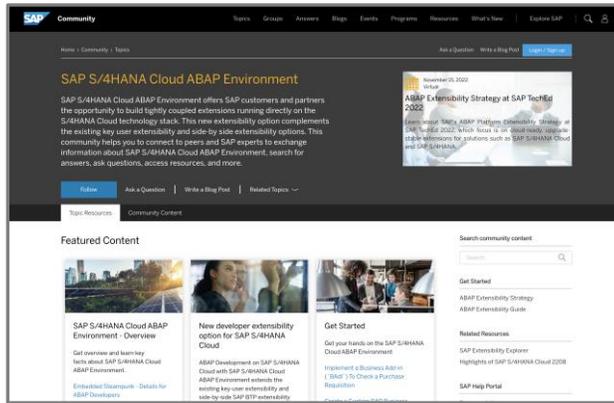
# Invoking RAP facades via EML

Entity  
Manipulation  
Language  
(EML)

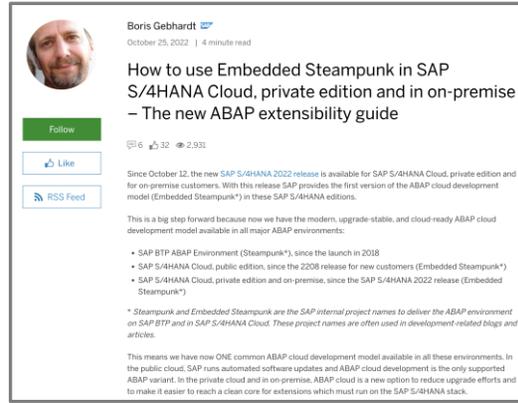
```
73  
74 METHOD create_pr.  
75  
76 keys IS NOT INITIAL.  
77  
78 READ ENTITIES OF Orders IN LOCAL MODE  
79 ENTITY Orders  
80 ALL FIELDS  
81 WITH CORRESPONDING #( keys )  
82 RESULT DATA(lt_order_result)  
83 FAILED DATA(lt_failed)  
84 REPORTED DATA(lt_reported).  
85  
86  
87 MODIFY ENTITIES OF i_purchaserequisitiontp  
88 ENTITY purchaserequisition  
89  
90 CREATE FIELDS ( purchaserequisitiontype )  
91 WITH VALUE #( ( %cid = 'My%CID_1'  
92 purchaserequisitiontype = 'NB' ) )  
93  
94 CREATE BY \_purchaserequisitionitem  
95 FIELDS (( plant  
96 purchaserequisitionitemtext  
97 accountassignmentcategory  
98 requestedquantity  
99 baseunit  
100 purchaserequisitionprice  
101 purreqnitemcurrency  
102 materialgroup  
103 purchasinggroup  
104 purchasingorganization  
105 )  
106 )  
107 WITH VALUE #( ( %cid_ref = 'My%CID_1'  
108 %target = VALUE #( ( %cid = 'My%ItemCID_1'  
109 plant = '1010'  
110 purchaserequisitionitemtext = lt_order_result[ 1 ]-Ordereditem  
111 accountassignmentcategory = 'U'  
112 requestedquantity = '8.00'  
113 baseunit = 'EA'  
114 purchaserequisitionprice = '10.00'  
115 purreqnitemcurrency = 'EUR'  
116 materialgroup = lt_order_result[ 1 ]-Materialgroup  
117 purchasinggroup = '001'  
118 purchasingorganization = '1010'  
119 ) ) )  
120 ) ) )  
121 ) ) )  
122 ) ) )  
123 ) ) )  
124 ) ) )  
125 ) ) )
```

Released  
RAP  
Facade

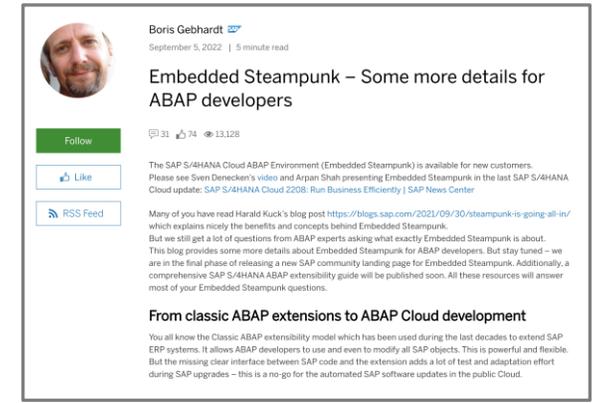
# More information



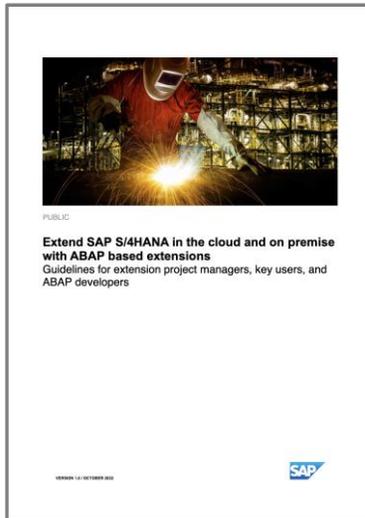
[SAP Community](#)



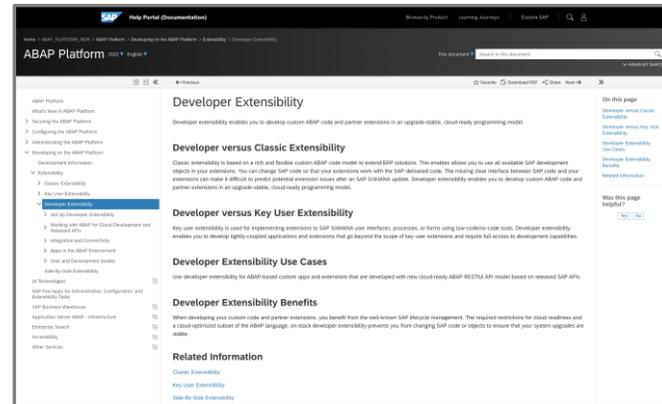
[How to use Embedded Steampunk in SAP S/4HANA Cloud, private edition and in on-premise – The new ABAP extensibility guide | SAP Blogs](#)



[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:

**Safa Golrokh Bahoosh**

Product Management ABAP Platform

SAP SE

[safa.golrokh.bahoosh@sap.com](mailto:safa.golrokh.bahoosh@sap.com)

