

AD162

# Build and extend Apps with the ABAP RESTful Application Programming Model

Public

# Agenda

GOAL OF TODAY'S SESSION

INTRODUCTION

TODAY'S SCENARIO – OVERVIEW

TODAY'S SCENARIO – EXERCISES

SUMMARY



# Goal of todays session



# Build a transactional SAP Fiori app with RAP

## with search, filter, and draft capabilities

The screenshot displays a SAP Fiori LIST REPORT PAGE titled "LIST REPORT PAGE". The interface includes a search bar with a "Freestyle search" annotation, a "Standard" dropdown, and input fields for "Travel ID", "Agency ID", and "Customer ID" with a "Filters" annotation. A "Go" button and "Adapt Filters (1)" text are also present. Below the search bar, a table lists 10 travels. The table has columns for "Travel ID", "Agency ID", "Customer ID", "Starting Date", and "Overall Status". The 4th travel, "The Ultimate Answer (70042)", is selected and highlighted in blue. A "Draft" annotation points to the "Draft" status of the 2nd, 3rd, and 6th travels. To the right of the table, there are action buttons: "Copy Travel", "Reject Travel", "Accept Travel", "Create", "Delete", "Show Details", and a settings icon. A "Create and Delete operations" annotation points to the "Create" and "Delete" buttons. A "Navigation to details object page" annotation points to the "Show Details" button. The table data is as follows:

Travel ID	Agency ID	Customer ID	Starting Date	Overall Status
1	Maxitrip (70041)	Ryan (594)	Dec 4, 2021	Open
2 Draft	Hot Socks Travel (70007)	Prinz (608)	Dec 4, 2021	Open
3 Draft	Hendrik's (70046)	Detemple (93)	Dec 4, 2021	Open
4	The Ultimate Answer (70042)	Madeira (665)	Dec 4, 2021	Accepted
5	Hot Socks Travel (70007)	Mechler (225)	Dec 4, 2021	Open
6 Draft	Miles and More (70049)	Neubasler (72)	Dec 4, 2021	Open
7	Hendrik's (70046)	Wohl (138)	Dec 4, 2021	Open
8	Ben McCloskey Ltd. (70012)	Müller (705)	Dec 4, 2021	Open
9	Sunny, Sunny, Sunny (70032)	Benz (115)	Dec 4, 2021	Accepted
10	Ali's Bazar (70016)	Leisert (697)	Dec 4, 2021	Open



# Build a transactional SAP Fiori app with RAP

## Travel list report app → Object page

The screenshot displays the SAP Fiori Object page for a Travel record. The interface is divided into two main sections: a list view on the left and a draft edit form on the right.

**List View (Left):**

- Travel**
- Travel ID: 4
- End Date: Dec 11, 2022
- Agency ID: The Ultimate Answer (70042)
- Booking Fee: 40.00 USD
- Customer ID: Madeira (665)
- Total Price: 1,871.00 USD
- Starting Date: Feb 12, 2022
- Description: Vacation to Berlin

**Draft Edit Form (Right):**

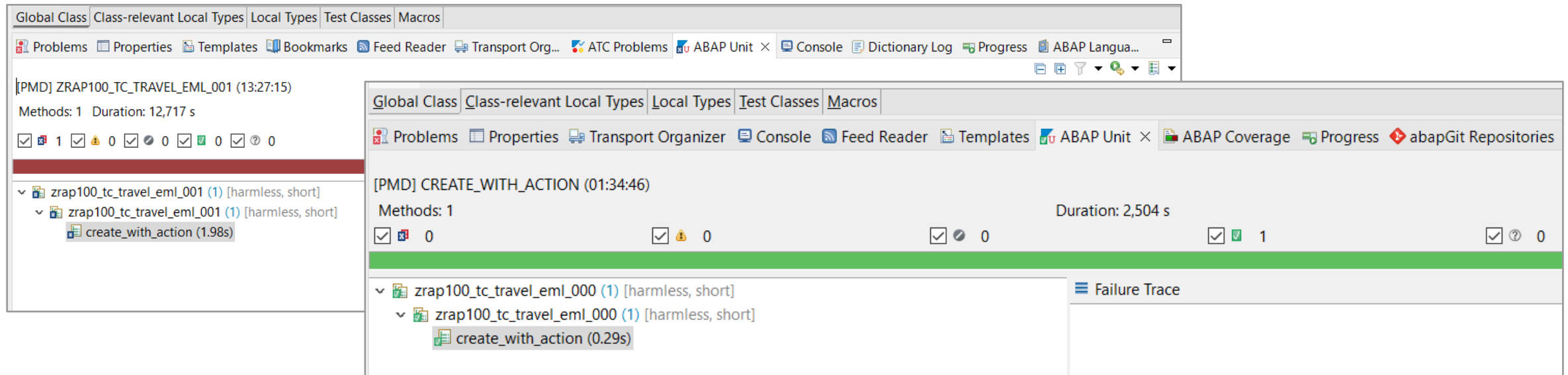
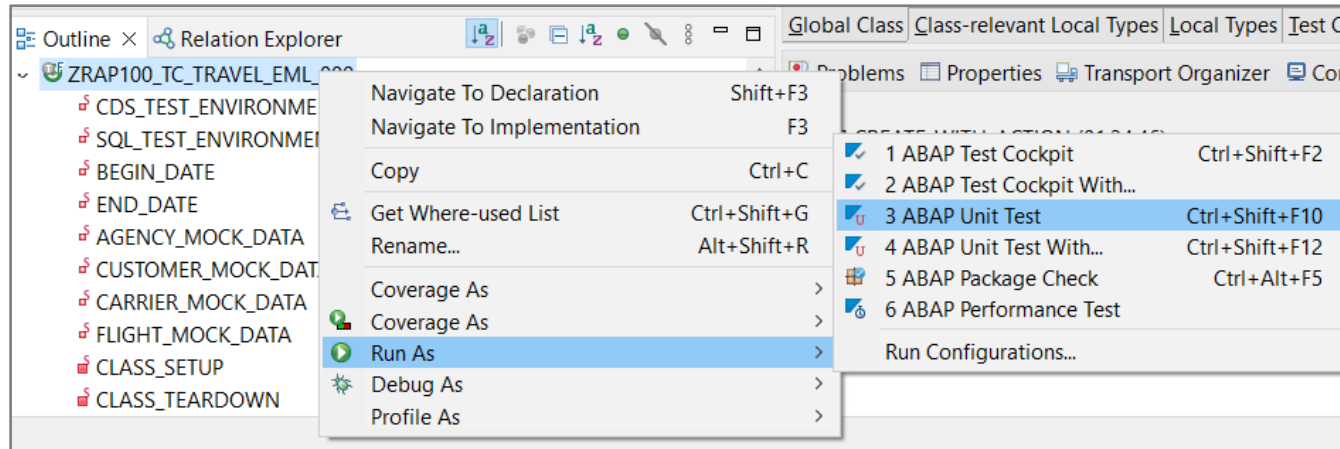
- Draft** (Status)
- Travel** (Section Header)
- Travel ID: 4
- End Date: \* Dec 11, 2022
- Overall Status: Open
- Agency ID: The Ultimate Answer (70042)
- Booking Fee: 40.00 USD
- Attachment: 281457\_Collaborate4\_R\_blue.png
- Customer ID: \* Madeira (665)
- Total Price: 1,871.00 USD
- Starting Date: \* Feb 12, 2022
- Description: Vacation to Berlin

**Annotations:**

- Edit, Delete, Actions:** Points to the top bar of the list view containing buttons: Edit, Delete, Deduct Discount, Accept Travel, Reject Travel, and a share icon.
- Upload, Delete:** Points to the attachment area in the draft form, showing an upload icon, a delete icon, and the filename 281457\_Collaborate4\_R\_blue.png.
- Draft:** Points to the draft status bar at the bottom of the form, which includes the text "Updating draft...", a **Save** button, and a "Discard Draft" link.

# Optional: Write an ABAP unit test for a RAP business object

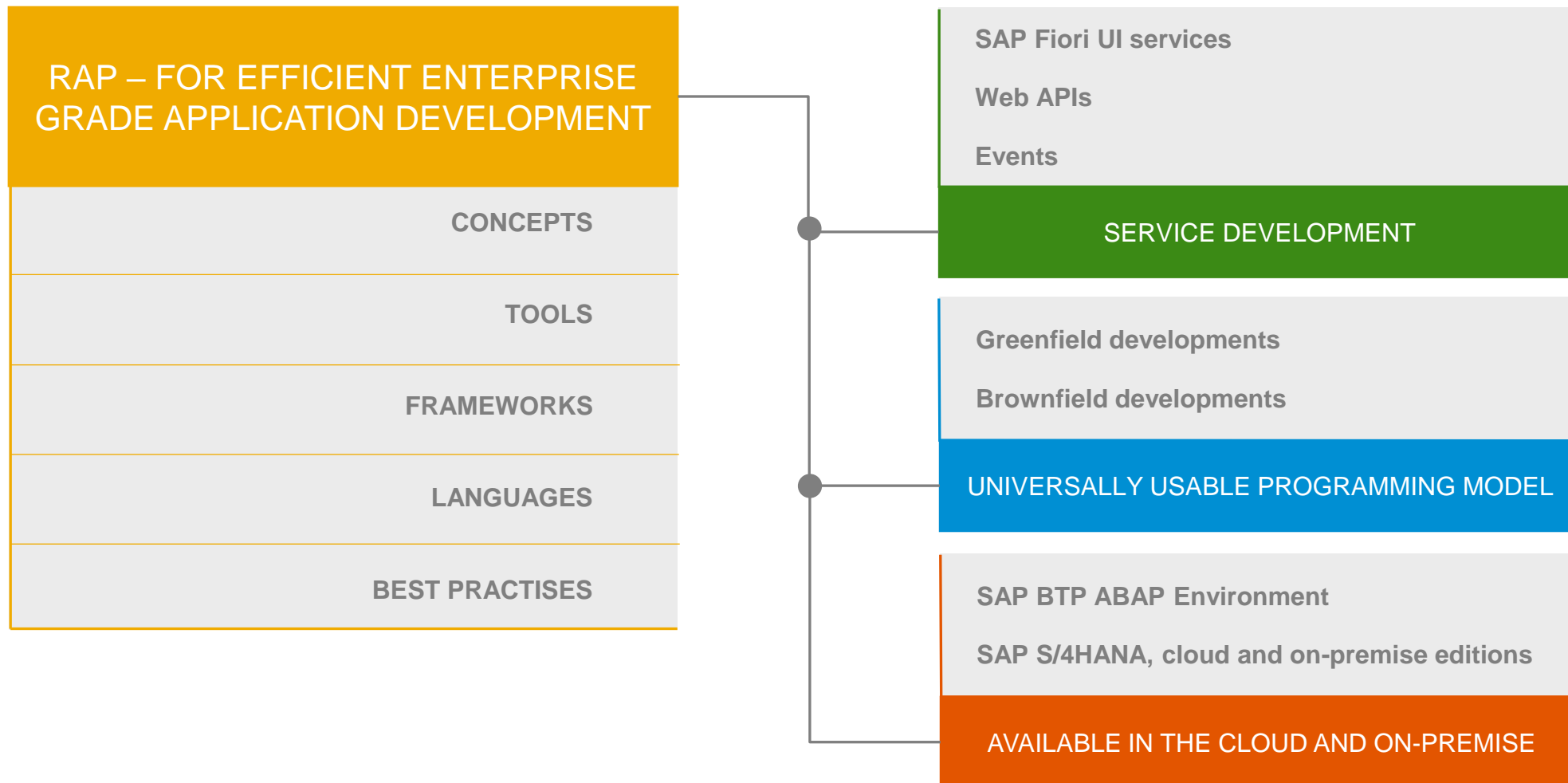
## Unit test runs



# INTRODUCTION



# ABAP RESTful Application Programming Model (RAP) – At a glance





# The key players

**ABAP Development Tools in Eclipse** for all development tasks

Easy developer onboarding  
End-to-end development flow

**Languages: ABAP and Core Data Services (CDS)**

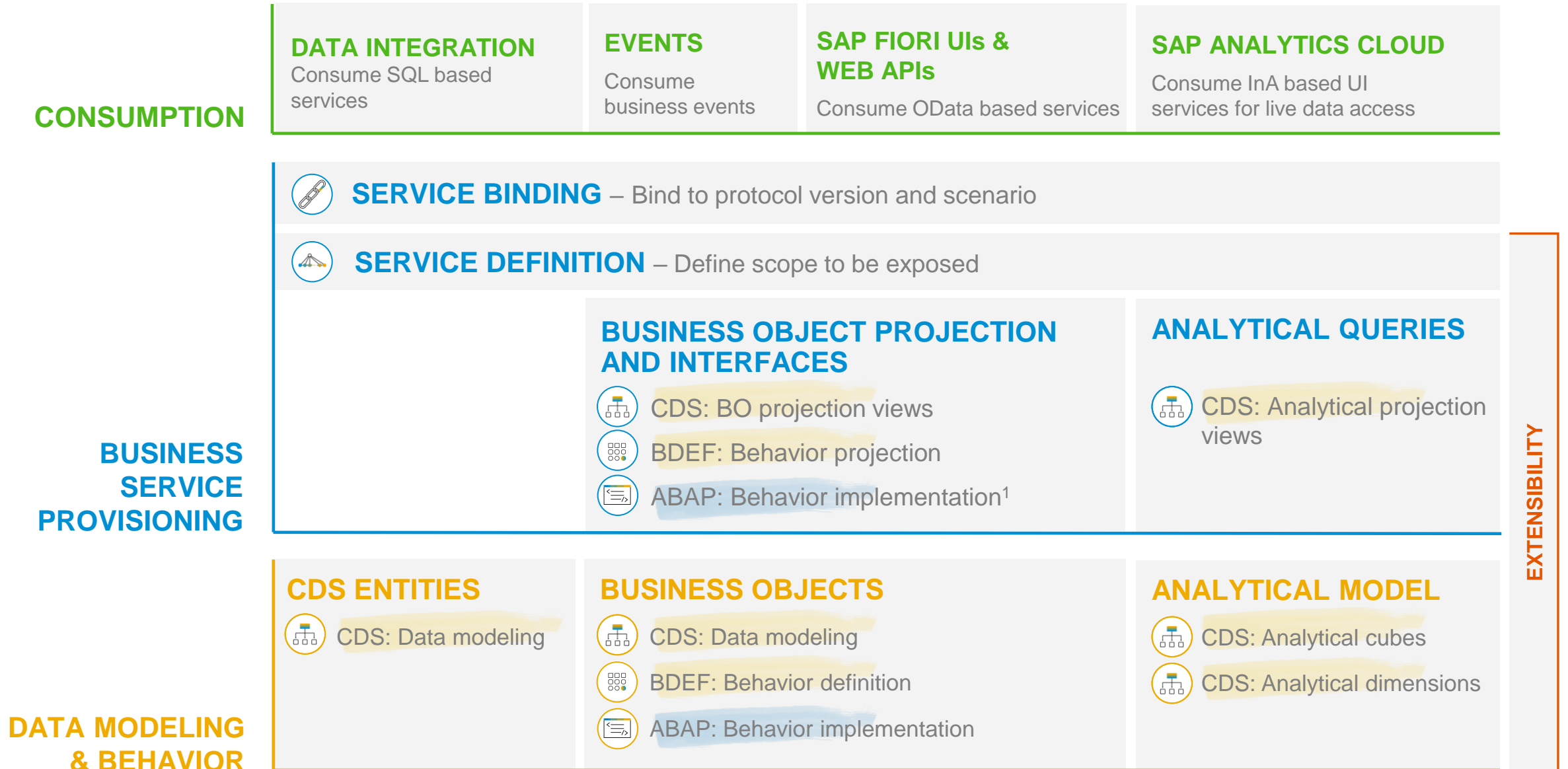
Standard implementation tasks via typed APIs supporting  
static code checks, auto-completion, element info

**Powerful frameworks**

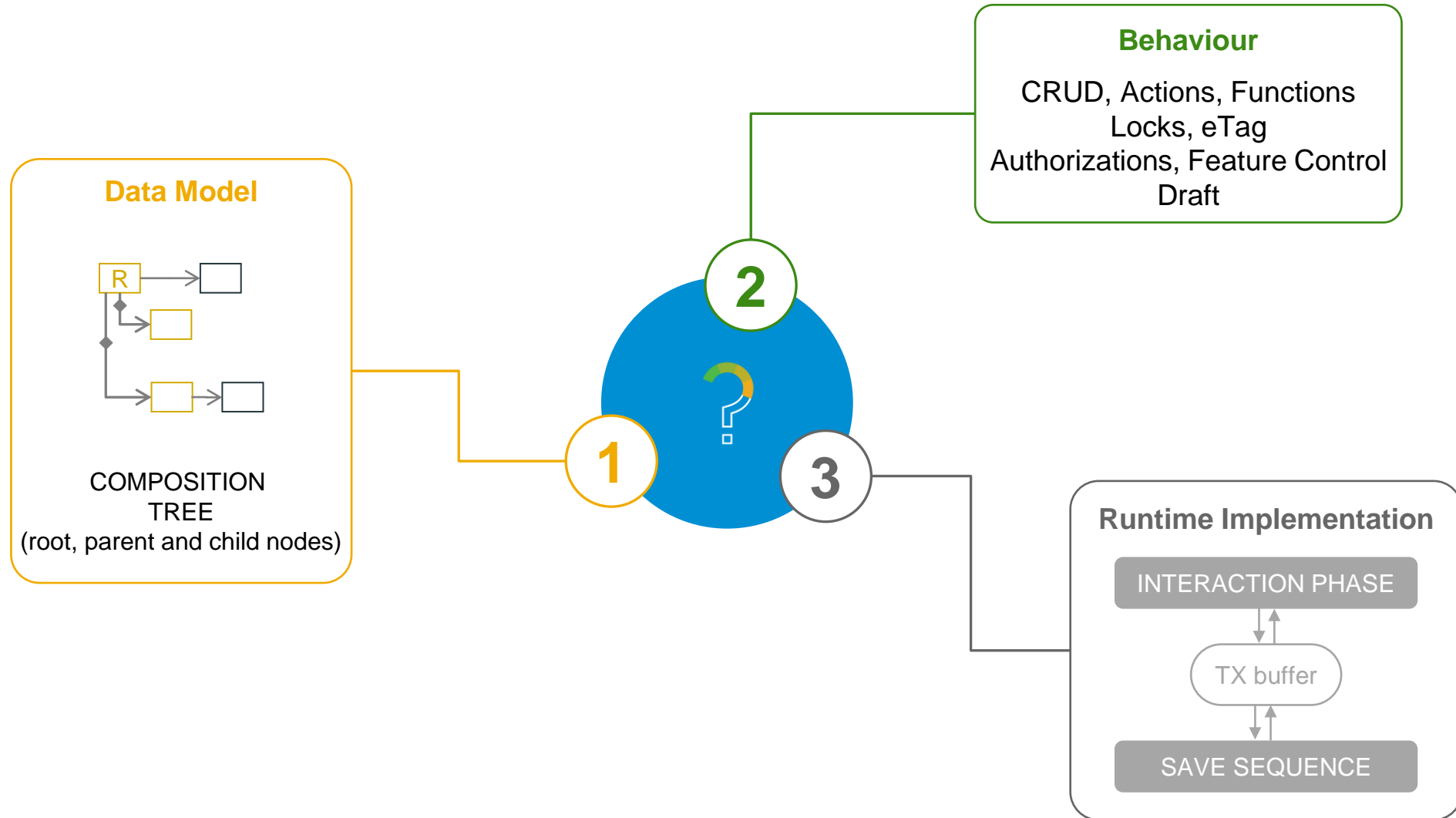
Take over technical implementation tasks  
Business logic added in code exits on protocol-agnostic layers



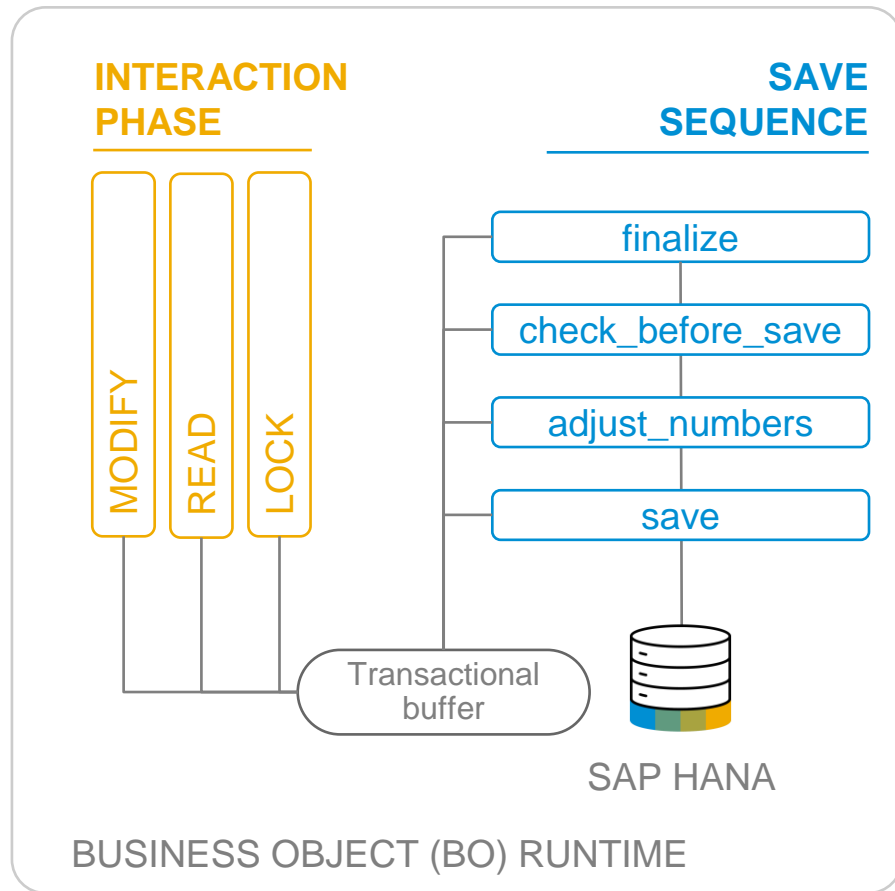
# The ABAP RESTful Application Programming Model – Big picture



# Business object



# Business object runtime implementation types



## UNMANAGED

For **brownfield developments** with available application code for interaction phase, transactional buffer, and save sequence

- ➔ Developers in charge of BO runtime: CRUD operations
- ➔ Adapters needed to integrate the existing code

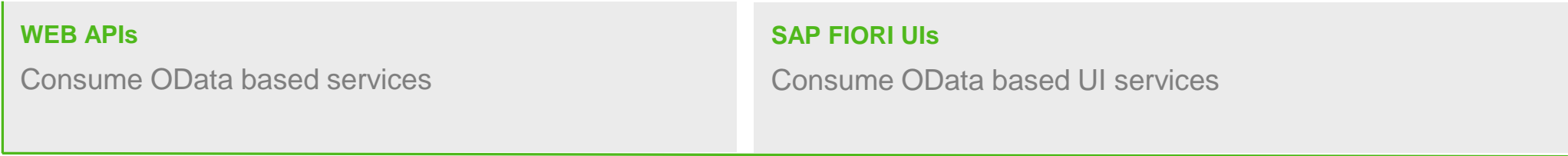
## MANAGED

For **greenfield developments** with standard implementation (opt. unmanaged appl. components: DB tables, lock/PFCG object, update task FM)

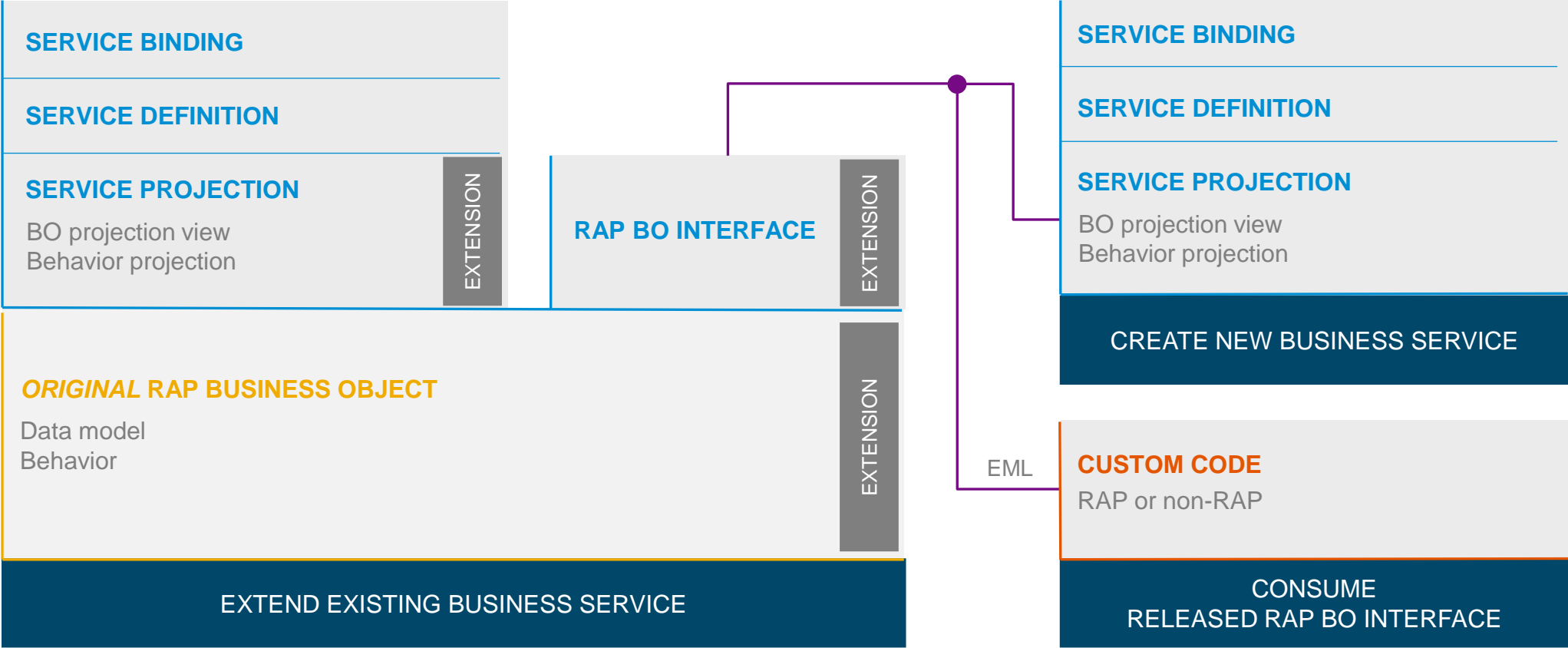
- ➔ Standard CRUD operations work out of the box
- ➔ Developers add BO specific business logic

# Developer extensibility with RAP

CONSUMPTION



BUSINESS  
SERVICE  
PROVISIONING



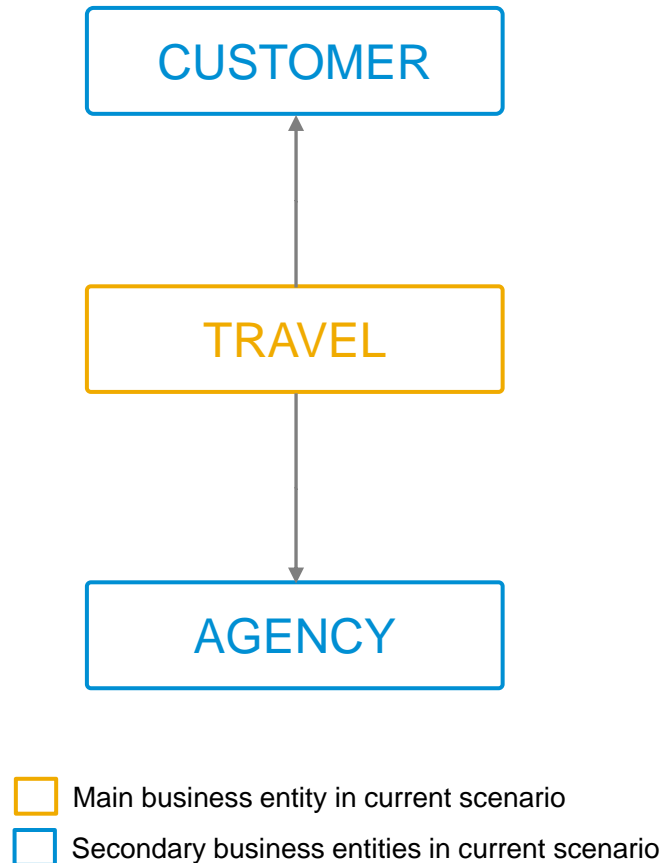


# TODAY'S SCENARIO – OVERVIEW



# Build and test a transactional SAP Fiori app with RAP

## Underlying simplified Flight data model



A **Travel entity** defines general travel data, such as the agency ID or customer ID, the overall status of the travel booking.

A **Customer entity** provides a detailed description of a flight customer, or passenger, such as the name, the address, and contact data.

An **Agency entity** defines travel agency data, such as the address and contact data.

# TODAY'S SCENARIO – EXERCISES



# The AD162 hands-on exercises



[Access the step-by-step AD162 exercises instructions on GitHub](#)

## PRE-REQUISITES

■ Set up and connect your ABAP Development Tools for Eclipse to the ABAP environment

Create the Database Table and Generate the UI Service

Enhance the BO Data Model & Enable OData Streams

Enhance the BO Behavior – Early Numbering

Enhance the BO Behavior – Determinations

Enhance the BO Behavior – Validations

Enhance the BO Behavior – Actions

Enhance the BO Behavior – Dynamic Feature Control *(optional)*

Write an ABAP Unit Test for the RAP BO *(optional)*

External API-based Access to the RAP BO with EML *(explore)*



# DEMO





# LET'S GET STARTED!



Move at your  
own speed!

Feel free to  
ask questions!



Access to the exercises!

**AD162:** [https://bit.ly/sap\\_tched2022\\_ad162](https://bit.ly/sap_tched2022_ad162) ([Link](#))

## Credentials

Username: [rap100-xxx@teched.sap](mailto:rap100-xxx@teched.sap)

Password: WelcomeRAP!

Service Key C:\Teched\eclipse\_2209\servicekeys

# SUMMARY



# Session Survey- Tell us how we did!

Please take a moment to tell us what you thought of this session – scan the QR Code to complete the session survey, and have your voice heard.



# Wrap up – Key takeaways

The **ABAP RESTful Application Programming Model (RAP)** helps to efficiently and rapidly build enterprise-grade services with intrinsic built-in cloud qualities

RAP best support **SAP HANA** and **SAP Fiori elements**

RAP is **available** on **SAP BTP ABAP Environment**, **SAP S/4HANA Cloud**, and **SAP S/4HANA** starting with edition 1909

The RAP **feature scope** is enhanced **quarterly** on SAP BTP ABAP Environment, **bi-yearly** on SAP S/4HANA Cloud, public edition, and **yearly** on SAP S/4HANA and SAP S/4HANA Cloud, private edition.



What's New in RAP: [SAP BTP](#) | [SAP S/4HANA](#) | [SAP S/4HANA Cloud](#)



Take a look at the [interactive SAP Road Map Explorer](#) for updates.





# Major RAP enhancements<sup>1</sup> in 2022

## ENHANCED BASE BUSINESS OBJECT LAYER

- ❖ Unmanaged internal early numbering for managed and unmanaged BOs
- ❖ Late numbering now also supported for managed BOs
- ❖ Instance factory actions for managed BOs to model actions that create new instances based on an input instance
- ❖ Use of client-independent tables as data sources for managed BOs with draft capabilities

## WORKING WITH LARGE OBJECTS

- ❖ OData-based services built with RAP now support streams
- ❖ Option to incorporate external binary files or text files can be offered to end users in Fiori elements based apps

## STABLE CONSUMPTION LAYER VIA BO INTERFACES ([link](#))

- ❖ A BO Interface offers an additional abstraction layer on top of a base RAP BO
- ❖ Can be defined using the BO view provider contract `transactional_interface` and the behavior implementation type `interface`
- ❖ Can be consumed via EML or via business services

# Major RAP enhancements<sup>1</sup> in 2022 (2)

## DEVELOPER EXTENSIBILITY FOR RAP BUSINESS OBJECTS [\(link\)](#)

- ❖ Enable the extensibility of your RAP BO with fine-granular control over the extension points
- ❖ Build upgrade-safe and lifecycle-stable extensions using well-defined extension anchors of the original RAP BO

## INTEGRATION OF BUSINESS EVENTS [\(link\)](#)

- ❖ Define and raise business events in RAP BOs and RAP BO behavior extension; Exposure fully integrated in RAP
- ❖ Events from SAP Event Mesh are consumed in RAP BOs using the Event Consumption Model.

## ADT WIZARD FOR END-2-END GENERATION OF SERVICES

- ❖ Generation of all required artifacts: Data model, basic BO behavior, and business service
- ❖ Generation of OData V4 based UI services and Web APIs currently supported

## INTEGRATION OF READ ACCESS LOGGING (RAL)

- ❖ To monitor and log all database read accesses performed within your RAP services

<sup>1</sup> Also available on-premise starting with [ABAP Platform for SAP S/4HANA 2022](#)

# Sample implementations with the ABAP Flight Reference Scenario

**SAP Help Portal**

ABAP RESTful Application Programming Model

- > Learn
- ▼ Start
  - > Prerequisites
    - Download the ABAP Flight Reference Scenario**
    - > Developing an OData Service for Simple List Reporting
    - > Generating a RAP Business Service with the Generate ABAP Repository Objects Wizard
  - ▼ Develop
    - Development Constraints
    - > Develop Applications
    - > Develop Web APIs
    - > Develop APIs
    - > Develop UI-Specifics
    - > Develop Individual BO Capabilities
    - > Develop Common Capabilities
    - > Implementing an UI
  - > Test

### Sample Services

The development guides for the ABAP RESTful Application Programming model are based on the sample data from the ABAP Flight Reference Scenario. That means that you can compare the documentation with the productive code that was used to build the documentation scenario. In addition, the ABAP Flight Reference Scenario also includes a demo package with the development objects that are created during the course of the development guides. That means, the whole demo scenario can be downloaded and tested. You obtain full demo services with code built by following conventions and best practices and you can use and reuse the delivered objects for your development.

The following demo scenarios are available for you:

- [Developing Read-Only List Reporting Apps](#) in the package /DMO/FLIGHT\_READONLY
- [Developing Unmanaged Transactional Apps](#) in the package /DMO/FLIGHT\_UNMANAGED
- [Developing Managed Transactional Apps](#) in the package /DMO/FLIGHT\_MANAGED
- [Developing Transactional Apps with Draft Capabilities](#) in the package /DMO/FLIGHT\_DRAFT

### Legacy Coding

The reference scenario also includes legacy coding. This legacy coding is based on function modules and exemplifies legacy applications that you can include in your new ABAP code. Above all, the legacy coding is relevant for the development guide, that explains how to build a new service on the basis of an existing application. It illustrates how you build an application with the unmanaged implementation type. The legacy coding that is used in this scenario is

- ▼ **/DMO/FLIGHT (332) Flight Reference Scenario**
  - > **/DMO/FLIGHT\_DRAFT (52) Flight Reference Scenario: Draft Guide**
  - > **/DMO/FLIGHT\_LEGACY (128) Flight Reference Scenario: Legacy Objects**
  - > **/DMO/FLIGHT\_MANAGED (46) Flight Reference Scenario: TX managed E2E Guide**
  - > **/DMO/FLIGHT\_READONLY (7) Flight Reference Scenario: Read-Only E2E Guide**
  - > **/DMO/FLIGHT\_REUSE (69) Flight Reference Scenario: Reused Entities**
  - > **/DMO/FLIGHT\_UNMANAGED (30) Flight Reference Scenario: TX unmanaged E2E Guide**

Demonstrate how to use different RAP capabilities concretely

Based on a simple to use and understand data model: SFLIGHT reloaded

Feature scope regularly enhanced

Downloadable from GitHub



Read more in the RAP documentation: [Cloud](#) | [SAP S/4HANA](#)



# FREE openSAP COURSE



## Building Apps with the ABAP RESTful Application Programming Model (RAP)



### Self-paced mode

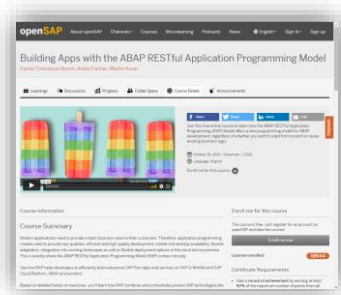


Week 1: Introduction  
Week 2: Developing a Read-Only List Report App  
Week 3: Enabling the Transactional Behavior of an App  
Week 4: Dealing with Existing Code  
Week 5: Service Consumption and Web APIs  
Week 6: Final Exam



**ENROLL NOW!**

<https://open.sap.com/courses/cp13>



# More information



## Further information

[Modernization with the ABAP RESTful Application Programming Model \(RAP\)](#)

[Getting started with RAP](#)

[Building Apps with RAP](#) (*openSAP course*)

[Get Started with ABAP Programming on SAP BTP](#) (SAP Learning Journey, also valid for SAP S/4HANA)

RAP – What's New: [SAP BTP ABAP Environment](#) | [SAP S/4HANA](#) | [SAP S/4HANA Cloud](#)

[SAP BTP ABAP Environment on the interactive SAP Road Map Explorer](#)

---

## Public SAP Web sites

ABAP Development Community: [www.sap.com/community/topic/abap.html](http://www.sap.com/community/topic/abap.html)

SAP BTP ABAP Environment Community: <https://community.sap.com/topics/btp-abap-environment>

SAP S/4HANA Cloud ABAP Environment Community: <https://community.sap.com/topics/s4hana-cloud-abap-environment>

ABAP Testing and Analysis Community: <https://community.sap.com/topics/abap-testing-analysis>

SAP products: [www.sap.com/products](http://www.sap.com/products)

---

## SAP training and certification opportunities

[www.sap.com/education](http://www.sap.com/education) – e.g. trainings S4D437, S4D430, HA400, and S4D400



# Open new career opportunities

Join the community of people with skills for the future



Check [learning.sap.com/teched](https://learning.sap.com/teched) to benefit like other certified experts:

**61%**  
Get promotions<sup>1</sup>

**91%** Increase  
confidence in abilities<sup>1</sup>

**>71%** Increase  
problem-solving skills<sup>2</sup>



Become an SAP solution expert –  
now as easy as 1,2,3 in one place:

- Follow expert-led **learning journeys** and **live sessions** for various development roles to upskill and **prepare for certification**
- Benefit from the **event-exclusive certification offer**



Expand your  
conference experience:

- Connect with experts, share your knowledge, expand your network, and collaborate with peers in **SAP Community**
- Network with other participants in the group for [SAP TechEd](#) and join the [SAP Learning Groups](#) to get your learning questions answered



1. [Pearson VUE's Latest "Value of IT Certification" Study Highlights Benefits of IT Certification in Challenging Times.](#) Pearson Education Inc., May 25, 2021.

2. Chuck Cooper, [Why Get IT Certified? The Value of IT Certification: An IT Certification White Paper](#), IT Certification Council, March 2021.

# Thank you.

Contact information:

André Fischer  
[andre.fischer@sap.com](mailto:andre.fischer@sap.com)

Rich Heilmann  
[rich.heilmann@sap.com](mailto:rich.heilmann@sap.com)