Introduction to
ABAP RESTful Application Programming Model (RAP)

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PUBLIC

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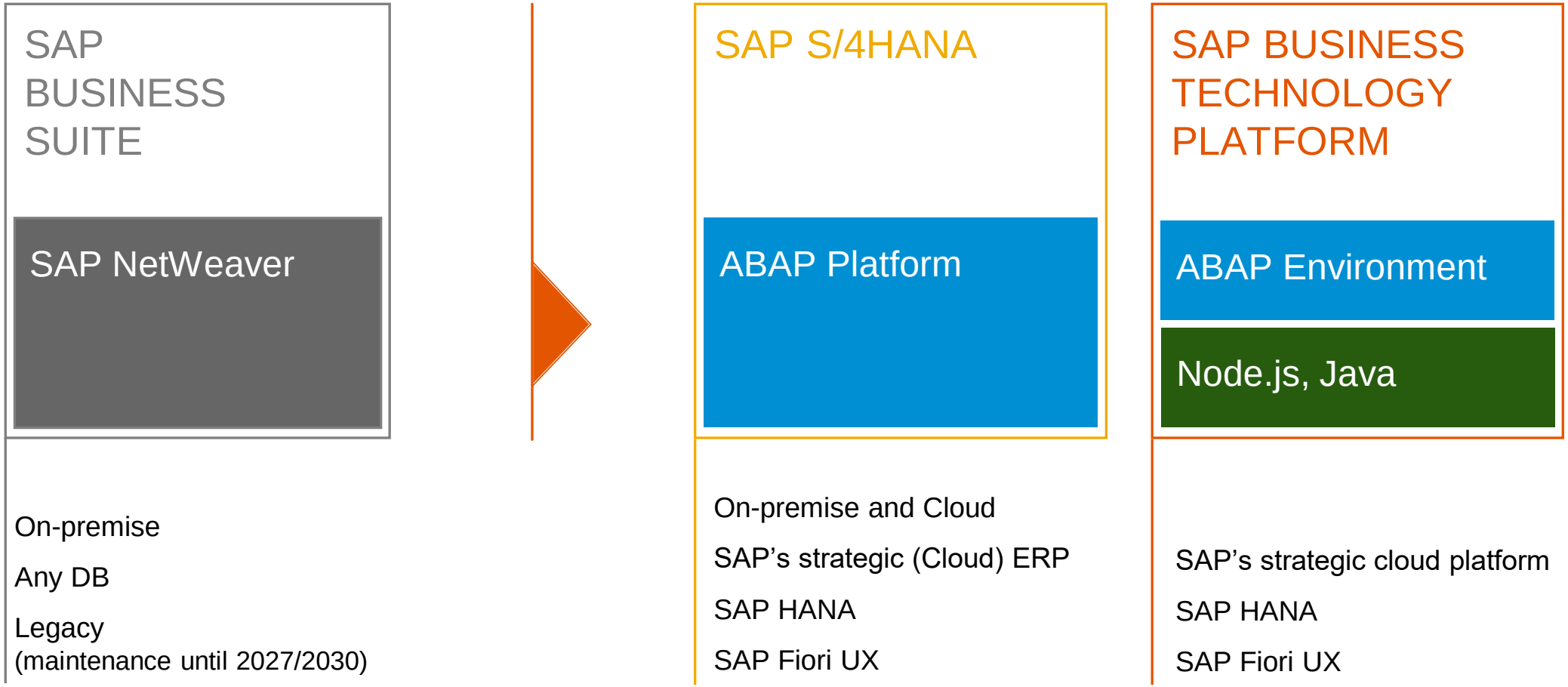
Agenda

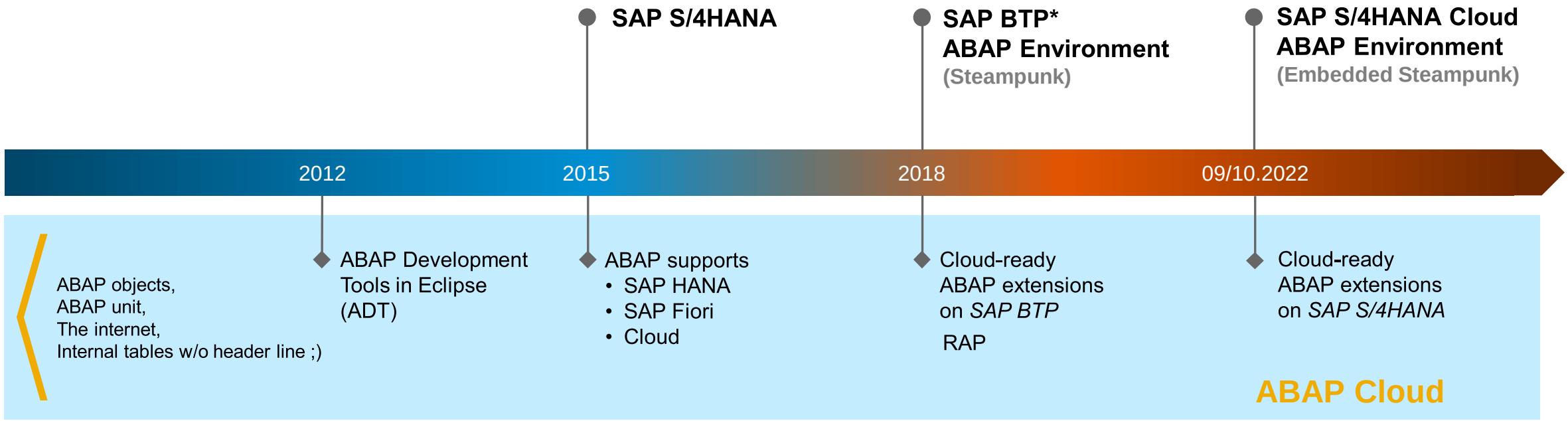
- INTRODUCTION
- BIG PICTURE
- LIVE DEMO
- SUMMARY

INTRODUCTION

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



The evolution towards ABAP Cloud



ABAP Cloud

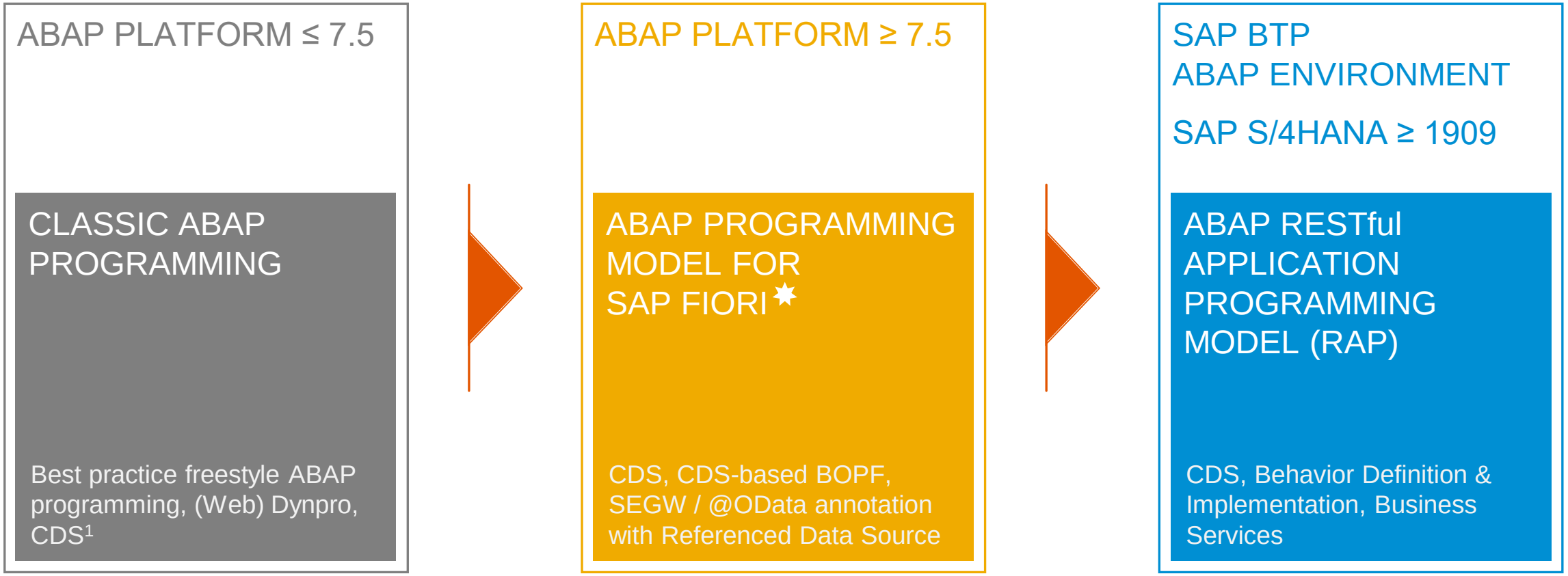
… is the ABAP development model to build cloud-ready business apps, services and extensions

… comes with SAP BTP and SAP S/4HANA

… works with public or private cloud, and even on-premise

* SAP Business Technology Platform

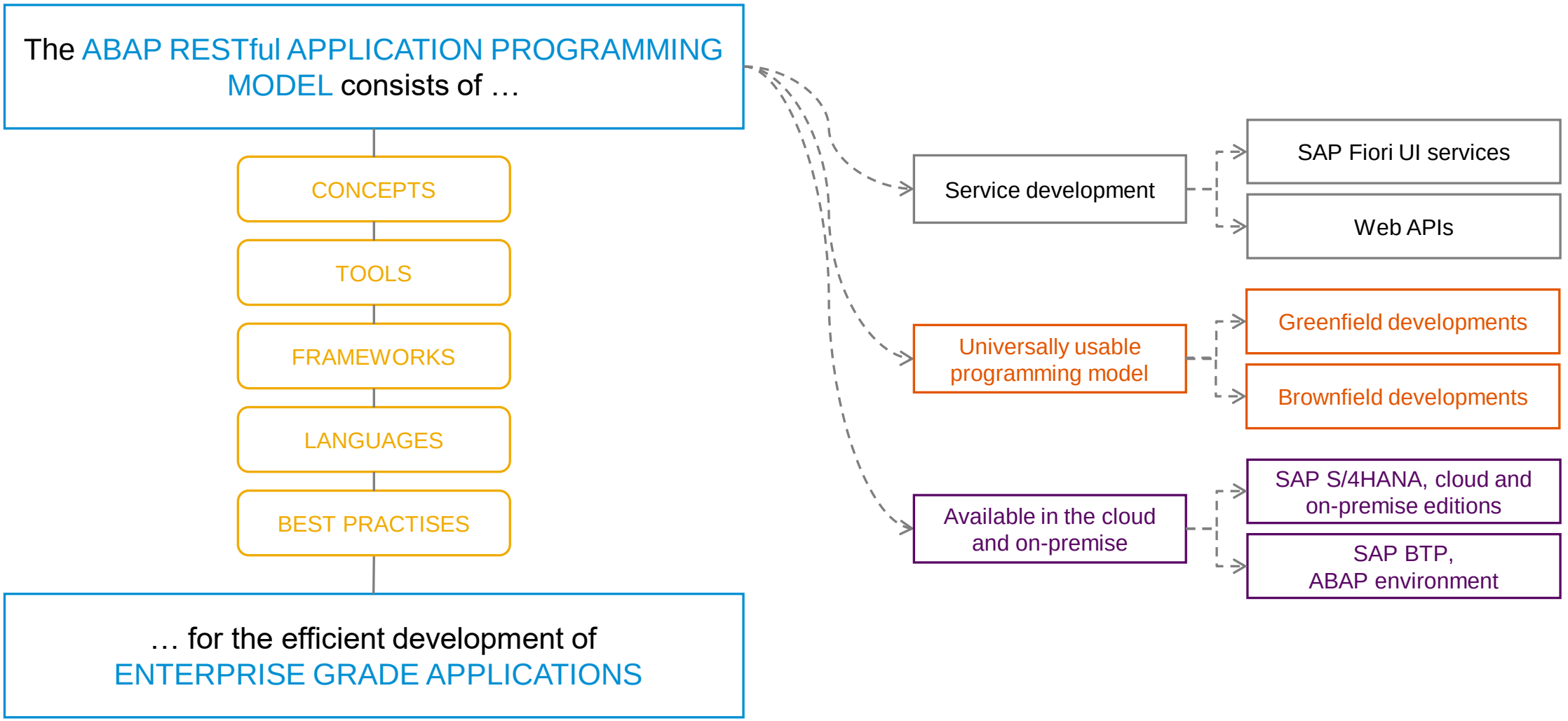
Evolution of the ABAP programming model



[1] starting with release 7.4 SPS05

Safe investments!

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

Efficient ABAP development in Eclipse©

HIGH DEVELOPER PRODUCTIVITY WITH THE ABAP DEVELOPMENT TOOLS (ADT) ON-PREMISE AND IN THE CLOUD

MODERN DEVELOPMENT TOOLSET

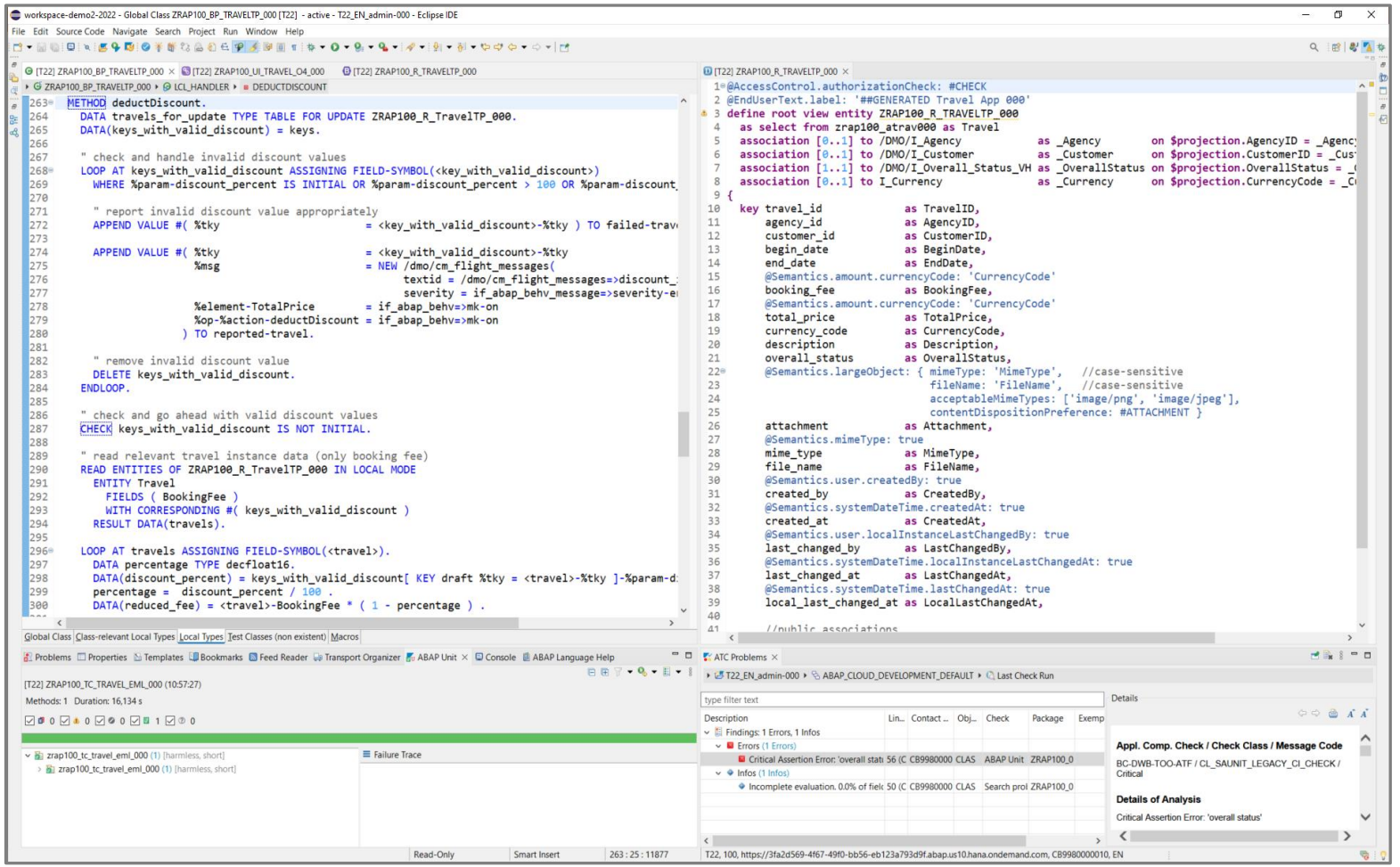
Fully eclipse-based
Syntax check, Code completion
Navigation, Search, Quick Fixes
Full support for the ABAP RESTful Application Programming Model and CDS

QUALITY ASSURANCE

Static code checks (ATC, CVA) with remote and local scenarios
Unit testing incl. isolation frameworks
Test seams and injections

SUPPORTABILITY

Debugging, profiling, tracing
Static and dynamic logging
Runtime monitoring and analysis



Next generation data modeling and access with ABAP CDS

VIEW BUILDING
SQL views with restricted feature set for SAP HANA capabilities

LIFECYCLE MANAGEMENT

ABAP lifecycle management e.g. transports

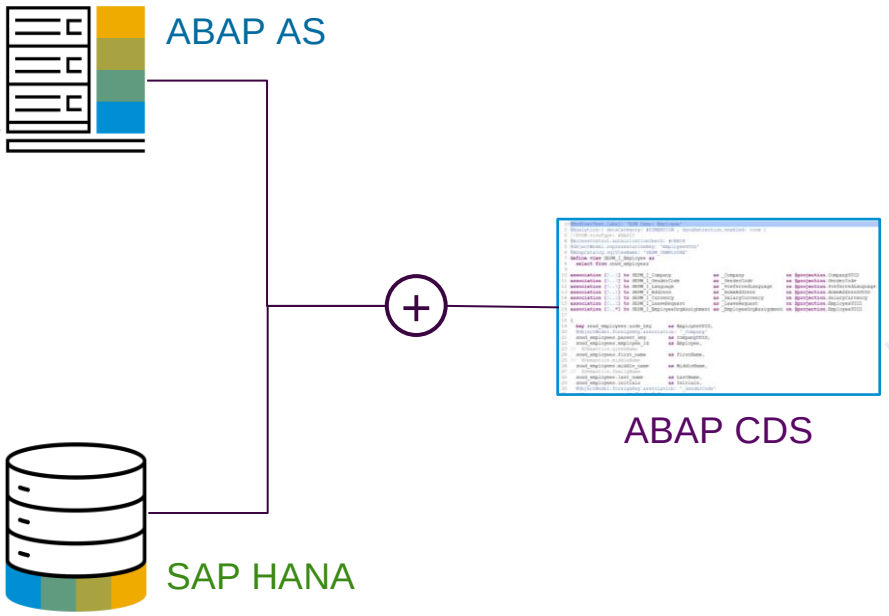
ABAP type system

VIEW BUILDING
Specialized views (analytical views, attribute views, calculated views, …)

LIFECYCLE MANAGEMENT

Non ABAP lifecycle management e.g. transports

Non ABAP type system



VIEW BUILDING

Advanced data modelling leveraging DDIC semantics

Code pushdown with various built-in SQL functions and expressions

Code breakouts to utilize native SAP HANA features and capabilities via CDS Table Functions

LIFECYCLE MANAGEMENT

Proven and consistent **ABAP** lifecycle management e.g. transports

ABAP type system

Consumption in ABAP SQL and ABAP frameworks

Next generation data modeling and access with ABAP CDS – Example

View annotations

View definition

Associations

Selection

```
1  @EndUserText.label: 'Travel View Entity for Draft RefScen'
2  @AccessControl.authorizationCheck: #NOT_REQUIRED
3
4  define root view entity /DMO/I_Travel_D
5    as select from /dmo/a_travel_d
6
7    composition [0..*] of /DMO/I_Booking_D         as _Booking
8
9    association [0..1] to /DMO/I_Agency            as _Agency         on $projection.AgencyID = _Agency.AgencyID
10   association [0..1] to /DMO/I_Customer          as _Customer       on $projection.CustomerID = _Customer.CustomerID
11   association [1..1] to /DMO/I_Overall_Status_VH as _OverallStatus  on $projection.OverallStatus = _OverallStatus.OverallStatus
12   association [0..1] to I_Currency               as _Currency       on $projection.CurrencyCode = _Currency.Currency
13
14 { ///dmo/a_travel_d
15   key travel_uuid           as TravelUUID,
16
17       travel_id             as TravelID,
18       agency_id             as AgencyID,
19       customer_id           as CustomerID,
20       begin_date            as BeginDate,
21       end_date              as EndDate,
22       @Semantics.amount.currencyCode: 'CurrencyCode'
23       booking_fee           as BookingFee,
24       @Semantics.amount.currencyCode: 'CurrencyCode'
25       total_price           as TotalPrice,
26       currency_code         as CurrencyCode,
27       description           as Description,
28       overall_status        as OverallStatus,
29
41       @Semantics.systemDateTime.lastChangedAt: true
42       last_changed_at       as LastChangedAt,
43
44       //Associations
45       _Booking,
46
47       _Agency,
48       _Customer,
49       _OverallStatus,
50       _Currency
51 }
```

Data source

Element annotations

ABAP Flight Reference Scenario -
Example available in package /DMO/FLIGHT_DRAFT

Declarative and expression-oriented ABAP language

MODERN ABAP

- Simple and concise ABAP code through new language features like inline declarations, constructor expressions
- Extensively expression-oriented syntax
- Advanced table operations like CORRESPONDING( ) operator, grouping and filtering
- Entity Manipulation Language (EML) to control the transactional business object behavior in the RAP context
- JSON support in sXML library
- Cloud-optimized ABAP language version available
- ABAP Unit Testing with test doubles and test seams
  Inline code documentation with ABAP Doc

More information:
ABAP Keyword Documentation

BIG PICTURE

RAP – The big picture

CONSUMPTION

DATA INTEGRATION
Consume SQL based services

EVENTS
Consume business events

SAP FIORI UIs & WEB APIs
Consume OData based services

SAP ANALYTICS CLOUD
Consume InA based UI services for live data access

BUSINESS SERVICE PROVISIONING

SERVICE BINDING – Bind to protocol version and scenario

SERVICE DEFINITION – Define scope to be exposed

BUSINESS OBJECT PROJECTION AND INTERFACES
- CDS: BO projection views
- BDEF: Behavior projection
- ABAP: Behavior implementation[1]

ANALYTICAL QUERIES
- CDS: Analytical projection views

DATA MODELING & BEHAVIOR

CDS ENTITIES
- CDS: Data modeling

BUSINESS OBJECTS
- CDS: Data modeling
- BDEF: Behavior definition
- ABAP: Behavior implementation

ANALYTICAL MODEL
- CDS: Analytical cubes
- CDS: Analytical dimensions

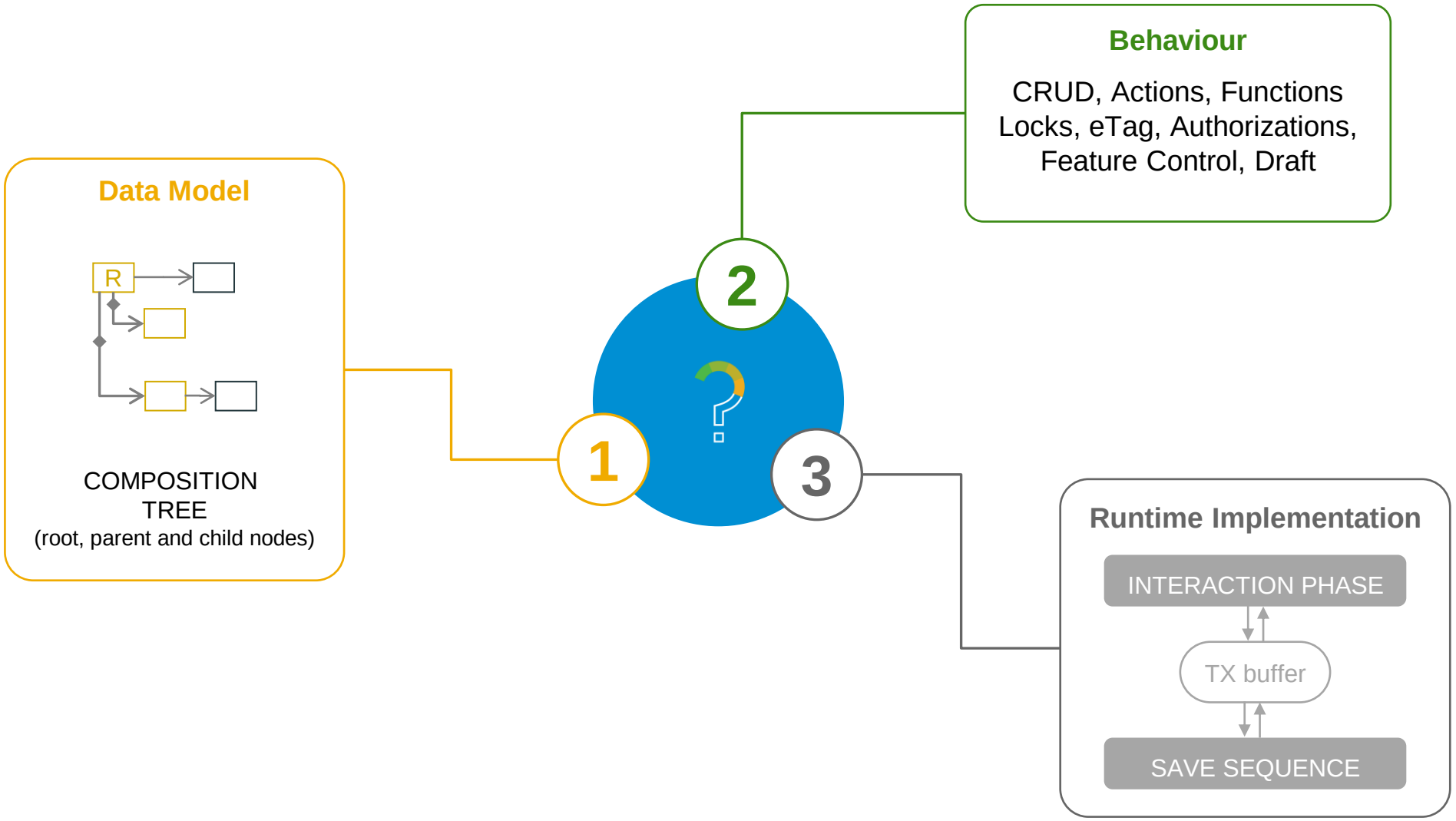
EXTENSIBILITY

CDS ABAP/EML

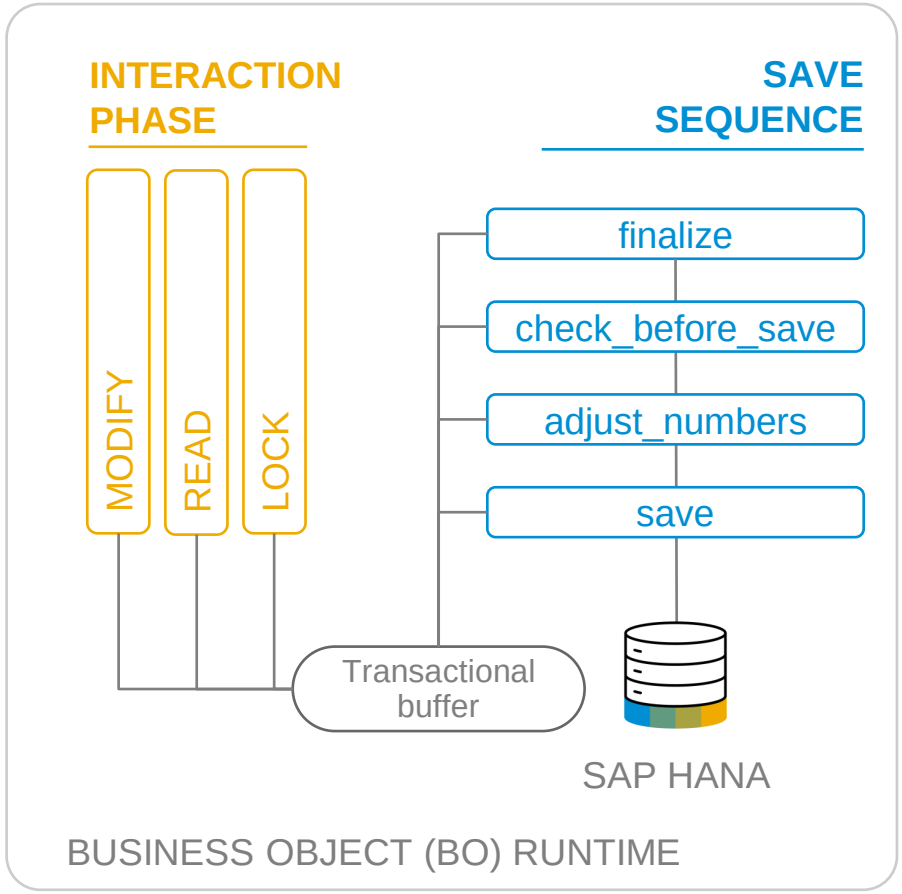
[1] Not applicable for RAP BO interfaces

BUSINESS OBJECTS

What is a business object (BO) ?



BO 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

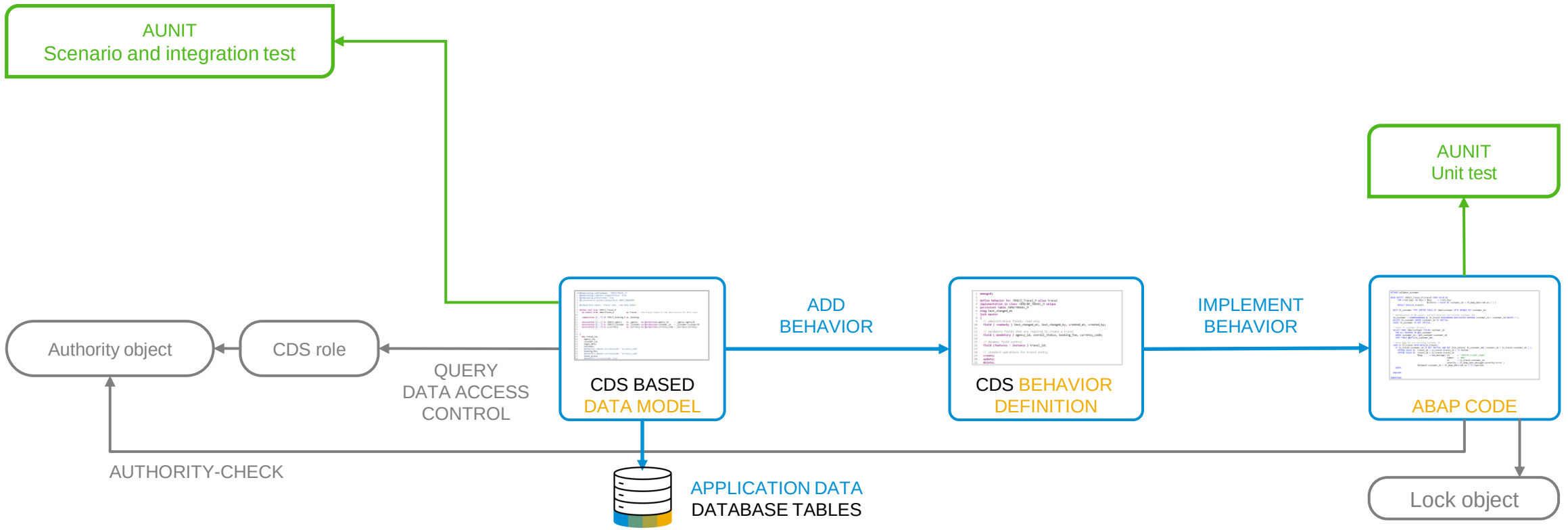
MANAGED

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

The development flow



BUSINESS SERVICES

What is a business service

Service Binding

Protocol: OData V2, OData V4, InA,

Scenario: Web API or UI?

Web API Lifecycle

Release

Versioning

Deprecation

2

3

1

4

Tool support

UI: SAP Fiori Elements preview

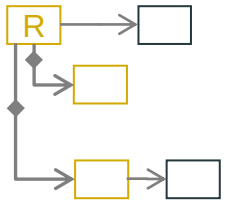
Web API: Swagger UI preview*

** planned*

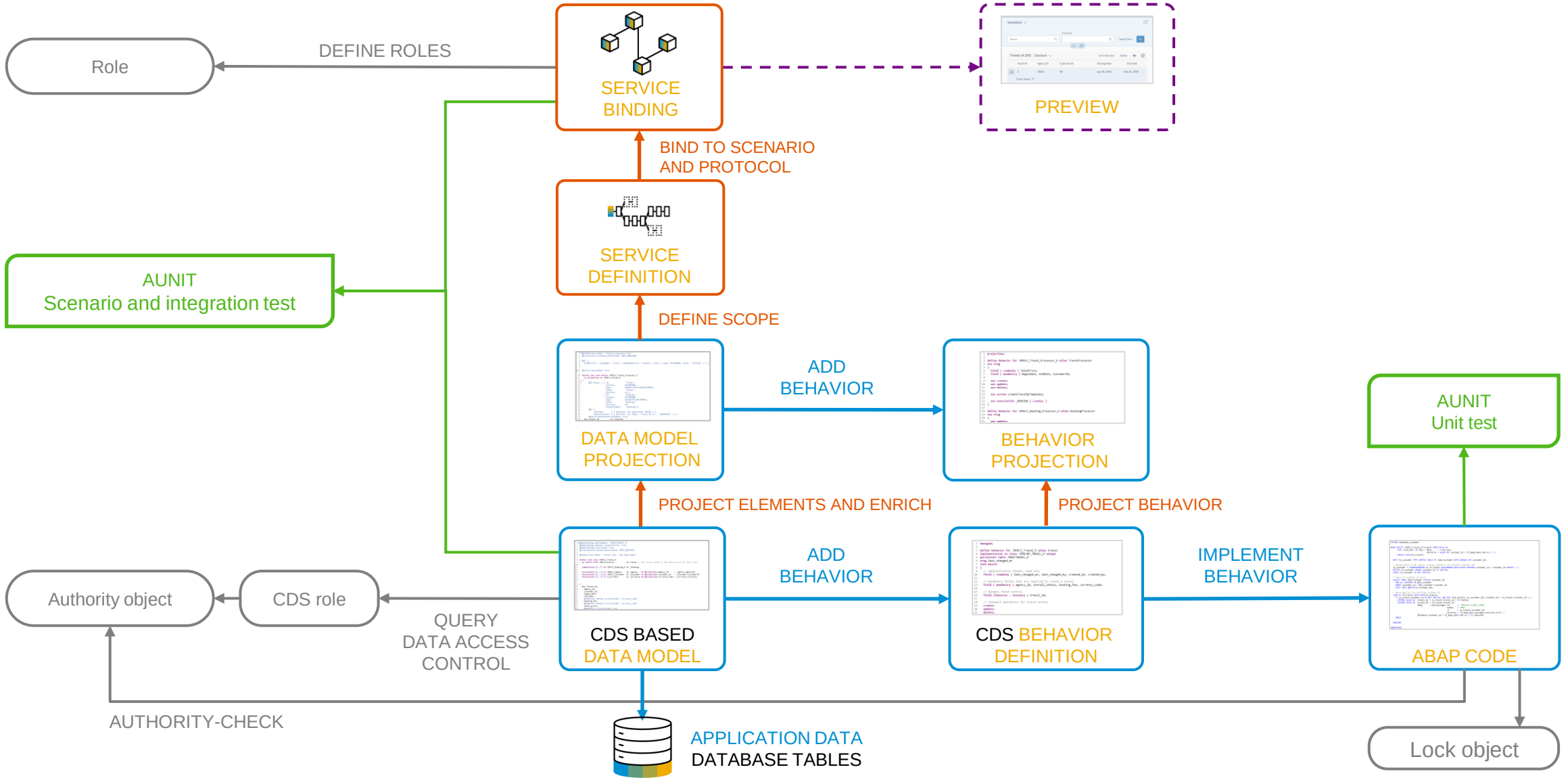
Service Definition: which entities?

BO Projection View: which elements?

Behavior Projection: which behavior?



The development flow



DEMO

GET THE IDEA

SUMMARY

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**.

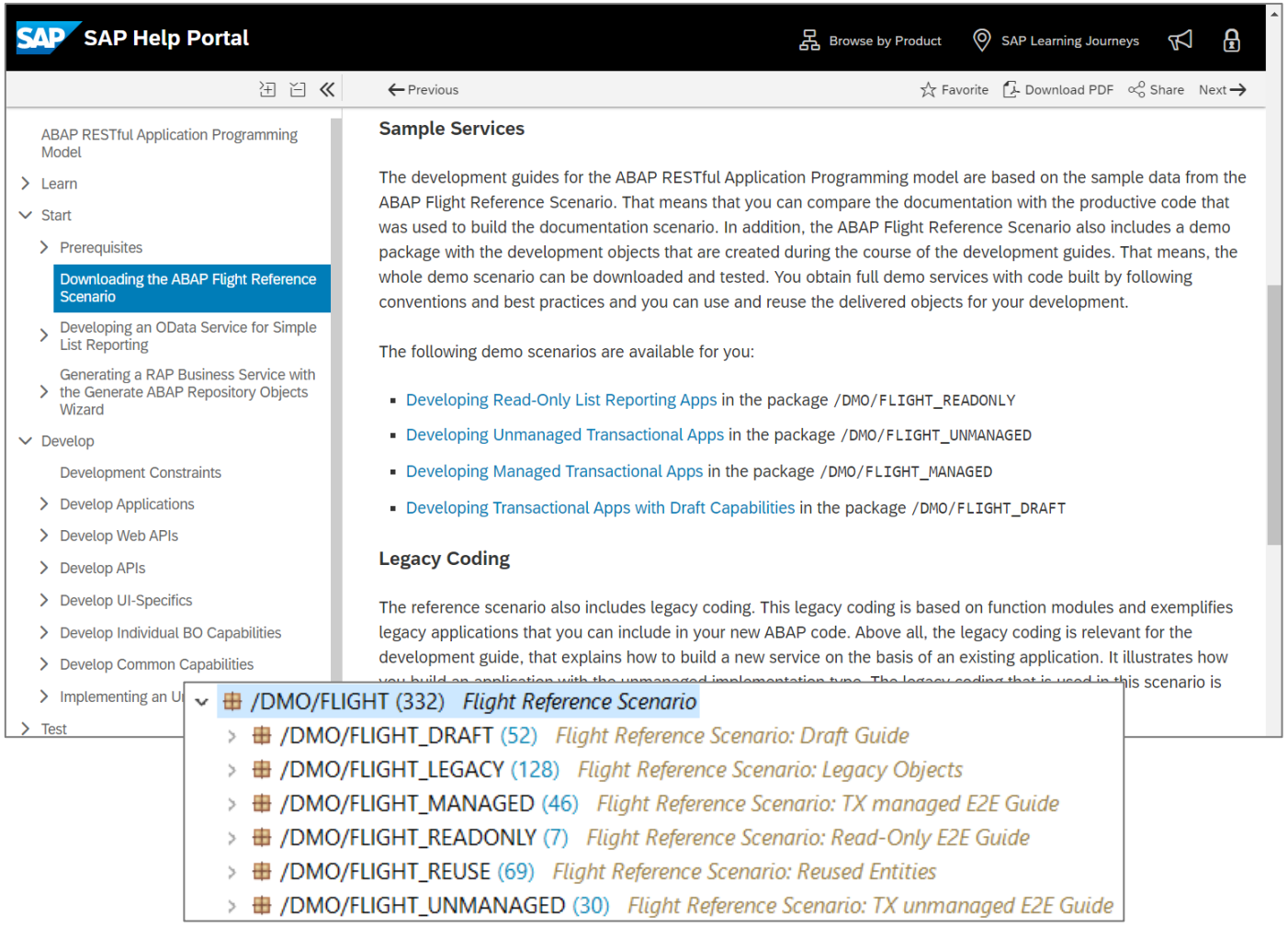
RAP is **available** on **SAP BTP ABAP Environment**, **SAP S4HANA Cloud**, and **SAP S/4HANA** starting with edition 1909.

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

What's New: SAP BTP ABAP Environment | SAP S/4HANA

Take a look at the interactive SAP Road Map Explorer for updates.

Sample implementations with the ABAP Flight Reference Scenario



Demonstrate how to use different RAP capabilities concretely

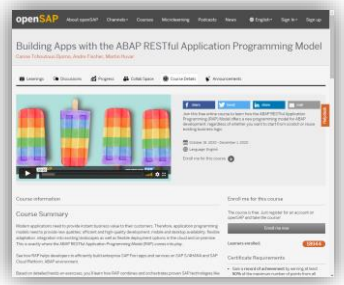
Based on a simple to use and understand data model: SFLIGHT reloaded

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

Modern ABAP Development with the ABAP RESTful Application Programming Model (RAP) (*SAP Community*)

Modernization with RAP | SAP Blogs

Building Apps with RAP (*free openSAP course*)

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

What's New in RAP: SAP BTP ABAP Environment | SAP S/4HANA | SAP S/4HANA Cloud

Outlook: SAP BTP ABAP Environment on the interactive SAP Road Map Explorer

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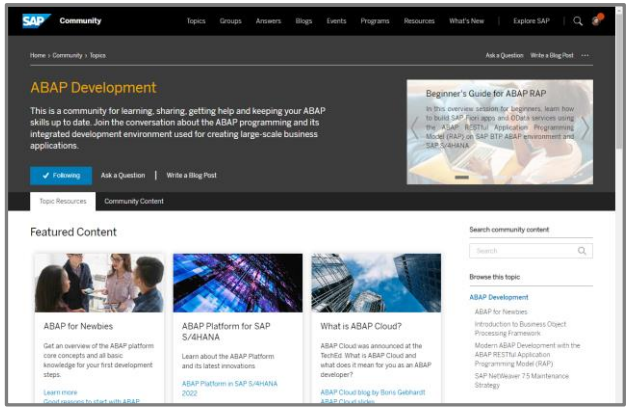
Public SAP Web sites

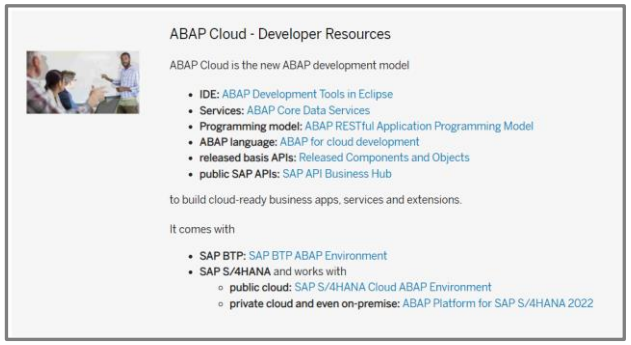
ABAP Development Community: www.sap.com/community/topic/abap.html
SAP BTP ABAP Environment Community: https://community.sap.com/topics/btp-abap-environment
SAP S/4HANA Cloud ABAP Environment Community: https://community.sap.com/topics/s4hana-cloud-abap-environment
ABAP Testing and Analysis Community: https://community.sap.com/topics/abap-testing-analysis
SAP products: www.sap.com/products

SAP training and certification opportunities

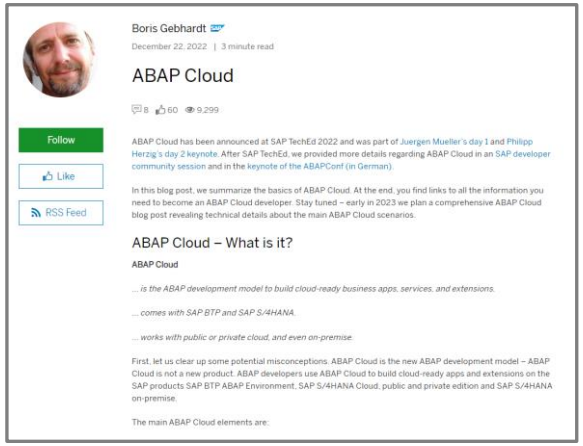
www.sap.com/education – e.g. trainings S4D437, S4D430, HA400, and S4D400

More information on ABAP Cloud



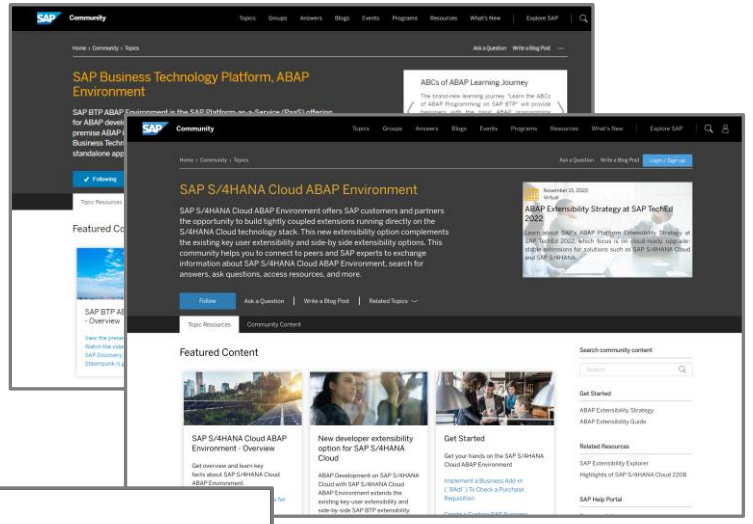


[ABAP Development | SAP Community]



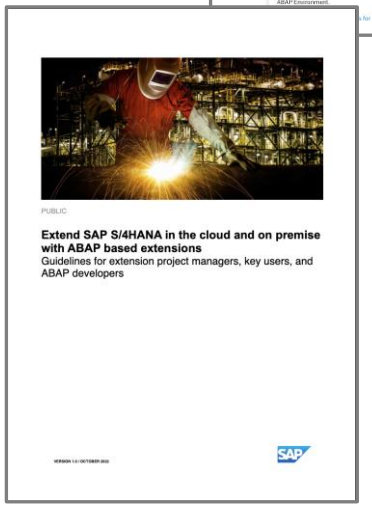
[ABAP Cloud | SAP Blogs]

[Developer Discussion: ABAP Cloud]



[SAP S/4HANA Cloud ABAP Environment | SAP Community]

[SAP BTP ABAP Environment | SAP Community]



[The new ABAP extensibility guide]

Thank you.

Contact information:

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