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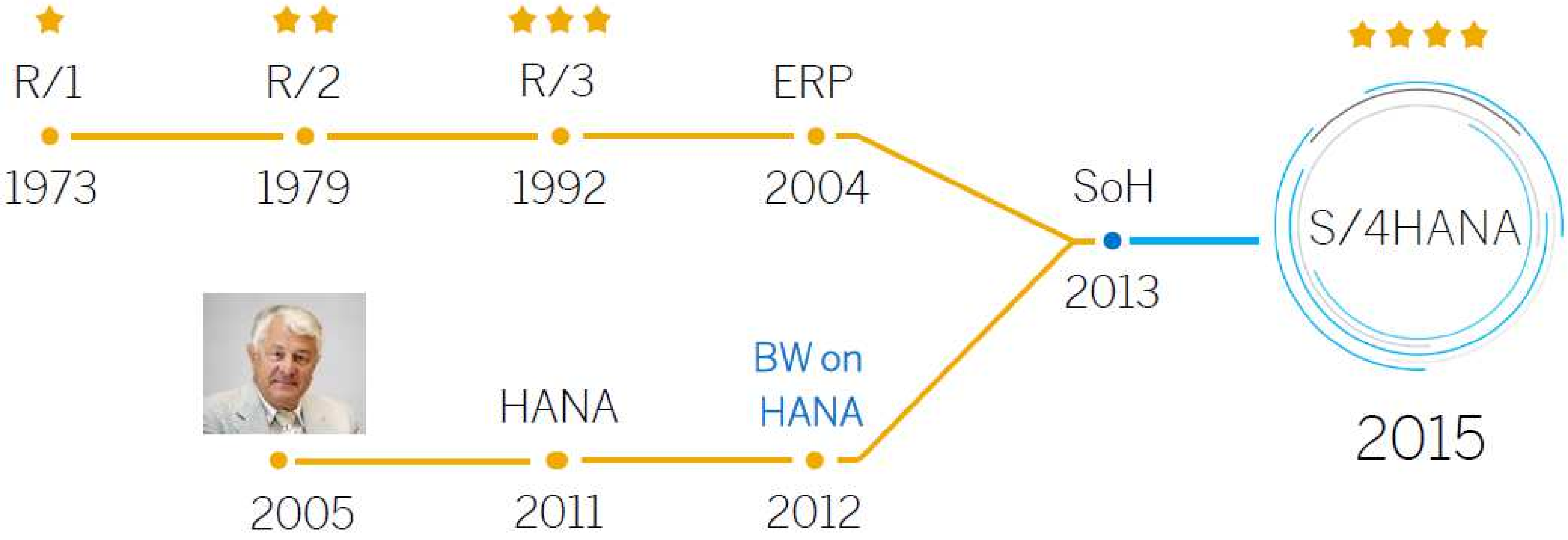
The S/4HANA Programing Paradigm

Welcome to the Future of ABAP Development

Agenda

1. **What is S/4HANA?**
2. **What are the paradigms?**
3. **What does this mean for SAP Development?**
4. **A look beyond the Horizon**

S/4HANA – A truly new Product



★ R/1 1973

★★ R/2 1979

★★★ R/3 1992

ERP 2004

2005

HANA 2011

BW on HANA 2012

SoH 2013

★★★★ S/4HANA 2015

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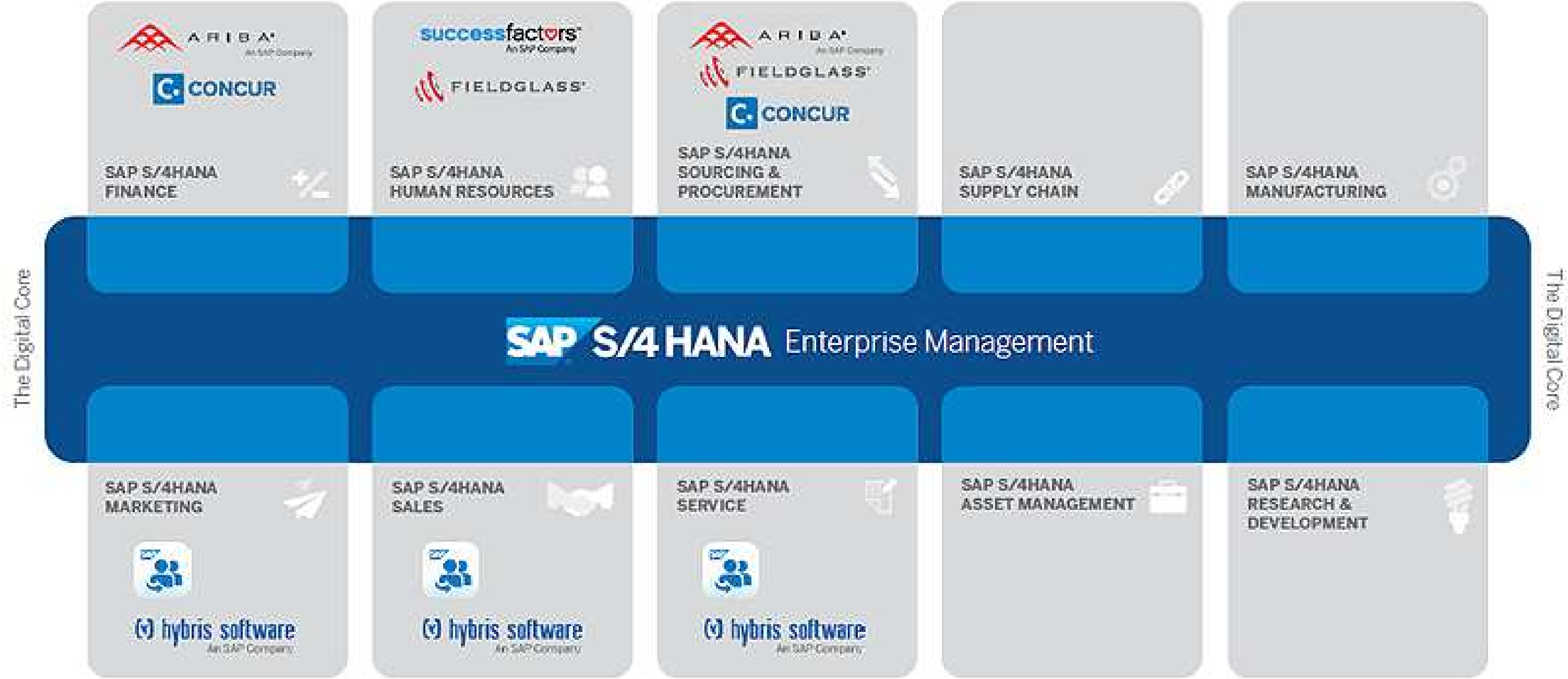
The S/4HANA Programing Paradigm

S/4HANA – A Global Glance


ARIBA An SAP Company
CONCUR
SAP S/4HANA FINANCE
successfactors An SAP Company
FIELDGLASS
SAP S/4HANA HUMAN RESOURCES
ARIBA An SAP Company
FIELDGLASS
CONCUR
SAP S/4HANA SOURCING & PROCUREMENT
SAP S/4HANA SUPPLY CHAIN
SAP S/4HANA MANUFACTURING
The Digital Core
SAP S/4 HANA Enterprise Management
The Digital Core
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The Paradigms of S/4HANA (Core)

Principle of One

Cloud First

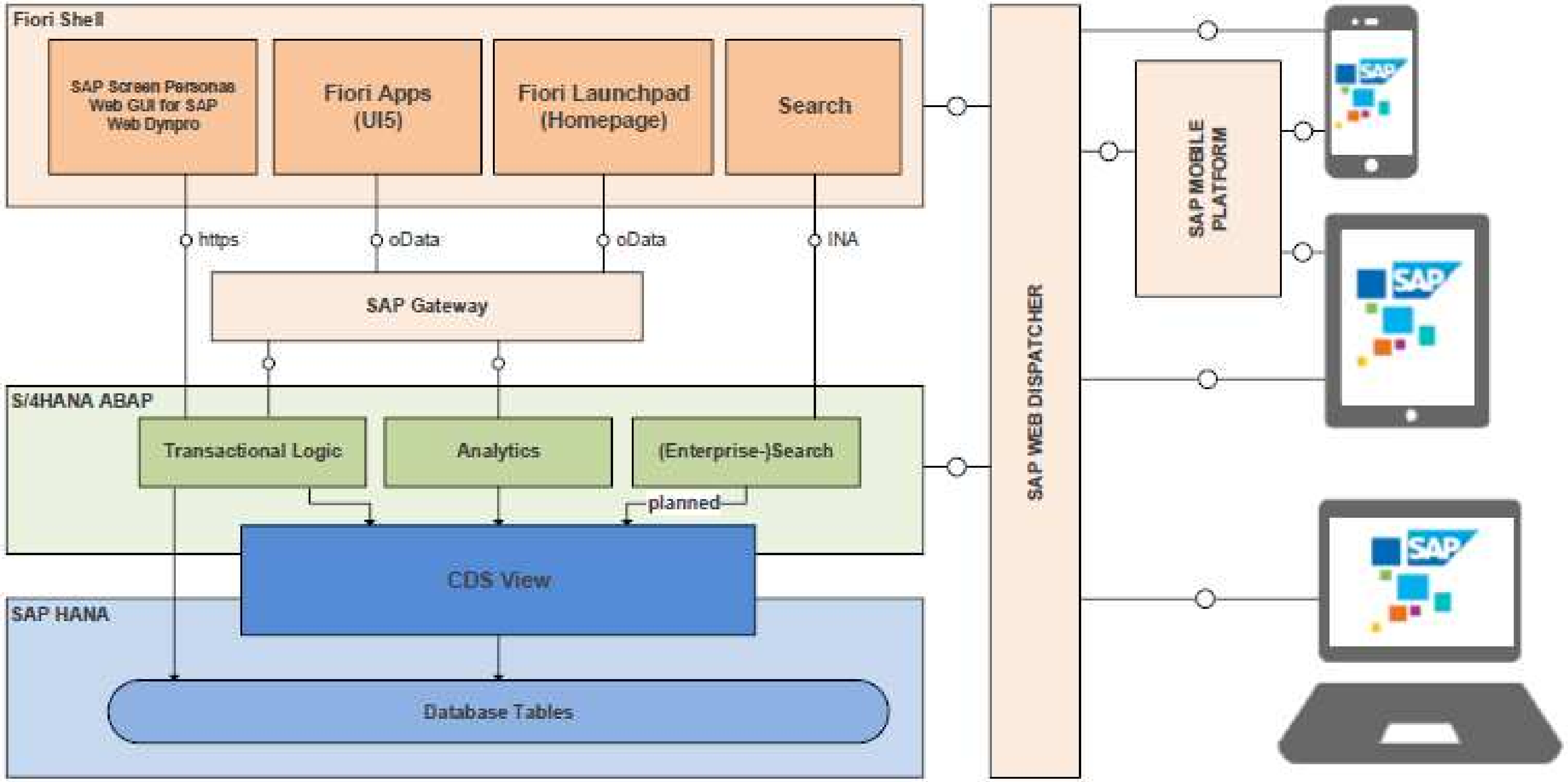
HANA only

Fiori as UX

The Development model: First of all …

https://www.spreadshirt.com/abaps+not+dead-A105364067

The S/4 Development Model – The Journey Map



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Cross Topic: ABAP Language

ABAP Syntax was renewed

- Idea: The developer should focus on **WHAT** he does and not **HOW** to do it

Code Push Down should be enabled

- Open SQL enhancements (→ Support of SQL92 standard)
- New Artefacts to support Code PushDown:
  - **ABAP Core Data Service** (CDS) Views
  - ABAP Managed Database Procedures (**AMPD**)
  - **Table Functions**

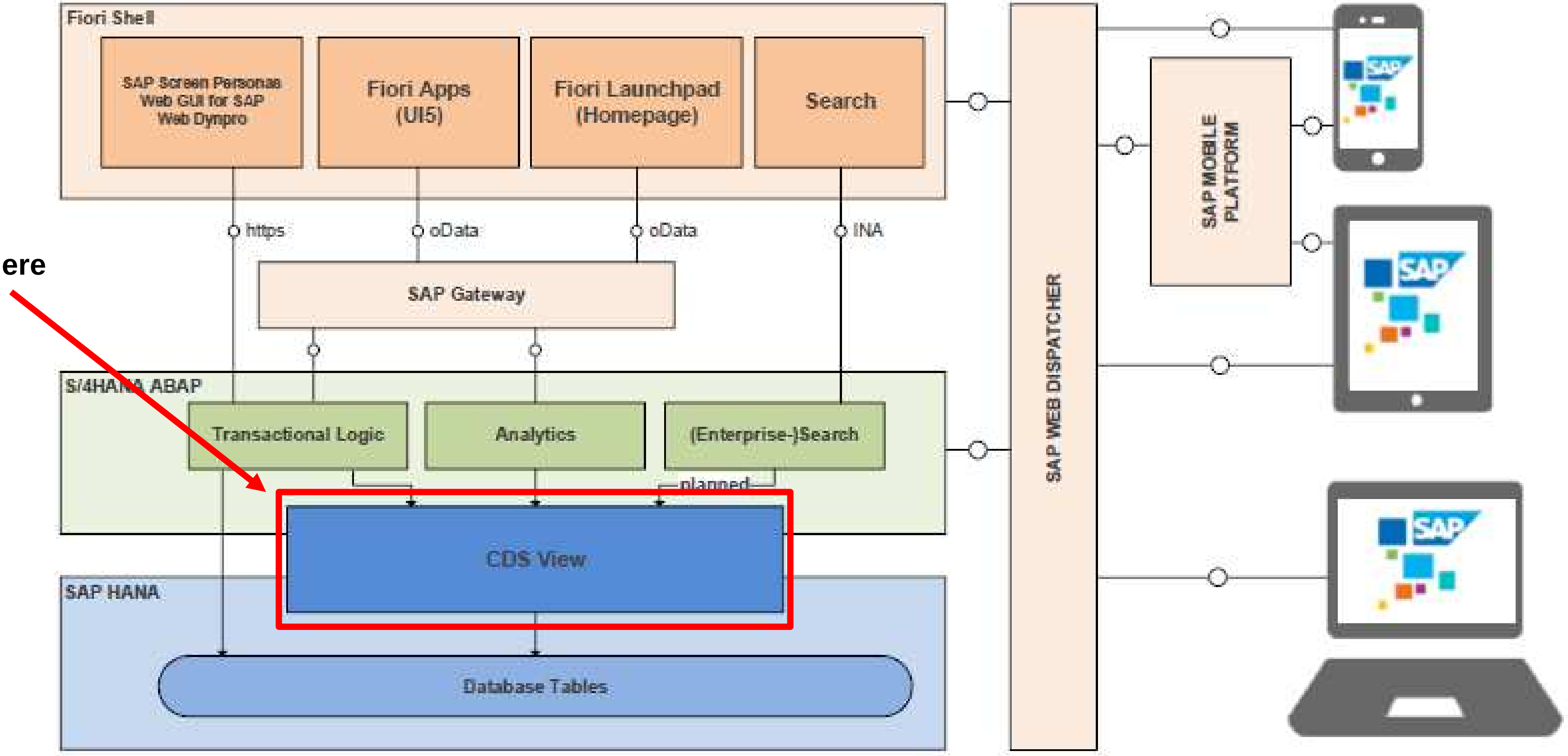
Cross Topic: Tooling

Before we start … a little "Disclaimer"

Image courtesy of Stuart Miles at FreeDigitalPhotos.net

Every Journey starts with the first step …

Let’s start here



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A new Player in the Game – ABAP CDS Views

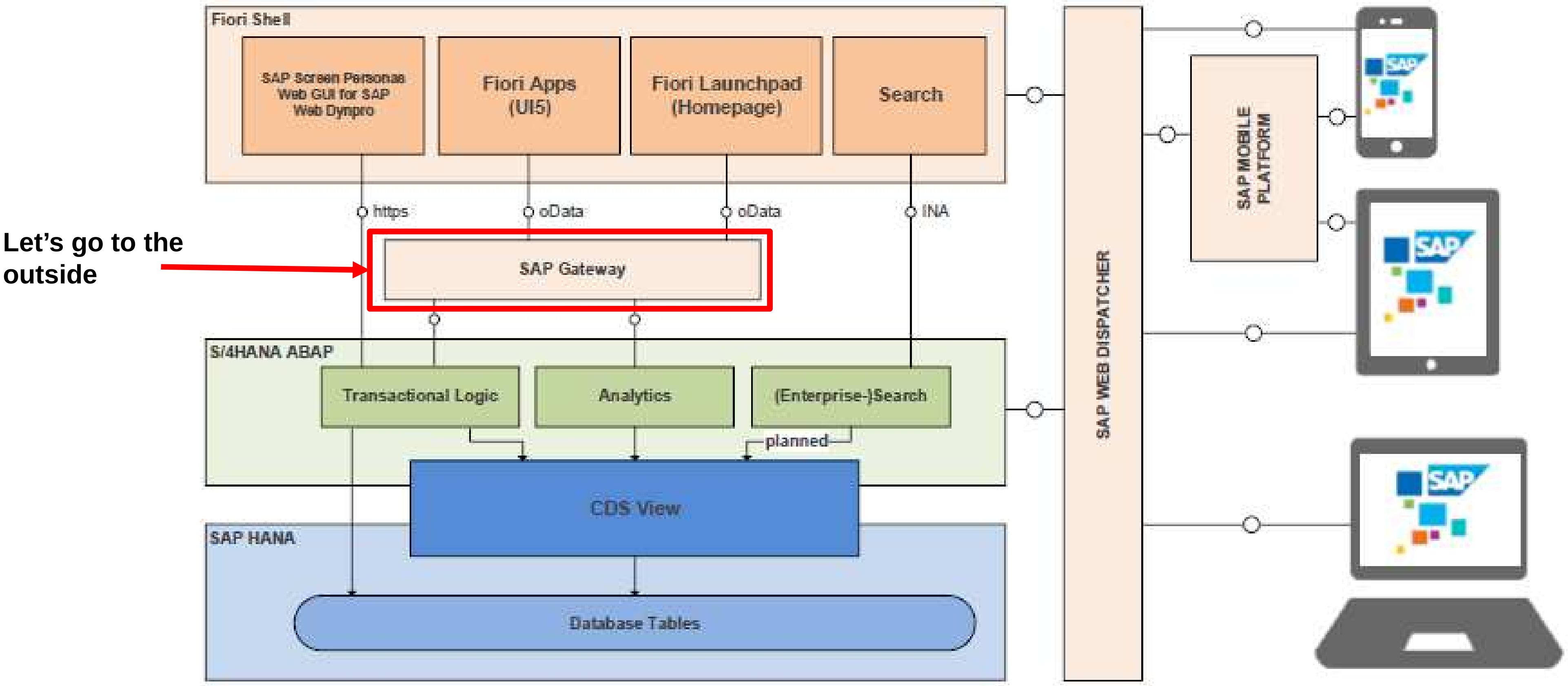
- **ABAP Core Data Service Views** (CDS Views) are one pillar of **Code Push Down**
- **New way** to model views:
  Overcome the **limits** of the classical SE11 view modelling
- Create **reusable SQL views** with an **enhanced syntax**
- **Semantical enrichment** of ABAP CDS Views via **annotations**

➔ Creation of an ABAP managed **Virtual Data Model** (VDM)

ABAP CDS Views

DEMO

The S/4 Development Model



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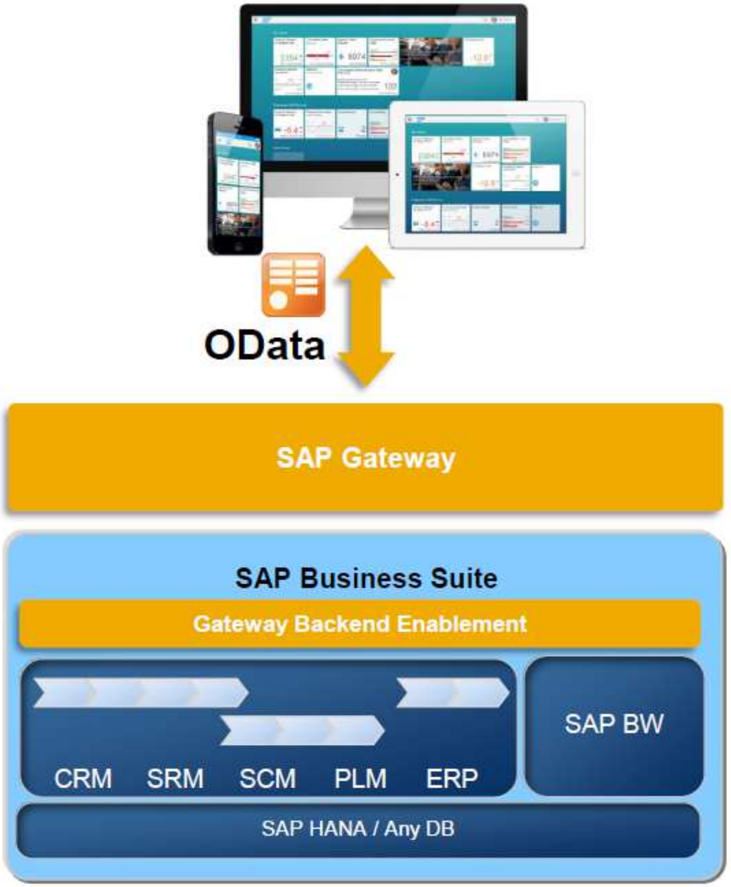
SAP Gateway – The Connection to the Outside



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- **SAP Gateway** is a secure communication layer between backend system and client devices
- It uses **OData** as open industry standard protocol
- **Arbitrary apps** can be built on this basis
- **The** communication layer in S/4HANA

Expose CDS Views via OData

Available options

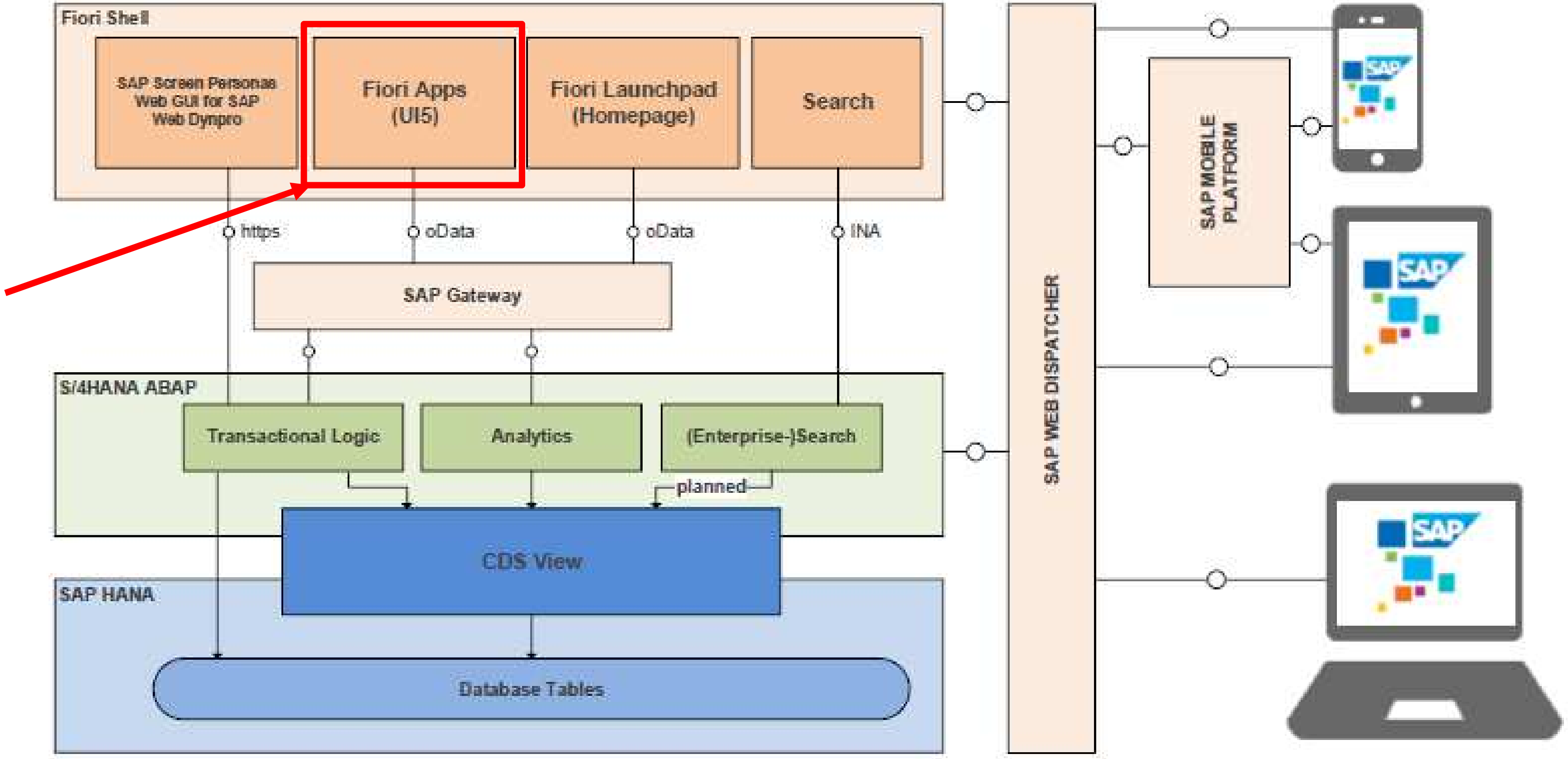
- Build service **“manually”** via SAP Gateway Service Builder
  Import or reference DDIC structure (CDS view)

- Use **annotation** to automatically create the necessary artefacts
  → Only registration of the service has to be done once

Expose CDS Views via OData

DEMO

The S/4 Development Model



Let's give it some face

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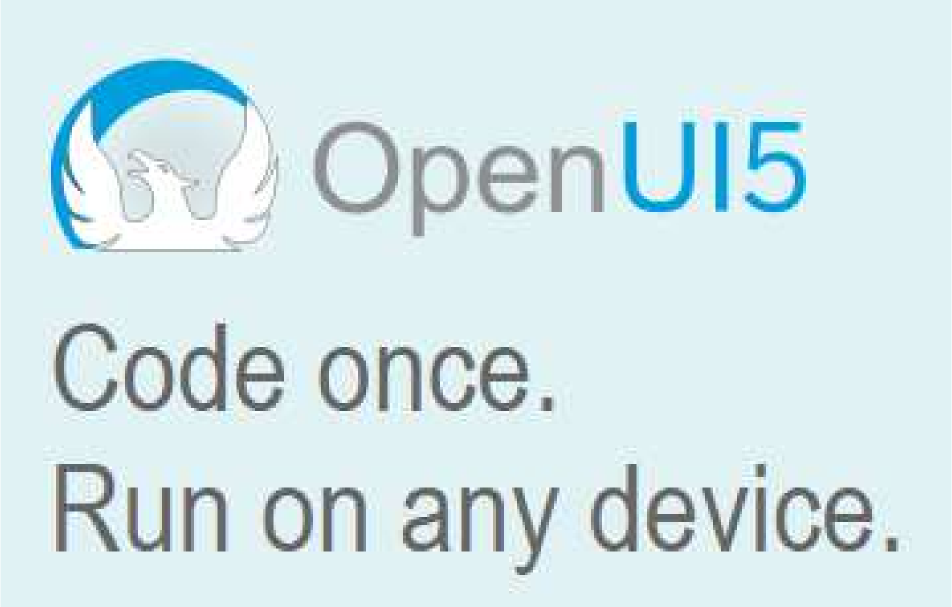
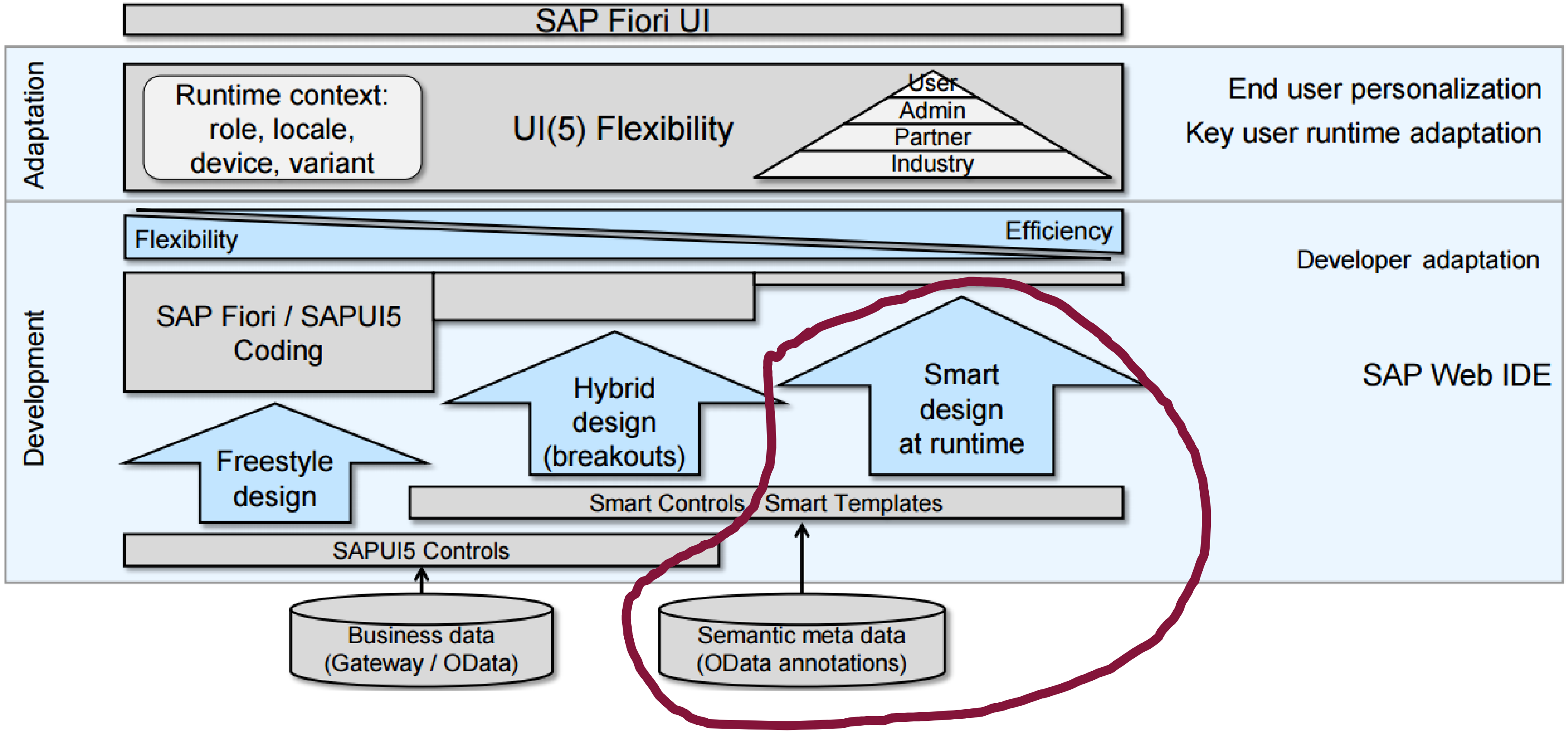
Recap UI5



- Enterprise-Ready Web Toolkit (HTML5)
- Consistent User Experience
- Feature-Rich UI Controls
- Responsive

http://openui5.org/

Implementing the UI – Options



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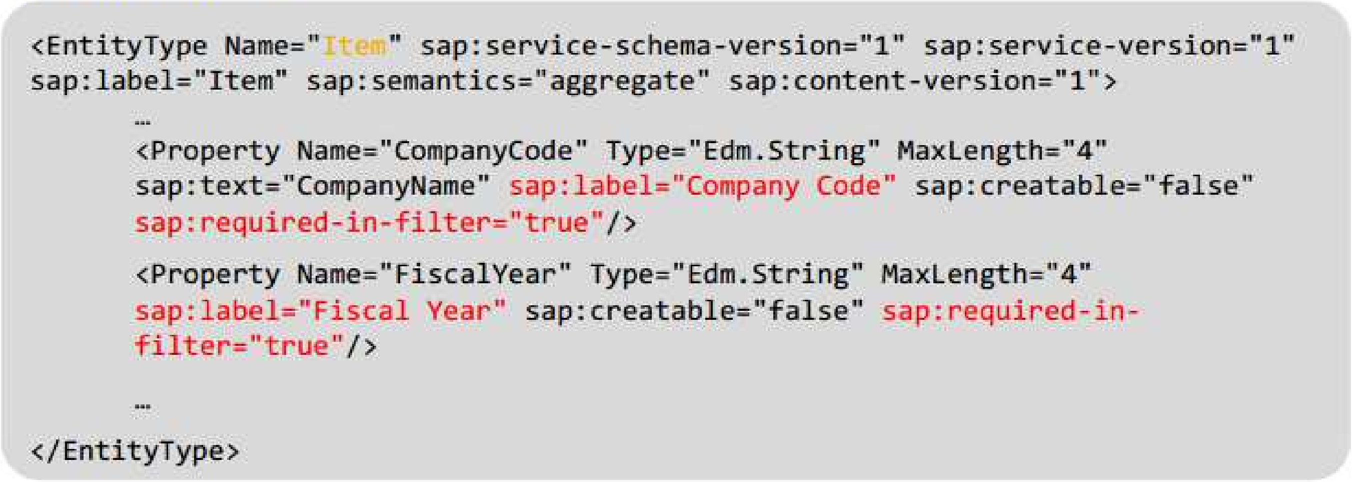
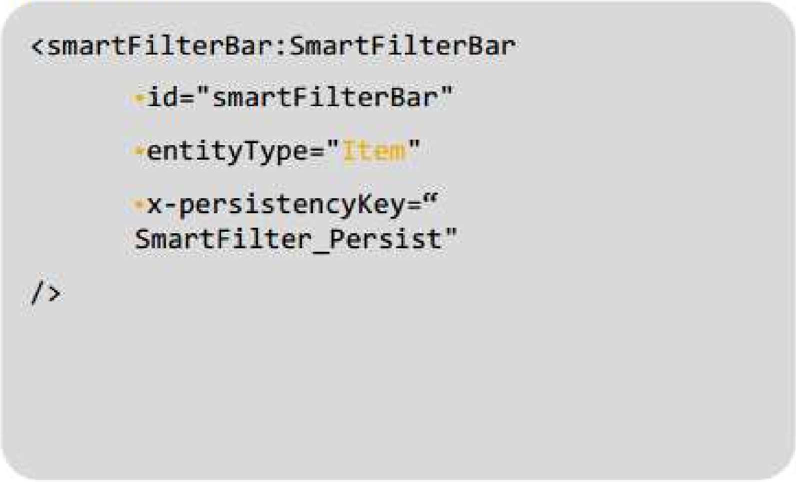
Smart Templates – or How To Accelerate the UI Development

Annotations.xml



```
<EntityType Name="Item" sap:service-schema-version="1" sap:service-version="1"
sap:label="Item" sap:semantics="aggregate" sap:content-version="1">
        …
        <Property Name="CompanyCode" Type="Edm.String" MaxLength="4"
        sap:text="CompanyName" sap:label="Company Code" sap:creatable="false"
        sap:required-in-filter="true"/>
        <Property Name="FiscalYear" Type="Edm.String" MaxLength="4"
        sap:label="Fiscal Year" sap:creatable="false" sap:required-in-
        filter="true"/>
        …
</EntityType>
```

view.xml



```
<smartFilterBar:SmartFilterBar
        id="smartFilterBar"
        entityType="Item"
        x-persistencyKey=“
        SmartFilter_Persist"
/>
```

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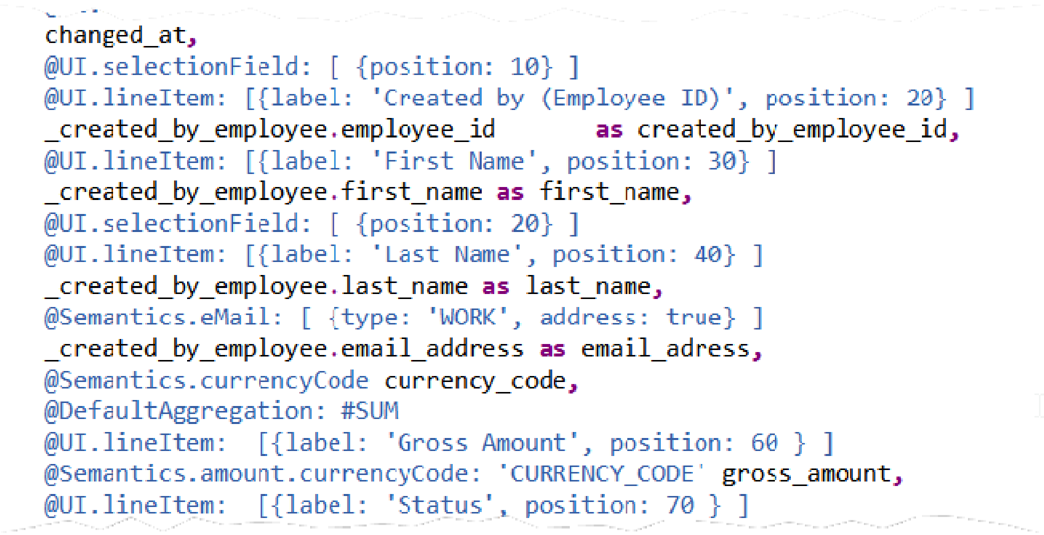
CDS Views and Annotations

- With SAP NetWeaver 7.50 the ABAP CDS Views can be (heavily) annotated

- The annotations cover different aspects/use cases (analytics, search, …)

- The group mainly relevant for Smart Templates is the **UI Annotations group** **`@UI.*`**



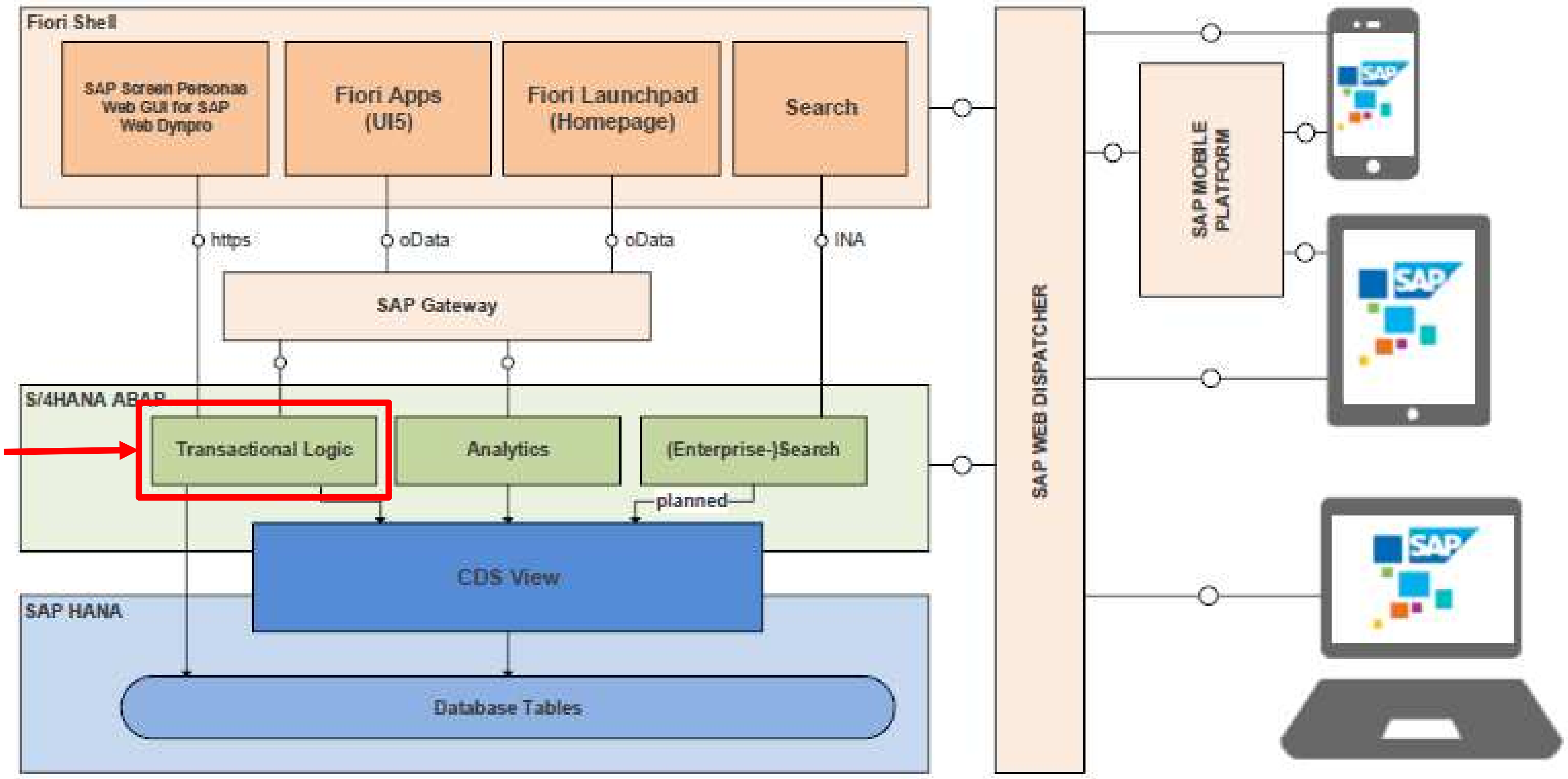
```
changed_at,
@UI.selectionField: [ {position: 10} ]
@UI.lineItem: [{label: 'Created by (Employee ID)', position: 20} ]
_created_by_employee.employee_id       as created_by_employee_id,
@UI.lineItem: [{label: 'First Name', position: 30} ]
_created_by_employee.first_name as first_name,
@UI.selectionField: [ {position: 20} ]
@UI.lineItem: [{label: 'Last Name', position: 40} ]
_created_by_employee.last_name as last_name,
@Semantics.eMail: [ {type: 'WORK', address: true} ]
_created_by_employee.email_address as email_adress,
@Semantics.currencyCode currency_code,
@DefaultAggregation: #SUM
@UI.lineItem:  [{label: 'Gross Amount', position: 60 } ]
@Semantics.amount.currencyCode: 'CURRENCY_CODE' gross_amount,
@UI.lineItem:  [{label: 'Status', position: 70 } ]
```

Build a UI with CDS UI Annotations

DEMO

The S/4 Development Model

What about Transactions?



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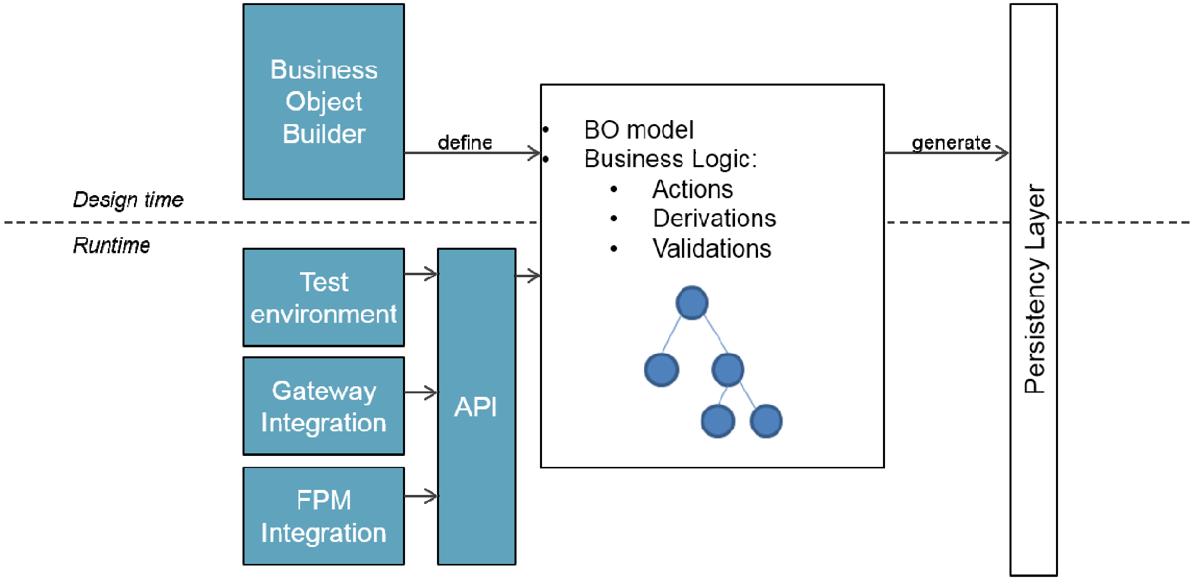
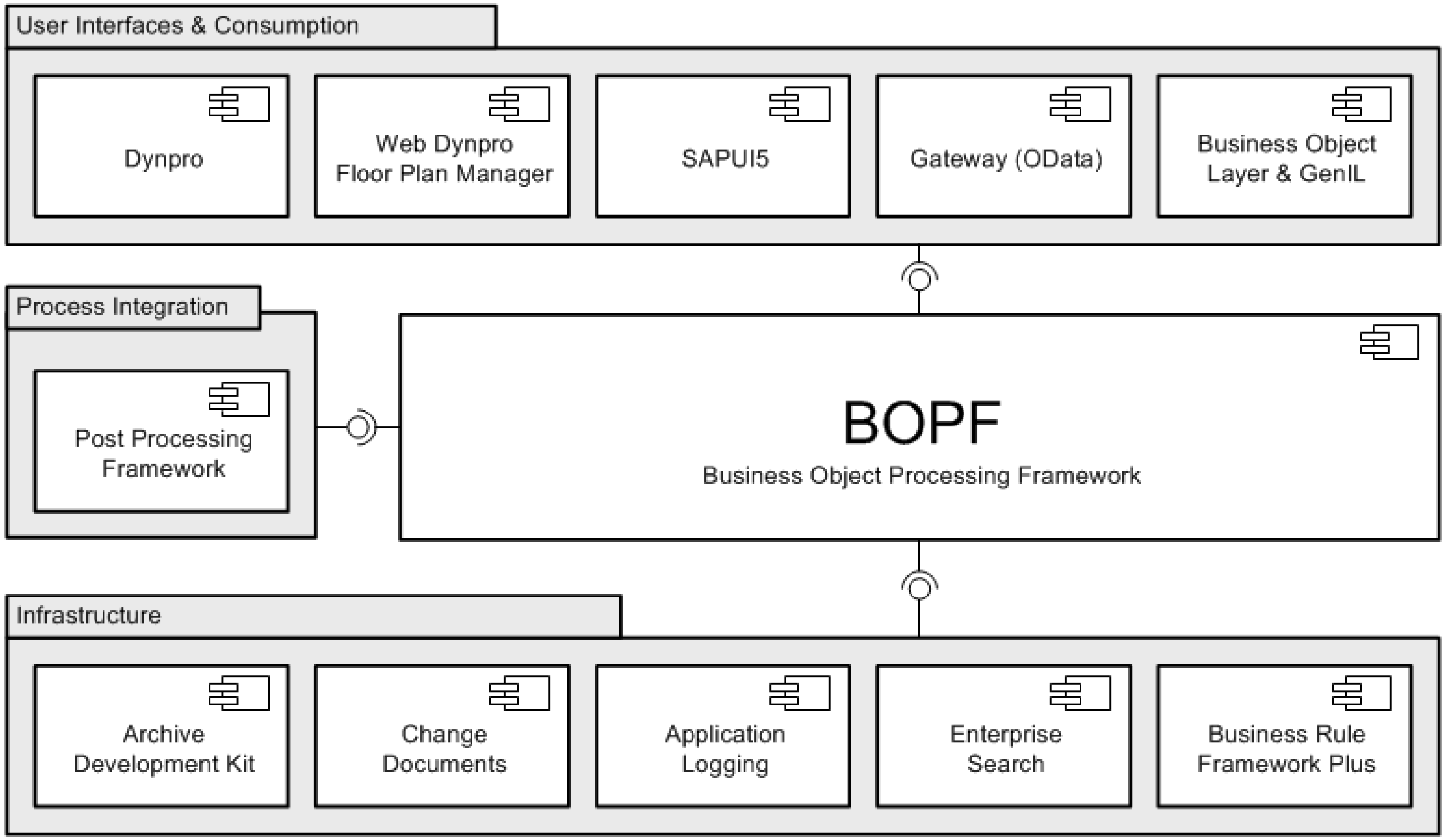
The Framework for Business Objects and their Logic - BOPF

- The programing model of S/4HANA for transactions is based on the **Business Object Processing Framework (BOPF)**

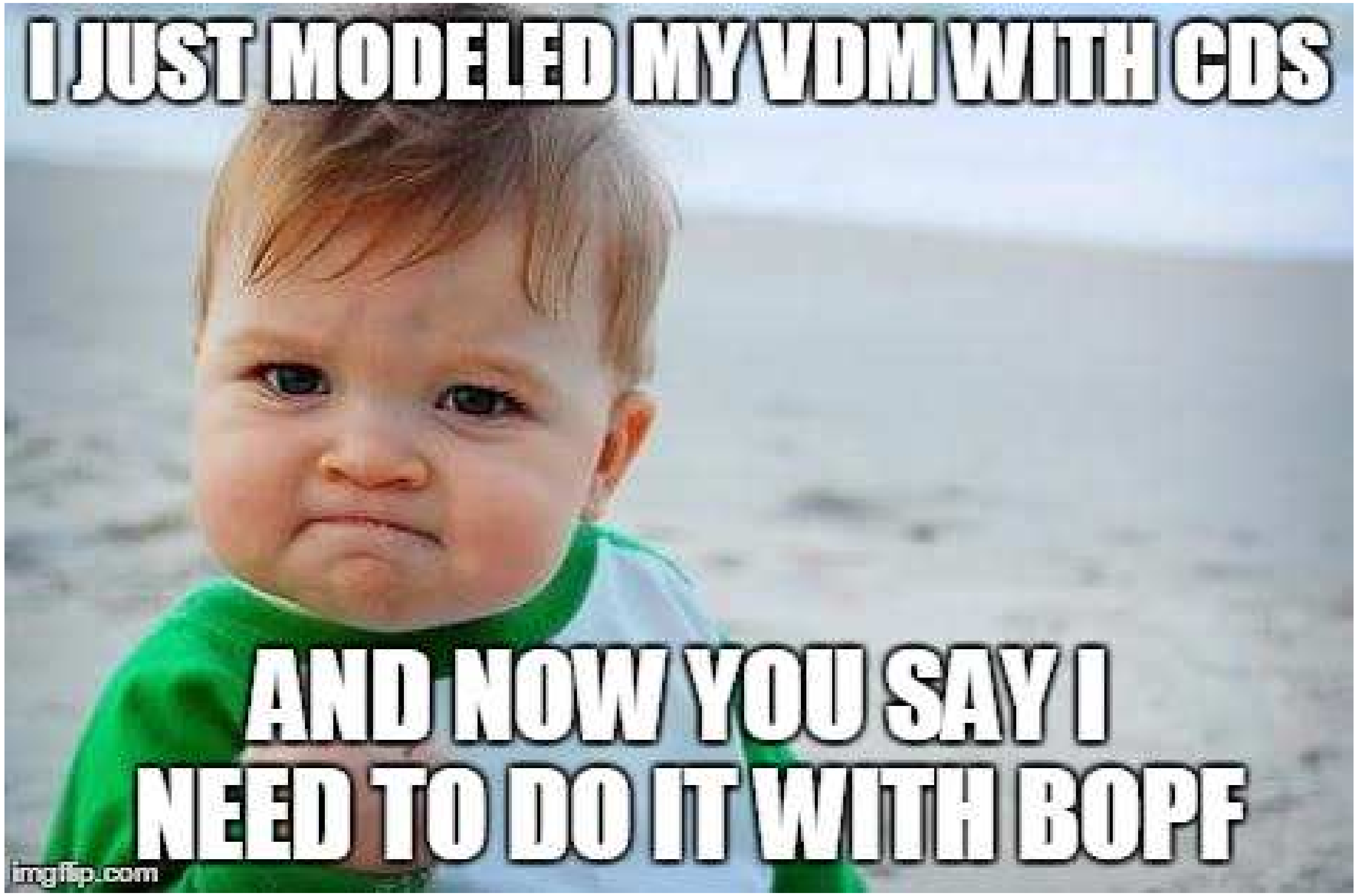
- **BOPF** is a framework for ABAP OO-based application development, providing services that support the entire software development lifecycle



BOPF – Further Benefits

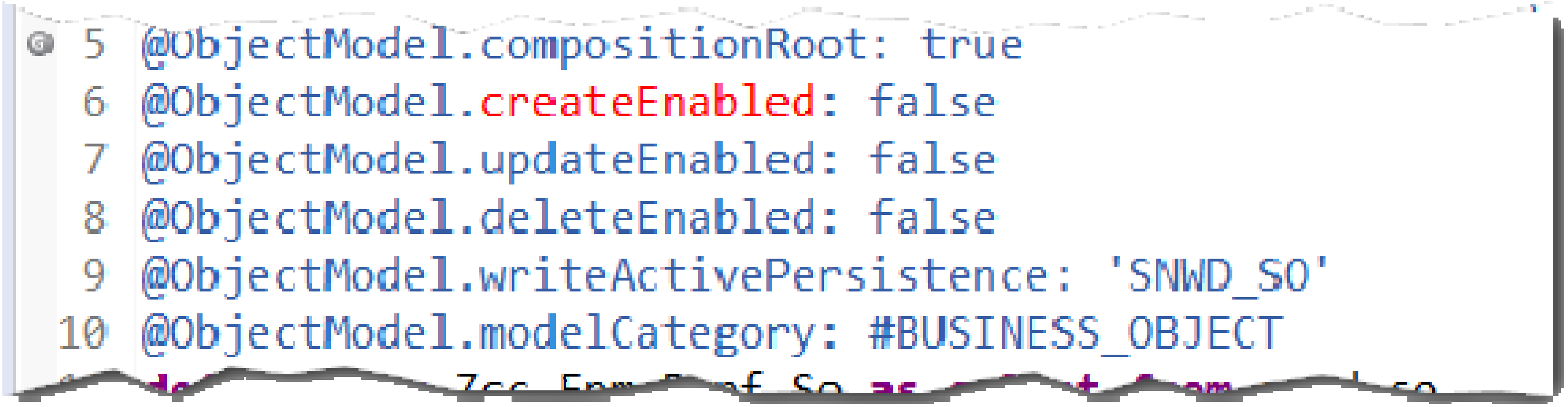

User Interfaces & Consumption
Dynpro
Web Dynpro Floor Plan Manager
SAPUI5
Gateway (OData)
Business Object Layer & GenIL
Process Integration
Post Processing Framework
BOPF
Business Object Processing Framework
Infrastructure
Archive Development Kit
Change Documents
Application Logging
Enterprise Search
Business Rule Framework Plus

CDS to BOPF


I JUST MODELED MY VDM WITH CDS
AND NOW YOU SAY I NEED TO DO IT WITH BOPF
imgflip.com

CDS to BOPF – Just an Annotation away

- CDS Views can be annotated to be represented by a BOPF object
- This includes the persistency
- The business logic can then be implemented within the BOPF tools



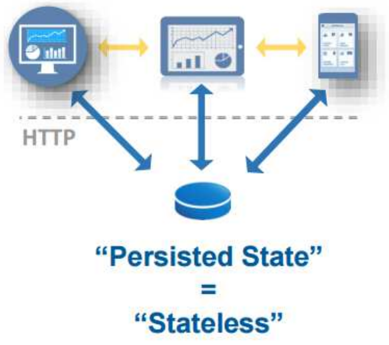
```
@ObjectModel.compositionRoot: true
@ObjectModel.createEnabled: false
@ObjectModel.updateEnabled: false
@ObjectModel.deleteEnabled: false
@ObjectModel.writeActivePersistence: 'SNWD_SO'
@ObjectModel.modelCategory: #BUSINESS_OBJECT
```

BOPF BO via CDS

DEMO

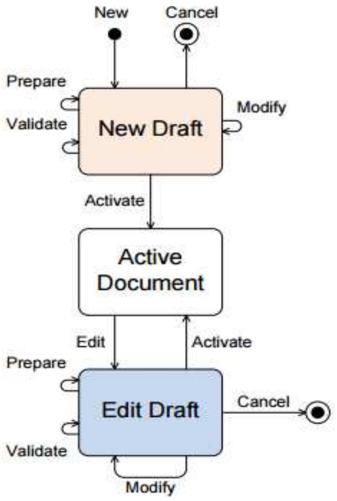
Goals for Transactional Applications in S/4HANA

- Start on one device – continue on other device
- Start now – let someone else continue later
- Start now – save incomplete – continue later
- Keep working – data is saved automatically and asynchronously
- No data loss connectivity disruption or session time-out



Solution

Draft Concept



NW 7.51

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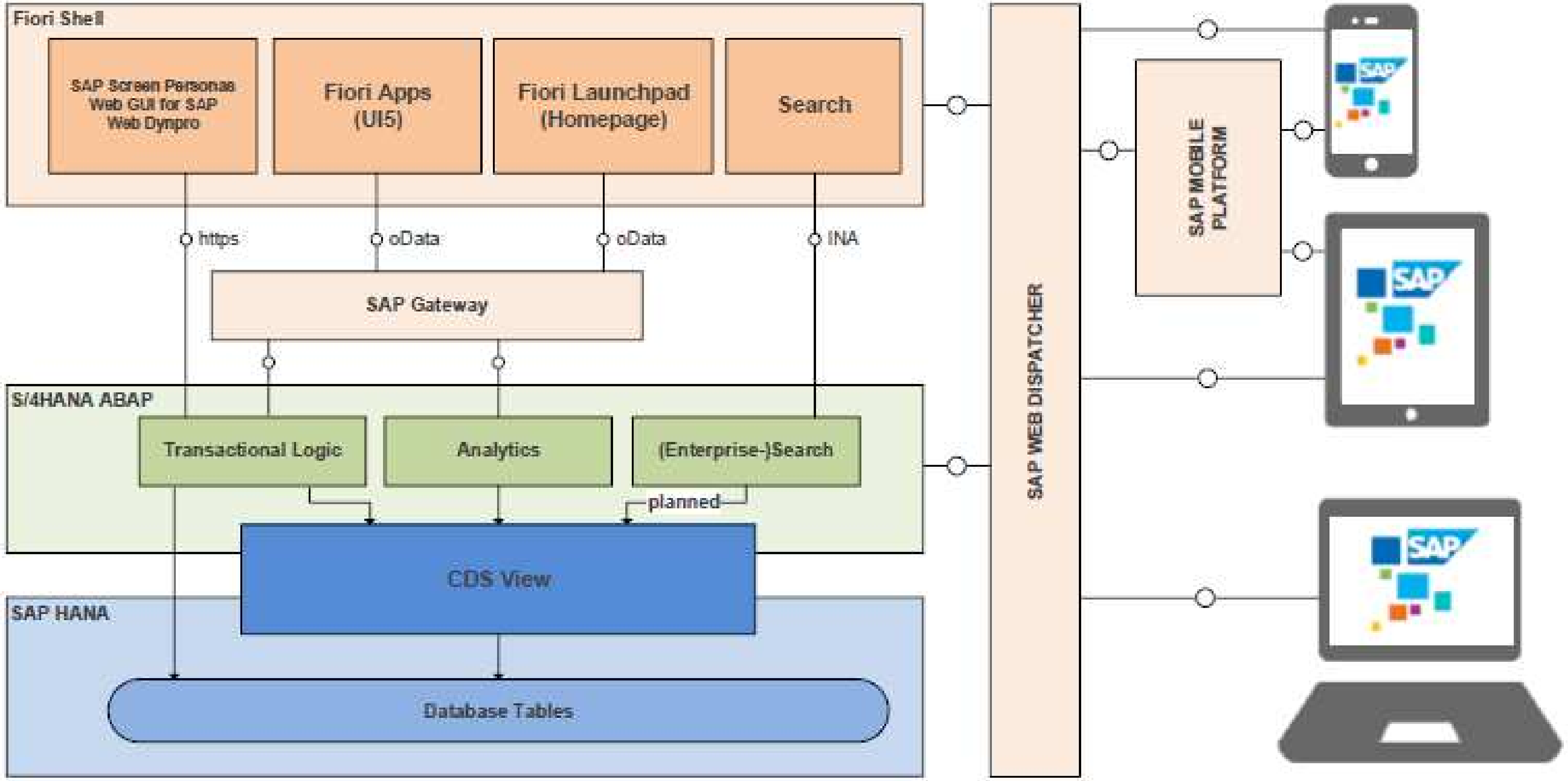
The S/4 Development Model – We're through ☺



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Topics we did not touch …

- Code Push Down on the Edge: **ABAP Managed Database Procedures** and **Table Functions**

- It is all about the **Cloud**:
  - Key User Extensibility
  - Restricted ABAP
  - Guided Configurations

- **Extension Scenarios** (In App and Side-to-Side)

- **Integration Scenarios** (Preconfigured connectors, HANA Cloud Platform, API Management, …)

Let’s wrap it up

- **S/4HANA** triggered a **renewal** of the SAP **development**

- The trigger touches the **complete development ecosystem**
  - Tooling
  - Language Features
  - Paradigms (Code Push Down, Draft)
  - Frameworks (BOPF)
  - Integration Technologies (SAP Gateway and OData)
  - User Interfaces (Fiori 2.0)

- **The good news**: a lot of those functionalities can be used without S/4HANA underneath
  → Technological basis is part of SAP NetWeaver ☺

The S/4HANA Programing Paradigm

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Thanks for your Attention
&
Enjoy the Conference + CodeJam

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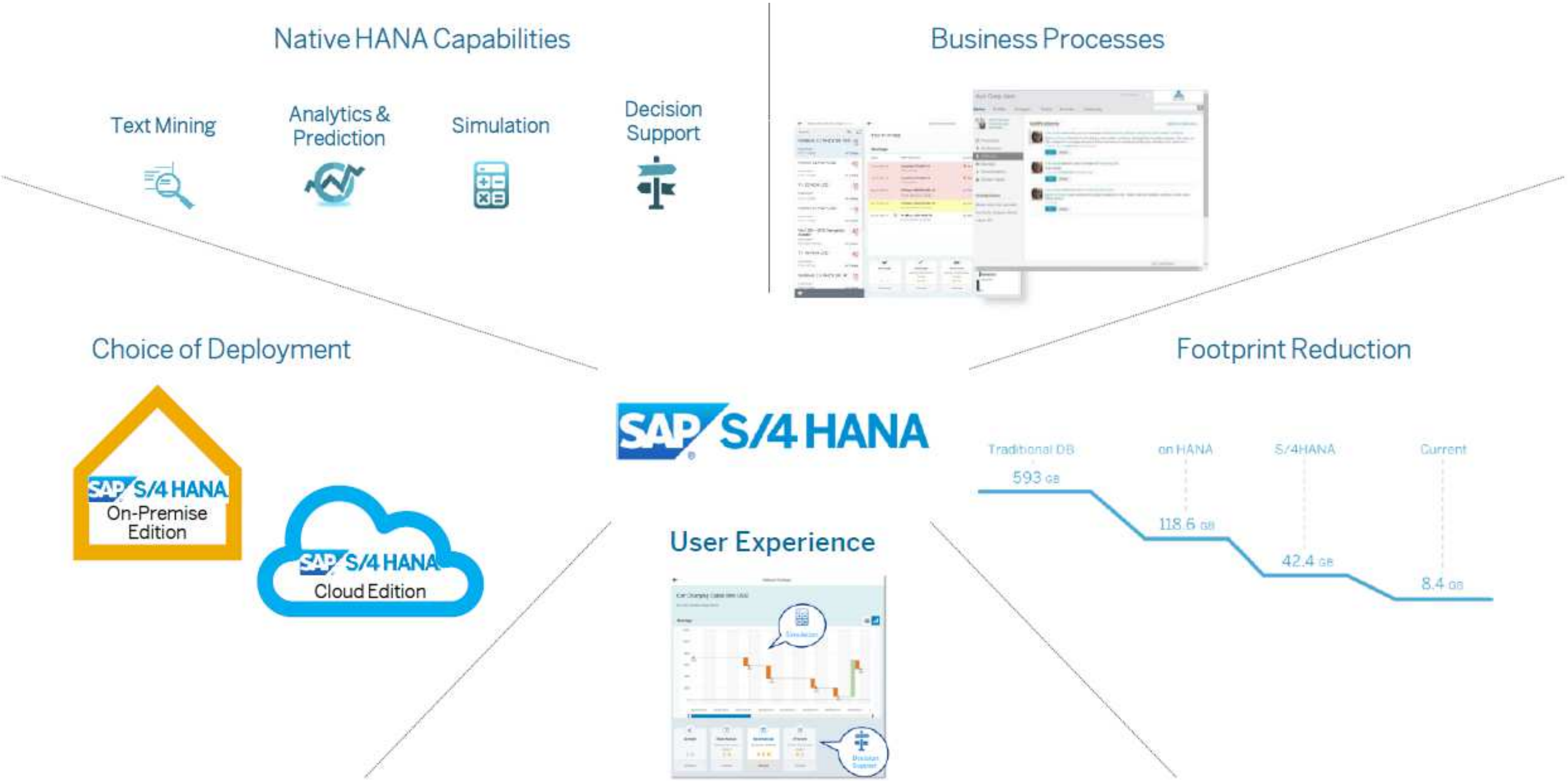
What is S/4HANA – The Pillars



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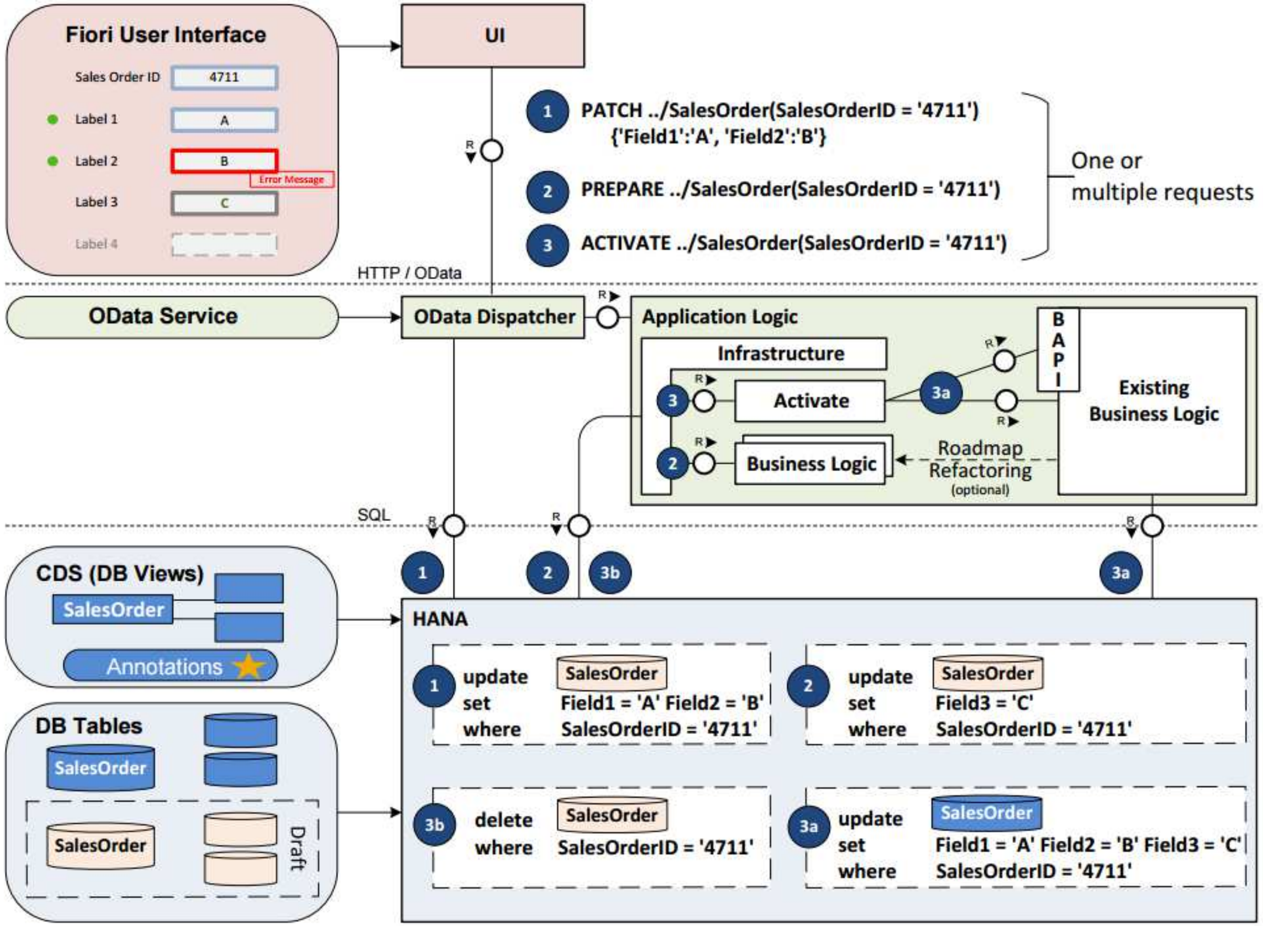
Draft in Detail



1 PATCH ../SalesOrder(SalesOrderID = '4711')
{'Field1':'A', 'Field2':'B'}

2 PREPARE ../SalesOrder(SalesOrderID = '4711')

3 ACTIVATE ../SalesOrder(SalesOrderID = '4711')

One or multiple requests

1 update SalesOrder set Field1 = 'A' Field2 = 'B' where SalesOrderID = '4711'

2 update SalesOrder set Field3 = 'C' where SalesOrderID = '4711'

3b delete SalesOrder where SalesOrderID = '4711'

3a update SalesOrder set Field1 = 'A' Field2 = 'B' Field3 = 'C' where SalesOrderID = '4711'

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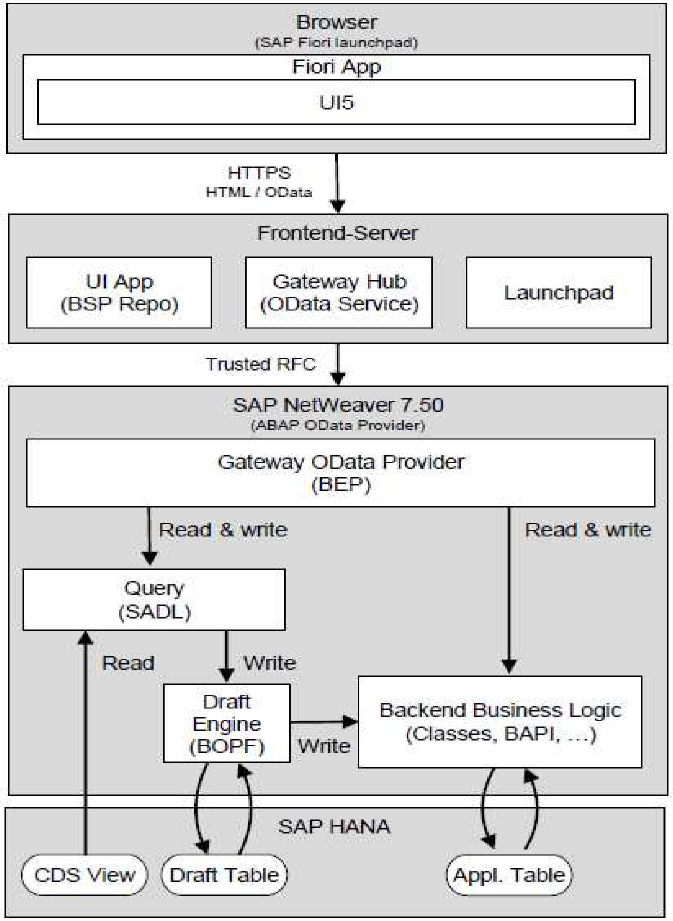
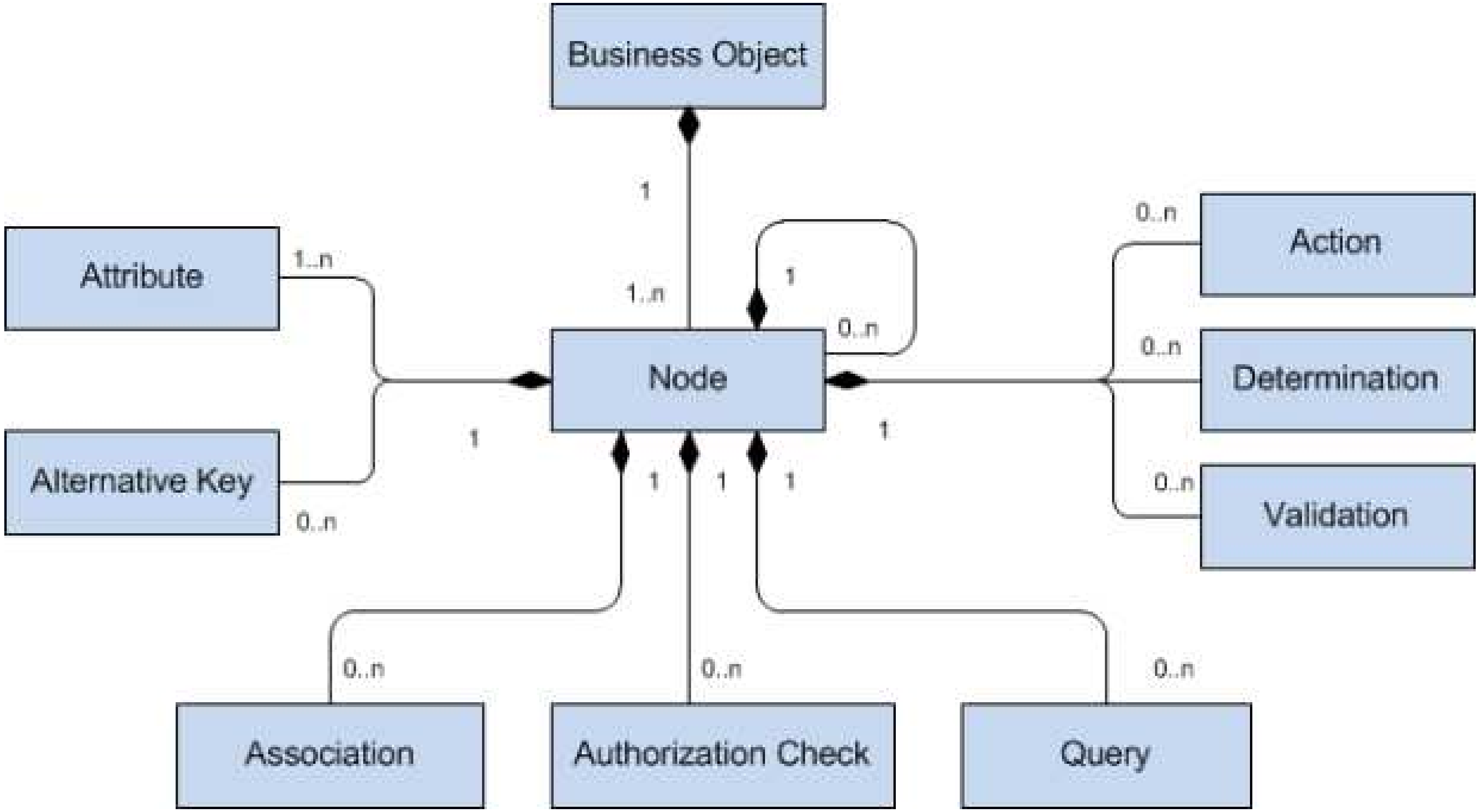
The S/4HANA Programing Paradigm

SAP Gateway – Detailed Architecture



The S/4HANA Programing Paradigm

BOPF – A Closer Look



Business Object
1
1..n
Attribute
1..n
Alternative Key
0..n
1
Node
1
0..n
1
Action
0..n
Determination
0..n
Validation
0..n
1
1
1
Association
0..n
Authorization Check
0..n
Query
0..n