



Leverage the Embedded Analytics Capabilities of SAP S/4HANA to Improve Your Decision Making and TCO

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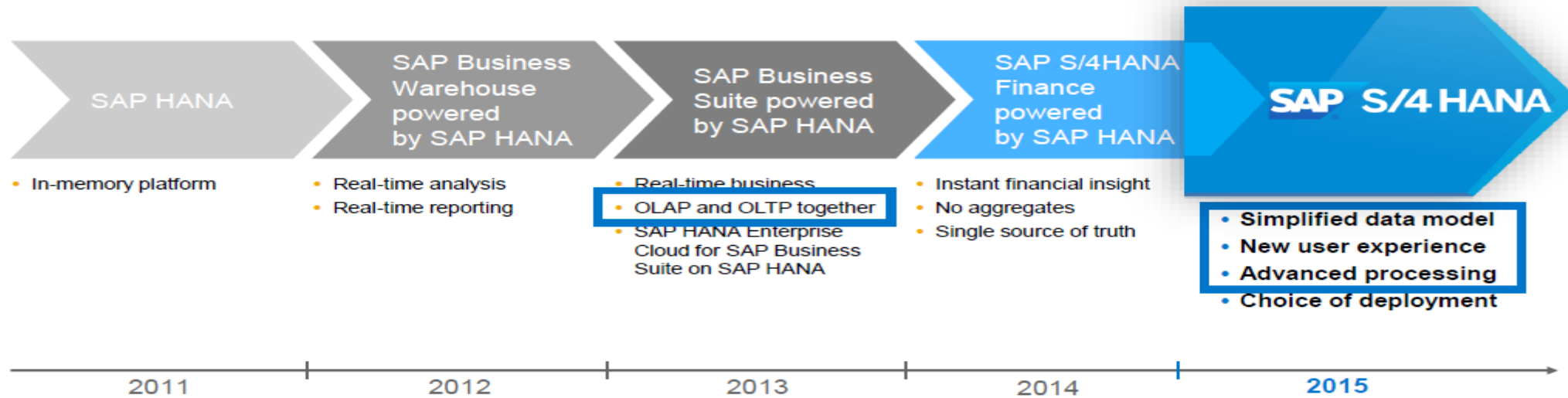
In This Session

- **Get clarity on how SAP S/4HANA architecture enables real-time operational analytics embedded in the business process in the form of Smart Business KPIs, Fiori apps, and queries**
- **Learn about CDS views and providing a single source of truth through a comprehensive semantic layer**
- **Also explore SAP S/4HANA integration with BW and SAP BusinessObjects BI**

What We'll Cover

- **What Is SAP S/4HANA?**
- **SAP S/4HANA and Real-Time Analytics**
- **Core Data Services (CDS)**
- **SAP S/4HANA and BW Integration**
- **Wrap-Up**

From SAP HANA to SAP S/4HANA

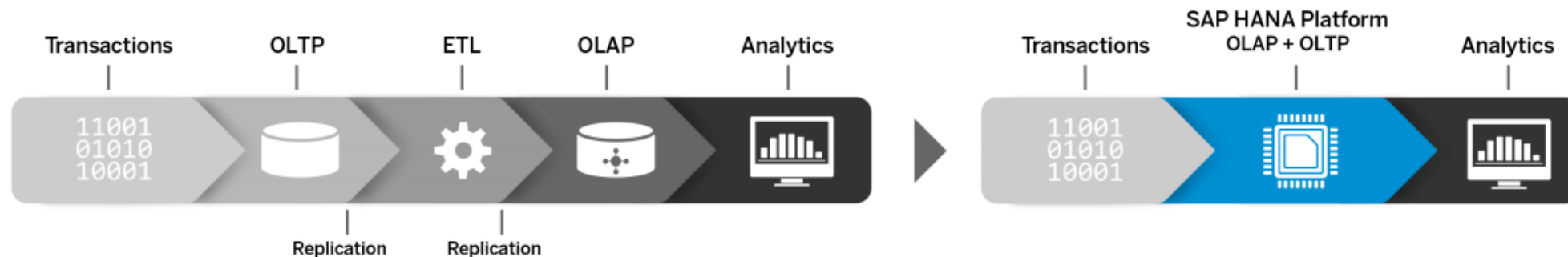


SAP S/4HANA is SAP's next-generation business suite. It's meant to replace SAP ECC, with a simplified tool designed specifically to work with SAP HANA. As time passes and new SAP S/4HANA functions are added, the benefits of moving away from Business Suite on HANA to S/4HANA will increase for a greater range of organizations.

What Does SAP S/4HANA Bring to You ...

The concept, the content, and the toolset to enable embedded analytics and real-time operational reporting on live transactional data

- Decisions based on “old” data
- Redundant copies of data
- Batch processing time and effort
- Insight to Action on live data
- One version of truth, no copies of data
- No need to ETL data



What Is SAP S/4HANA Embedded Analytics?

- It is a set of Analytical Features integrated in SAP S/4HANA that enables users to perform real-time analytics on the live transactional data. It comes with a set of built-in representations of operational data, called VDM (Virtual Data Models), which will allow users to arrive at better decisions from the available data.
- It doesn't require a separate installation or implementation or any other licenses. It is a part of the S/4HANA software and is generally available with the new SAP S/4HANA releases.
- It is combining transactions and analytics on a single in-memory platform

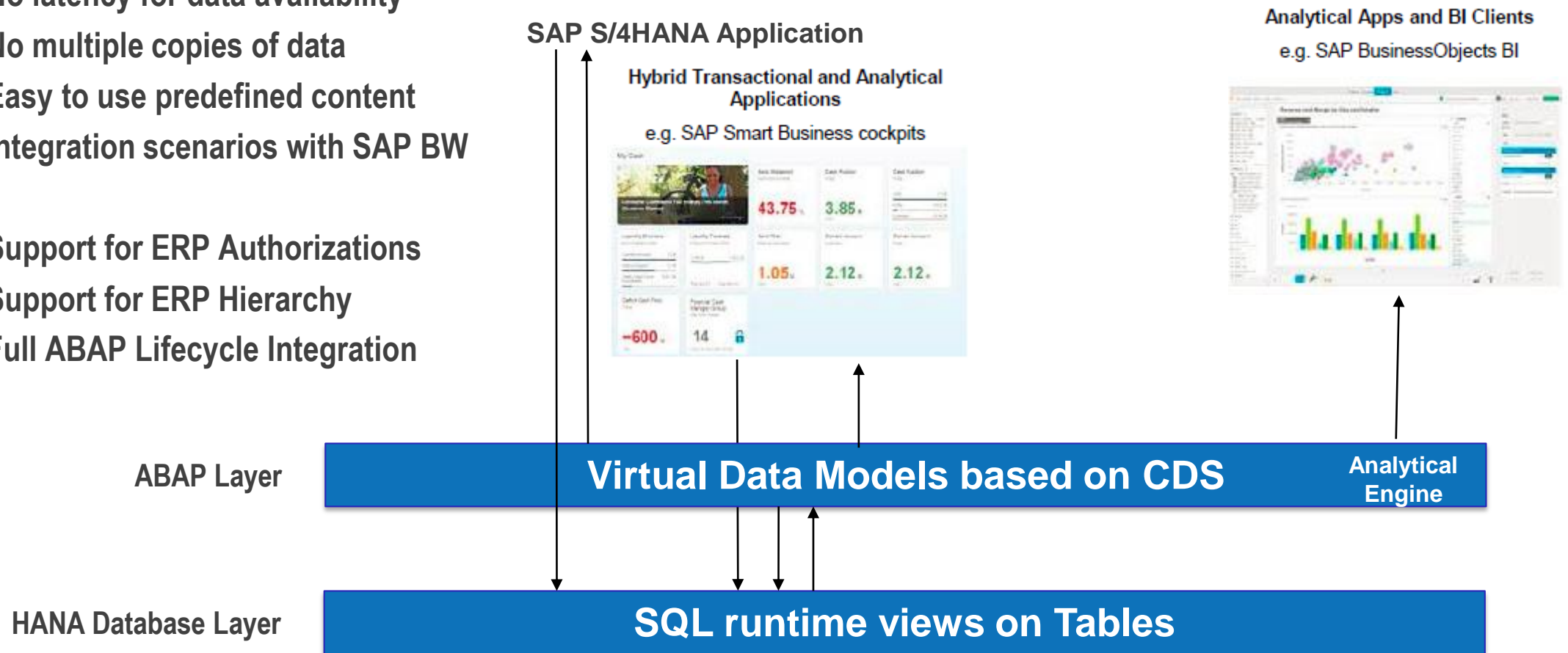
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Real-Time Analytics Architecture

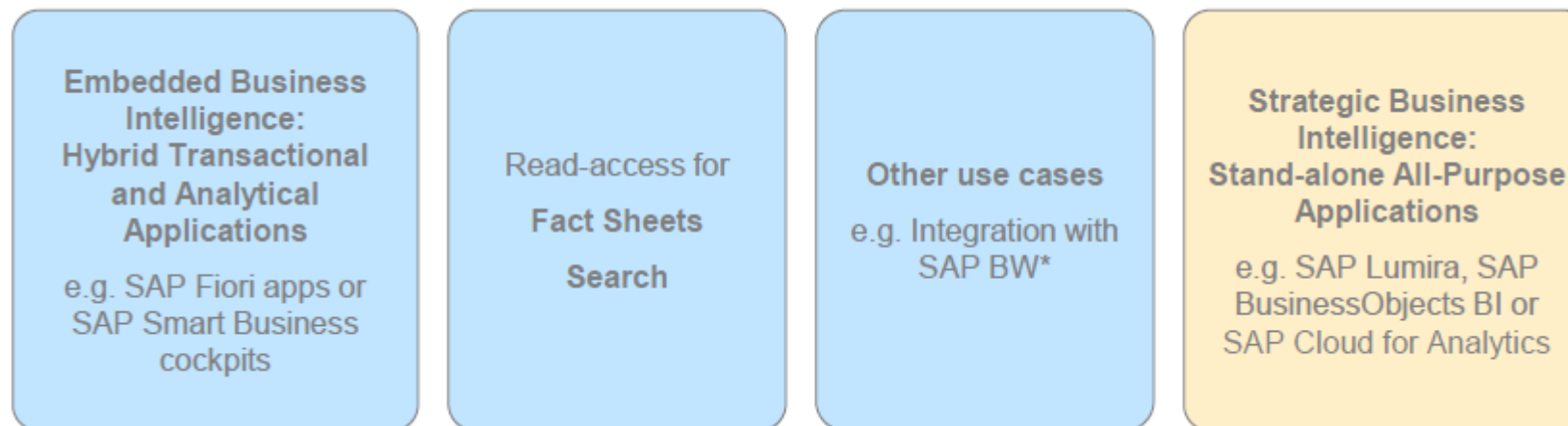
The real-time analytics is driven off the Virtual Data Models, which are based on CDS views

- No latency for data availability
- No multiple copies of data
- Easy to use predefined content
- Integration scenarios with SAP BW
- Support for ERP Authorizations
- Support for ERP Hierarchy
- Full ABAP Lifecycle Integration



Consuming Virtual Data Models

- A virtual data model (VDM) is a structured representation of HANA database views used in SAP HANA Live for SAP Business Suite and follows consistent modeling rules
- It provides direct access to SAP business data using standard SQL or OData requests. Business data is exposed through well-defined database views, operating directly on the tables of the SAP Business Suite systems and transforming them into consistent and easily understandable views.



Source: SAP

Virtual Data Model Views

Query views are designed for direct consumption by an analytical application or a generic analytical tool (for example, SAP BO)

- ♦ They are always the top view in a hierarchy of views and are not designed for reuse in other views
- ♦ However, the virtual data model also includes query views to support (showcase) applications based on the virtual data model

Reuse views are the heart of the virtual data model

- ♦ They expose the business data in a well-structured, consistent, and comprehensible way, covering all relevant business data in SAP Business Suite systems
- ♦ They are designed for reuse by other views and must not be consumed directly by analytical tools

Virtual Data Model Views (cont.)

Private views encapsulate certain SQL transformations on one or several database tables or even other views

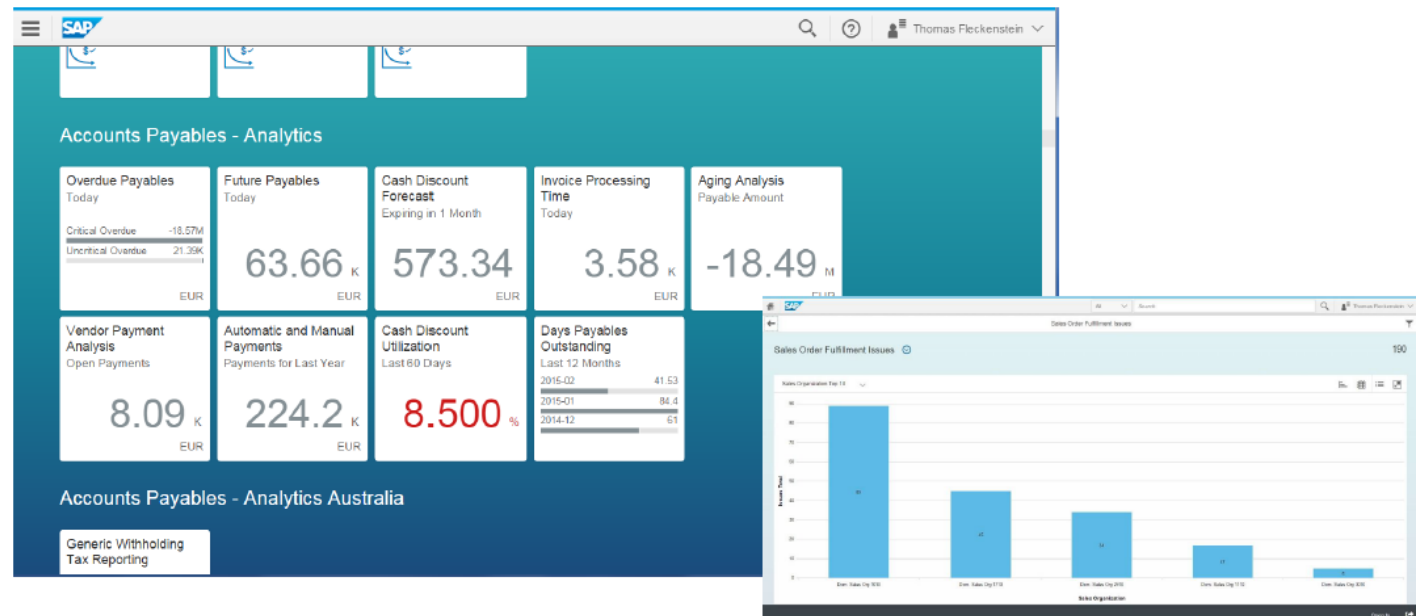
- ♦ They are not classified as reuse views, as they might not carry clear business semantics, but are rather intended to be reused in other views
- ♦ They are comparable to subroutines or (private) methods in programming languages
- ♦ A private view may be based on database tables, other private views, or reuse views

Value help views (VHVs) provide the value list for a specific business entity that is used in a value help in a query view

- ♦ Relevant business entities are specified by an identifier or code
- ♦ A maximum of one VHV is defined for each business entity per package
- ♦ A VHV is included either in an underlying package to the business query views that make use of it, or in the same package
- ♦ In SAP HANA, for each main package a specific VHV exists for a specific business entity

Smart Business Cockpits

- The SAP Smart Business modeler apps are a set of SAP Fiori apps that you use to create and manage SAP Smart Business entities
- Smart Business entities allow your company to define, manage, and leverage consistent KPIs across all your business apps (for example, reporting tools, dashboards, and custom-built apps)
- The SAP Smart Business modeler apps are as follows:
 - ◆ Create KPI
 - ◆ Create Evaluation
 - ◆ Manage KPI Authorizations
 - ◆ Configure KPI Tiles
 - ◆ Configure KPI Drilldown
 - ◆ Manage KPI Associations
 - ◆ KPI Workspace



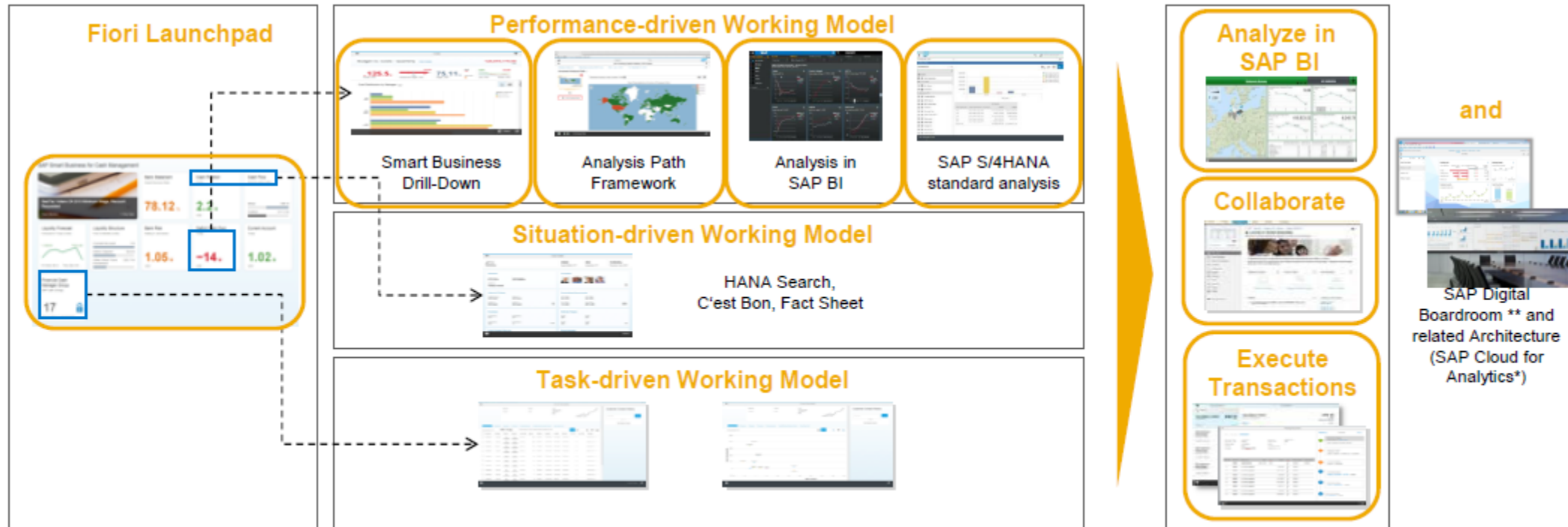
Smart Business Cockpits cont ...

Smart Business Cockpits can be personalized & bring the analytics into the business process when the user needs it ..

- **Responsive** Bringing together transactions and analytics to close the gap between insight and action. Helping users to act on real-time information
- **Individualized** Offering personalized role-based tailored KPIs, actionable insights, news feeds and tasks. Design around how ppl work,..
- **Seamless** Delivering the same real-time insights and user experience across desktops, mobiles and tablets
- **Beautiful** Combining simplicity, easy of use, and functionality with a completely reimagined user interface

Different Analytics Models for Working with Data

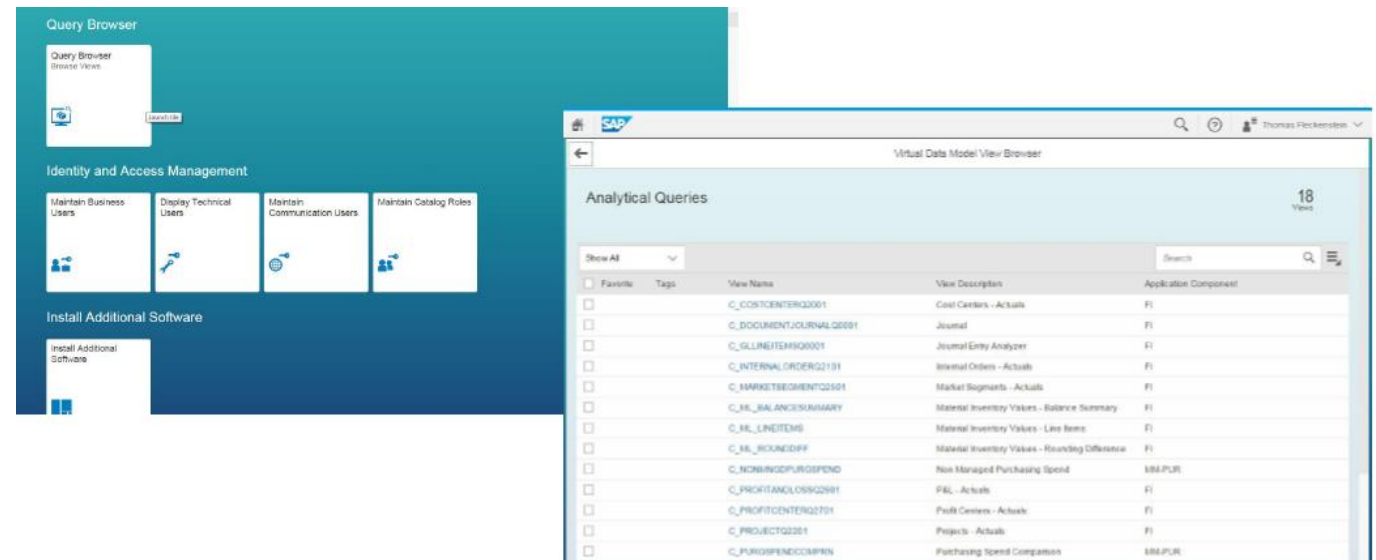
- Different workflows for different analysis situations demonstrate the value of SAP S/4HANA
- Analytics bring real-time insight to transactions: Faster and better decisions
- Scenario-specific content



* Connection to S/4HANA VDM planned
 ** Templates for SAP S/4HANA planned

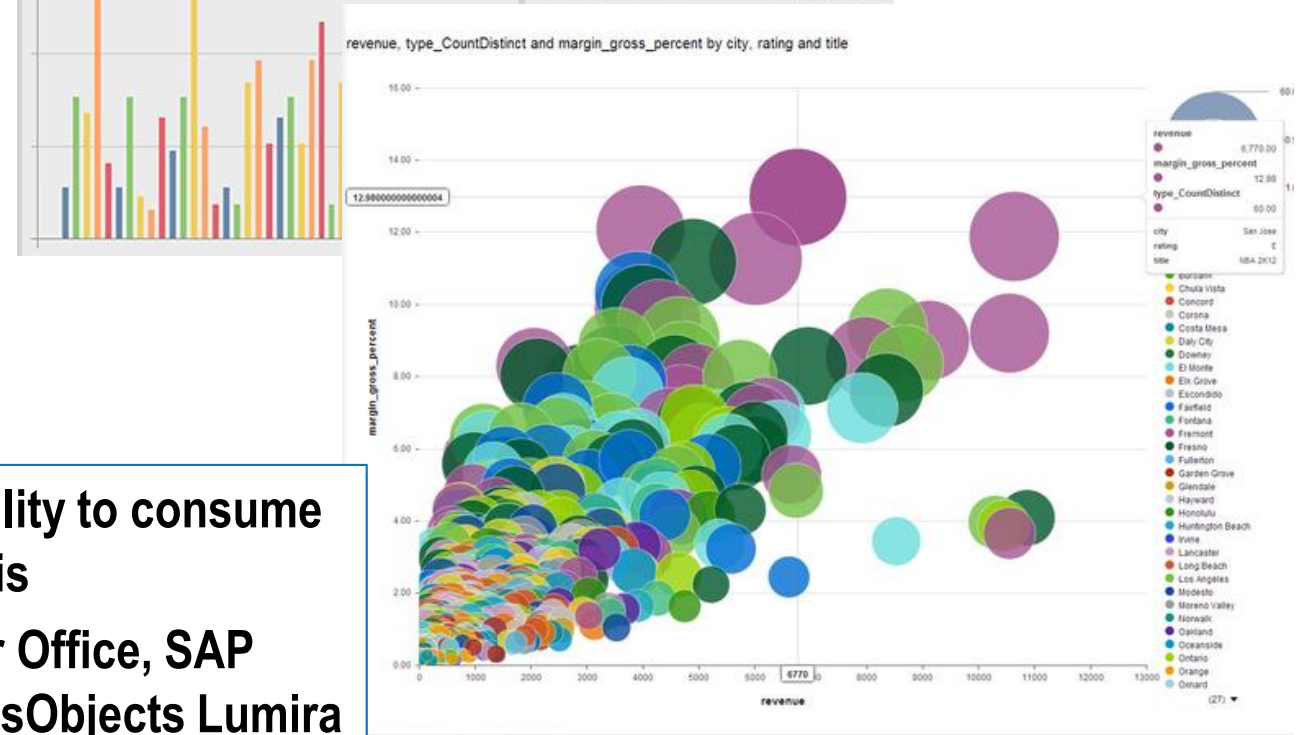
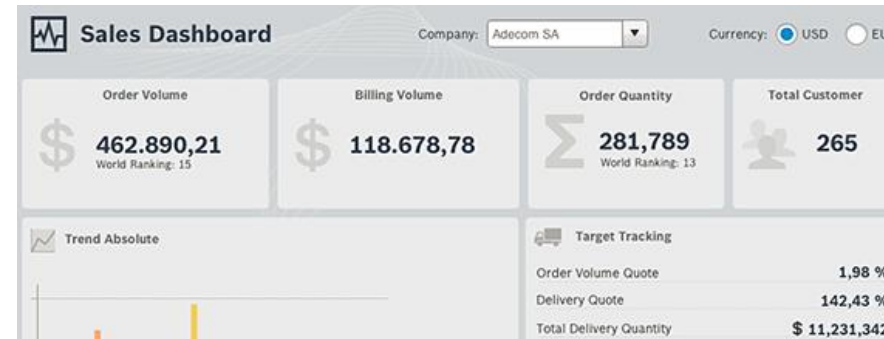
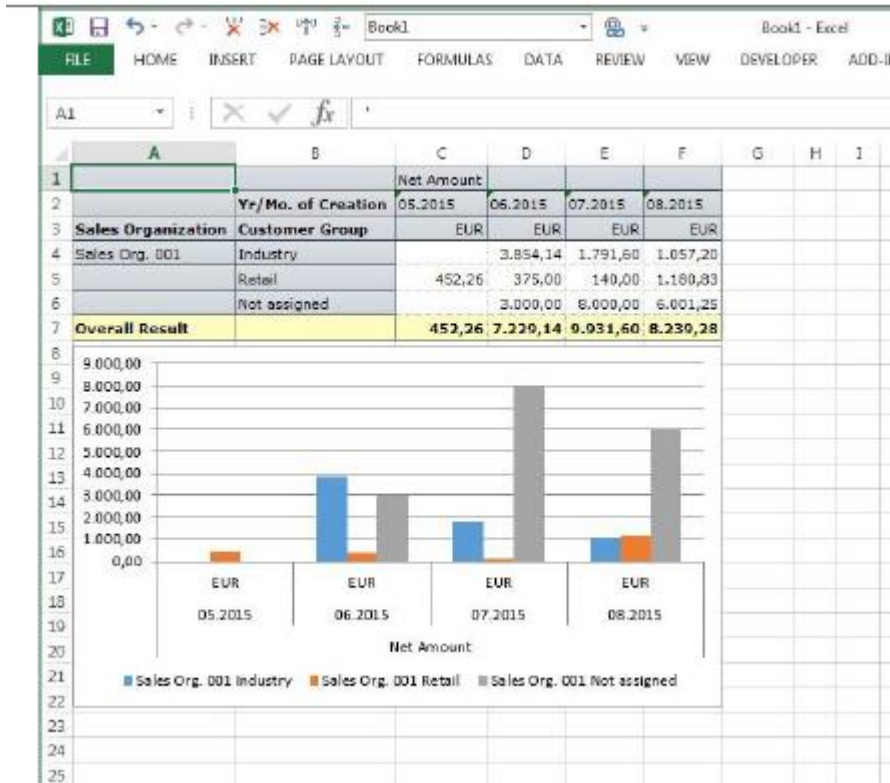
Overview to Details: Query Browser

- The Query Browser is a Fiori application which you can use to quickly and easily search, browse, and tag the analytical queries. This application displays all the analytical queries to which the user has access.
 - ♦ Assign the Query Browser role to a user
 - ♦ Click the Tile Catalog and choose Query Browser from the Query Browser catalog
 - ♦ By default, the content views are pre-organized by the view name



Source: SAP

Analytical Apps Through SAP BusinessObjects BI Clients



- SAP BusinessObjects offers tools with rich capability to consume and display analytical information and visualize this
- These tools are SAP BusinessObjects Analysis for Office, SAP BusinessObjects Design Studio, and SAP BusinessObjects Lumira

Key Benefits of SAP S/4HANA Analytics

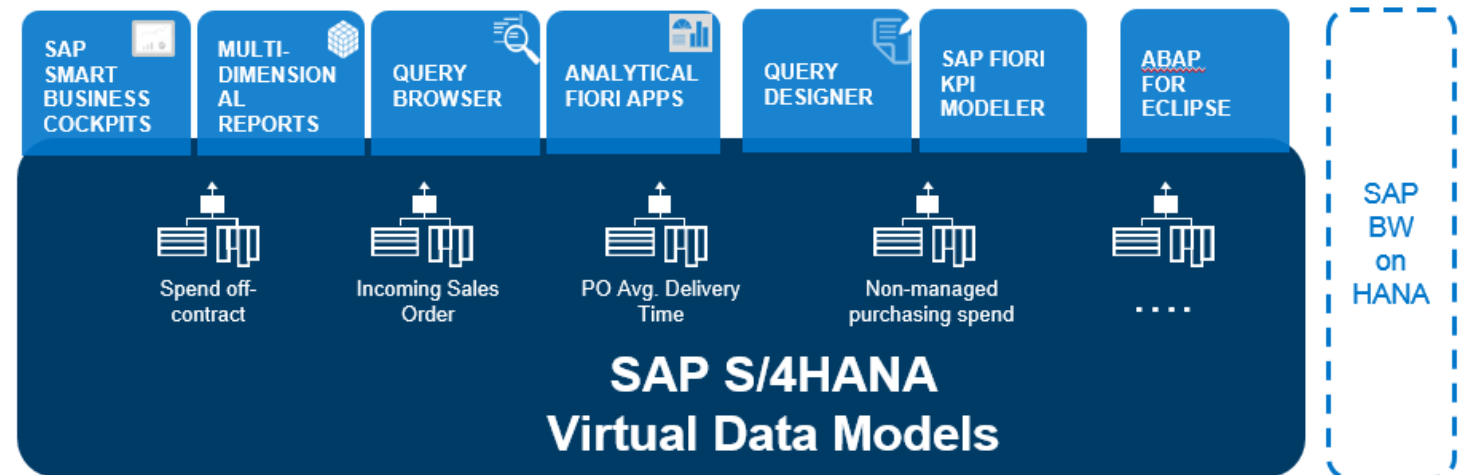
With S/4HANA embedded analytics, SAP supports OLAP, using SAP BO solution, and HTAP (Hybrid Transactional & Analytical Processing) applications such as embedded BI or SAP Smart Business cockpits using the same models.

This greatly simplifies IT deployment efforts and reduces total cost of ownership (TCO).

- Real-time, relevant data delivered in business dashboards and reports that support ad hoc questions and interactive drilling into data
- In-context information supported with analytics and insights presented within the context of work and tailored to business needs and roles
- Forward-looking tools that offer user-friendly access to analytics that can help users predict, simulate, and perform what-if analyses when making business decisions

SAP S/4HANA Embedded Analytics

SAP Cloud for Analytics, SAP BusinessObjects BI, SAP Lumira



S/4HANA Embedded Analytics : Across different lines of business

Role-based Launchpad to monitor KPIs, get more insight through detailed analytics and drilldowns, and then act (change through business transactions)



Sales and marketing

- Customer discovery and segmentation
- Cross-selling and up-selling
- Real-time customer recommendations
- Churn Analysis and customer retention



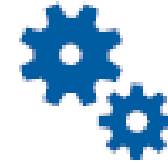
Supply chain

- Out-of-stock detection and prevention
- Sales and operations planning
- Demand modeling and forecasting
- Supplier management and quality analysis



Finance

- Cash and liquidity management
- Budgeting, planning, and forecasting
- Cost and profitability analysis
- Financial dashboards and reporting



Manufacturing

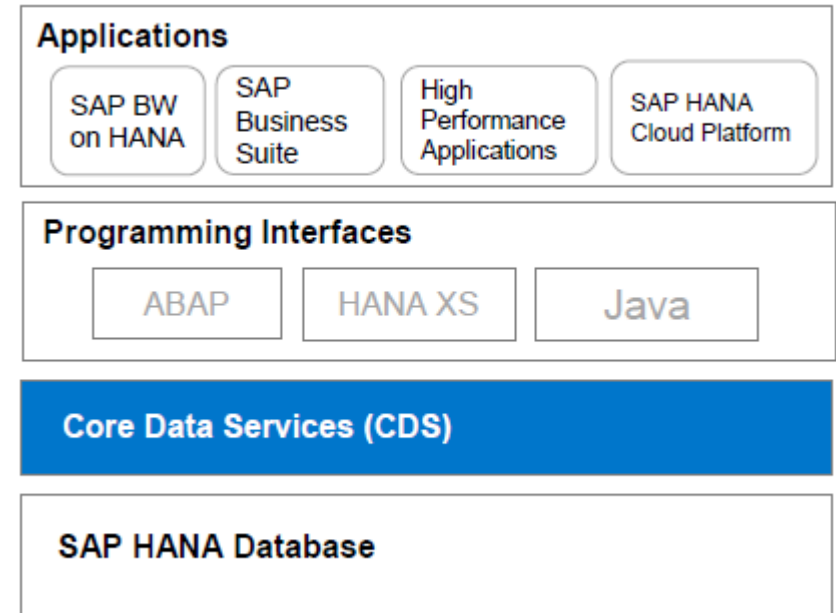
- Production schedule optimization
- Plant performance analytics
- Detection and analysis of quality variance
- Preventative maintenance

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CDS: Core Data Services

- S/4HANA embedded analytics provides tighter integration between analytics and transactions by implementing the analytic data models using ABAP managed core data services (CDS) of the ABAP layer of SAP S/4HANA.
- CDS holds all metadata information and supports new hybrid scenarios for embedded analytics by, for example, using existing authorizations and hierarchies of SAP S/4HANA. In SAP S/4HANA, CDS is created and maintained in the application layer of ABAP and creates structured query language (SQL) statements in SAP HANA.
- Data definition and access for database-centric applications
- Harmonizes the programming model across all SAP platforms on HANA
- Ensures reuse and interoperability
- Extends SQL to capture business intent in the data model. Reduces technical complexity in the query.



Components of CDS

Domain-specific languages and services for defining and consuming semantically enriched data models

DDL

Data Definition Language

Data modelling and retrieval on a higher semantic level

Extends native SQL means for higher productivity

QL

Query Language

Consume CDS entities via platform embedded SQL (e.g. Open SQL in ABAP)

Fully transparent SQL extensions

DCL

Data Control Language

Define authorizations for CDS views

Integrates with classic authorization concepts

DML

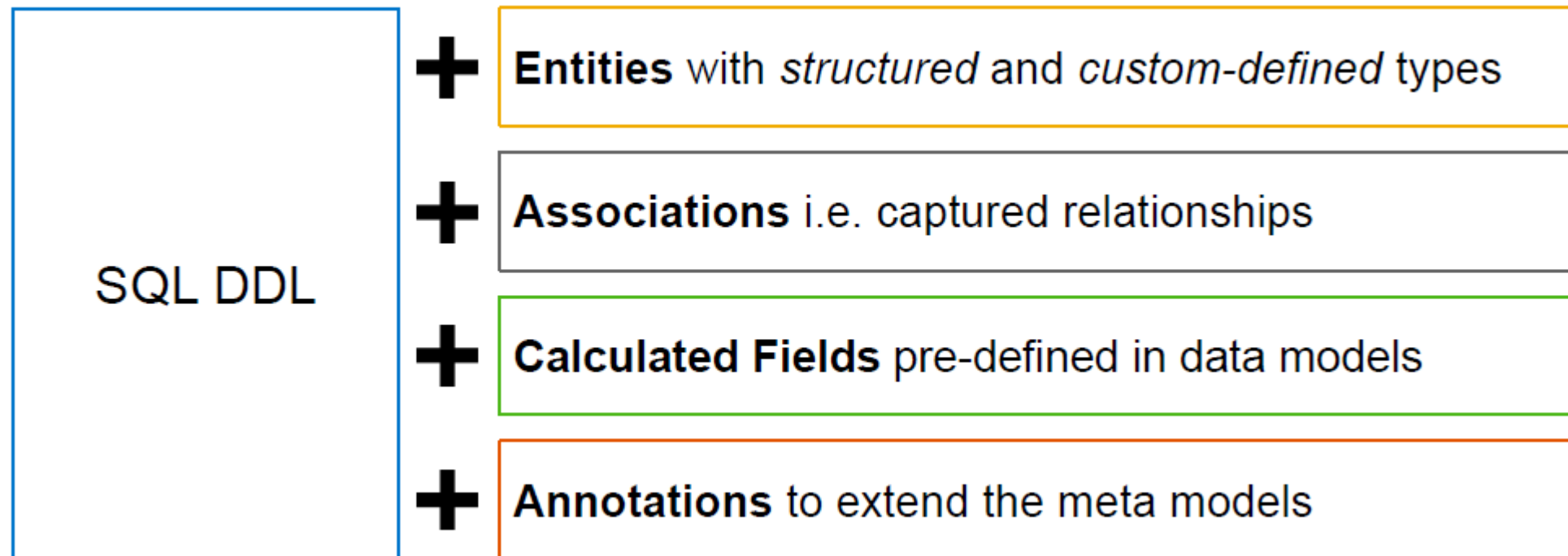
Data Manipulation Language



Write data

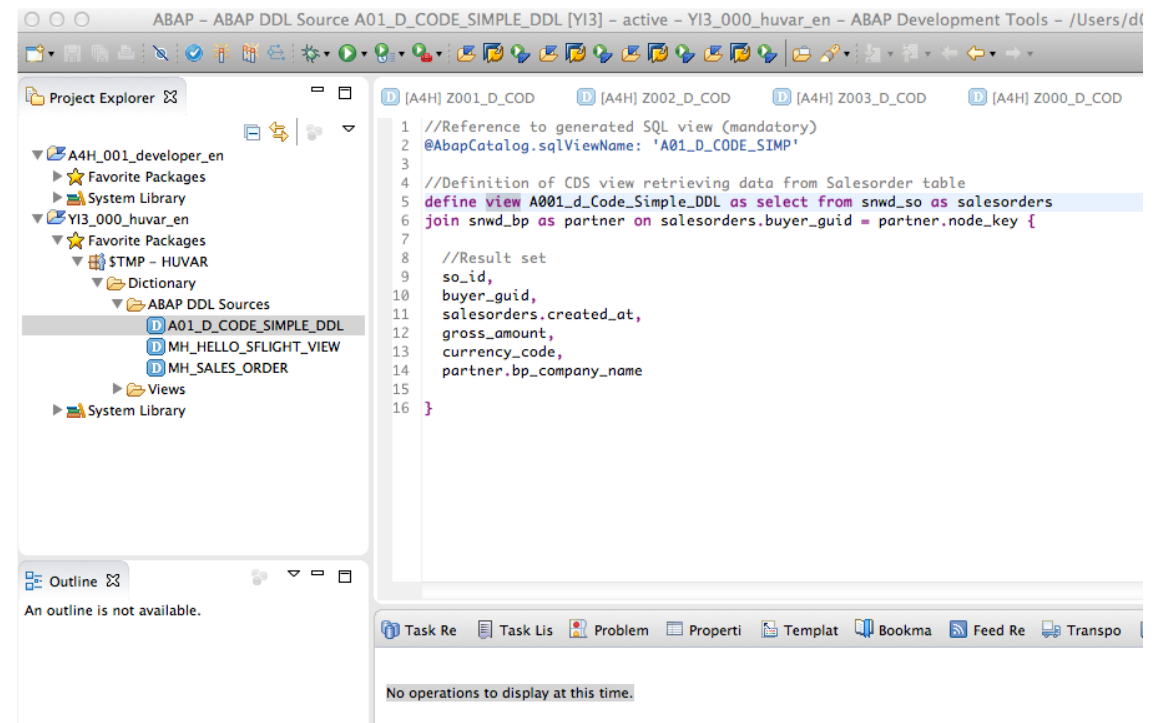
DDL: Data Definition Language

Data Definition Language (DDL) to define a table, which is also referred to as an “entity” in SAP HANA Core Data Services (CDS)



CDS: Development Environment

- Based on Eclipse platform
- Integrated in SAP HANA Studio and in ABAP in Eclipse
- Textual editor
- Rich feature set for fast development
- Integrated lifecycle management
- Code completion
- Data preview
- Quick-Fix function
- Syntax highlighting



The screenshot displays the SAP ABAP development environment. The main window shows a textual editor with the following code:

```
1 //Reference to generated SQL view (mandatory)
2 @AbapCatalog.sqlViewName: 'A01_D_CODE_SIMP'
3
4 //Definition of CDS view retrieving data from Salesorder table
5 define view A001_d_Code_Simple_DDL as select from snwd_so as salesorders
6 join snwd_bp as partner on salesorders.buyer_guid = partner.node_key {
7
8 //Result set
9 so_id,
10 buyer_guid,
11 salesorders.created_at,
12 gross_amount,
13 currency_code,
14 partner.bp_company_name
15 }
16 }
```

The left sidebar shows the Project Explorer with the following structure:

- A4H_001_developer_en
 - Favorite Packages
 - System Library
- Y13_000_huvar_en
 - Favorite Packages
 - STMP - HUVAR
 - Dictionary
 - ABAP DDL Sources
 - A01_D_CODE_SIMPLE_DDL
 - MH_HELLO_SFLIGHT_VIEW
 - MH_SALES_ORDER
 - Views
 - System Library

The bottom status bar indicates "No operations to display at this time."

CDS: Highlights

- CDS provides one semantic layer for all use cases: search, operational, and analytical
- CDS provides a unified data model across all application domains
- CDS extends SQL to capture business intent in the data model instead of technical complexity in query

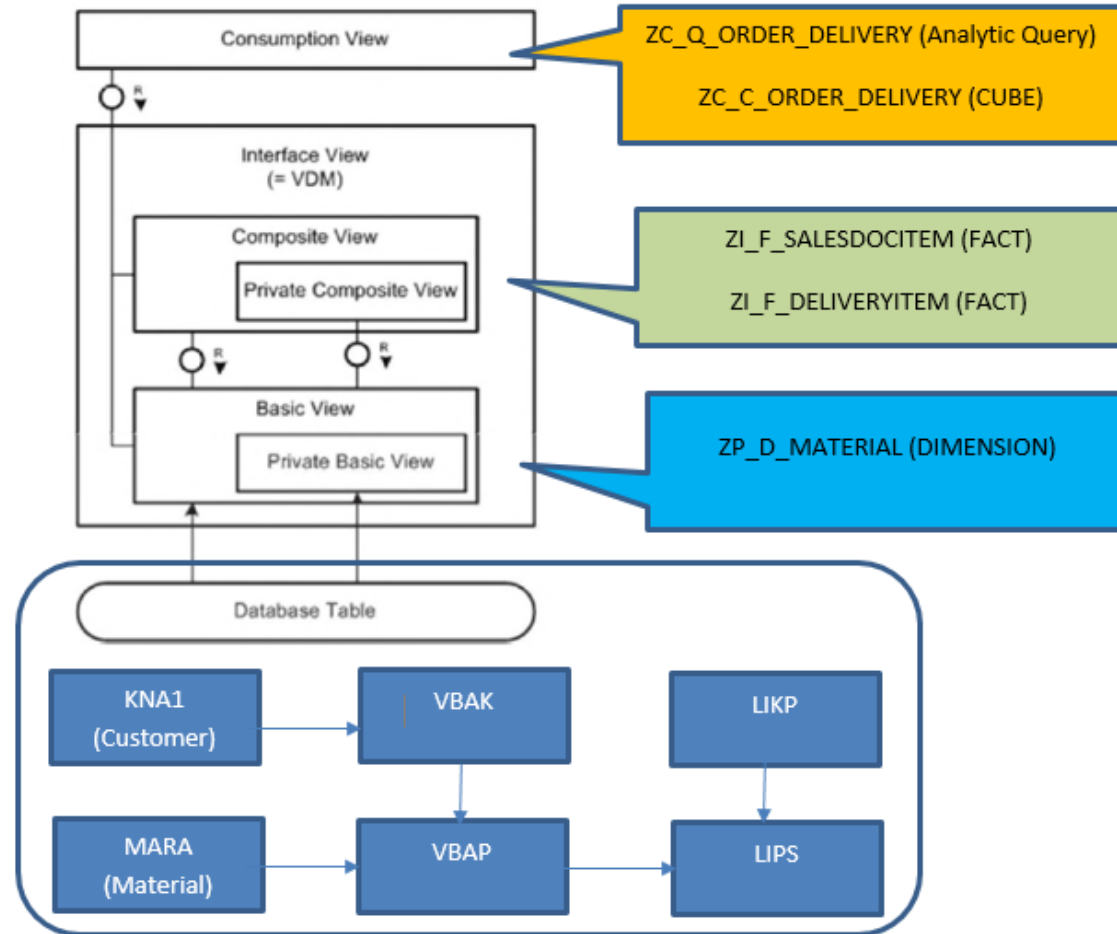


Note

CDS Demo View: Scenarios

As part of this demo we will create different types of CDS Views (Virtual Data Models), based on Sales and Distribution data, to implement the operational sales analytics

- The data model gives a simplified description of the various steps involved in the sales order fulfillment and the logic related to the various KPIs of sales analytics
- Sales order quantities/revenue for various dimensions such as material, customer, and sales organization
- Sales order delivery performance – based on On-Time or Late delivery and delivery quantity variance calculations
- Business entities Customer, Sales Area, Material, Sales orders, and Delivery documents



Demo: CDS View

- Create Material Master CDS view
- Create the CDS view interface for Sales document item (FACT type Virtual Data Model)
- Change the CDS view definition to include additional annotations to enable analytical consumption
- Create the CDS view interface for Delivery document item (FACT type Virtual Data Model)
- Create the Consumption Type CDS views for Sales Order delivery performance analysis – On-time or Late deliveries
- Create a CDS view of type Analytic query for Sales Order delivery performance analysis – On-time or Late deliveries



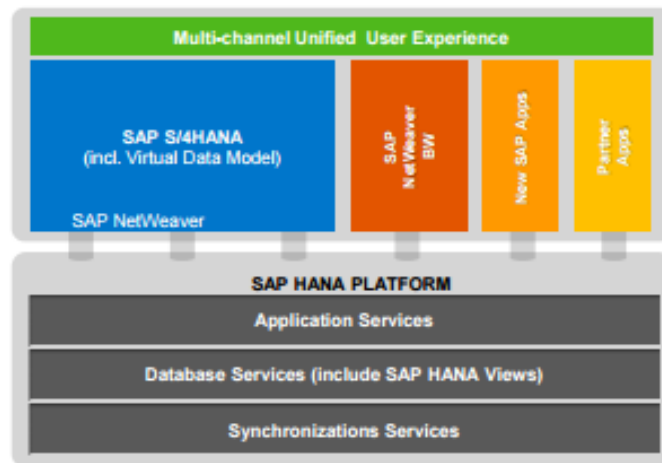
Demo

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SAP S/4HANA Embedded Analytics + SAP BW on SAP HANA

SAP BW/4HANA Comprehensive Operational + Historical Analytics and Planning Powered by SAP HANA



SAP BW powered by HANA or SAP BW/4HANA

- Strategic and tactical
- Integration, harmonization, cross-system consistency
- Consumption
- Planning
- Multi-sourced data
- Preconfigured content
- Data lifecycle
- Data governance
- Full-blown analytical suite

SAP S/4HANA embedded analytics

- Operational data
- Real-time
- Lightweight modeling and consumption
- Extensible
- Uniform
- Basis for multiple embedded use cases
- Model reuse in analytical applications



Key Feature

All analytics requirements fulfilled with one unified solution
Data Integration Scenarios are possible in multiple hybrid system setups

SAP S/4HANA Embedded Analytics and BW Together

- Here are three possible hybrid scenarios (mixed modeling)
 - ◆ SAP BW and SAP S/4HANA: Side by Side
 - ◆ SAP BW Embedded in SAP S/4HANA

The Technical Drivers for SAP S/4HANA and SAP BW/4HANA are the Same!

SAP S/4HANA

Simplicity

New simplified processes and removal of all unused or rarely used functionality

Remove all unnecessary objects which are obsolete in an SAP HANA context (e.g. aggregation tables, etc.) –single source principle

Modern UI

SAP Fiori Strategy: The new user experience for SAP S/4HANA (e.g. to create new Fiori-enabled simplified transactions as well as processes for built-in analytics using embedded analytics)

Openness

Interfaces i.e. to SAP Fiori (OData) and SAP BusinessObjects (InA)

High Performance

Push down calculations and processing down to SAP HANA directly (e.g. MRP process, SAP S/4HANA embedded analytics VDM's)

All new innovations will take place in SAP S/4HANA

SAP BW/4HANA

Simplicity

SAP HANA-optimized BW objects only: simple data structures

Reduced modeling efforts: simple data flows

Modern UI

SAP HANA studio-like SAP BW/4HANA Modeling Tools

Web based administration and monitoring (planned)

Ready for SAP BusinessObjects Cloud

Openness

Integration with Big Data/Data Lake scenarios (planned)

Interoperability with SQL Data Warehouse approach

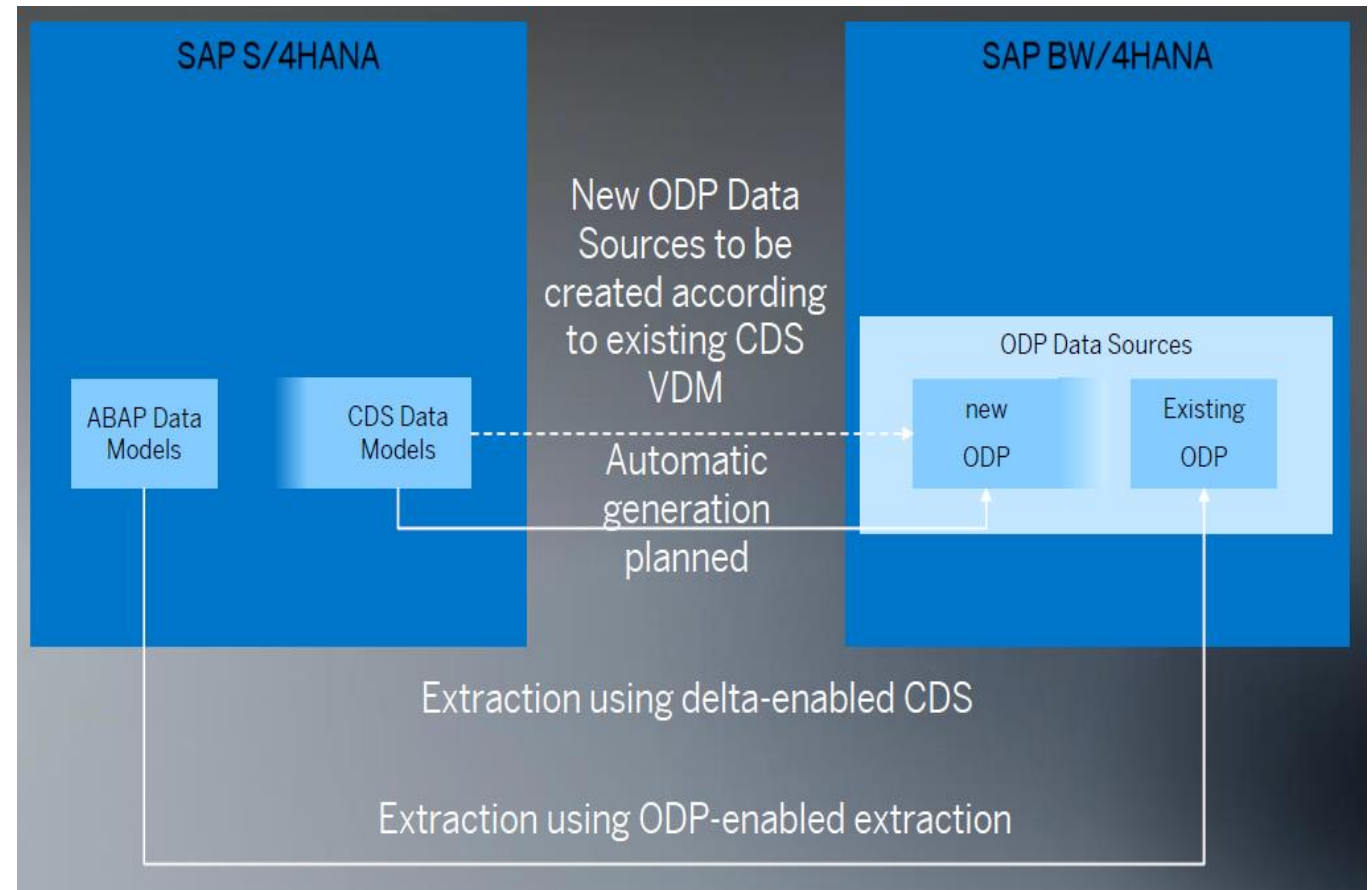
High Performance

Push down of calculations and processing to SAP HANA (OLAP, ETL, usage of SAP HANA libraries)

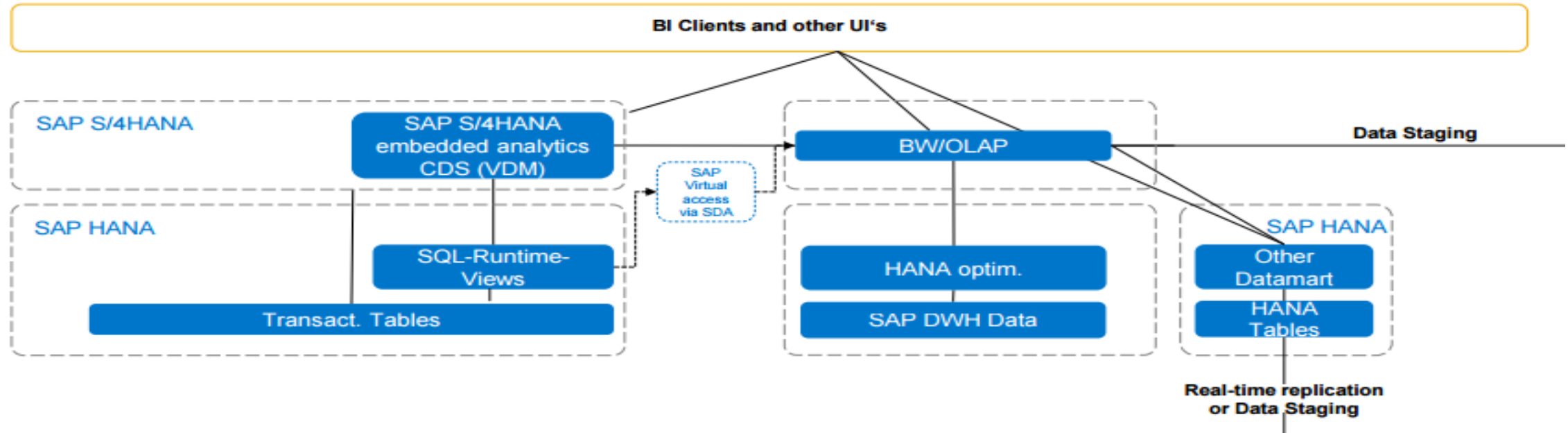
All new innovations will take place in SAP BW/4HANA

Future Direction

- All new planned SAP standard content extraction from SAP S/4HANA to SAP BW/4HANA or SAP BW , powered by SAP HANA will be based on CDS delta extraction technology
- New Business content in SAP BW/4HANA and SAP BW , powered by SAP HANA will be aligned with SAP S/4HANA embedded analytics virtual data model structures (VDM)

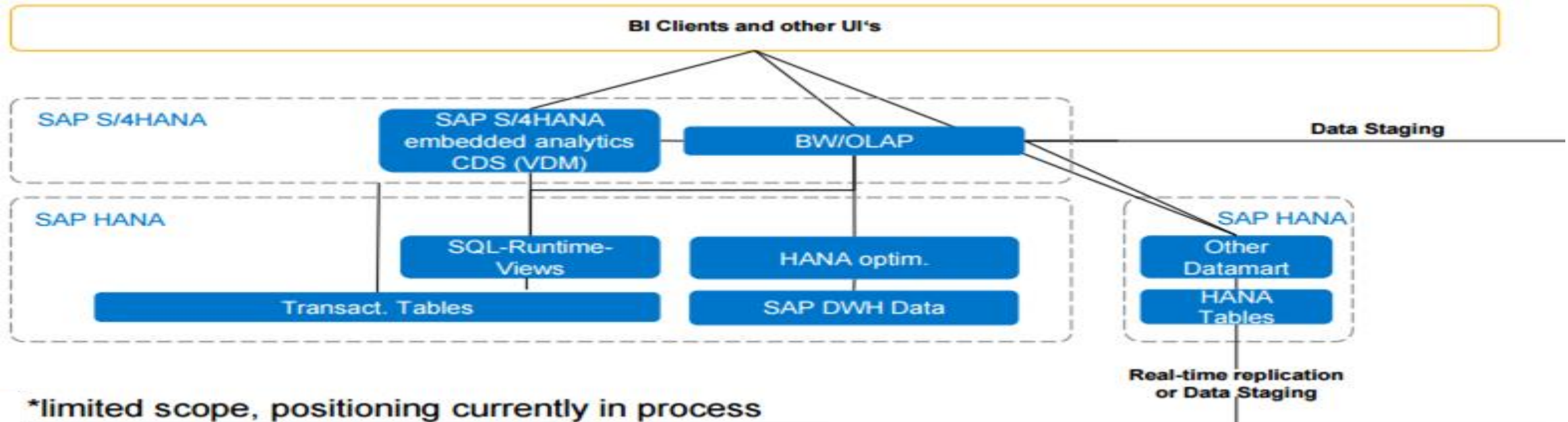


SAP BW and SAP S/4HANA: Side by Side



- Virtual access of HANA Views in BW via SDA (Smart Data Access)
- CDS Views also consumed in BW
- BW is the Data Staging Layer
- Combined data access through BI clients

SAP BW Embedded in SAP S/4HANA



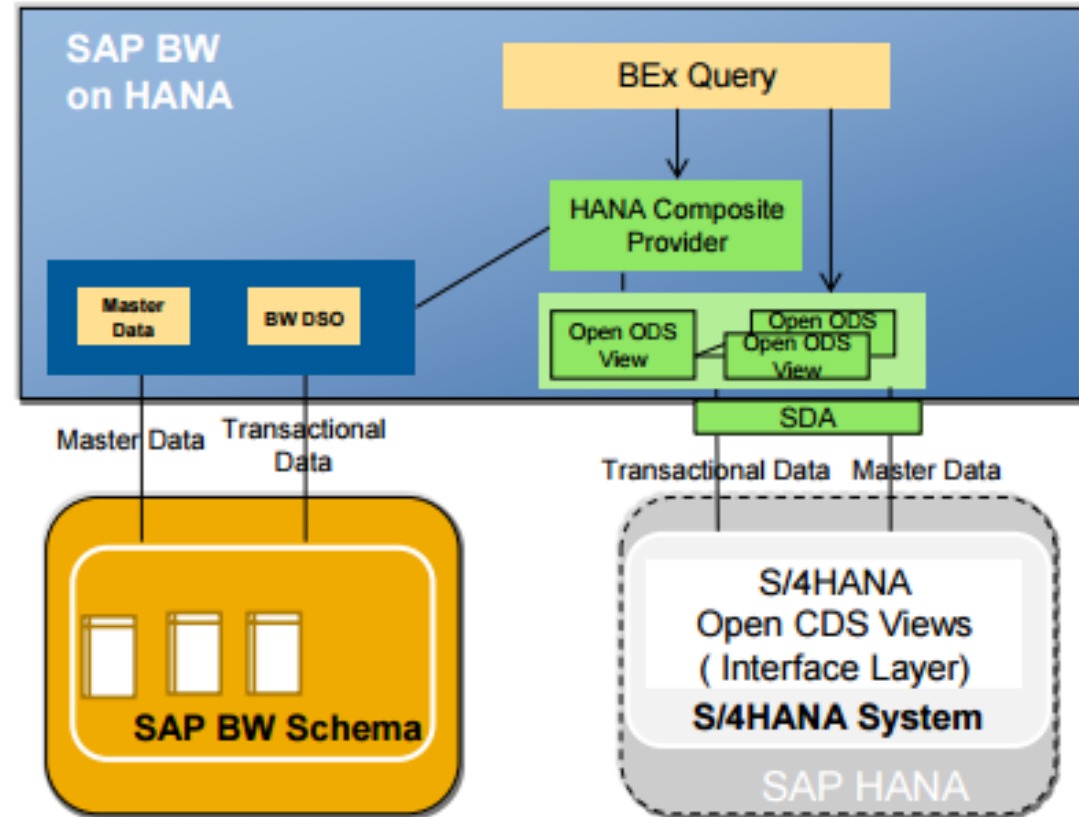
- BW embedded with SAP S/4HANA
- No SDA required for virtual data access
- BW continues to datamart with other HANA systems
- Access through BI clients or other UIs

SAP S/4HANA and BW Data Integration Scenarios

- **Scenario A (Modeling via Open ODS):** Transactional and master data via SAP S/4HANA embedded analytics consumed by BW (Consumption of SAP S/4HANA embedded analytics transactional and master data views by Open ODS Views in BW)
- **Scenario B (Modeling-free only in embedded case):** Transactional data provisioning via SAP S/4HANA embedded analytics Open CDS View in BEx Query (Consumption of SAP S/4HANA embedded analytics Open CDS views in BW via ODP Transient Provider)
- **Loading of data into BW using Reuse Layer of SAP S/4HANA embedded analytics as data source (Extract data from SAP S/4HANA embedded analytics reuse views into BW)**

Integration Scenario A

- Transactional and master data from SAP S/4HANA embedded analytics Virtual Data Model consumed by BW Open ODS view
- This scenario is valid for BW and SAP S/4HANA deployed across different HANA instances (prerequisite: HANA SDA configured)



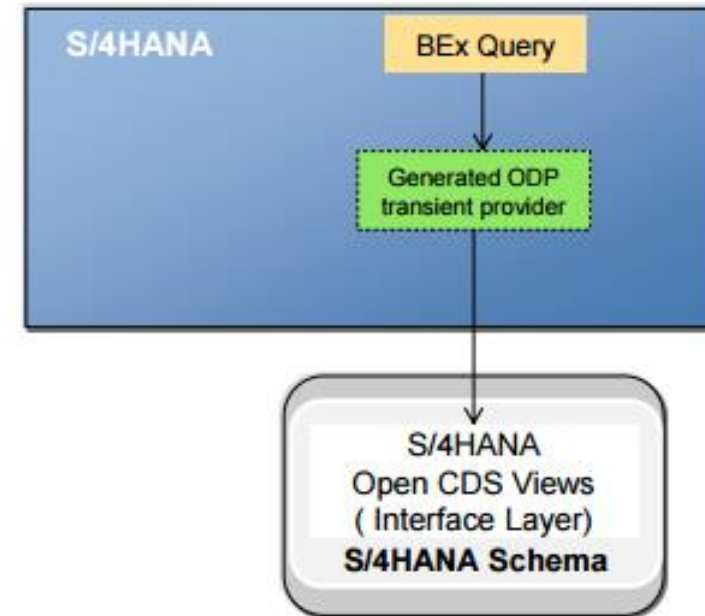
Source: SAP

Integration Scenario A: Further Details

- **Prerequisite: HANA Smart Data Access is configured in BW on HANA system and connects to SAP S/4HANA system**
- **Recommended to implement Open ODS Views based on SAP S/4HANA ABAP CDS interface/reuse views**
- **Distinguish between transactional and master data (attribute and text) views and create associations accordingly**
- **Start with the Open ODS Views for master data (attribute and text), then proceed with transactional Open ODS Views**
- **SAP client needs to be added to the key of all Open ODS Views and needs to be uniquely filtered**
- **Use BEx Query on top of Open ODS Views/Composite Provider to take advantage of full set of reporting features**

Integration Scenario B

- Consumption of SAP S/4HANA embedded analytics Open CDS views in BW via ODP transient provider
- Only for Embedded Scenario
- To simply display and use SAP S/4HANA embedded analytics consumption/query views without any further investments
- Mainly to leverage BEx capabilities and valid for embedded BW setup

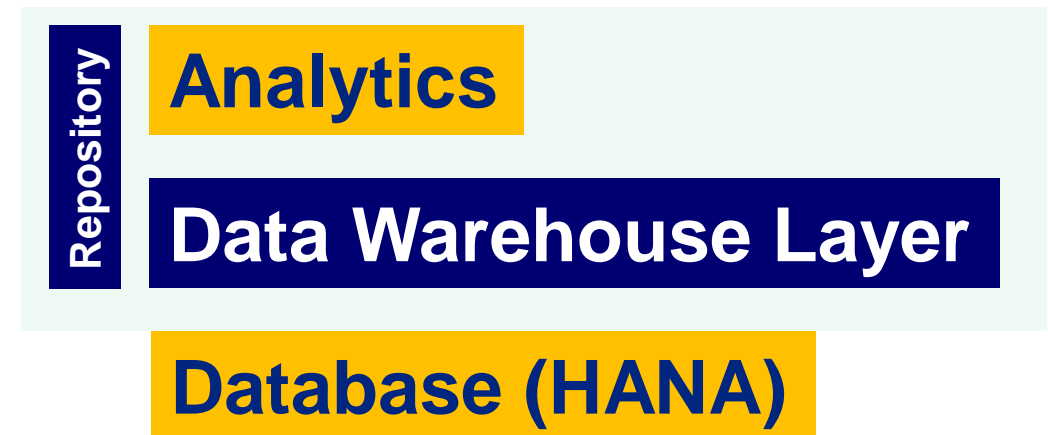


Integration Scenario B: Further Details

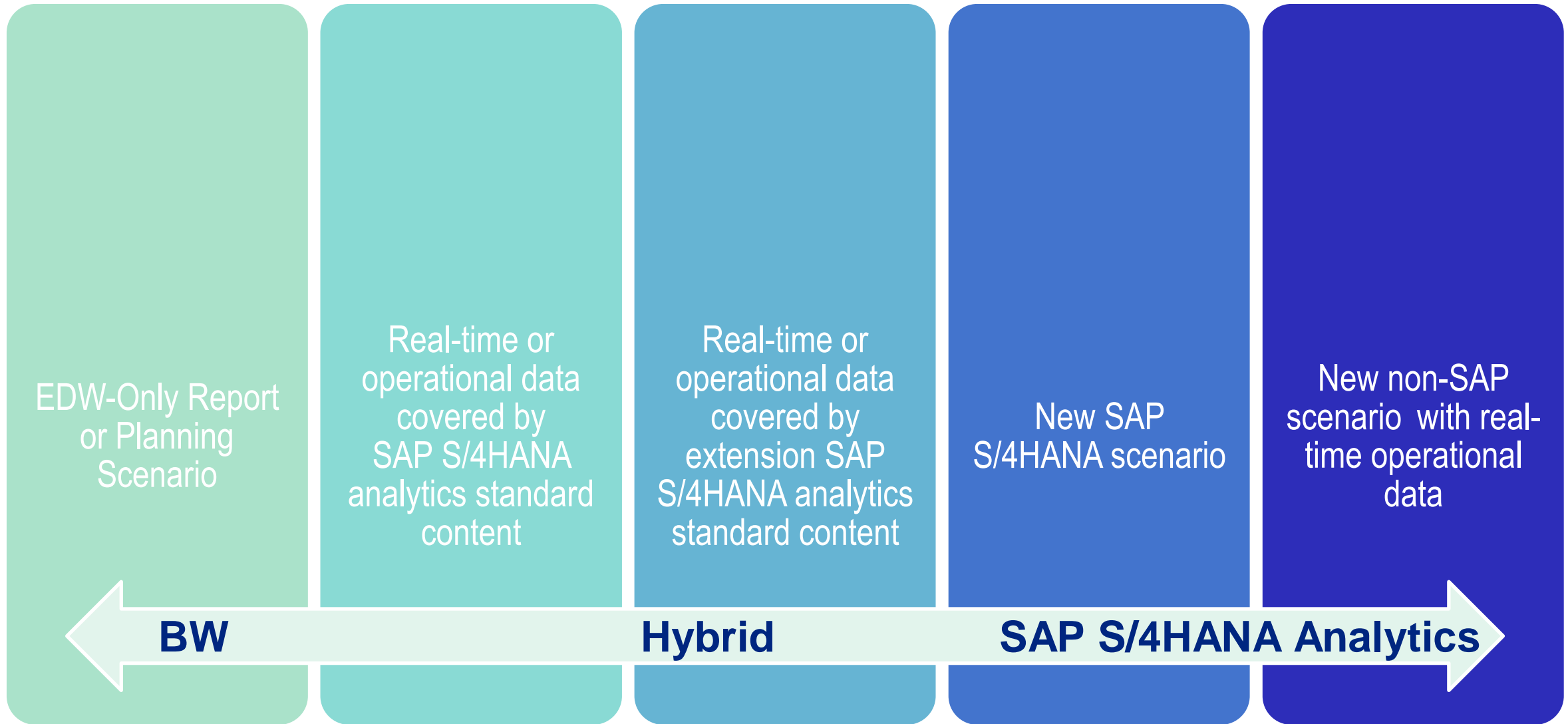
- All SAP S/4HANA CDS views are automatically exposed as an ODP transient InfoProvider and can be used in the BEx Query Designer to define custom queries
- Quick way to add BW functionality without using BW modeling objects
- It is recommended to implement BEx queries based on SAP S/4HANA Analytics CDS consumption/query views
- Input parameters/variables defined in SAP S/4HANA embedded analytics CDS view must be defined in the BEx Query as static filter, e.g., by a fix value or mandatory variable
- BW analysis authorizations and BW hierarchies are not supported
- BEx Queries created on ODP Transient Provider can be transported through the SAP S/4HANA landscape, as the transient provider is generated with same technical name in all systems

Possibility with BW Architecture

- **BW as Data Warehouse**
 - Consolidate BW – owned persistence
 - Multiple sources (SAP + non-SAP)
 - Explicit modeling of semantics, security, storage
 - SAP S/4HANA is a source
- **BW is Embedded**
 - No BW – owned persistence
 - Part of SAP S/4HANA – single source
 - Uses SAP S/4HANA semantics, security, storage

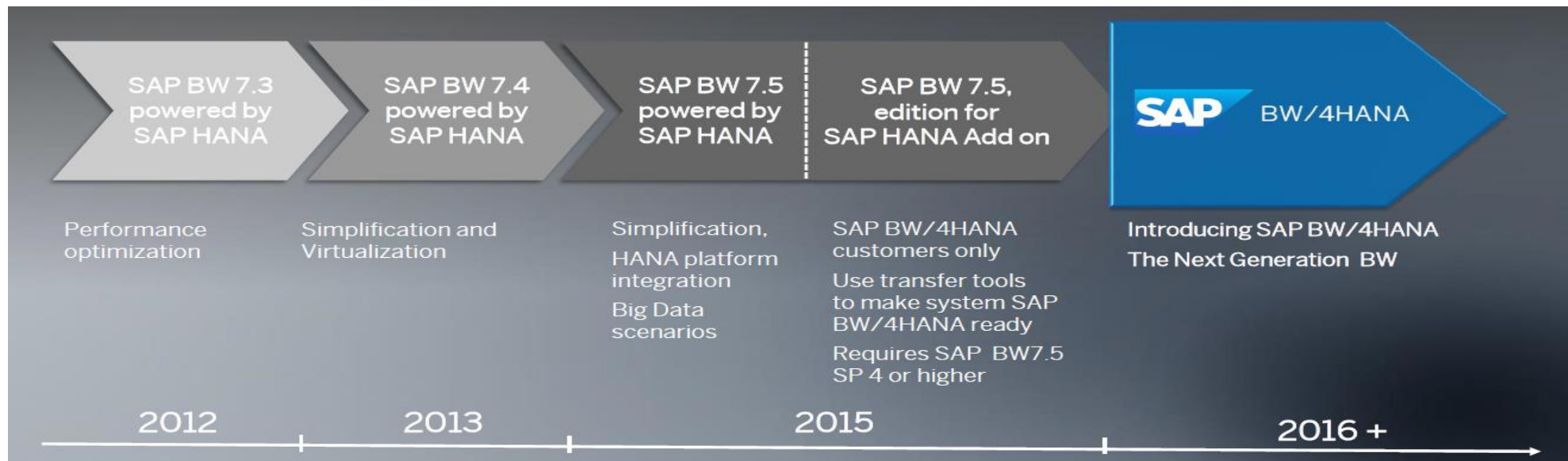


BW4/HANA or SAP S/4HANA or Both?



SAP BW/4HANA

- SAP's next-generation data warehouse solution
- New product, not a successor of existing BW solutions
- Manages all sorts of data, whether from SAP applications or other systems, structured or unstructured, and allows accessing of all models through an open SQL interface
- SAP HANA-optimized processes that let you leverage huge amounts of data in real time for competitive advantage
- All future innovations will take place in SAP BW/4HANA
- General availability: September 7, 2016



Source: SAP

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Wrap-Up of This Session

- There are exciting scenarios for integrating SAP S/4HANA embedded analytics virtual data models and SAP BW
- Both environments complement each other
- Together they can cover all analytic use cases on one data source
- Combined with BW, SAP S/4HANA provides a comprehensive data access platform for enterprise analytics: Real-time and historical

Where to Find More Information

- Matthias Kretschmer, “Unified Solution – SAP S/4HANA Embedded Analytics & SAP Business Warehouse powered by SAP HANA!” (SCN, November 2015).
 - ♦ <http://scn.sap.com/community/s4hana/blog/2015/11/23/unified-solution-sap-s4hana-embedded-analytics-sap-business-warehouse-powered-by-sap-hana>
- Saiprashanth Reddy Venumbaka, “SAP HANA Multitenant Database Containers” (SAP HANA Blog, January 2015).
 - ♦ <https://blogs.saphana.com/2015/01/27/sap-hana-multitenant-database-containers/>
- SAP Best Practices for analytics with SAP S/4HANA
 - ♦ <https://service.sap.com/analyticswiths4h> *

* Requires login credentials to the SAP Service Marketplace

7 Key Points to Take Home

- **SAP S/4HANA and BW integration scenarios leverage key features to bring real-time and historical analytics together**
- **Enable real-time operational reporting on SAP S/4HANA with embedded analytics and easily consolidate the data from SAP S/4HANA within SAP BW**
- **Rapidly integrate SAP S/4HANA with best-in-class analytical solutions provided by SAP and get up and running with pre-built content in the SAP BusinessObjects BI platform**
- **Multi-tenancy allows for efficient use of hardware resources. Major role in reducing TCO.**
- **Two possible BW architectures are: EDW and Embedded**
- **Enhance ROI with integration between SAP S/4HANA and SAP BusinessObjects BI and SAP S/4HANA and SAP BW**
- **Increase efficiency and productivity**

Your Turn!



Questions?

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Twitter: [@PravGupta](https://twitter.com/PravGupta)

Please remember to complete your session evaluation

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