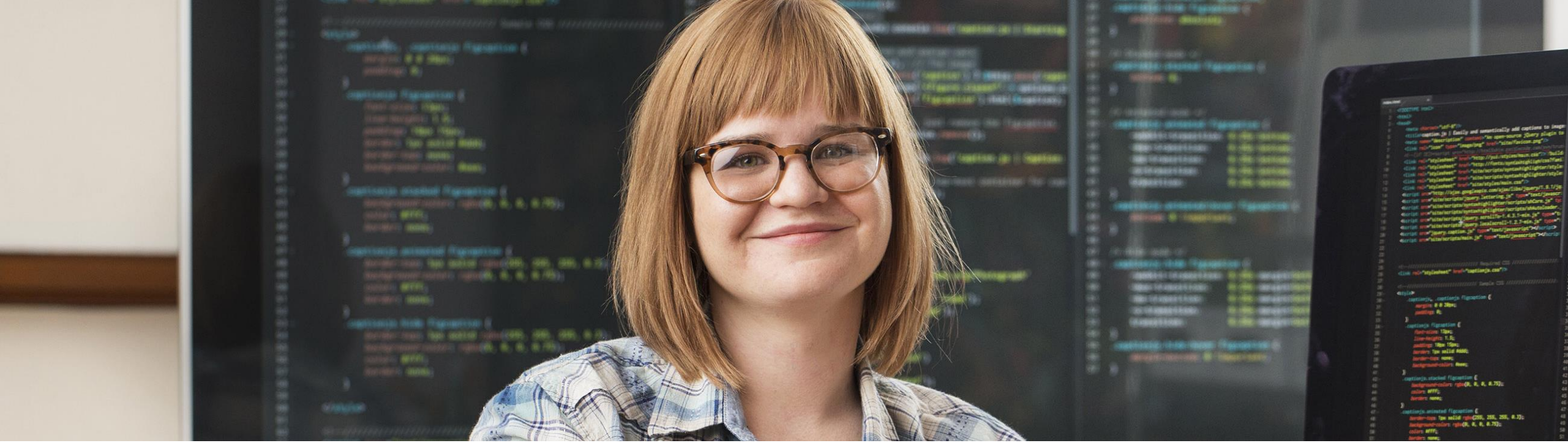

DA281 (virtual) Hands-On Session:
SAP Data Intelligence: Connectivity & Integration

Bengt Mertens, Matthias Kretschmer, Martin Boeckling / Daniel Ingenhaag

November 2022

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Agenda

Connectivity & Integration

- General Overview
- ABAP Integration with SAP Data Intelligence Cloud

Deep Dives – Integration with SAP S/4HANA

1. Creation of S/4HANA CDS Views & Implementation of Pipelines for integrating SAP S/4HANA CDS Views
2. Integration of any remote ABAP functionality with Data Intelligence Custom ABAP Operators
3. Technical Background and Introduction to Data Intelligence Replication Flows for mass data replication

Access to the workshop's SAP Data Intelligence environment (for interested participants)

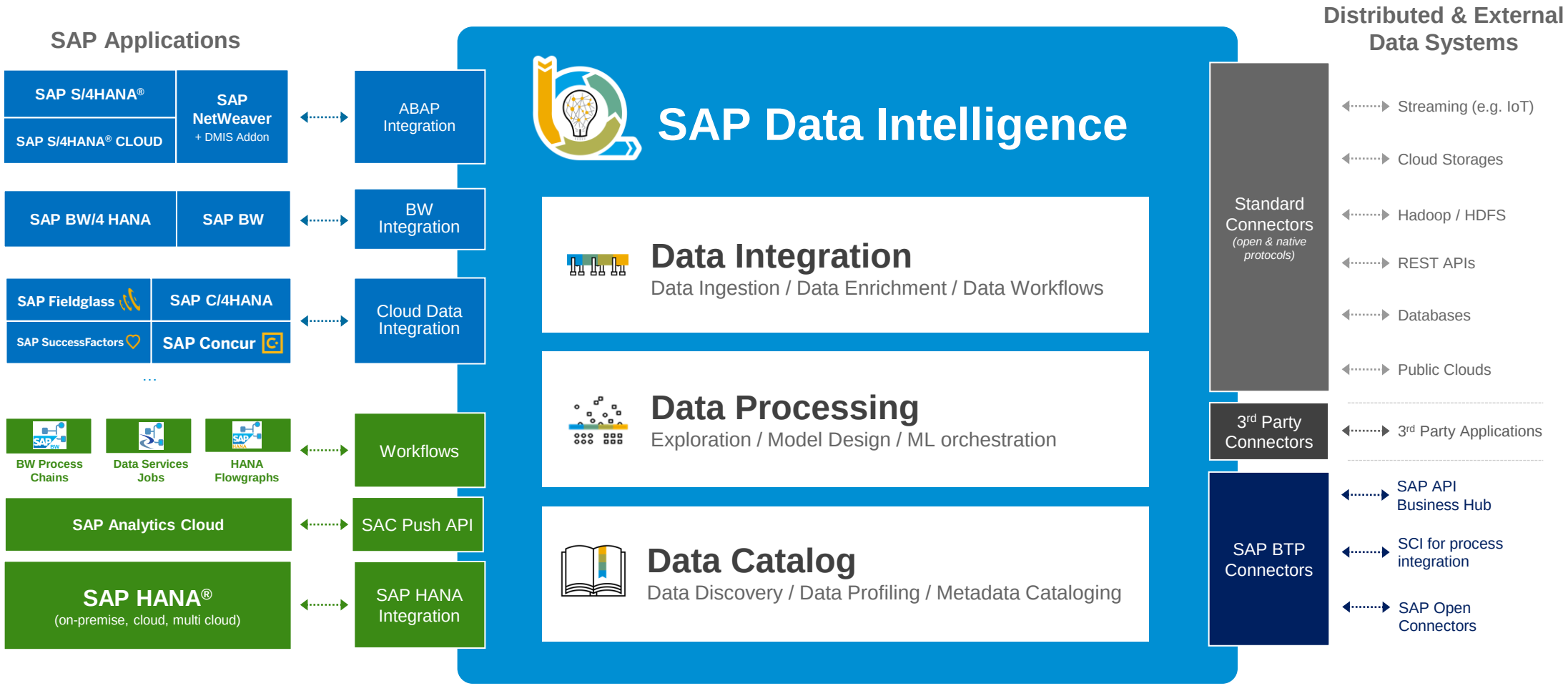
Short Introduction to the (optional) Exercises

1. Replicating data from S/4HANA ABAP CDS Views in SAP Data Intelligence Pipelines
2. Integrate ABAP CDS Views in SAP Data Intelligence Replication Management Flows

Connectivity & Integration

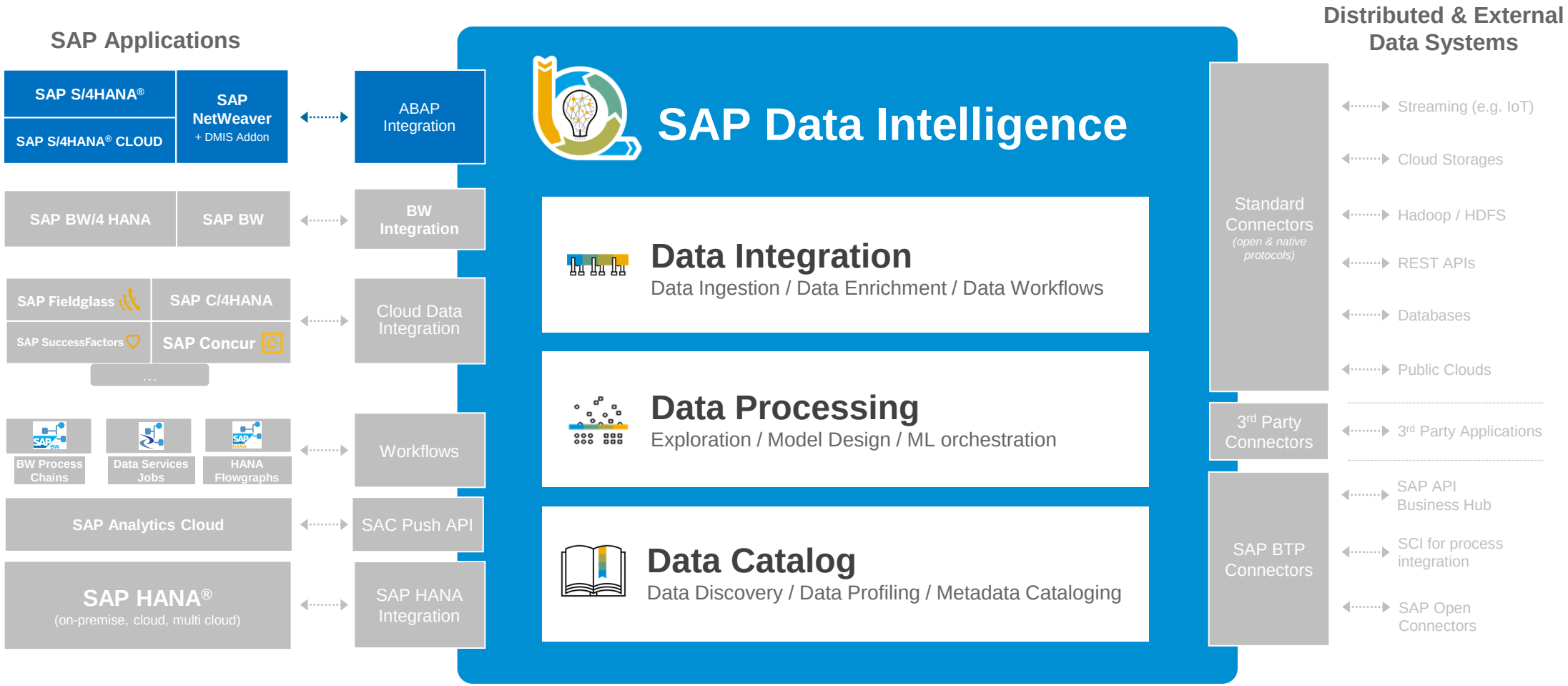
General Overview

SAP Data Intelligence - Unified Data Integration for the Intelligent Enterprise



*This is the current state of planning and may be changed by SAP at any time without notice.

SAP Data Intelligence - Unified Data Integration for the Intelligent Enterprise



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Deep Dive 1

ABAP CDS View based Data Extraction in SAP Data Intelligence

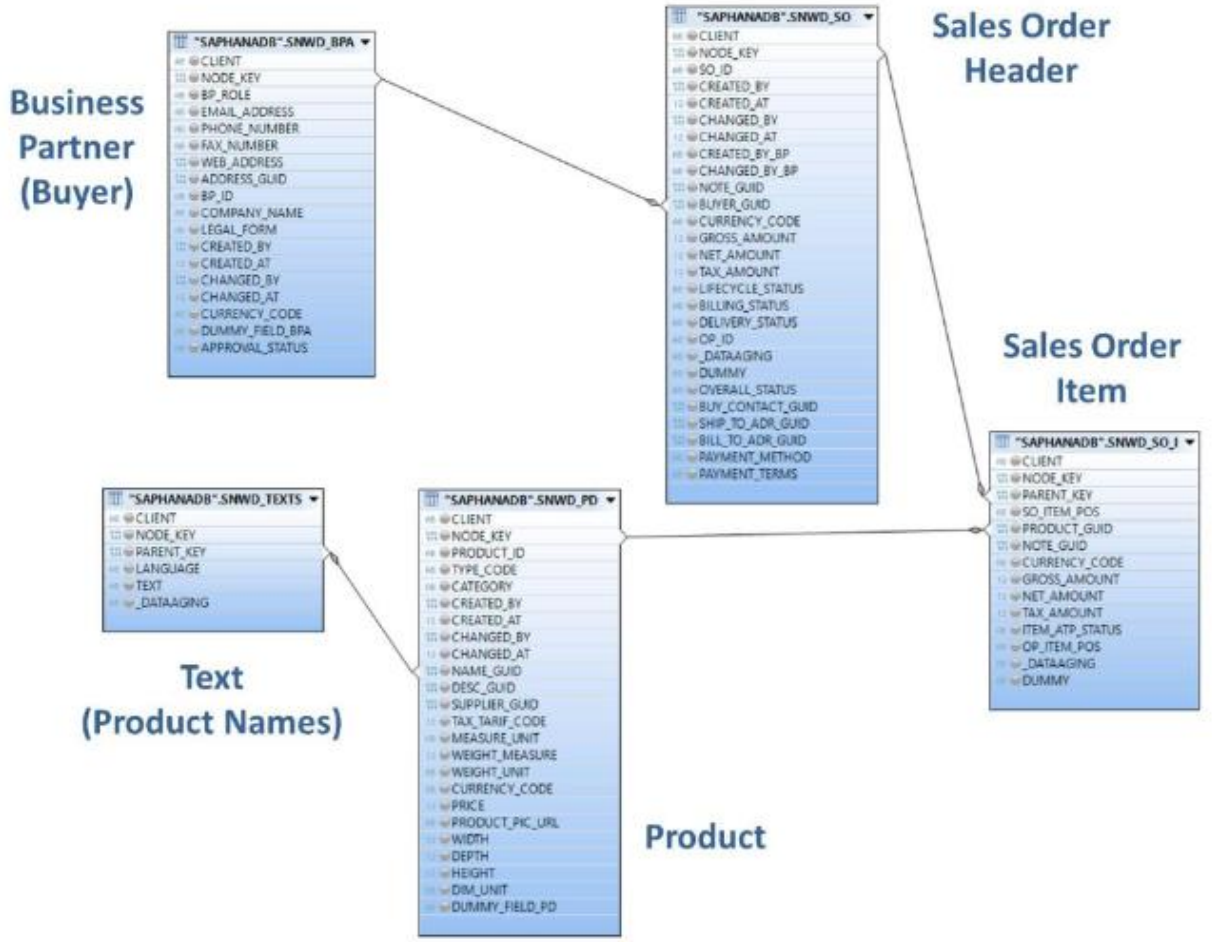
The Enterprise Procurement Model (EPM) in SAP S/4HANA

The business scenario at the core of EPM is that of a web shop run by a fictive retail company called “ITelO”, which is buying and selling computers and accessories.

Even though EPM also provides several pre-defined CDS Views, which are all linked to each other via associations, we’ll be using the underlying physical tables in our Deep Dive demos and the Hands-On Exercises. The tables are all starting with the prefix name “SNWD_”.

The relevant tables for our scenario are

- Business Partner (SNWD_BPA)
- Sales Order Header (SNWD_SO)
- Sales Order Item (SWND_SO_I)
- Product (SNWD_PD)
- Texts (SNWD_TEXTS)



Create and Consume HANA Views in ABAP

Advanced Viewbuilding with Core Data Services in ABAP

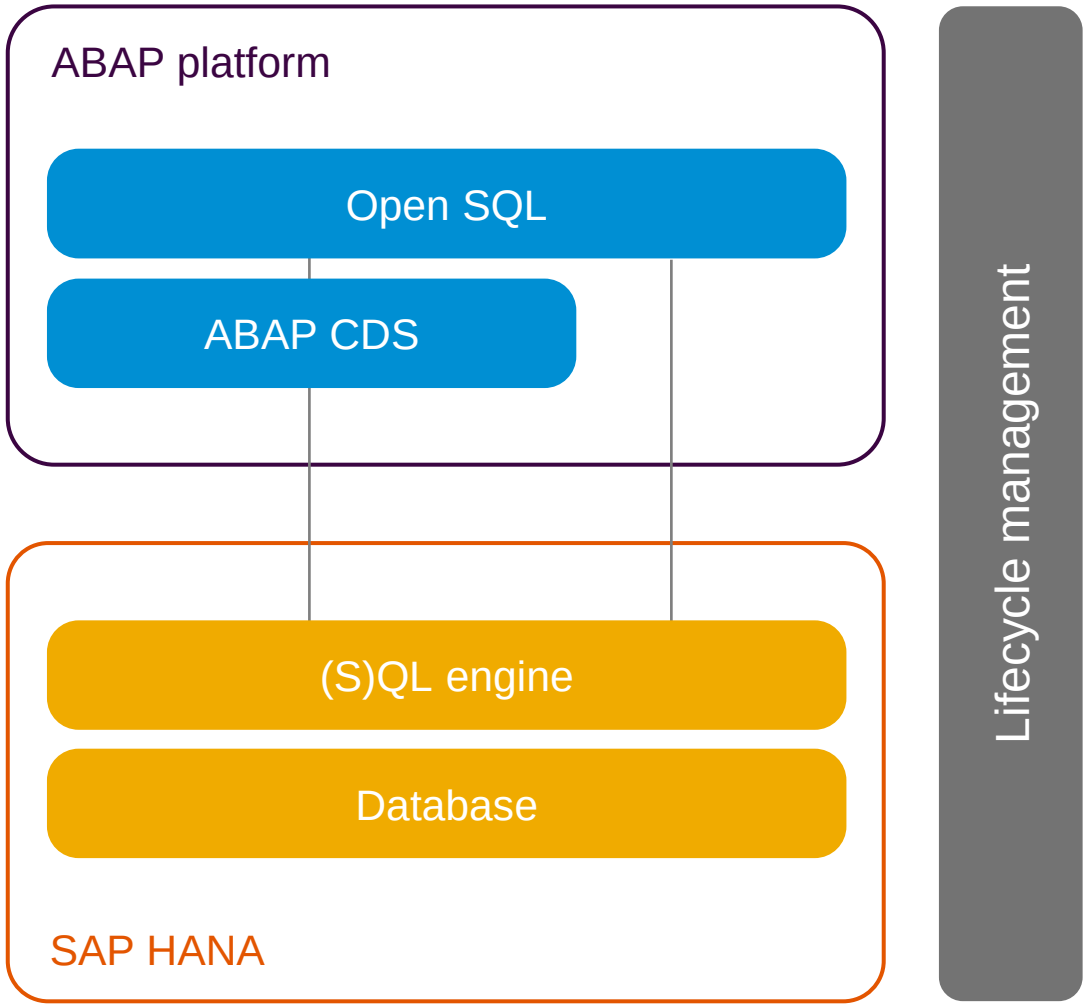
01 Leverage DDIC semantics

02 Highly reusable and extensible CDS artefacts

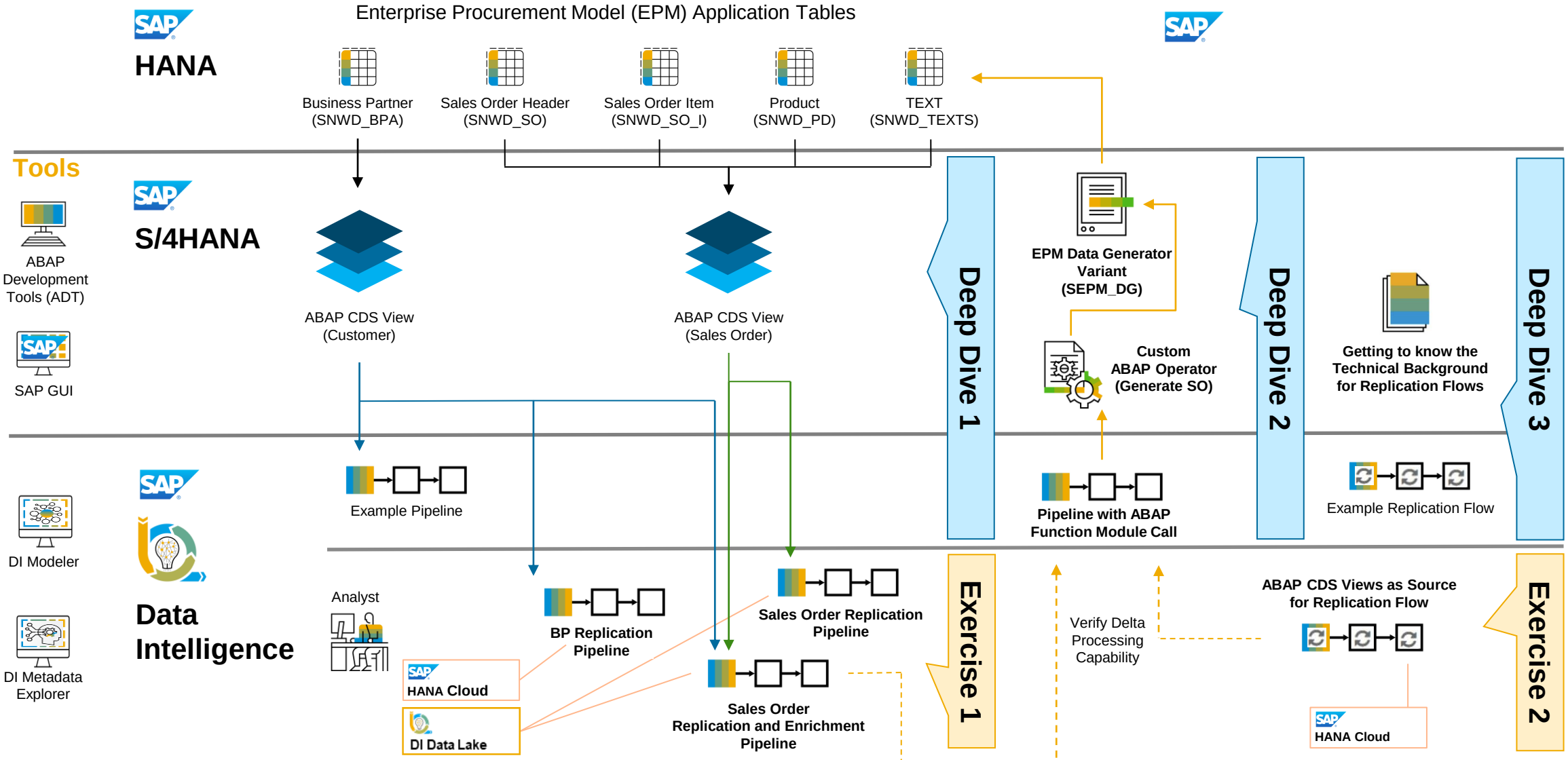
03 Fully integrated into the ABAP infrastructure

04 Proven and consistent ABAP lifecycle management

05 Consumption in Open SQL and Gateway/SADL



DA281 Workshop Scenarios



Demo: ABAP CDS View based data extraction in SAP Data Intelligence

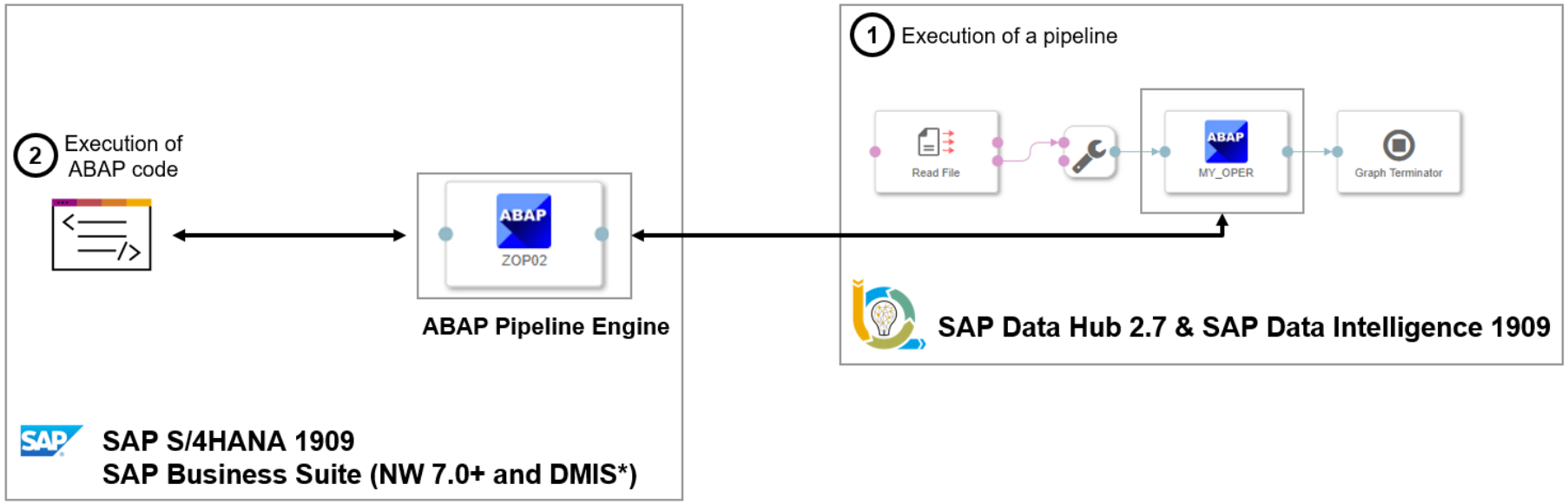
Deep Dive 2

Functional ABAP Integration with SAP Data Intelligence

Custom ABAP Operator for the Functional ABAP Integration with SAP Data Intelligence

There are two variants of ABAP operators available in SAP Data Intelligence, both based on the same framework for adapters:

- SAP ABAP Operator: pre-defined by SAP (in namespace com.sap). Examples for these out-of-the-box operators are (the already known) ABAP CDS Reader, ODP Reader, SLT Connector, Cluster Table Splitter (for Business Suite systems), or the ABAP Converter.
- Custom ABAP Operator: Any ABAP operator created by customers (in namespace customer).



The ABAP Operator Framework: Implementation Steps

Custom ABAP Operators are created in the ABAP System by implementing the BAdI: BADI_DHAPE_ENGINE_OPERATOR.

The BAdI implementation consists of a class with two methods that must be redefined. It is recommended that the BAdI implementation extends the abstract class cl_dhape_graph_oper_abstract.

- GET_INFO: Returns metadata about the operator
- NEW_PROCESS (with its local class lcl_process): Creates a new instance of the operator.

The local class ***lcl_process*** uses a simple event-based model and can be implemented by redefining one or more of the following methods, depending on the required functionality

- ON_START: Called once, before the graph is started
- ON_RESUME: Called at least once, before the graph is started or resumed
- STEP: Called frequently (loop)
- ON_SUSPEND: Called at least once, after the graph is stopped or suspended
- ON_STOP: Called once, after the graph is stopped

Demo: Creating a Custom ABAP Operator and making use of it in an SAP DI Pipeline

Short Introduction to *Generation 2* Operators in SAP Data Intelligence

Enterprise Application Integration

Unified integration model to consume and interact with SAP S/4HANA & SAP Business Suite systems

Read data from SAP System
(Generation 2)

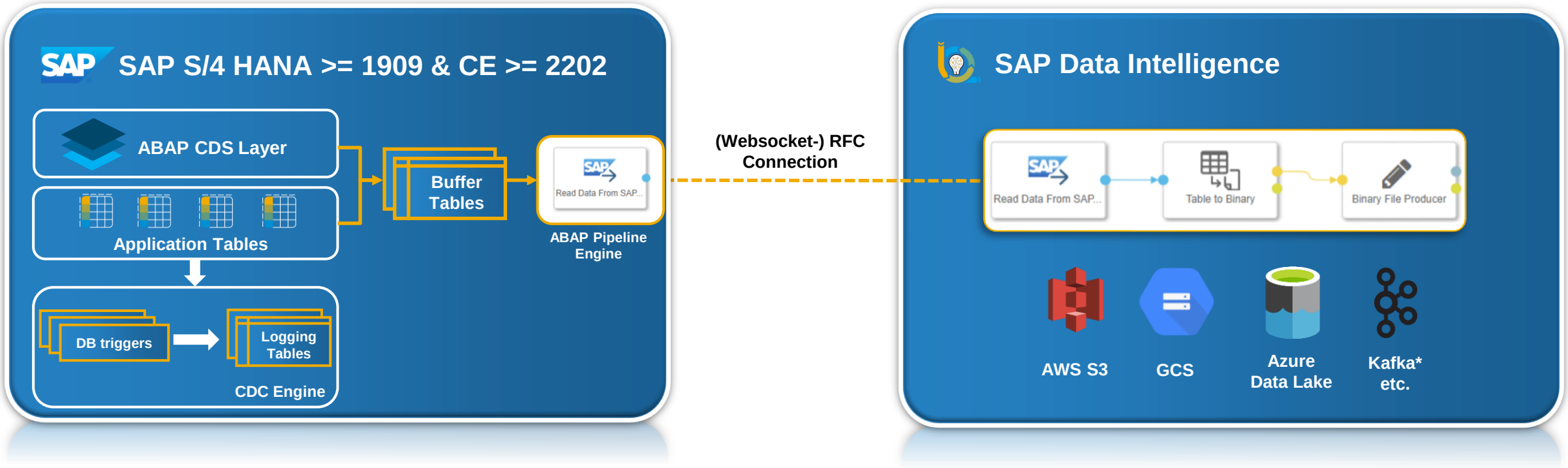
Unified operator that supports initial load and delta replication of CDS views, tables via SLT as well as business extractors & SAP Business Warehouse objects via ODP interface.

Custom ABAP
(Generation 1)

Operator to implement your ABAP custom code that will be executed as part of a pipeline in the connected ABAP system. For example to call a function module.

ABAP Integration with SAP Data Intelligence using Generation 2 Operators

Architectural Concept for Integration of SAP S/4 HANA CDS Views



Source S/4 HANA System

- (Real-time) Data replication via DB Triggers & logging tables from S/4 HANA CDS Views
- Direct integration of CDS Views for S/4 HANA >= 1909 & S/4 HANA CE (version 2202 onwards) for extraction enabled CDS Views

SAP Data Intelligence

- Consuming data provided by S/4 HANA CDS Views in a Pipeline for further processing using new “Read Data from SAP System” operator.
- Enrich & manipulate data in a pipeline and send the data to various different target systems, like cloud storages (S3, ADL etc.) or streaming services such as Kafka, MQTT and additional targets.

* Planned with DI 2113 Cloud Release

Simplified operators for core integration scenarios

Overview of generation 2 functionality & available operators

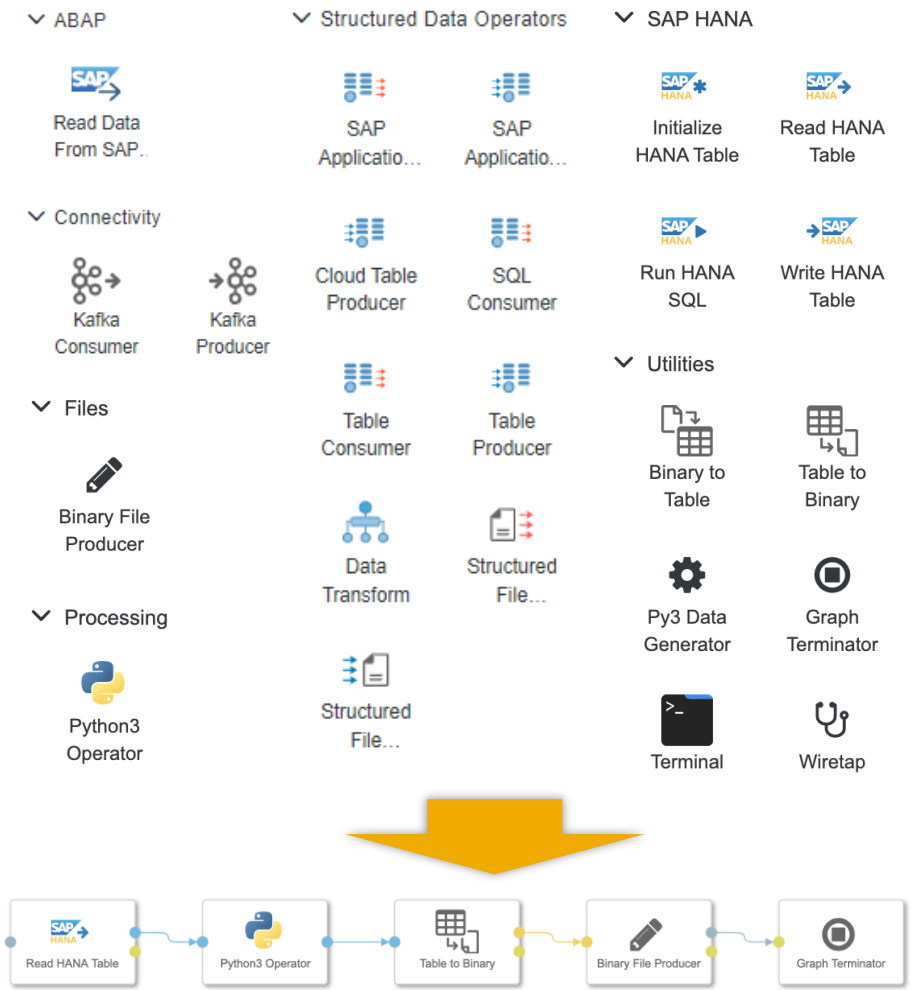
Introduction of new operators with the following features:

- Unified table types for better interoperability for operators
- Improved error handling of operators
- Automatic recovery of pipelines
- State management and snapshots for resiliency

Operators are available as a new ”Generation 2” category:

- **Connections**: SAP ABAP, HANA, 3rd Party Databases (Table & SQL Consumer), Kafka Consumer & Producer, File Readers & Writers etc.
- **Processing**: Structured Data Transform, Python, and standardized Table Encode/Decoder (CSV, JSON, Parquet, ORC)

Note: Generation 2 operators do not interfere with existing graphs

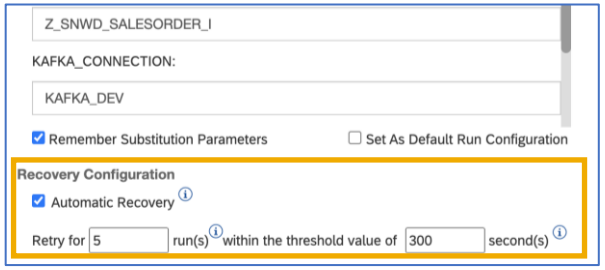


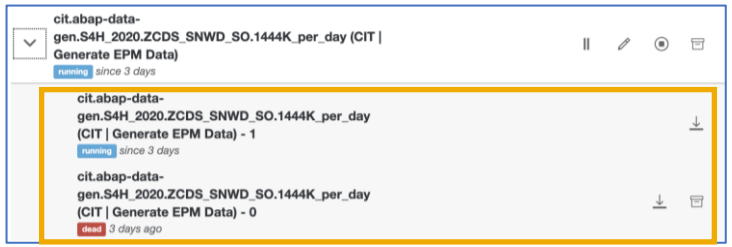
Simplified operators for core integration scenarios

Automatic recovery & stateful pipelines

Automatic Recovery

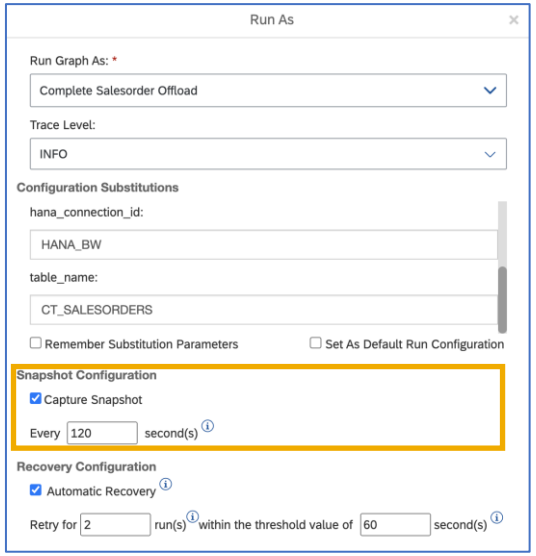
- Pipelines can automatically re-start in case of (temporary) failures by a pre-defined interval & maximum number of retries
- Pipelines can be paused and re-started by a user
- Restarted pipelines are grouped in Modeler and can be fully analyzed (traces, logs, metrics)





Stateful Pipelines

- Operators save snapshots with processing state
- On failure, the pipeline can be re-started from the last saved snapshot for efficient recovery
- Allows to implement resilient and long running pipelines
- Introduced as part of generation 2 pipelines & operators

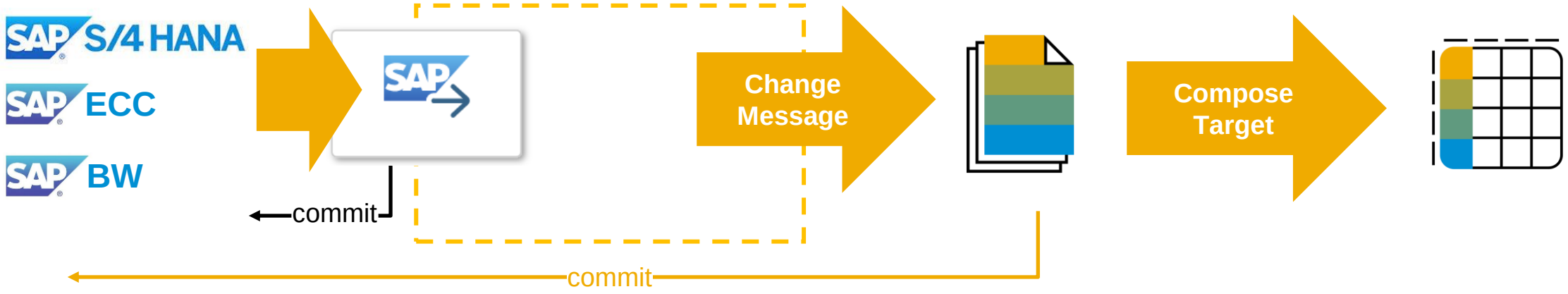


Deep Dive 3

Technical Background and Example for Replication Flows in SAP Data Intelligence

Recap: Data Replication in SAP Data Intelligence

Data replication use cases leveraged via Pipelines



As-Is functionality :

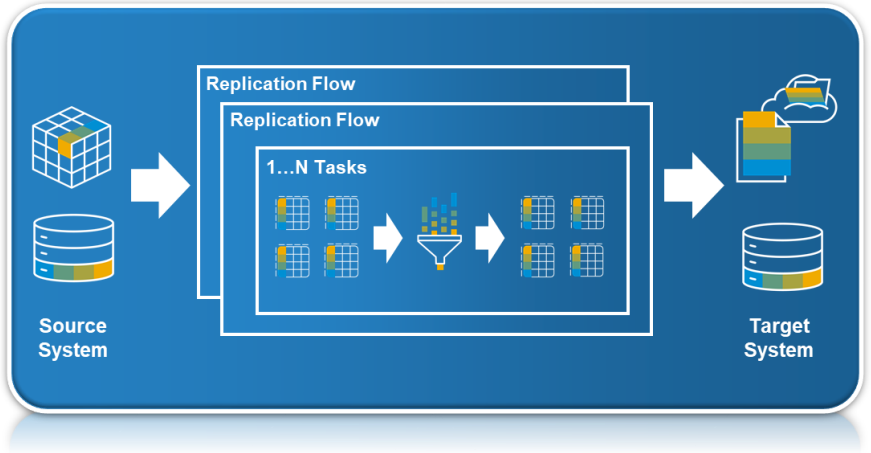
- 1 data set replication ≙ 1 pipeline in DI with possibility to generalize pipeline execution with variables in certain scenarios
- Recovery of data integration pipelines in case of various error situations using resilience functionality
- TCD & TCO when having large amount of data sets (e.g. hundreds or thousands of CDS Views or tables)
- Limited performance scalability

Replication Flows for mass data replication use cases

High-Level Overview & Concept of Replication Flows

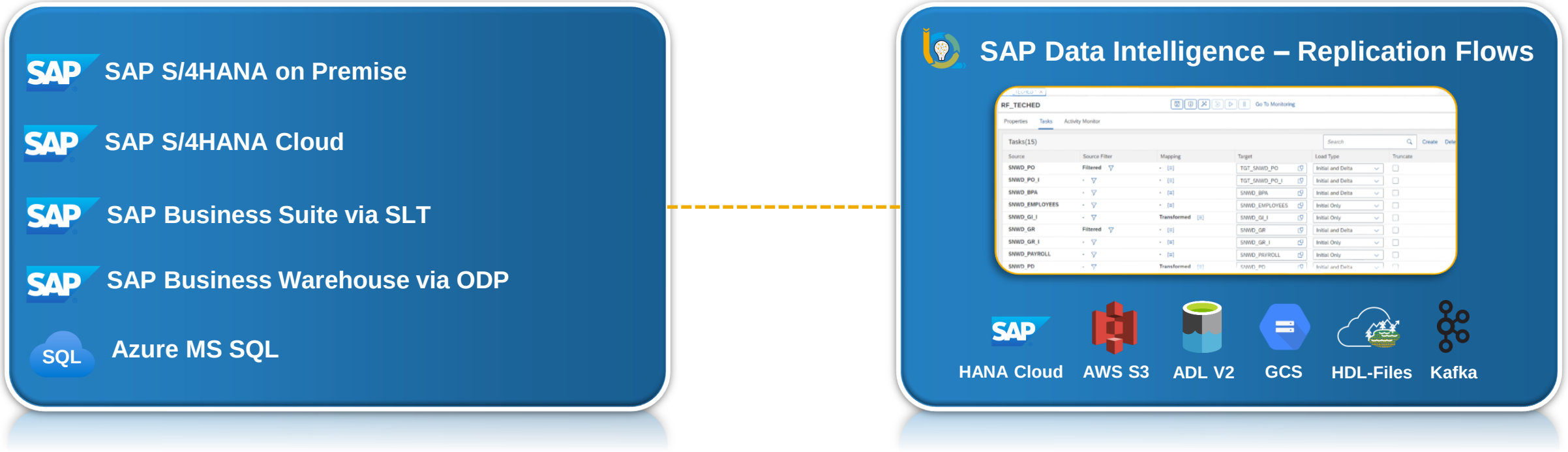
Enhancement of Data Replication Use Cases in Data Intelligence

- Model data replication from a selected source to a selected target
- Initial focus on 1:1 replication with simple projections and filters
- Dedicated user interface for modeling mass data replication
- Lower TCO and TCD for data replication
- Support Initial Load as well as Delta Load capabilities



Replication Flows for mass data replication use cases

Overview of Replication Flows source and target connectivity in SAP Data Intelligence Cloud



Source Systems

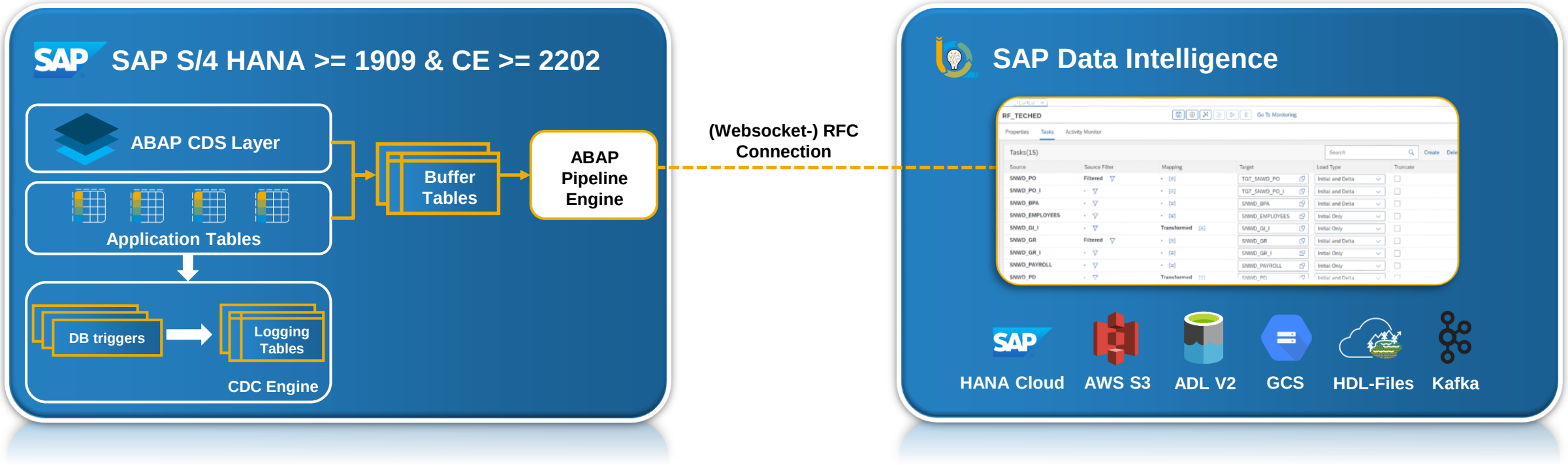
- (Real-time) Data replication via DB Triggers & logging tables from SAP and non-SAP sources
- Integration of data from various SAP systems including SAP S/4HANA, SAP Business Suite as well as SAP Business Warehouse
- Integration from tables from Azure MS SQL

Target Systems

- Replicate data 1:1 with simple projections & filters via a simplified user interface in DI Modeler application via “Replication Flows”
- Monitoring of Replication Flows integrated in standard DI monitoring application
- Support of HANA Cloud, ADL V2, S3, GCS, HDL-Files and Kafka as target systems

ABAP Integration with SAP Data Intelligence using Replication Flows

Architectural Concept for Integration of SAP S/4 HANA CDS Views



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SAP Data Intelligence Cloud

- Replicate data from CDS Views 1:1 with simple projections and filters via a simplified user interface inside DI Modeler application via “Replication Flows”
- Monitoring of Replication Flows integrated in standard DI monitoring application

Demo: Replication Flow

Access to the SAP Data Intelligence environment

All participants are requested to register for an individual user name and password on the provided SAP Data Intelligence workshop tenant.

Exercise duration: November 17th – December 4th

Therefore, SAP provided a specific User Registration Tool: https://workshop_registration.cfapps.eu10.hana.ondemand.com/register/danieli

After having successfully obtained the credentials for the SAP Data Intelligence system, you can login as follows:

- In a Chrome or Firefox Browser, open the following link to the SAP Data Intelligence Cluster: https://data-intelligence-svc-broker-canary.cfapps.sap.hana.ondemand.com/dashboard/0f966ba3-984d-4476-b733-95bf19b16d38-da281
- User credential as received from the user registration tool described above

For issues and problems please contact: SAP Data Intelligence dataintelligence@sap.com

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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.

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