Disclaimer

This presentation outlines our general product direction and should not be relied on in making a purchase decision. This presentation is not subject to your license agreement or any other agreement with SAP. SAP has no obligation to pursue any course of business outlined in this presentation or to develop or release any functionality mentioned in this presentation. This presentation and SAP's strategy and possible future developments are subject to change and may be changed by SAP at any time for any reason without notice. This document is provided without a warranty of any kind, either express or implied, including but not limited to, the implied warranties of merchantability, fitness for a particular purpose, or non-infringement. SAP assumes no responsibility for errors or omissions in this document, except if such damages were caused by SAP intentionally or grossly negligent.
Session Abstract

Real-Time Data Warehousing with SAP NetWeaver Business Warehouse BW 7.40

This lecture will outline best practices, tips, and tricks for a successful enterprise data warehouse implementation for SAP NetWeaver Business Warehouse (SAP NetWeaver BW) in regards to real-time aspects for data provisioning and agility aspects during design time. Key learning points of this session will include understanding the available set of functions and capabilities for an agile and real-time data warehouse implementation scenario for SAP NetWeaver BW. You will learn which tools you will have to use in the best way. This session will include system demos and an outlook to SAP's strategy for the SAP HANA enterprise data warehouse.
BW 7.4 – Overview
Planned with BW 7.4, SP5/SP6 on HANA

Enhanced Data Modeling
- New overall reference Architecture LSA++
- BW/HANA Smart Data Access providing the logical EDW
- Easy integration of external data models with Open ODS Layer
- Composite Provider for enhanced support of “Mixed Scenarios”
- Common Eclipse based Modeling environment

Push down further processing logic to HANA
- BW Analytic Manager
- HANA Analysis Processes
- BW Transformations

New class of Data Provisioning
- BW enhancements for Operational Data Provisioning (ODP) and Operational Delta Queue (ODQ)
- PSA layer obsolete during Data Acquisition
- Simplified SLT handling in BW
BW 7.4 – Real-time Data Warehousing Aspects
Planned with BW 7.4, SP5/SP6 on HANA

Enhanced Business Flexibility by providing “the logical EDW”
Real-time Data Access
- Direct Data Access across different source systems
- Direct Meta Data Access during design time for field based modelling

Lightweight Evolution options into staging scenarios for the EDW layer
- BW enhancements for Operational Data Provisioning (ODP) and Operational Delta Queue (ODQ)
- Real-time Staging Scenarios
  - Reduced latency
  - Reduced footprint (PSA obsolete)
  - RDA Real-time Data Acquisition improved by change notification
  - Direct Delta from SAPI-Extractors
  - Real-time Replication into BW via SLT
Real-time DWH - Virtual Access vs. Persistent Staging

Overview

Open ODS View as the very modeling object of the Open ODS Layer
- allows direct access via DataSources, DB tables or views, and HANA Virtual Tables (Smart Data Access – SDA)
- Acts as InfoProvider and can be part of CompositeProviders

Operational Delta Queue (ODQ) as part of ODP covers the main services offered by the PSA today
- DTP runs with full set of options directly against ODP/ODQ without PSA layer (InfoPackages)
- Recovery in case of DSO load issues can be achieved on data packet level
- Monitoring the PSA replaced by monitoring the ODQ (TA ODQMON)
- Recovery for more than latest delta load
## BW 7.4 – New Options to realize real-time Data Warehousing

Scenarios covered in this lecture

<table>
<thead>
<tr>
<th>Source</th>
<th>Direct Access</th>
<th>Real-time Staging</th>
</tr>
</thead>
</table>
| ERP (SAPI)      | • Open ODS View  
Type: SAPI DataSources | • Field Based DSO derived from Open ODS View  
• Data Staging via ODQ/RDA  
(SAPI ODP DataSource) |
| SAP HANA        | HANA Schema (e.g. COPA Accelerator)  
• Open ODS View  
Type: SAP Hana Table/View | • Field Based DSO derived from Open ODS View  
• ODP DataSources with InfoPackage and DTP  
(SLT ODQ-Replication) |
| anyDB*          | Open ODS View  
• DB Connect/SAP HANA Smart Data Access |                                                                                  |
1. BW 7.4 Real-time DWH Aspects for SAP ERP Sources

   1. Direct Access
      1. Open ODS Views
      2. ServiceAPI DataSources

   2. Persistent Staging
      1. Field based DSO derived out of Open ODS View
      2. Operational Data Provisioning (ODP) Framework / Operational Delta Queue (ODQ)

2. BW 7.4 Direct Access to HANA DB

3. BW 7.4 Real-time Staging for HANA DB

4. Summary
Flexible consumption of external data models
Planned with SAP BW 7.4, SP5 on HANA

Flexible and easy consumption of external data models building a BW Open ODS Layer using field-based modeling

Consume & combine external data models for
- Direct query access (w/o replication)
- Staging scenarios
- Switch between both options

Agile modeling
- Field based modeling via Open ODS View and DSO (with fields *)
- Complementing InfoObject modeling
- Integrate with existing BW models
- Gradually build up models and architectures based on relational schemas
- Possibility to start modeling from facts developing towards the dimensions
- Enables rapid prototyping – quick ROI

Direct query access
- Integrated with BW authorization concept
- Combine with existing InfoObjects / DSOs

* Pilot only (Note 1922533)
Open ODS View – Direct Access to SAP ERP Data from BW
Available with BW 7.4, SP5/SP6 on HANA

Open ODS View offers
• Metadata object as abstraction layer for underlying source object
• HANA virtual tables as supported source objects via SDA
• Querying on field level
• Supported for Teradata, Sybase ASE/IQ, Hadoop
• Optimized Query execution by pushing down to HANA
• Supported scenarios:
  - Virtual Access
  - Persistent Access *
    o Switch from Virtual to Persistent *
    o The possibility to generate structure identical Field based DSO including DTP and Transformation
    o Direct staging into DSO bypassing PSA
    o No need to adjust existing queries

Easy assignment of semantics
• Underlying object (Table, DB View, DataSource) can be tagged as Text, Master data or Facts
• Single fields of the object can be linked to already existing Open ODS Views or InfoObjects * Pilot only (Note 1922533)
Given SAP ERP Business Content DataSource with Direct Access

Example: Financials - Customer Balances (0FI_AR_20)

1. ODP Source System – SAP Extractors
2. DataSource
3. Fields
4. Extractor Capabilities
Create Open ODS View
New Metadata object as abstraction layer for underlying DataSource

1. Name
2. Semantics
3. Type
4. Source System
5. DataSource
Create Proposal for Open ODS View
• Arrange Source Fields with view structure for Semantic Facts
• Preview Option for Query given
Open ODS View – Field List and proposed View categorization

### Display Open ODS View Fi Customer Balances from SAP ERP (QT6)

<table>
<thead>
<tr>
<th>Source Field</th>
<th>Description</th>
<th>ScreenType</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>KUNNR</td>
<td>Customer Number</td>
<td>CHAR</td>
<td>000010</td>
</tr>
<tr>
<td>BUKRS</td>
<td>Company Code</td>
<td>CHAR</td>
<td>000004</td>
</tr>
<tr>
<td>AKONT</td>
<td>Reconciliation Account in General Ledger</td>
<td>CHAR</td>
<td>000010</td>
</tr>
<tr>
<td>FISCER</td>
<td>Period/year</td>
<td>NUMC</td>
<td>000007</td>
</tr>
<tr>
<td>GJAHR</td>
<td>Fiscal Year</td>
<td>NUMC</td>
<td>000004</td>
</tr>
<tr>
<td>PERIO</td>
<td>Period</td>
<td>NUMC</td>
<td>000003</td>
</tr>
<tr>
<td>KTOPL</td>
<td>Chart of Accounts</td>
<td>CHAR</td>
<td>000004</td>
</tr>
<tr>
<td>FISCVAR</td>
<td>Fiscal year variant</td>
<td>CHAR</td>
<td>000002</td>
</tr>
<tr>
<td>CURTYPE</td>
<td>Currency Type</td>
<td>CHAR</td>
<td>000002</td>
</tr>
<tr>
<td>UM01S</td>
<td>Total debit postings</td>
<td>CURR</td>
<td>000017</td>
</tr>
<tr>
<td>UM01H</td>
<td>Total credit postings</td>
<td>CURR</td>
<td>000017</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

#### View Field

- Characteristics (key)
  - KUNNR: Customer Number

#### Name key field and activate Open ODS View
Open ODS View – Query Preview
Open ODS View - Seen via SAP BO Analysis for MS Excel
1. BW 7.4 Real-time DWH Aspects for SAP ERP Sources
   1. Direct Access
      1. Open ODS Views
      2. ODP DataSources
   2. Persistent Staging
      1. Operational Data Provisioning (ODP) Framework
      2. Operational Delta Queue (ODQ)

2. BW 7.4 Direct Access to HANA DB
3. BW 7.4 Real-time Staging for HANA DB
HANA BW – Operational Data Provisioning (ODP) Infrastructure
Planned with BW 7.4, SP5/SP6 on HANA

Provider

SAP ERP Extractors
SLT
HANA Views
Source BW

Subscriber / Consumer

Operational Data Provisioning

Unified infrastructure for data provisioning and consumption

- Enables extract once deploy many architectures for sources
- Unified configuration and monitoring for all provider and subscriber types
- Time stamp based recovery mechanism for all provider types with configurable data retention periods
- Highly efficient compression enables data compression rates up to 90% in Operational Delta Queue (ODQ)
- Quality of service: „Exactly Once in Order“ for all providers
- Intelligent parallelization options for subscribers in high volume scenarios
New ODP Source System Types in BW 7.40

- ODP for SAPI Sources
- ODP for SLT supported DBMSs
Simplified data provisioning from SAP ERP and SAP BW
Planned with BW 7.4, SP5/SP6 on HANA

Provider ERP Extractors
- Direct Update to BW InfoProviders – PSA not required
  - Scheduled or real – time daemon
  - Automatic change notification for daemon
- Consumption by multiple subscribers

Provider BW
- Enables direct staging between InfoProviders of source and target BW systems
- PSA not required
- Consumption of ODQ by multiple BW subscribers and SAP Data Services

Benefits
- Simplified data flow
- PSA no longer required
- Flexible recovery options
- Stream lined system communication
  - Synchronous RFC replaces ALE/IDoc
SAP ERP ODQ Monitor (Transaction ODQMON)
Example from SAP ERP: ODQ in action …

![Monitor Delta Queues](image)

### Monitor Delta Queues

<table>
<thead>
<tr>
<th>Queue</th>
<th>Q</th>
<th>Subscriptions</th>
<th>Units</th>
<th>Rows</th>
<th>Original Size in Bytes</th>
<th>Compressed Size in Bytes</th>
<th>Comp. %</th>
</tr>
</thead>
<tbody>
<tr>
<td>UFIQL</td>
<td>1</td>
<td>39</td>
<td>43.91k</td>
<td>46.82k</td>
<td>1.262.76k</td>
<td>96.5</td>
<td></td>
</tr>
<tr>
<td>2LS11VSS</td>
<td>1</td>
<td>38</td>
<td>17.92k</td>
<td>2.67k</td>
<td>92.56k</td>
<td>96.5</td>
<td></td>
</tr>
<tr>
<td>2LS11VHDR</td>
<td>1</td>
<td>38</td>
<td>18.74k</td>
<td>2.116k</td>
<td>139.45k</td>
<td>93.4</td>
<td></td>
</tr>
<tr>
<td>2LS11VAITM</td>
<td>1</td>
<td>38</td>
<td>19.92k</td>
<td>7.95k</td>
<td>634.28k</td>
<td>97.9</td>
<td></td>
</tr>
<tr>
<td>2LS11VAKON</td>
<td>1</td>
<td>4</td>
<td>43.37k</td>
<td>1.56k</td>
<td>978.10k</td>
<td>99.0</td>
<td></td>
</tr>
<tr>
<td>2LS11VASCL</td>
<td>1</td>
<td>38</td>
<td>18.29k</td>
<td>6.19k</td>
<td>219.60k</td>
<td>98.1</td>
<td></td>
</tr>
<tr>
<td>2LS11VASTH</td>
<td>1</td>
<td>38</td>
<td>18.25k</td>
<td>6.11k</td>
<td>113.18k</td>
<td>83.2</td>
<td></td>
</tr>
<tr>
<td>2LS11VASTH</td>
<td>1</td>
<td>38</td>
<td>18.25k</td>
<td>6.11k</td>
<td>113.18k</td>
<td>83.2</td>
<td></td>
</tr>
<tr>
<td>2LS12VHDR</td>
<td>1</td>
<td>93</td>
<td>10.65k</td>
<td>2.401k</td>
<td>112.68k</td>
<td>95.3</td>
<td></td>
</tr>
<tr>
<td>2LS12VCTM</td>
<td>1</td>
<td>92</td>
<td>10.65k</td>
<td>2.401k</td>
<td>112.68k</td>
<td>95.3</td>
<td></td>
</tr>
<tr>
<td>2LS12VCSC</td>
<td>1</td>
<td>0</td>
<td>9.95k</td>
<td>4.72k</td>
<td>781.11k</td>
<td>98.3</td>
<td></td>
</tr>
<tr>
<td>2LS12VDHDR</td>
<td>1</td>
<td>194</td>
<td>4.25k</td>
<td>85.52k</td>
<td>38.76k</td>
<td>95.5</td>
<td></td>
</tr>
<tr>
<td>2LS13VDITM</td>
<td>1</td>
<td>194</td>
<td>4.29k</td>
<td>89.88k</td>
<td>40.52k</td>
<td>97.7</td>
<td></td>
</tr>
<tr>
<td>2LS13VDKON</td>
<td>1</td>
<td>192</td>
<td>11.60k</td>
<td>31.64k</td>
<td>104.69k</td>
<td>98.5</td>
<td></td>
</tr>
</tbody>
</table>

Total: 14 queues, 995 requests, 186.811 rows, 407.514.745 bytes, 2.445.101.238.156 bytes, 31.642.004.673 bytes
Evolution from Direct Access into Persistent Staging
Available with BW 7.4, SP5/SP6 on HANA

OpenODS Layer
- Supports the evolution from view based - to a lightweight persistence base mode
  - The possibility to generate structure identical Field based DSO including DTP and Transformation
  - No InfoObject creation necessary
  - No need to adapt query
- Querying on field level possible
- Optimized Query execution by pushing down to HANA
- Switch to persistence in case of harmonization needs (quality of source), semantical transformations, data lookups
- Query keeps stable if no incompatible changes
1. BW 7.4 Real-time DWH Aspects for SAP ERP Sources

2. BW 7.4 Direct Access to HANA DB
   1. Direct Access to HANA Schema on BW
   2. Direct Access to separate HANA DB

3. BW 7.4 Real-time Staging for HANA DB

<table>
<thead>
<tr>
<th>Source</th>
<th>Direct Access</th>
<th>Real-time Staging</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERP (SAP)</td>
<td>Open ODS View</td>
<td>Field Based DSO derived from Open ODS View</td>
</tr>
<tr>
<td></td>
<td>Type: SAP DataSources</td>
<td>Data Staging via ODQ/RDA (SAP ODP DataSource)</td>
</tr>
<tr>
<td>SAP HANA</td>
<td>Open ODS View</td>
<td>Field Based DSO derived from Open ODS View</td>
</tr>
<tr>
<td></td>
<td>Type: SAP Hana Table/View</td>
<td>CDP DataSources with InfoPackage and DTP (SLT ODQ-Replication)</td>
</tr>
<tr>
<td>HANA instance</td>
<td>Open ODS View</td>
<td></td>
</tr>
<tr>
<td>(e.g. HANA Application)</td>
<td>Type: Smart Data Access</td>
<td></td>
</tr>
<tr>
<td>anyDB*</td>
<td>Open ODS View</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DB Connect/SAP HANA Smart Data Access</td>
<td></td>
</tr>
</tbody>
</table>
Flexible and easy consumption of external data models building a BW Open ODS Layer

Agile modeling

- Integrate external data models for
  - direct query access
  - staging scenarios
  - switch between both options
- Field based modeling complementing InfoObject modeling
- Integrate with existing BW models
- Gradually build up models and architectures based on relational schemas
- Possibility to start modeling from facts developing towards the dimensions
- Enables fast prototyping – quick ROI

Immediate light weight querying

- Integrated with BW authorization concept

Accelerated Loads

BW Queries, ODATA, MDX, SQL

BW Virtual Datamart Layer

Architected Datamart Layer

Transformations

EDW Layer

Transformations

Open Operational DataStore Layer

HANA tables, views

(Field based) DSO

HANA Schema

BW Schema

External Sources
Smart Data Access
Planned with BW 7.4, SP5/SP6 on HANA

Enhanced Business Flexibility by providing “the logical EDW”

Data Federation in diverse EDW landscapes
- Smart data access – read access to relational and non-relational sources via ODBC
- Enables access to remote data access just like “local” table
- Supports data location agnostic development
- No special syntax to access heterogeneous data sources
- Non-disruptive evolution
- BW based Analytic Services on external data

Scenario
- Make other DWHs transparent to HANA
- Evolve from virtual table to persistent structure by establishing ETL without major effort
- Consolidating / rationalizing the DWH landscape
- Consumption of HANA datamart scenarios from second HANA database
1. BW 7.4 Real-time DWH Aspects for SAP ERP Sources

2. BW 7.4 Direct Access to HANA DB

3. BW 7.4 Real-time Staging for HANA DB
   1. Operational Data Provisioning (ODP) Framework
      1. Operational Delta Queue (ODQ)
      2. SLT ODQ Replication

<table>
<thead>
<tr>
<th>Source</th>
<th>Direct Access</th>
<th>Real-time Staging</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERP (SAP)</td>
<td>Open ODS View Type: SAP DataSources</td>
<td>Field Based DSO derived from Open ODS View Type: SAP HANA Smart Data Access</td>
</tr>
<tr>
<td>SAP HANA</td>
<td>HANA Schema (e.g., CQP Accelerator)</td>
<td>HANA instance in a HANA Application  * Open ODS View Type: Smart Data Access</td>
</tr>
<tr>
<td>anyDB*</td>
<td>DB Connect/SAP HANA Smart Data Access</td>
<td>Field Based DSO derived from Open ODS View  * ODP DataSource with InfoPackage and DTP (SLT ODQ Replication)</td>
</tr>
</tbody>
</table>
Model evolution
Planned with BW 7.4, SP5/SP6 on HANA

OpenODS Views offer
- Metadata object as an abstraction layer against underlying source object
- Possibility to assign semantics (Text, Master data, Facts)
- Supports the evolution from view based – to a persistence base mode
  - The possibility to generate structure identical Field based DSO including DTP and Transformation
  - PSA becomes obsolete
- Querying on field level possible
- Evolution of model
  - Switch to persistence in case of harmonization needs (quality of source), semantical transformations, data lookups
  - query keeps stable if no incompatible changes
- Supported for RDBMS

Easy assignment of semantics
- Underlying object (Table, View, DataSource) can be tagged as Text, Master data or Facts
- Single fields of the object can be associated to already existing Open ODS Views or InfoObjects
Evolution from Direct Access into Persistent Staging
Available with BW 7.4, SP5/SP6 on HANA

OpenODS Layer
- Supports the evolution from view based - to a lightweight persistence base mode
  - The possibility to generate structure identical
  - Field based DSO including DTP and Transformation
  - No InfoObject creation necessary
  - No need to adopt query
- Querying on field level possible
- Optimized Query execution by pushing down to HANA
- Switch to persistence in case of harmonization needs (quality of source), semantical transformations, data lookups
- Query keeps stable if no incompatible changes
SAP LT Replication Server for Real-time Replication via Operational Data Provisioning - Overview

Scenario
SAP LT Replication Server can act as a provider for the Operational Data Provisioning Framework (ODP) and stores data from connected SAP systems in this framework in an Operational Delta Queue (ODQ). The ODP framework supports extraction and replication scenarios for various target SAP applications (referred to as 'subscribers'). The subscribers retrieve the data from the delta queue and continue processing the data.

Value Proposition
With the ODP/SAP LT Replication Server scenario (in the following called „ODP/SLT scenario“), replicated data (initial loads and delta records) are available in real-time in a „central place“ and can be consumed by multiple subscribers over the ODP interface. The replication can be started by users of the subscribing SAP application. This is a strategic enhancement of SLT’s and the trigger-based replication portfolio to address the needs of other consumers - beyond the “highly integrated but proprietary solutions” for SAP HANA and SAP BW.

Scope
Currently restricted to data from SAP systems, only simple tables, and extractors without delta mechanism and complex business logic.
Architecture with source systems, ODP/SLT system and Subscribers

- **DMIS 2011 SP5** (SAP LT Replication Server 2.0 Add-on) required on:
  - source systems, ODP/SLT system, SAP BW system
  - (for source system also possible with DMIS 2011 SP3/SP4 and DMIS 2010 SP8/SP9 with SAP Note 1863476)

- **ODP Framework** required on:
  - ODP/SLT system and Subscriber systems

Current Subscribers for the ODP/SLT Scenario
- SAP NW Business Warehouse (release >= 7.30)
- SAP Business Objects Data Services 4.2 SP1 (RTC Q4/2013)
ODP/SLT Scenario with Subscriber SAP BW

**Option 1:** Setup with Data Transfer via InfoPackages into BW PSA
possible with SAP BW >=7.30

**Option 2:** Setup with Data Transfer Process into BW Data Targets
possible with SAP BW >=7.30 SP8

**Future Option:** Setup with Data Transfer Process into BW Data Targets and RDA Daemon
RDP270 - handsOn Session Overview: Step by Step

**Steps**

1. **Create Open ODS View (Sales Order)** with first Associations (Views for Employees and Departments). Add additional customer InfoObject to experience the BW master data integration. *(DIRECT ACCESS)*

2. Create based on the created Open ODS View a persistency via a generated Field based DataStore Object *(FULL data uploads)*

3. Change the data flow and create an RDA data transfer based on a given SLT-ODQ and switch your scenario to *(REAL-TIME DELTA uploads)*

**Description**

1. Create Open ODS View *(Sales Order)* with first Associations *(Views for Employees and Departments)*. Add additional customer InfoObject to experience the BW master data integration. *(DIRECT ACCESS)*

2. Create based on the created Open ODS View a persistency via a generated Field based DataStore Object *(FULL data uploads)*

3. Change the data flow and create an RDA data transfer based on a given SLT-ODQ and switch your scenario to *(REAL-TIME DELTA uploads)*
1. BW 7.4 Real-time DWH Aspects for SAP ERP Sources
2. BW 7.4 Direct Access to HANA DB
3. BW 7.4 Real-time Staging for HANA DB
4. Summary
### BW 7.4 – New Options to realize real-time Data Warehousing

**Key Points to take home …**

1. The new BW 7.4 release allows flexible and easy consumption of external data models building a BW Open ODS Layer using field-based modeling.

2. Direct query access w/o replication and staging scenarios with reduced latencies are supporting real-time Data Warehousing two ways.

3. Specific features for field based modeling of Open ODS Views and DSOs offer more agility and give the possibility to start modeling from facts developing towards the dimensions

4. BW enhancements for Operational Data Provisioning (ODP) and the Operational Delta Queue (ODQ) introduce a new class of data provisioning based on a publish and subscribe principle.

5. SAP LT Replication Server can act as a provider for the ODP framework and stores initial and delta records from connected DBMS tables to Operational Delta Queue (ODQ) in real-time.

---

<table>
<thead>
<tr>
<th>Source</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERP (SAPI)</td>
<td>Open ODS View Type: SAPI Table/View</td>
</tr>
<tr>
<td>SAP HANA</td>
<td>HANA Schema (e.g. CO-PA Accelerator)</td>
</tr>
<tr>
<td>any DB+</td>
<td>Open ODS View Type: SAP HANA Table/View</td>
</tr>
</tbody>
</table>

© 2013 SAP AG or an SAP affiliate company. All rights reserved.
Further Information

**SAP Public Web**

scn.sap.com
www.sap.com

**SAP Education and Certification Opportunities**

www.sap.com/education

**Watch SAP TechEd Online**

www.sapteched.com/online