SAP BW/4HANA – An Introduction

EDW Product Management
November, 2017
1. What is a Data Warehouse?

2. Decisions to make: What approach is right for you?

3. SAP HANA Data Warehouse – Strategy & Vision

4. Enterprise Data Warehousing with SAP BW/4HANA

5. Summary
What is a **Data Warehouse**?
Different analytical needs and the consequences in IT architectures

- High variety of information sources
- Extensive information needs

Complex architecture landscapes including different kind of Data Marts, Data Warehouses and EDW
Unlock The Power of Your Data Across The Enterprise
Enterprise Data Warehousing – the single point of truth

**Enterprise Data Warehousing – why?**
- Consolidate data across the enterprise to get a consistent and agreed view
- Combine SAP and other sources
- Standardized data models on corporate information
- Support decision making on all organizational levels

**EDWs require a Database plus an EDW application**

**EDW with SAP BW/4HANA – a flexible and scalable EDW application**
- Highly integrated tools for modeling, monitoring and managing the EDW
- Open for SAP and non-SAP systems
- Agile data modeling using BW/4HANA workspaces
- Runs optimized on top of HANA
- Easy consumption of HANA Data Mart scenarios via virtualized data access

**EDW with custom built application**
- High development and maintenance efforts
- Variety of tools lacking integration
Decisions to make:
What approach is right for you?
Decisions to make
What approach is right for you?

There are different approaches how to implement an analytical data foundation.

**Pre-Built (Enterprise)Data Warehouse**
- Integrated (E)DW application
- Model-driven pre-packaged (E)Data Warehouse management and orchestration application as a central component
- Out of the box tool set for modeling, managing, operating, and governing an EDW including various data marts

**Custom Built (E)Data Warehouse**
- Loosely coupled orchestration tools
- Higher efforts for development and maintenance
- High flexibility to build custom data models and processes with little enforced governance
- Open environment to easily import industry models

**Custom built data marts without (E)DW integration layer**
- Maximum flexibility for custom data marts specifically built for isolated use cases
- Easy to build and fast realization time
- Low level of integration among different data marts
How does SAP approach Data Warehousing
Two ways to run, or get the best of both

Application driven approach, SAP BW/4 HANA as premium DW application with integrated services

- SAP BW/4HANA is an application offering. All data warehousing services via one integrated repository
- Optional integration of additional tools for modelling, monitoring and managing the data warehouse

SQL driven approach, SAP HANA with loosely coupled tools and platform services, logically combined

- SQL approaches require several loosely coupled tools, usually having separate repositories
- “Best of breed” approach to build your own model
SAP HANA Data Warehouse
Strategy & Vision
SAP HANA Data Warehouse – Strategy & Vision

Planning and definition
2016

Market presence in data warehousing with a clear roadmap

Analytics
(Business Intelligence, Predictive, Planning)

SAP Power Designer
SAP DW Foundation
SAP HANA EIM
SAP BW/4HANA

Execution and delivery
2016 - 2018

Strong and simplified offering with tight integration

Analytics
(Business Intelligence, Predictive, Planning)

SAP Power Designer
SAP DW Foundation
SAP DWH Foundation
SAP BW/4HANA
SAP HANA EIM

Vision

Convergence into one technology stack addressing BW and SQL-based DW needs

Analytics
(Business Intelligence, Predictive, Planning)

DW Modeling
DW ETL & DM

SAP HANA Platform
SAP HANA Data Warehouse
Future-Proof Data Management Platform

Meet future demands
- LDW for dynamically changing system landscapes
- Cloud and hybrid deployment
- Integration of any data types and Big Data technologies
- Scale out to high volumes and data lakes

Go beyond other DW offerings
- Top out-of-the-box integration to SAP solutions on-premise and in cloud environments
- Real-time processing power of HANA
- Hadoop integration with SAP HANA Vora
- HANA-optimized re-usable business content

Serve standard SQL-based and BW-style data warehousing in order to …
**SAP Data Hub & SAP BW/4HANA**

**Establish a BIG Data Warehouse**

- Build a modern, open and hybrid DWH offering for any data
- SAP BW/4HANA as modern and simplified core data warehouse solution
- Implement and execute high volume transformations on Big Data Clusters Data Lake
- Leverage Big Data landscapes for data onboarding and ingestion for various types of data and files
- Data Hub as orchestration and refinery application to address end to end processes
Enterprise Data Warehousing with SAP BW/4HANA
Enterprise Data Warehousing with SAP BW/4HANA

**BUSINESS CONTENT**
- Pre-defined integrated Data Models and Applications
- Enables fast implementation on proven business applications and industries knowledge
- Rich extractor content for SAP data out-of-the-box

**DATA MODELING**
- Fully integrated modeling environment
- Store once & virtualize wherever possible
- Mix BW and SQL based data models
- Predefined modeling objects for transaction & master data (database abstraction)
- Integrated engines for OLAP & planning functions

**SECURITY & TRACEABILITY**
- Fine-grained security model with mass handling capabilities
- Auditing & Access statistics including identity handling
- Possibility to trace on application logic, database access and effect of authorizations

**RELIABLE DATA ACQUISITION**
- Batch, Real-time & Remote Data Acquisition
- Delta capabilities & Sophisticated Error Handling
- Standard (mapping, formula, lookup, conversion) & custom transformations
- Open adapter framework to connect any system (databases, OpenSource, Social Media, IOT, etc.)

**SCHEDULING & MONITORING**
- Rich scheduling & monitoring capabilities on all levels
- Process Chains enable workload management for data load processes across systems
- Management of data consistency (insert/update/delete and roll-back/reload)

**LIFECYCLE MANAGEMENT**
- Meta Data Management & Data Governance built in
- Propagation of Meta Data changes (DEV → QA → PRD)
- Data Tiering Optimization with unified concept covering hot, warm and cold data
• Modeling based on predefined semantics and modeling patterns (master data, DataStores) as well as database fields

• Database abstraction using an fully integrated modeling environment

• Store data once & virtualize wherever possible

• Options to use hybrid modeling of BW and SQL based data models

• Pre-defined integrated data models and applications enables fast implementation (Business Content)

• Data Tiering Optimization to handle data lifecycle management for large data volumes
Model-driven approach

InfoObjects (Characteristics, Keyfigures) are the most granular building blocks accompanied by a rich set of business related information for master data:

- Slowly changing dimensions support with integrated time dependency (master data historization)
- Currency and unit conversion built in
- Inventory & non-cumulative measure support
- Complex hierarchies & Multi-language support
- Geospatial support
- Time & date hierarchies including all fiscal year features
- Support for detailed Analysis Authorizations

Alternatively field-based modeling is supported, when these features are not needed.
SAP BW/4HANA – Layered Scalable Architecture (LSA++)

Simplified Data Flows

- High speed Analytics at any layer
- Flexibility through Virtual Data Marts
- Agility through virtually combining data across layers
- Business needs and service level driven
- Combination of bottom-up and top-down modeling approaches – for agile, flexible and sustainable development
- Field or InfoObject based Modelling

An architecture can only become lean if a great deal of transformations and solution modeling are done virtually and dynamically across the DWH and beyond.
Model-driven approach
- Fully integrated modeling environment incl. planning functions (with BPC add-on)
- Predefined modeling patterns for transaction & master data optimized for SAP HANA
- Store once & virtualize wherever possible

Persistent Objects
- DataStore object (advanced) – the central object for data storage and data consolidation
- InfoObject – for master data characteristics and key figures with units/currencies

Virtual Objects
- CompositeProvider – to combine data from BW/4HANA and SAP HANA via Join or Union
- Open ODS View – to consume external (and internal) data flexibly without staging

Field based modeling
- Completes InfoObject modeling
- Integrated with existing BW/4HANA Objects/Models and BW/4HANA authorizations
- Direct staging from any source possible, even mass-data loads
SAP BW/4HANA – Mixed Data Model Integration

Use the best of both worlds

• Reuse both BW and SQL skills
• Seamless data model integration
• Use your data at the frequency they are generated: batch, real-time, stream or remote
• Store data once – use multiple times
• Consume via native HANA SQL or BW query by any tool
• Add predictive, spatial and other HANA platform features
SAP BW/4HANA – OLAP & Planning Functions

Analytic Manager
- Analytic Manager is the built-in OLAP engine of BW
- The majority of analytical functions in BW/4HANA are pushed down to HANA and executed directly in the database
- Supports business processes like slow-moving items or elimination of internal business volume
- Rich set of analytical capabilities like
  - Hierarchy handling,
  - Currency and unit conversions
  - Exception aggregation & conditions
  - Restricted and calculated key figures
  - Inventory handling for non-cumulative key figures

Planning Capabilities
- Provide rich set of in-memory optimized planning capabilities using the SAP Business Planning and Consolidation, version for SAP BW/4HANA:
  - Aggregation, Disaggregation, Conversions, Revaluation
  - Copy, Delete, Set value, Repost, FOX-Formulas
- Supports embedded and standard models
SAP BW/4HANA – OLAP & Planning Functions
Example: OLAP Functionalities

SAP BW/4HANA

Build reports with a variety of rich OLAP functions on an object model level

Native SQL Database

Complex aggregations have to be defined in SQL statements or in an additional BI tool

```
SELECT Country, Product, Customer, SUM(Quantity), 1
FROM SalesData
GROUP BY Country, Product, Customer
HAVING SUM(Quantity) > 50000
```
Rich Business Content

- Enables fast and cost-effective implementation
- Based on proven business applications and industries knowledge
- Pre-defined integrated Data Models and Applications
- Rich extractor content for SAP data out-of-the box
- Supporting layered scalable architecture (LSA++)
- Provides higher level of details (line items, …)
- Mixed modeling implemented with SAP HANA and SAP BW/4HANA content where applicable
- [LINK] to latest Business Content
SAP BW/4HANA – Reliable Data Acquisition

- Batch and Real-time Data Acquisition
- Virtual/Remote Data Access support
- Delta capabilities & Sophisticated Error Handling
- Built-in data transformation and data quality functions with standard (mapping, formula, lookup, conversion) & custom transformations
- Open adapter framework to connect any system (databases, OpenSource, Social Media, IOT, etc.)
- Out-of-the-box data integration for a variety of external sources
- Optimal integration with SAP Systems (extractor content)
SAP BW/4HANA – Simplified Data Integration

SAP BW/4HANA simplifies data integration, offering comprehensive access to external systems

- Replicate data in real-time (HANA SDI based replication or via ODP – especially with ODP-SLT)
- Access data virtually
- Load data using optimized processing
Each entity with key ‘measures’ will need to define a ‘delta’ table

- Delta handling process needs to be implemented manually in ETL code / tool, for example, based on timestamp or using table compare statements

**Native SQL Database**

**Contracts**

```
SELECT * FROM Contracts
WHERE timestamp >= '20141224'
```

**Contracts_delta**

```
contract_id  Date    Value  
1            29/08/2012 1000  
1            29/08/2012 -100   
1            29/08/2012 1000   
```
Lifecycle management of Metadata
- Object-Versioning and modification tracking
- Append Concept
- Consistent Patching & Upgrades across landscape
- Deployment using proven SAP transport mechanism across multi-tier landscapes (e.g. DEV → QA → PRD)
- Consistent Remodeling

Lifecycle management of Data Persistence
- Data Tiering Optimization with unified concept covering HOT, WARM and COLD data
One concept for hot, warm and cold data based on Advanced DataStore Object Partitions

**SAP HANA In-Memory Store**

This tier is used to store mission critical data for real-time processing and real-time analytics.
Data is retained “In-Memory”.

**Data Tiering with Scale-Out**

This tier is used to store data with reduced performance SLAs, which is less frequently accessed.
Data is stored on dedicated SAP HANA Scale Out Nodes (Extension Nodes) with a relaxed sizing ratio.

**Data Tiering with External Storage**

This tier is used to store voluminous data for sporadic or very limited access.
Data is stored on disk, in columnar structures on SAP IQ or in Hadoop HDFS.
SAP BW/4HANA – Scheduling & Monitoring

- Integrated data processing and error monitoring/handling across systems
- Scheduling framework for all DWH processes
- Management of data consistency (insert/update/delete and roll-back/reload)
- Process Chains enable workload management for data load processes
- Open-hub service for data distribution
- Integration into 3rd party scheduling tools (e.g. Redwood)
- High scalability for large implementations
- Rich monitoring capabilities on all levels
SAP BW/4HANA – Security & Traceability

- Fine-grained security model with mass handling capabilities
  - Object and Hierarchy level security
  - Access-control at row level
  - Analytic Privileges grant different users access to different portions of data in the same view based on their business role.
  - Can be implemented on top of mandatory object privileges to secure access based on certain values or combination of values.

- Synchronization with other applications and IDM systems
- Support for SSO and Active Directory
- Auditing & Access statistics including identity handling
- Possibility to trace on application logic, database access and effect of authorizations
Summary
SAP BW/4HANA is SAP’s strategic EDW solution

SAP BW/4HANA offers fully integrated data warehouse application with

- Agile and flexible data modeling to also combine BW and native SQL data for real-time insights.
- Predefined Content for fast implementation
- Sophisticated data acquisition with rich scheduling & monitoring
- Integrated lifecycle management for metadata
- Built-in Data Tiering Optimization for hot, warm and cold data
- Detailed security & auditing
Thank you.
Appendix
SAP BW/4HANA vs. SAP BW – Differences

**SAP BW**

- Built on SAP NetWeaver
- Supports only classic objects
- Supports AnyDB

**SAP BW powered by SAP HANA**

- Built on SAP NetWeaver
- Supports classic objects and HANA-optimized objects
- Supports SAP HANA only

**SAP BW/4HANA**

- Based on lean ABAP appl. Server (codelines of other NetWeaver components and classic BW objects were removed)
- Supports only HANA-opt.objects
- Supports SAP HANA only
Training for SAP BW4/HANA

BW462 – SAP BW/4HANA

Classroom or Virtual Live Classroom
German (English coming soon!)

- 5 days
- Prerequisites:
  - Hands-on experience in data modeling with SAP BW 7.x
  - BW310 (SAP BW Enterprise Data Warehousing non-HANA)

For details, go to SAP Training

DBW4H – Data Warehousing with SAP BW/4HANA - Delta from SAP BW powered by SAP HANA to SAP BW/4HANA

Classroom or Virtual Live Classroom
German (English coming soon!)

- 2 days
- Prerequisites:
  - SAP BW 7.4 / 7.5 and SAP HANA 1.0 knowledge is necessary
  - DBW74, BW362, HA100 or HA100e, BW310H

For details, go to SAP Training

SAP BW/4HANA in a Nutshell

Open Online Course
English

- 4 Units – 2-3 hours in total
- No prerequisites
- Free participation & certification

For details, go to openSAP