SAP NetWeaver BW Powered by SAP HANA and Future Roadmap

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Agenda

Introduction

SAP NetWeaver BW’s use of In Memory technology
  • SAP NetWeaver BW powered by SAP HANA
  • Customer results

What’s new with NetWeaver BW 7.3, SP8

Outlook- SAP NetWeaver BW 7.3 SP 9 and further Roadmap
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Unlock The Power of Your Data Across The Enterprise

Enterprise Data Warehousing – the single point of truth

• **Enterprise Data Warehousing - why**
  – Consolidate the data across the enterprise to get a consistent and agreed view on your data
    → "Having data is a waste of time when you can't agree on an interpretation."
  – Combine SAP and other sources together
  – Standardized data models on corporate information
  – Supporting decision making on all organizational levels

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

• **EDW with SAP NetWeaver BW - 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 workspaces
  – Runs on top of HANA and other RDBMS
  – Easy consumption of HANA Data Mart scenarios via virtualized data access

• **EDW with custom built application**
  – High development and maintenance efforts
  – Variety of tools with lacking integration
Stable Product, Large installed Base, Constant Growth

- Adoption of SAP NetWeaver BW constantly growing
- Unaffected by economic downturn in 2009
- ~ 14,000 customers referring to >17,000 productive systems

Usage

- Vast majority: Central DWH, harmonizing many source systems
- Minority: One-to-One to an ERP
- Embedded into mission critical business processes
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Customer Value of BW Powered by SAP HANA

**Speed and Accelerated performance**
- Excellent query performance for improved decision making
- Performance boost for Data Load processes for decreased data latency
- Accelerated In-Memory planning capabilities for faster planning scenarios

**New Business Insights**
- Self-Service BI – Data modeling with BW Workspaces
- Flexible combine EDW with HANA-native data for better insights and decision making

**Streamline Landscape and simplify data management**
- Non-disruptive DB Migration with SAP standard tools and services
- Data persistency layers are cut out and admin efforts reduced: No aggregates, indexes, rollups, statistics
- Simplified data modeling and remodeling
SAP NetWeaver BW 7.x on xDB
- Standard DataStore Objects
- Data Base server and SAP NetWeaver BWA
- Standard InfoCubes
- BW Integrated Planning
- HANA Data Marts running side-by-side BW

SAP NetWeaver BW 7.3 on HANA
- SAP HANA-optimized DataStore Objects
- SAP HANA In-Memory platform
- SAP HANA-optimized InfoCubes
- In-Memory planning engine
- Consumption of HANA artifacts created via HANA studio
- BW staging from HANA

Migration without reimplementation - no disruption of existing scenarios
DataStore Objects in SAP NetWeaver BW 7.3
Overview and Challenge

DataStore Objects are fundamental building blocks for a Data Warehouse architecture

- They are used to create consistent delta information from various sources
- Reporting can be done on a detailed level
- In today’s RDBMS-based implementation, the activation and querying operations are extremely performance-critical
DataStore Objects in SAP NetWeaver BW 7.3
Creation of Consistent Delta Information

Current architecture

- Activation algorithm calculates the changes of each record and creates heavy load on the DBMS
- Delta calculation performed on the application server, too complex to push it down to the DBMS as SQL/Stored Procedure
- Roundtrips to application server needed for delta calculation

![Diagram of DataStore Objects in SAP NetWeaver BW 7.3](image)
SAP HANA-Optimized DataStore Objects

Accelerated Data Loads

SAP HANA-optimized DSOs

- Delta calculation completely integrated in HANA
- Using in-memory optimized data structures for faster access
- No roundtrips to application server needed
- Process of SID generation highly optimized for HANA Optimized DSOs → low impact on staging performance
- Speeding up data staging to DSOs by factor 5-10
- Avoids storage of redundant data
- After the upgrade to BW on HANA all DSOs remain unchanged
- Tool support for converting standard DSOs into SAP HANA-optimized DSOs

User interface Layer
SAP NW BW

Presentation

Application Layer
SAP NW BW

DSO Objects

Activation

Database Layer
xDB

Data

No changes of Data Flows required
SAP HANA-Optimized InfoCubes
Faster Data Loads and Easier Modeling

Traditional InfoCubes tailored to a relational DB consist of 2 Fact Tables and the according Dimension tables

SAP HANA-optimized InfoCubes represent “flat” structures without Dimension tables and E tables*:

- Up to 5 times faster data loads
  - Creation of DIM Ids no longer required
- Simplified Data modeling
- Faster remodeling of structural changes
- After the upgrade to BW7.3, SP5 all InfoCubes remain unchanged
- Tool support for converting standard InfoCubes
  - Preliminary lab result: 250 Million records in 4 minutes

No changes of processes, MultiProvider, Queries required

*Tables for compressed data
Query Performance

Query Performance at Least as Good as with BWA

Query acceleration on BW InfoCubes
- Leverage column store and In-Memory Calculation Engine for query acceleration
- No replication – fast query access directly on primary data persistence
- Indexes on InfoCubes and InfoObjects no longer required → No Rollups, Change runs

Query acceleration on BW DataStore Objects
- Leverage column store and In-Memory Calculation Engine for query acceleration
- SID generation during DSO activation to be enabled
- Result: Same kind of excellent query performance on DSOs
- Process of SID generation highly optimized for HANA
  Optimized DSOs → low impact on staging performance

No changes of processes, MultiProvider, Queries required
Query Performance
Are InfoCubes Still Required?

Info Cubes required for
• Non-disruptive approach when migrating to BW on HANA
• Non-cumulative Key Figures
• Complex business logic (report specific)
• BW Integrated Planning
• External write-interface (RSDRI)

Conclusion
• There are scenarios where the InfoCube layer becomes obsolete
• Less materialized data and simplification
• Decision to be made scenario by scenario: Business and Performance needs

InfoCube can be removed when used for query performance only
SAP NetWeaver BW – SAP HANA Interoperability

Consumption of SAP HANA data models in BW

**TransientProvider based on HANA Model**
- For ad hoc scenarios
- Generated not modeled, no InfoObjects required
- Full BEx Query support
- Can be included in a CompositeProvider to combine with other BW InfoProviders

**VirtualProvider based on HANA Model**
- For a flexible integration of HANA data with BW managed metadata (e.g. lifecycle)
- Security handled by BW
- Full BEx Query support
- Can be included to Composite- and MultiProvider to combine with other BW InfoProviders
BW In-Memory Planning
Accelerated Planning Functions

Traditional Planning runs planning functions in the App. Server

In-memory Planning runs all planning functions in the SAP HANA platform

- Performance boost for planning capabilities like:
  - Aggregation, Disaggregation
  - Conversions, Revaluation
  - Copy, Delete, Set value, Repost, FOX
  - Performance boost for plan/actual analysis

No changes of planning models, planning processes, MultiProvider, Queries required
SAP NetWeaver BW – Post-Copy Automation (BW PCA)

Easier and faster migration to SAP NetWeaver BW on SAP HANA

Automated migration of SAP NetWeaver BW on RDBMS to SAP NetWeaver BW on SAP HANA using BW PCA

- Optimized downtime for SAP NetWeaver BW source system
- Automated delta-queue cloning/synchronization
  - Enables easy operation of original + new system in parallel
- Automated clean up of target system
- Automated post-copy configuration
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Outlook- SAP NetWeaver BW 7.3 SP 9 and further Roadmap
Asian Paints, the biggest paint manufacturing company in India with very strong brand equity is seen as the early adopter of cutting edge IT solutions, and is widely regarded in the SAP customer community as very prolific user of SAP BI. In late 2011, Asian Paints decided to implement HANA for their growing analytical needs for the large volume ERP and BW implementations, and with the help of SAP Consulting implemented SAP HANA running under SAP BW in only 3 weeks.

### Performance and benefits

- Data volume compression savings of 6:1 moving from BW/Oracle to BW/HANA
- **Significant improvement in the query performance: average query performance improvement was** 15 x **with maximum improvement 266x times.**
- Certain queries, for analyzing orders and billing that could not run in the past on BW-Oracle, are returning the results with an impressive query response time of 15-20 secs with BW-HANA.
- Data load time reduced by an average of 95% with some of the delta data load completing in 2 minutes in BW-HANA, paving the way for near real-time data extraction and analysis, compared to more than 35-40 minutes it used to take in BW-Oracle.
Merit Energy is one of the largest privately held oil and gas companies in the world. They purchased BW on HANA in Q4 2011 and implemented a BW on HANA pilot system that is running next to their production BW on Oracle system. They are feeding delta loads from their production ECC environment to both BW on Oracle and BW on HANA.

**Project scope and business scenario**

**Performance and benefits**

**DSO Activation**

Biggest DSO is for FI-GL line items with nearly 1 billion rows of active data. From ECC, loaded 1 million+ rows of delta data into the FI-GL DSO. On Oracle, the activation took 588 seconds. With BW on HANA, the activation took 14 seconds! **42x Improvement.**

**Data Loading**

Loading 14 million rows of data into an InfoCube for Lease Operating System data took 37 minutes in the Oracle based BW system. With BW on HANA, the In Memory Optimized InfoCube with no Dimension ID lookups took only 12 minutes for a **3x improvement.**

**Infocube Compression**

The Lease Operating System InfoCube was 64.66 GB. With BW on HANA the same cube was only 19.32 GB for **3x compression.**

"I am able to access the lowest level of detail in our General Ledger DSO and the performance is incredible. Using the intuitive, Excel-based Analysis Office Interface I can navigate through 1 billion records in 10 seconds or less per navigation."

**Customer Quote**
Yazaki Europe, an automotive supplier and the world’s largest producer of wiring harnesses for cars and trucks, had been using the 3.5 version of SAP NetWeaver BW 3.5. The company was having challenges with the performance of the existing reporting system.

“We chose SAP NetWeaver BW powered by SAP HANA to improve and accelerate several processes in the areas of finance and controlling, production and logistics and we have already seen major improvements. We were able to accelerate processes within finance and controlling, such as end-of-month closing, year-end closing and other common analysis in the area of controlling.”

“Our next big step will be the acceleration of processes within the productive ERP system, among others in the area of production and logistics.”

With SAP NetWeaver BW powered by SAP HANA, Yazaki Europe has been able to accelerate reporting and is now accessing reports faster out of info cubes and using creativity within reporting. In addition, they are leveraging in-memory processing for fast acceleration of raw tables, calculations and BW metadata.

Salim Siddiqi,
CIO Yazaki Europe
More time for everyone

"Thanks to SAP HANA, our operating costs for SAP NetWeaver Business Warehouse have gone down by a third," says Schindler. The individual business areas conduct the analyses themselves without any need of assistance from the IT department. In turn, IT has more time for other tasks and no longer needs to rely on external consultants.

"But one very important benefit is often forgotten," notes Schindler. "Users can now evaluate their data within seconds – and no longer need to wait minutes for the system to return the results. As a result, they don’t lose their train of thought and ultimately work much more effectively." The time needed to analyze inventory has gone down to only five seconds for a total of 7 million data records – a time savings of more than five minutes.

Plus, users gain a whole new insight into the data that was never possible before. "Even completely random and unordered data can be analyzed very quickly, according to all thinkable criteria," explains Schindler. The vertical database structure makes all this possible. It finds the required data much faster than a traditional horizontal structure and stores information in a way that allows queries to be processed extremely quickly.
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Overview

SAP HANA-specific highlights*
- SAP BW and SAP HANA Mixed Scenarios
- “Non active” data concept
- Conversion of Semantic Partitioned Objects (SPO)
- Enhanced Partitioning for write-optimized DSOs

Platform independent highlights
- Enhanced Support of 3.x → 7.x Dataflow Migration
- File Download of BW meta data
- DSO Planning

*please ensure to install the latest HANA revision
SAP NetWeaver BW – SAP HANA Mixed Scenarios:
Combining the strengths of both worlds

BW:
- SAP Extractors
- Data Services
- SLT

Native HANA:
- SAP Extractors (DXC)
- Data Services
- SLT

BW InfoProvider consumption in HANA
HANA model consumption in BW
BW data provisioning for HANA
HANA data staged into BW
SAP NetWeaver BW – SAP HANA Interoperability

Recap - Consumption of SAP HANA data models in BW before SP8

**TransientProvider based on HANA Model**
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- Full BEx Query support
- Can be included in a CompositeProvider to combine with other BW InfoProviders

**VirtualProvider based on HANA Model**
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- Security handled by BW
- Full BEx Query support
- Can be included to Composite- and MultiProvider to combine with other BW InfoProviders
Optimized SAP HANA Data Load into SAP NetWeaver BW

- Complementary to DB Connect
- Based on new source system type: Operational Data Provider (ODP) with the context ‘HANA’
- Enable direct loading from HANA Views via DTP into BW managed schema
- Data persistency in PSA optional
- Mass data loading
**SAP NetWeaver BW – SAP HANA Interoperability**

**Easy consumption of HANA master data in BW queries**

**SAP NetWeaver BW Virtual Master Data**
- HANA attribute view exposed as master data in BW
- No data staging of SAP HANA master data required
- Prior to SP 8 information in master data tables stored in SAP HANA schema could only be consumed in BW query via staging into BW
Open Hub Destination with new target SAP HANA DB:

- Support data transfer from BW InfoProviders, DataSources and Queries into tables residing in SAP HANA for further usage by HANA applications.
- Default is 1:1 mapping, individual transformation can be modeled
- Delta extraction supported for InfoProviders and DataSource
- Query snapshots via QueryProvider are possible
- Supported also for BW on classic RDBMS
Generate Analytic View for BW InfoProvider via HANA Modeler

- Generated Analytic View contains basic BW Metadata
- Generated Analytic View can be consumed via SAP HANA interfaces and used in further SAP HANA models
- This enables SAP BO Explorer on BW data
“Non Active” Data Concept *

Providing lower TCO by optimized RAM sizing

Tables/partitions in SAP HANA can be marked as “non active”

- Such tables/partitions are …
  - loaded into RAM only when accessed
  - loaded into RAM in case of read access (column-wise) and processed as usual (same speed and functionality)
  - loaded to RAM for merge process (if new data was written and delta reaches limit)
  - displaced from RAM with highest priority in case of RAM shortage (but only then) or when actively a cleanup is triggered

- BW automatically marks all PSA tables and all write-optimized DSO tables as “not-active”, no extra maintenance or tuning is necessary

* Requires HANA SPS 5
Multi Temperature Data

<table>
<thead>
<tr>
<th>hot</th>
<th>warm</th>
<th>cold</th>
</tr>
</thead>
</table>
| Data is read and/or written frequently  
  In memory  
  No restrictions, all features available  | Infrequent access  
  On disk, no need to keep in memory all the time  
  No restrictions, all features available | Sporadic access  
  Not stored in HANA DB; stored in Near-line Storage  
  Restricted to NLS capabilities |

Data volume

Performance

Non-Active Data Concept

Providing lower TCO by optimized RAM management
“Non Active” Data Concept – SAP NetWeaver BW

Reduces RAM sizing, thereby reducing TCO

Optimized RAM sizing

- “Non active” data concept has substantial impact on SAP NetWeaver BW on SAP HANA RAM sizing
- Assumption: only ~ 20% of “not active” tables are required in memory, rest resides on disk only.
- ABAP Sizing Report (note 1736976) for SAP NW BW on HANA will take “not active” data into account

Examples of Customer Savings

<table>
<thead>
<tr>
<th>Customer A</th>
<th>Customer B</th>
<th>Customer C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software Industry</td>
<td>Beverage Industry</td>
<td>Automotive Industrie</td>
</tr>
</tbody>
</table>

GB RAM Size without “non active” data consideration

GB RAM Size with “non active” data consideration
Conversion of Semantic Partitioned Objects to HANA optimized

Providing Investment Protection for investment made in SPOs

Tool Support for Converting existing SPOs to HANA-optimized DSOs and InfoCubes

- Integrated into standard conversion tool RSMIGRHANADB to ensure consistency during conversion
- Conversion can be re-started at any time in case of failure
Better performance of write-optimized DataStore Objects

- Write-optimized DSO are now partitioned by request-ID
- Partitioning improves merging performance significantly, especially in case the delta Index is merged for a large Write-Optimized DSO.
- With partitioning only the relevant (last) partition (with changed/new records) is merged.
- In addition performance for read and delete is improved, because with partition pruning only a subset of the data is accessed.

Reduces data latency for Write-Optimized DSOs
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SAP NetWeaver BW
Product Roadmap Overview – Key Themes and Capabilities

SAP NW BW 7.3 on SAP HANA

SAP HANA specific features
- Performance boost for data loading, query response time and in-memory planning
- SAP HANA-optimized InfoCubes and Data Store Objects
- Simplified and faster data modeling/remodeling
- “Not active” data concept
- SAP NetWeaver BW and SAP HANA Mixed Scenarios (BO Explorer, BW Virtual Master Data, etc.)
- Support of Semantic Partitioned Objects and enhanced partitioning for write optimized DSOs
- Simplified system landscape

Platform independent highlights*
- Graphical data flow modeling and enhanced support of 3.x-7.x data flow migration
- Semantic Partitioned Objects (SPO)
- Rapid prototyping of Ad Hoc scenarios via BW Workspaces
- File download of BW meta data
- DSO planning
- Tighter integration with SAP Data Services

Today
(Release SAP NW BW 7.3 SP8; SAP NW BW 7.31 SP5)

* SAP will continue to support RDBMS platforms

Upcoming planned release

HANA-and platform independent
- SAP NetWeaver BW Near Line Storage solution (NLS) based on Sybase IQ
  - Helps to reduce TCO by reducing data volume in BW
  - Shortens backup time frames
  - High speed analysis for NLS residing historical information
  - SAP owned solution out of one hand

- SAP NetWeaver BW Post-Copy Automation Refresh
  - Helps to reduce operations costs and risks by automating post-copy configuration tasks
  - Availability planned with 2013/Q2 for all releases from BW 7.0 onwards

Future innovations

Prepare for Big Data
- Data LifeCycle Management / Multi-temperature data
- Bulk load capabilities
- Dimensions with more than 2 billion members
- Hadoop connection

Additional flexibility / agility
- Harmonize SAP NetWeaver BW and SAP HANA modeling
- Eclipse based modeling environment in BW e.g. BW Query Designer, CompositeProvider
- PSA layer becomes optional
- Leverage HANA libraries in BW transformations
- Support extra long texts

Planned Innovations
(Release SAP NW BW 7.3 SP9; SAP NW BW 7.31 SP7)

Future Direction
THANK YOU!