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Introduction: In-Memory
The First 35 Years: Innovated with ERP & LOB Apps

Data “In”

ERP + LOB

Systems of Record
Three Years Ago: Innovated with Analytics

Data “In”

ERP + LOB
Systems of Record

BICS

Business Analytics
Systems of Engagement

Info “Out”
Last Year: Innovated with Mobility

[Diagram showing Mobility, Accessible Systems, Data "In", ERP + LOB (Systems of Record), BICS, Business Analytics (Systems of Engagement), and Info "Out"]
This Year: Innovating the Database

Mobility
Accessible Systems

ERP + LOB
Systems of Record

Business Analytics
Systems of Engagement

Data “In”

BICS

Info “Out”

Business Applications Performance Bound by Data

Oracle
DB2
SQL
Other
HANA Accelerates Data, Applications, Analytics

ERP + LOB
Systems of Record

Business Analytics
Systems of Engagement

Data “In”

Oracle
ELT or ETL
HANA
In Memory Database

BICS

SQL
DB2, etc.

Info “Out”

Mobility
Accessible Systems

HANA Accelerates Data, Applications, Analytics
Long Term: HANA is the Database

ERP + LOB
Systems of Record

MOBILITY
Accessible Systems

BICS

Business Analytics
Systems of Engagement

HANA
In Memory Database

Data “In”

Info “Out”
In-Memory Computing – The Time is NOW

**HW Technology Innovations**

- Multi-Core Architecture (8 x 8core CPU per blade)
- Massive parallel scaling with many blades
- One blade ~$50,000 = 1 Enterprise Class Server
- 64bit address space – 2TB in current servers
- 100GB/s data throughput
- Dramatic decline in price/performance

**SAP SW Technology Innovations**

- Row and Column Store
- Compression
- Partitioning
- No Aggregate Tables
SAP HANA Appliance

Preconfigured Analytical Appliance
- In-Memory software + hardware (HP, IBM, Fujitsu, Dell and Cisco)

In-Memory Computing Engine Software
- Data Modeling and Data Management
- Real-time Data Replication via Sybase Replication Server
- Data Services for ETL capabilities from SAP Business Suite, SAP BW and 3rd Party Systems

Capabilities Enabled
- Analyze information in real-time at unprecedented speeds on large volumes of non-aggregated data
- Create flexible analytic models based on real-time and historic business data
- Foundation for new category of applications (e.g., planning, simulation) to significantly outperform current applications in category
- Minimizes data duplication
SAP NetWeaver BW 7.30
SAP NetWeaver BW adoption

Productive SAP NetWeaver BW systems – constant growth

- Adoption of SAP NetWeaver BW constantly growing
- More than 13,000 customers referring to more than 16,000 productive systems

Stable Product, Large installed Base, Constant Growth
SAP NetWeaver Business Warehouse
Strong EDW capabilities

Integrated, scalable Enterprise Data Warehouse (EDW) platform

| Business Content | Fast, sustainable implementation:  
|                  |  ■ Modeling Patterns  
|                  |  ■ Business Content  |
| Reliable Data Acquisition | Load any data with trust and quality:  
|                          |  ■ Out-of-the box integration for data originating in SAP systems  
|                          |  ■ Integrated with SAP BusinessObjects Data Services (Data Integrator and Data Quality Management)  |
| Streamlined Operations | Efficient, streamlined data management:  
|                         |  ■ Management of data consistency  
|                         |  ■ Sophisticated Security, Authorization and Identity Handling  
|                         |  ■ High availability  |
| Lifecycle Management | Sophisticated lifecycle management at different levels:  
|                        |  ■ System  
|                        |  ■ Meta Data  
|                        |  ■ Data (Nearline storage, archiving)  |
Existing SAP BW Reference customers
SAP NetWeaver BW Powered by HANA
Supercharge BW Applications

Primary Database for BW
Foundation for new Applications
- In-Memory database used as primary persistence for BW
- BW manages the analytic metadata and the EDW data provisioning processes
- Detailed operational data replicated from applications is the basis for all processes
- SAP HANA 1.x will be able to provide the functionality of BWA
- High-performance foundation for new SAP applications
Typical Bottle Necks - Short Comings of current Approach

- Missing analytical capabilities on DB level lead to massive AppServer/DBServer traffic
  - DataStoreObjekt (DSO) (e.g. Activation)
  - Integrated Planning (e.g. Disaggregation)

- Missing capability of integrating different data mart types on a single platform
  - Architected data marts vs. operational data marts vs. agile data marts

- Nature of RDBMS - tuple based data storage, indexing necessary for performance
  - Read/Load Performance on the RDBMS (e.g. Extended SAP Star Schema too complex)

- Other Examples
  - Exception Aggregation (e.g. Distinct Count only available as BWA Calculation Engine feature)
Application vs. Database Server - Technical Overview

Applications – Tight coupling between Application Server and SAP HANA

- With large data volumes, reading information becomes a bottleneck
- Next generation applications will delegate data intense operations
- The runtime environment executes complex processes in memory
- In memory computing returns results by pointing apps to a location in shared memory

Today

In-Memory empowered

ABAP AS Next Generation

Next Generation Apps

Compile & deploy

Data in memory

Fast data transfer

Runtime

Procedure code

Program code

ABAP AS

RDBMS
SAP NetWeaver BW – Fully In-Memory Enabled EDW

- Data Modeling
- Analytical / Planning Engine
- Data Management

- Relational Database
- Data Storage

- HANA
  - Analytical / Planning Engine
  - Data Management
  - Data Storage
SAP NetWeaver BW Powered by SAP HANA
Customer Value

1 Supercharge BW with Dramatically Improved Performance
   *Time becomes your competitive advantage*
   - With faster reporting and more insightful analysis
   - With faster data loading and decreased data latency

2 Simplified Administration and Streamlined Landscape
   *Efficiency becomes your competitive advantage*
   - With reduced IT workloads and administrative tasks
   - With a simplified system landscape and less data storage

3 Unlock The Power of Your Data Across The Enterprise
   *Business flexibility becomes your competitive advantage*
   - With access to ALL your data down to the most detailed level
   - With business users empowered to quickly get the answers they need

4 Preserve Your BW Investment without Disruption
   *Innovation without disruption becomes your competitive advantage*
   - With no disruption to your BW application but with all the benefits of a supercharged system
   - With minimal impact to business users and administrations in terms of training
BW powered by HANA
SAP NetWeaver BW Powered by SAP HANA

SAP NetWeaver BW 7.x on xDB
- Standard DataStore Objects
- Data Base server and SAP BWA
- Standard InfoCubes
- BW Integrated Planning
- HANA Data Marts running side-by-side BW

SAP NetWeaver BW 7.3 on HANA
- HANA as a Platform
- In-Memory based InfoCubes
- In-Memory based DataStore Objects
- In-Memory planning engine
- Consumption of HANA artifacts created via HANA studio
- BW staging from HANA

Migration without reimplementation - no disruption of existing scenarios
Business Benefits of SAP BW on HANA
Superior Performance

Accelerated reporting performance

Access Data Faster
- Improved Reporting and query performance over traditional RDBMS
- Query acceleration on BW DataStore Objects (DSO)
- Acceleration via In-Memory column storage
- Additional acceleration via Analytic Views on top of DSO

Real-Time Operational Data Access
- Transient InfoProider dynamically generated on top of Analytic Views during Query runtime

Reduce Latency
- Performance boost for ETL processes
- Faster delta loading via massively improved load window
SAP HANA optimized InfoCubes represent “flat” structures

- Up to 5 times faster data loads (lab results)
- Faster remodeling of structural changes
- After the upgrade to BW on HANA all InfoCubes remain unchanged
- Tool support for converting standard InfoCubes (lab result: 250 Million records in 4 minutes)
- No changes of processes, MultiProviders, Queries required
HANA Optimized DataStore Objects

HANA Optimized DSOs provide faster activation times!

HANA optimized DSOs

- Delta calculation completely integrated in HANA
- Using in-memory optimized data structures for faster access
- No roundtrips to application server needed
- 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 HANA optimized DSOs
- No changes of data flows required
Using in-memory computing technology

... one of the most time consuming staging operations – the request activation – was speed up tremendously by factor 5 - 10

... storage of redundant data was prevented

BW 7.30 - RDMBS based
In-Memory optimized
Business Benefits of BW on HANA
Plan Faster and Plan More Frequently

In-Memory enabled planning for shorter planning cycles!

Push-Down Planning Logic to SAP HANA
- Traditional Planning runs planning functions in the App. Server
- In-memory Planning runs planning functions in the SAP HANA platform

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

Non-Disruptive
- No changes of planning models, planning processes, MultiProvider, Queries required
Example: BW In-Memory Planning

Traditional Approach

1. Determine the delta → +50
2. Disaggregate (in appl. server)
   - per week (52)
   - per branch (500)
     26000 combinations / values
3. Send 26000 values to DB to save

HANA-Based Approach

1. Determine the delta → +50
2. Send 1 value to DB
   + instruction to disaggregate and how
3. Disaggregate (in DB engine)
   - per week (52)
   - per branch (500)
     create + save 26000 values
Consumption of SAP HANA Data Models

SAP BW can leverage real-time operational data-marts from SAP HANA!

Tight integration between HANA Data Mart scenarios and SAP NetWeaver BW

- Providing additional flexibility by combining ad-hoc data models from Data Marts with consolidated data in the EDW
- No need to manually create/maintain Metadata for Analytic Views in SAP NetWeaver BW
- Transient InfoProvider dynamically generated on top of Analytic Views during Query runtime
- Query: e.g. Analysis, Xcelsius, Web Intelligence (WebI)
- Integration BW Analysis Authorization Concept
Feedback from Early Customers

10x Faster Data Loading

100x Faster Reporting

3x faster than BWA!

20% Reduction in Admin & Maintenance FTE

Estimated by customer. Customer plans on re-deploying FTEs to BI projects
BW / Non-BW Mixed EDW Environment on HANA

- Analysis (Pioneer)
- BICS Universes (WebI, CR, XC)
- Universes (SQL)
- other SQL clients
- Explorer

BICS, MDX, SQL

BW application

BW managed schema

any schema

HANA

- SAP Extractors
- Data Services

- Replication Services
- Data Services

* Planned functionality, not yet available.
* Scope tbd, but will be limited.
Thank You!

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