SAP HANA Overview & Roadmap

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Business Analytics Solutions from SAP
Most complete offering

Analytic Applications

- **By Industry**
  - Financial Services
  - Public Sector and Healthcare
  - Manufacturing
  - Consumer Products
  - Retail and Telco
  - Utilities and more…

- **By LoB**
  - Service, Sales, and Marketing
  - Procurement
  - Supply Chain
  - Finance
  - Sustainability
  - IT, HR, and more…

Enterprise Performance Management
- Strategy Management
- Planning, Budgeting, and Forecasting
- Profitability and Cost Management
- Financial Consolidation
- Disclosure Management

Governance, Risk, and Compliance
- Enterprise GRC
- Access Risk Management
- Global Trade Services
- Continuous Transaction Monitoring

Business Intelligence
- Reporting and Analysis
- Dashboards and Visualization
- Data Exploration
- Mobile
- BI Platform

Enterprise Information Management
- Data Services
- Master Data Management
- Event Processing
- Content Management
- Information Governance

Data Warehousing
- Enterprise Data Warehousing
- High-performance Analytic Solutions
- Data Mart Solutions
Vision: In-Memory Computing

Background and Context

Technology that allows the processing of massive quantities of real time data in the main memory of the server to provide immediate results from analyses and transactions.
SAP Strategy for In-Memory Computing

TECHNOLOGY INNOVATION → BUSINESS VALUE
Real-Time Analytics, Process Innovation, Lower TCO

HEART OF FUTURE APPLICATIONS
Packaged Business Solutions for Industry and Line of Business

CUSTOMER CO-INNOVATION
Design with customers

INNOVATION WITHOUT DISRUPTION
New Capabilities For Current Landscape

EXPAND PARTNER ECOSYSTEM
Partner-built applications, Hardware partners
SAP’s Currently Available In-Memory Solutions

- **The Business Warehouse Accelerator (BWA)** - Accelerates BW Queries by speeding up data acquisition and supporting very specific on-the-fly calculations & aggregations

- **SAP BusinessObjects Explorer, accelerated version** - Combines the speed of BWA with the simplicity of Explorer to gain insights by analyzing large volumes of data

- **SAP NetWeaver Enterprise Search** - Role based secured search solution for structured & unstructured data

- **SAP CRM Customer Segmentation**: Solution for determining target groups for marketing campaigns, slicing through millions of records in fractions of a second

- **SAP Advanced Planner and Optimizer with liveCache**

- **SAP Business ByDesign analytics**

SAP HANA is founded on a history of building in-memory products at SAP
In-Memory Computing – The Time is NOW
Orchestrating Technology Innovations

The elements of in-memory computing are not new. However, dramatically improved hardware economics and technology innovations in software have now made it possible for SAP to deliver on its vision of the Real-Time Enterprise with in-memory business applications.

**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
- Insert Only on Delta
Making Use of Columnar Data Store

**Columnar data store benefits**

- Optimizes load of data to CPU
- High data compression
- Very fast data aggregation
- Makes use of real-life fill of tables (few fields filled, few updates)

**Can be joined with row-based data**

<table>
<thead>
<tr>
<th>Columnar Data Store Benefits</th>
<th>Conceptual View</th>
<th>Memory Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 10 €</td>
<td>A B C D E</td>
<td>A B C D E</td>
</tr>
<tr>
<td>B 35 $</td>
<td>10 35 2 40 12</td>
<td>10 35 2 40 12</td>
</tr>
<tr>
<td>C 2 €</td>
<td>€ $ € $</td>
<td>€ $ € $</td>
</tr>
<tr>
<td>D 40 €</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E 12 $</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SAP High-Performance Analytic Appliance (SAP HANA) Architecture

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

In-Memory Computing Engine Software
- Data Modeling and Data Management
- Real-time Data Replication Data Services for 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
HANA v1.0 Landscape with external systems along with Operating systems & Software installed

- **Admin Workstations (WIN)**
  - SAP IMCE Studio 1.0
  - SAP IMCE Clients 1.0
  - Data Services Designer
  - Information Designer
  - MS Excel 2010
  - Web access to BI admin tools

- **End users Workstations (WIN)**
  - MS Excel 2010
  - SAP IMCE Clients 1.0
  - Web access to BI clients

- **HANA (SLES 11 SP1)**
  - SAP IMCE Server 1.0, Client, Studio
  - SAP HANA Load Controller 1.0
  - SAP Host Agent 7.20
  - Sybase Replication Server 15.5 + ECDA

- **BOE (Refer to PAM)**
  - BI Platform
  - WebApp server
  - Repository

- **Data Sources**
  - SAP ERP System
    - SAP ERP
    - SAP Host Agent 7.20
    - Sybase Replication Agent (HP UNIX, SLES, AIX)
  - SAP BW System
  - 3rd Party systems

- **Data Services (Refer to PAM)**
  - Data Services 4.0
  - Data Services Job Server
  - Repository (shared with BOE)
In-Memory Services
Deployment Considerations

1. Process for deploying In-memory appliance; involves system architects and administrators with in-memory familiarity
2. Identify respective data considerations based on relevant scenario; involves data modeling, data synchronization
3. Development of desired BI front end; reporting, dashboards, other BI outputs
In-Memory Services
Service Offerings - From Assessment to Full Implementation

Business assessment
Identify road map and suitable scenarios
- Understand how In-memory can assist business users.

Planning assessment
Identify road map and suitable scenarios
- Understand how In-memory could fit into the overall environment
- Assess reporting situation and derive appropriate scenarios and advice to integrate In-memory into existing BI strategy
- Sizing assistance, scenario applicability, performance and real-time considerations
- Includes In-memory Overview Workshop and Technical Landscape Workshop
- Duration/Efforts: 10 days on-site/remote, 2 consultants

Quick start
Quick start of predefined business content
- Implement one selected scenario
- Real life data is used in a fully functional In-memory environment to create quick wins
- Discuss further implementation options
- Includes In-memory Overview Workshop and Technical Landscape Workshop
- Duration/Efforts: 2 consultants

Full implementation
Customer business scenarios implemented from data acquisition to analytics
- Scope and blueprint development
- Data modeling and acquisition from identified sources
- Design and build analytics process and dashboards
- Multiple scenarios are covered
- Includes In-memory Overview Workshop and Technical Landscape Workshop
- Duration/Efforts: T&M, 2 consultants

Planning assessment
Identify road map and suitable scenarios
- Understand how In-memory could fit into the overall environment
- Assess reporting situation and derive appropriate scenarios and advice to integrate In-memory into existing BI strategy
- Sizing assistance, scenario applicability, performance and real-time considerations
- Includes In-memory Overview Workshop and Technical Landscape Workshop
- Duration/Efforts: 10 days on-site/remote, 2 consultants
Next Generation Applications Overview

Applications – Tight coupling between application server and SAP HANA

Today

Tight Coupling

- 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

Mid-Term (Plan)

- ABAP AS Next Generation
  - Next Generation Apps
    - Procedure code
    - Program code
  - Fast data transfer
  - Compile & deploy
  - Runtime
  - Data in memory
  - SAP HANA
SAP HANA Proof-Points

SAP High Performance Analytic Appliance (SAP HANA)
SAP HANA is the engine of the real-time enterprise. It provides a foundation on which to build a new generation of applications, enabling customers to analyze large quantities of data from virtually any source, in real time. The example below showcases actual customer performance of a core reporting process.

Runs 350x faster

77 minutes
Before SAP HANA

13 seconds
With SAP HANA
Business Intelligence Clients and SAP HANA 1.0

- SAP BusinessObjects BI 4.0
  - Semantic Layer
    - WebI
    - Dashboards
    - Crystal
  - SAP In-memory Computing Engine
    - SAP BW
    - 3rd Party
    - Sybase Replication Server
      - Sybase Unwired
    - SAP BusinessObjects Data Services
      - Microsoft Excel
        - MDX (ODBC)
      - DBSQL
        - BICS
          - DSQL
            - MDX (ODBC)
      - SAP BW
        - SQL (ODBC/JDBC)
      - Sybase Replication Server
        - Real Time
          - ERP
            - DB

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HANA Proof Point

Experience the real-time Enterprise in action
A live analysis by a consumer products company reveals how SAP HANA analyzes current point-of-sale data in real time—empowering this organization to review segmentation, merchandising, inventory management, and forecasting information at the speed of thought.

- 70 retailers
- 460 billion records
- 50 terabytes of data

0.04 seconds
analysis response time
on any device, anywhere, anytime

- 20x Faster Analysis with 200x Better Price/Performance
- Shelf turnaround: Down to 2 days from 5 days
- Eliminated out of stock scenarios during promotions
Query Acceleration
Large Bank – 1 Month of Customer Information

Data Compression with HANA

<table>
<thead>
<tr>
<th>Traditional DB</th>
<th>HANA</th>
</tr>
</thead>
<tbody>
<tr>
<td>41.9 GB</td>
<td>6.6 GB</td>
</tr>
</tbody>
</table>

Data Volume (GB)

Query Run-Time Comparison

<table>
<thead>
<tr>
<th>Query</th>
<th>Query Run-Time (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Query 1</td>
<td>1050</td>
</tr>
<tr>
<td>Query 2</td>
<td>1320</td>
</tr>
<tr>
<td>Query 3</td>
<td>2660</td>
</tr>
</tbody>
</table>

Query Run-Time (seconds)

- Traditional DB
- HANA

6.3x Data Compression

- No Schema Changes
- Same Data
- Same SQL
- Immediate Benefits

369x Average Query Speed-Up
Example for new In-Memory Applications

A smart grid delivers electricity from suppliers to consumers using two-way digital technology to control appliances at consumers' homes to save energy, reduce cost and increase reliability and transparency. It overlays the electricity distribution grid with an information and net metering system.

Smart-meters deliver information on the current power consumption of every household every 15 minutes.

A management system needs to be able to capture and process this information in real time.

In-Memory Computing is planned to be capable of managing the data coming from smart meters.

Applications will be able to process the captured information in real time, in order to buy or sell power depending on current consumption patterns.

Applications will be able to trigger home appliances based on the current price for electricity.

In-Memory Computing will provide the possibility to introduce completely new business models based on real time information and execution.
Additional examples for new In-Memory Applications

**Financial Services**
- Hedge fund trading analysis.
- Real-time systematic risk management and reporting based on market trading exposure.

**Consumer Products Goods**
- Supplier Risk Management
- Inventory Recall Reconciliation Product trace
- Product Lifecycle and Cost management
- EPA standards compliance
- On-Shelf Availability Analysis
- Real-time Warranty and defect analysis

**Manufacturing**
- Manufacturing Production and Maintenance Analytics
- Real-time Asset Utilization Analytics

**Oil & Gas**
- Operations Performance Management
- Business Transformation
- Oil Well Performance Analysis
- Supply Chain Network Visibility
- Spend Performance Analysis

**Retail**
- Store Operations
- Point-of-Sales Retail Sales Analytics
- Load Balance Optimization
- Real-time complete multi-channel pricing
- Product damage, returns and spoilage

And many more ….
SAP In-Memory Strategy
Product Strategy and Plan

In-Memory Analytics
- SAP HANA real-time operational analytics
- Complete BI Suite with BI 4 runs on SAP HANA

Next-gen Applications
- SAP BW fully running on SAP HANA
- SAP HANA platform for in-memory apps
- SAP Business Suite runs on SAP HANA
- Further optimization of BI 4 Suite for SAP HANA
- Industry and LOB Analytic Apps

One Store for Data and Analytics
- SAP HANA only persistence layer for SAP Business Suite
- SAP Business Suite optimized for in-memory computing

Capabilities
- Flexible real time analysis of operations at non-aggregated level
- Real-Time operational planning and simulation capabilities: link to execution
- Primary persistence and optimized for SAP BW

Benefits
- Reduced landscape complexity
- Value chain transformation

“Renovation”
SAP HANA 1.0
Ramp-Up since Dec 2010

“Innovation”
Mid-Term (Plan)

“Transformation”
Longer-Term (Plan)
Today’s Situation
Traditional Business Intelligence and Data Warehousing

Corporate BI

EDW/SAP BW

DB

ETL

SAP ERP

BI

DB

Local BI

Data Mart

SAP ERP

DB

DB

Non SAP

ETL
Step 1 – SAP HANA 1.0 and BWA
BI & Data Warehousing with SAP In-Memory Computing

Ramp-Up Today

Corporate BI

SAP BW

DB

BWA

ETL

Local BI

SAP HANA

SAP ERP

X

DB

Real Time

SAP HANA

SAP ERP

Real Time

ETL

Local BI

Non SAP
Step 2 – SAP HANA (Plan)
BI & Data Warehousing with SAP HANA & BW 7.3

Corporate BI

SAP BW

SAP HANA

Virtual DM

Virtual DM

Virtual DM

Real-time

SAP ERP

SAP ERP

SAP HANA

DB

DB

Local BI

ETL

Non SAP
Step 3 – SAP HANA (Plan)
Native In-memory Applications

- SAP ERP
- DB
- Virtual DM

Corporate BI
- SAP BW

Local BI

SAP HANA
- Virtual DM
- Virtual DM
- Virtual DM

Next Gen App Server
- New Applications

Real-time

ETL

SAP ERP
- DB

SAP ERP
- DB

Non SAP
Step 4 – SAP HANA (Plan)
OLTP & BI Convergence

- SAP ERP 1
- SAP ERP n
- SAP BW

Local BI

SAP HANA
- Virtual DM
- Virtual DM
- Virtual DM

Corporate BI

Next Gen App Server

New Applications

Real Time

3rd Party
- DB

Longer-Term (Plan)
Further Information

SAP Community Network

In-Memory community page

In-Memory discussion forum

In-Memory blogs

Business Analytics community
http://www.sdn.sap.com/irj/boc

Social Media

Twitter
http://twitter.com/SAPcommnet
http://twitter.com/SAPInMemory

Facebook
https://www.facebook.com/sapcommunitynetwork

Upcoming Webinars

Business Analytics Webinar Series
http://www.sdn.sap.com/irj/scn/businessobjects-webinars
Thank You!

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