Innovating the Real-Time Business with SAP In-Memory Computing (HANA)

Oscar Trompé HANA lead EMEA

2012

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.

© 2012SAP AG. All rights reserved.

Speed of Business Change

Years It Took to Reach a Market Audience of 50 Million

Radio

38 years

TV

13 years

Internet

4 years

iPod

3 years

Facebook

2 years

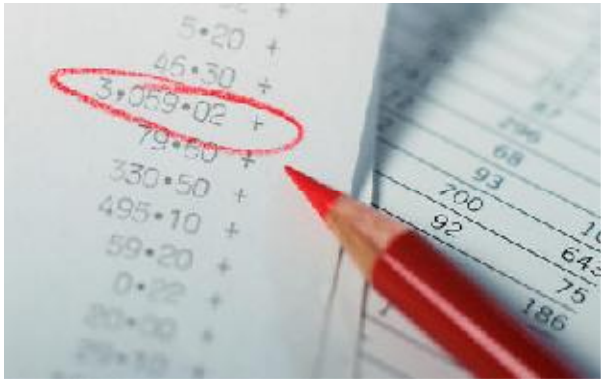
„It is not the strongest of the species that survive, nor the most intelligent but the most responsive to change.“

(Charles Darwin)

© 2012SAP AG. All rights reserved.

Innovation Drives Success

Technology Innovations Enable Businesses to Become …



- Fiscally and operationally efficient
- More flexible and quick to action with proper insight
- Empowered at the business user level to make smart decisions and act on these demands

© 2012SAP AG. All rights reserved.

AGENDA

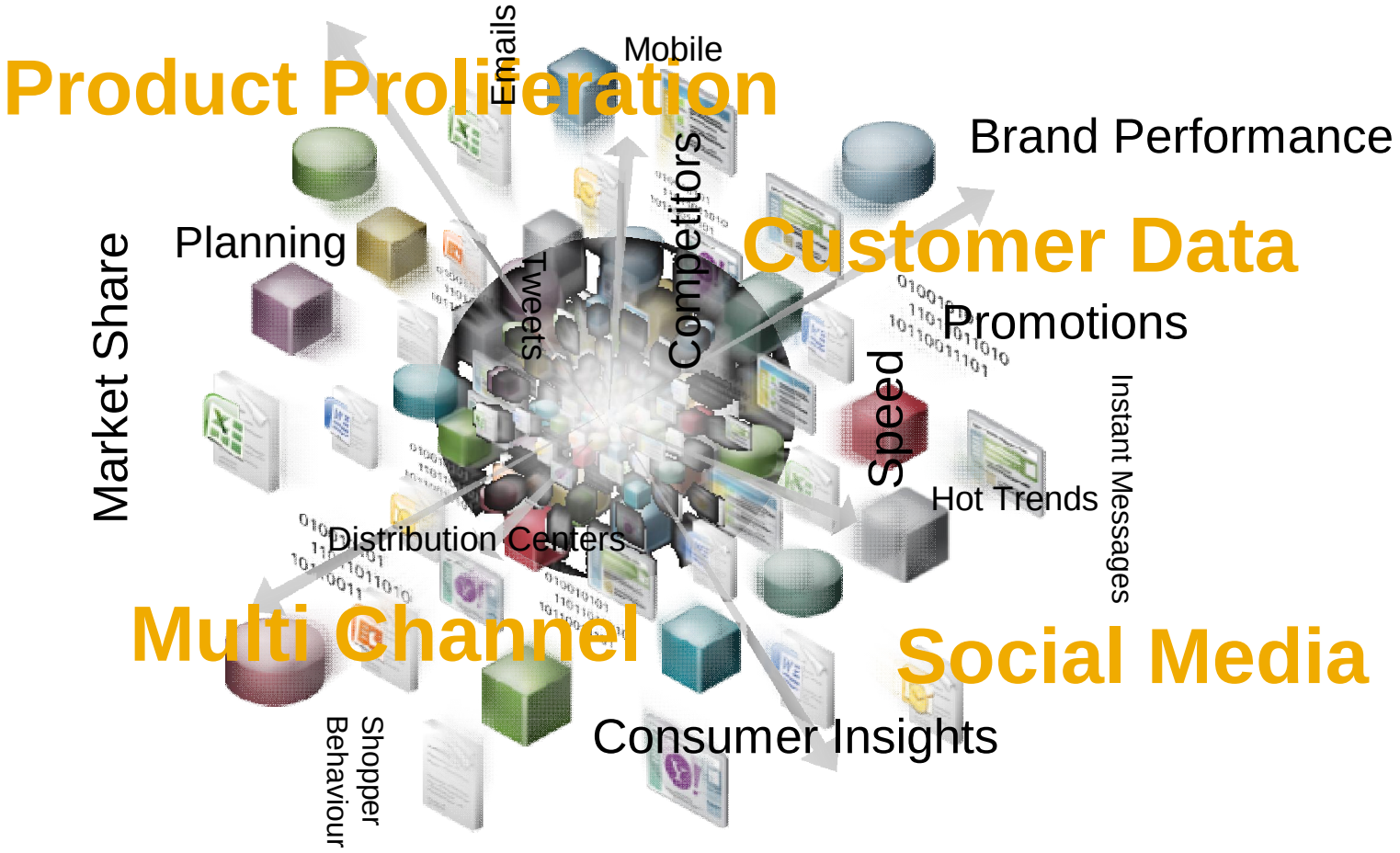
1. SAP’s In-Memory Computing Technology

2. How do you benefit?

3. SAP’s In-Memory Computing Offerings

© 2010 SAP AG. All rights reserved.

Information is Exploding



© 2012SAP AG. All rights reserved.

In-Memory Computing

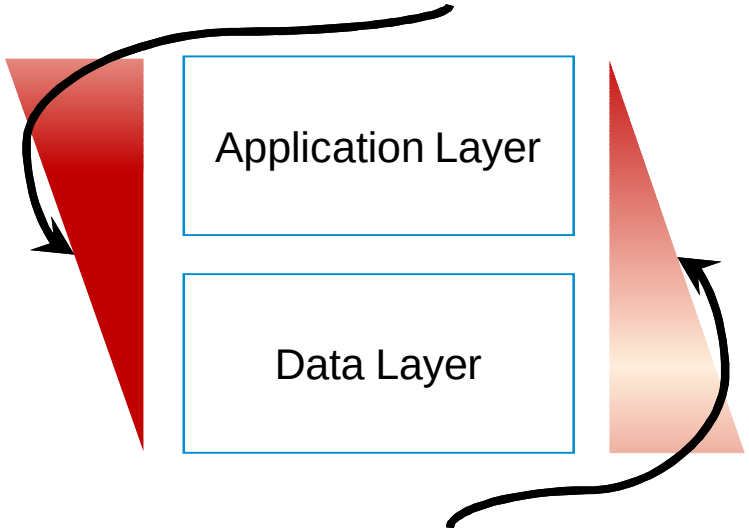
In-Memory Computing

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

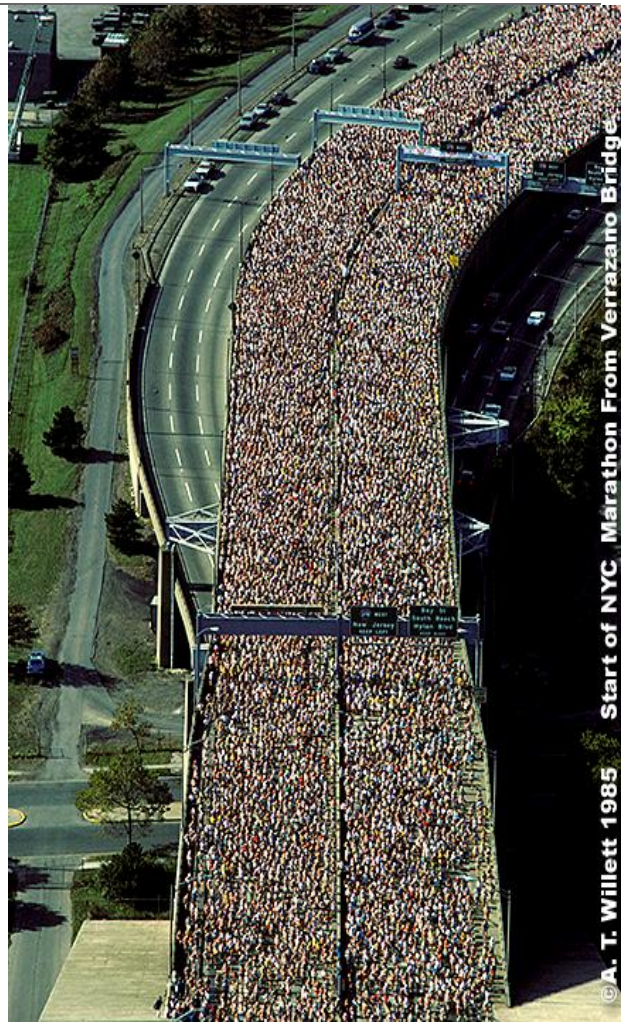
© 2012SAP AG. All rights reserved.

SAP In-Memory computing

Today‘s applications execute many data intense operations in the application layer



High performant apps delegate data intense operations to the in-memory computing



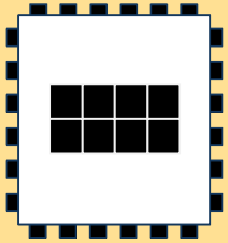
In-Memory Computing Imperative

Avoid movement of detailed data calculate first, then move results

© 2012SAP AG. All rights reserved.

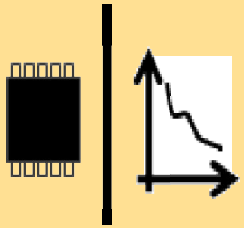
SAP HANA In-Memory Appliance

Hardware Innovations



Multi-core Architecture
(8 x 8 core CPU per blade)

Massive parallel scaling
with many blades



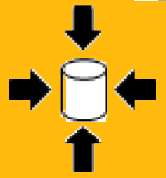
64-bit address space – 2TB
in current servers

100 GB/s data throughput

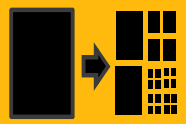
Dramatic decline in
price/performance

Software Innovations

Row and column store



Compression



Partitioning

No aggregate tables

Insert only on delta

© 2012SAP AG. All rights reserved.

In-Memory Computing
The Next Wave of Technology Innovation

Exponential potential for change

Ground-breaking innovation

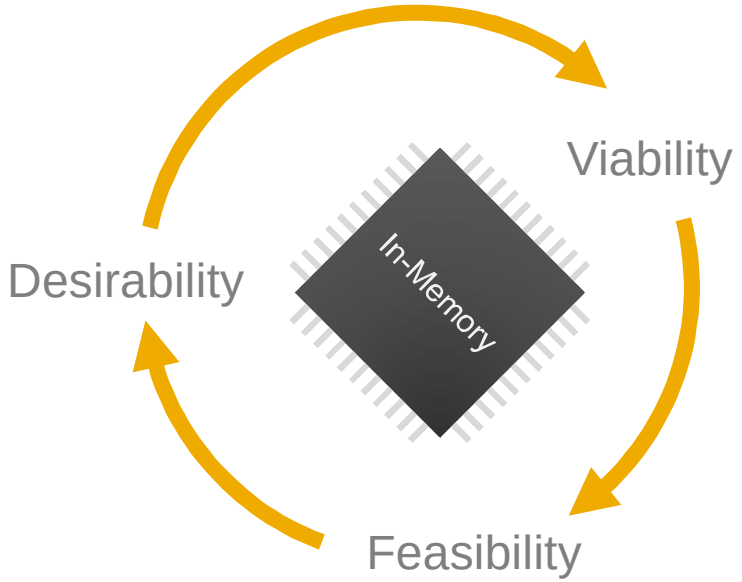
- 10,000x improvement in speed of access from disc to memory

Movement to main memory from disk storage: viable performance with increasing data volumes

- Affordable servers >1 TB system memory
- CPUs - multi-core for rapid parallel processing
- Data more easily shared between systems, structured/unstructured

Cost feasible technology: mass adoption

- Business user access to rapid data processing



➔ **In-Memory Computing: Speed, Volume, Flexibility, Reach**

© 2012SAP AG. All rights reserved.

Because now you can

…have split second answers to complicated questions across your entire supply chain

…instantly change your distribution based on actual consumption and availability

…instantly predict customer needs and revenue opportunities

…predict cash flows to manage collections, risk and short-term borrowing in real time

© 2012SAP AG. All rights reserved.

AGENDA

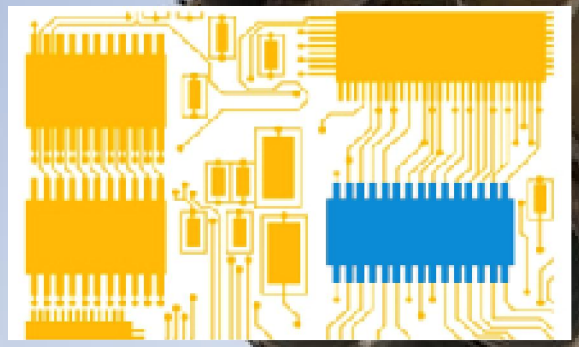
1. SAP’s In-Memory Computing Technology

2. How do you benefit?

3. SAP’s In-Memory Computing Offerings

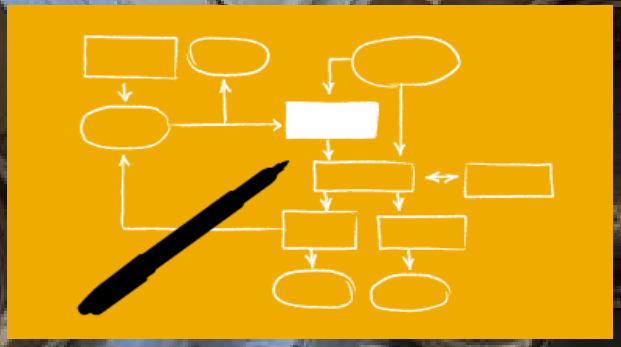
© 2010 SAP AG. All rights reserved.

Three strategies for running better using SAP HANA



Breakthrough analytics

Deliver real-time insight and manage ‘big data’ with the SAP HANA™ appliance with SAP BusinessObjects BI



Amazing new applications

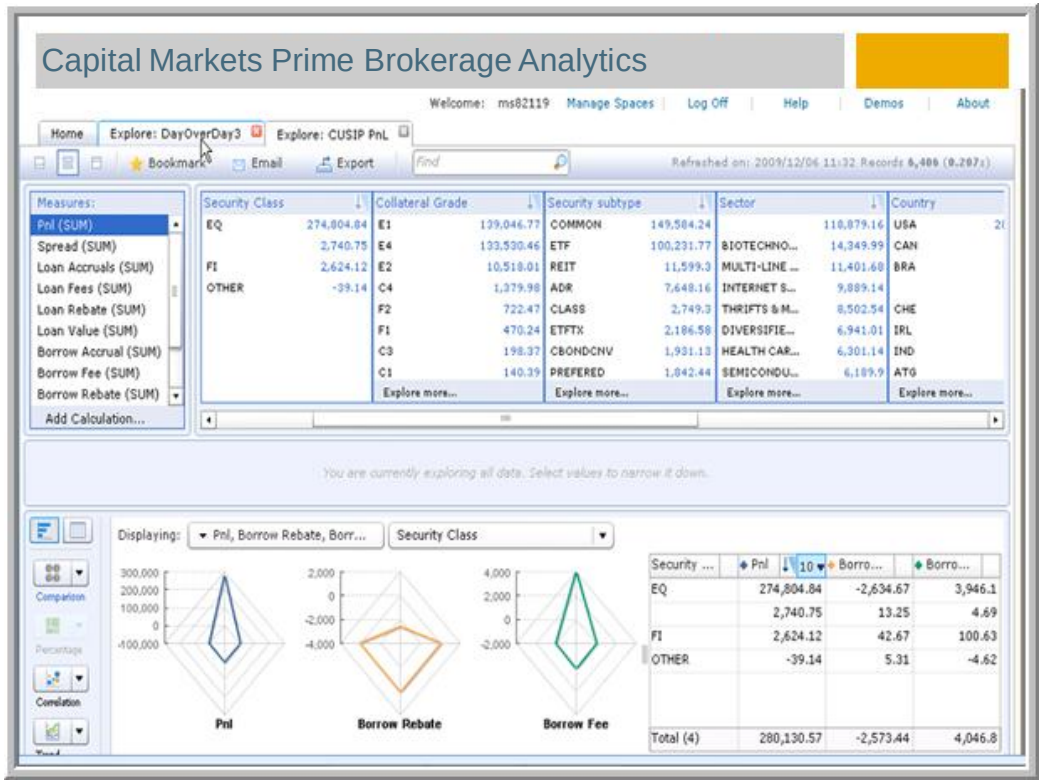
Drive rapid innovation and meet strategic challenges with a new wave of in-memory business applications

Dramatic simplification

Reduce complexity to lower cost and accelerate value delivery from IT

Industry Scenarios: Real Real-Time Business Analytics

- **Financial Services**
  - Hedge fund trading analysis .
  - Real-time systematic risk management and reporting based on market trading exposure
- **Consumer Products**
  - Supplier Risk Management
  - Inventory Recall Reconciliation Product track and trace
  - Product Lifecycle and Cost management
  - EPA standards compliance
  - On-Shelf Availability Analysis
  - Real-time Warranty and defect analysis
- **Retail**
  - Store Operations
  - Point-of-Sales Retail Sales Analytics
  - Load Balance Optimization
  - Real-time completive multi-channel pricing
  - Product damage, returns and spoilage
- **Manufacturing**
  - O&G Operational Performance Management
  - Manufacturing Production and Maintenance Analytics
  - Real-time Asset Utilization Analytics



© 2012SAP AG. All rights reserved.

Retail Customer Snapshot:

Analytics at the Speed of Light

Comments from "Proof of Concept" Customer

"For the business analysts, this is like candy"

"There is no tool that can allow this volume of data in this response time"

"There are no limitations, you can do anything"

"This is pretty impressive to be able to drill down into 2 years of data"

"You can validate on the fly..no training needed"

Business Pain Points

- Fortune 100 Consumer Electronics Retailer needed **real-time** information to improve productivity and decision-making and allow IT to focus on strategic reporting

Challenges

- Substantial amounts of time spent accessing data to address critical business questions
- Inability to get a detailed level of data in operational inefficiencies
- Significant investment in DW resulted in a high total cost of ownership of the BI platform

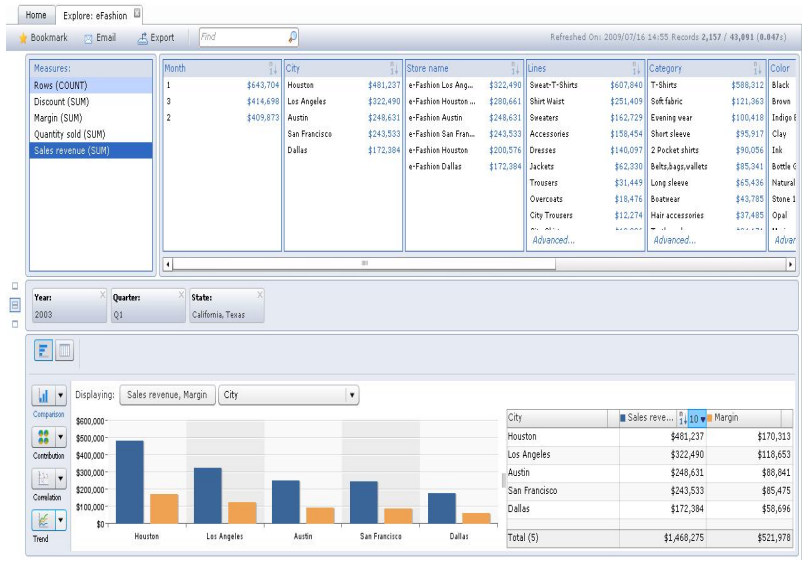
Proof of Concept Results

- 1.47B rows of sales data + 1.4B rows of inventory data were processed in .078 sec.
- Real time –no time latency, no aggregation
- Infrastructure Costs of Data-Intense Businesses
- Higher performance for lower total cost (30% lower than traditional data base)

© 2012SAP AG. All rights reserved.

CPG Customer Snapshot:

Point of Sale Analysis



Business Pain Points

- Fortune 200 Global CPG firm needed to analyze 460 Billion records (40 TB) for global POS analysis to predict demand

Challenges

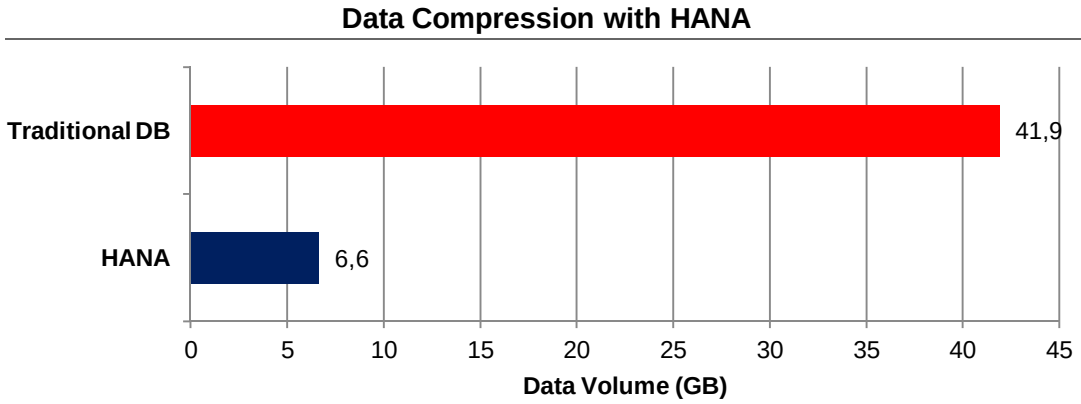
- Unable to analyze data using current database platform
- Need to stock shelves with 48 hour turnaround
- 120 TB environment with 6 BW Systems and Teradata

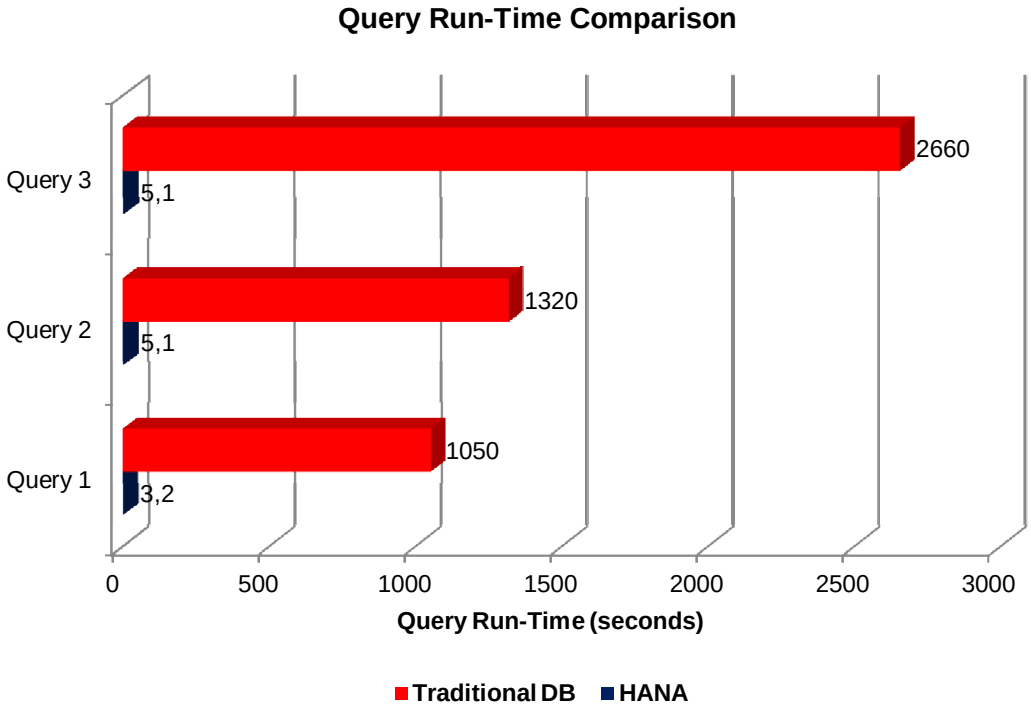
Proof of Concept Results

- 120 TB Total System/40TB Raw compressed to 4TB
- Improved shelf turnaround from 5 days to 2
- Out of stocks eliminated during promotions

© 2012SAP AG. All rights reserved.

Query Acceleration
Large Bank – 1 Month of Customer Information





6.3x Data Compression

No Schema Changes

Same Data

Same SQL

Immediate Benefits

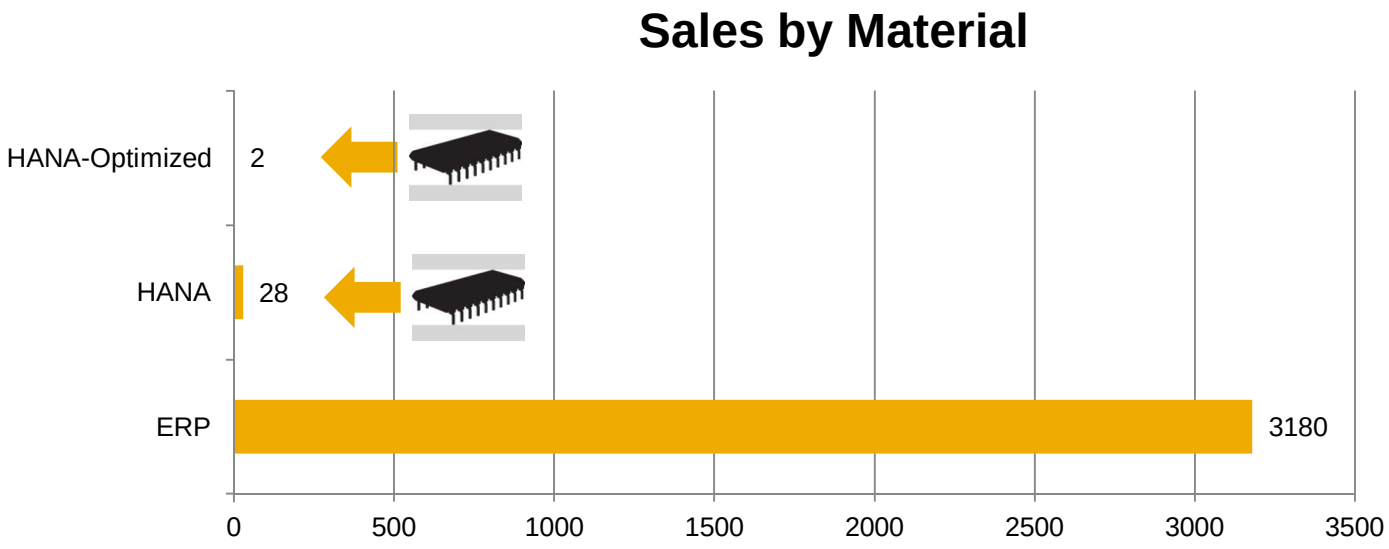
369x Average Query Speed-Up

© 2012SAP AG. All rights reserved.

Report Analysis Example – Sales by Material

Report run for a specific day

113x Faster on HANA by default



1590x Faster!

when optimized

© 2012SAP AG. All rights reserved.

Colgate-Palmolive is a leading global consumer products company

“ For a global business selling products in more than 200 countries and territories, it is critical for us to understand sales trends at a high level as well as at a more actionable level by retail location and SKU to drive our business goals. Prior to SAP HANA*, we were unable to run full analytics in a reasonable timeframe. With SAP HANA, we will be able to run analytics at a local level on specific brands and locations, and at the lowest level of detail in real time. ”

Tom Greene, CIO

*** SAP’s In-Memory Appliance**

© 2012 SAP AG. All rights reserved.

Canoe Ventures has created the largest national interactive television platform available working with their business partners.

“ To build a successful business with the many operators in our ecosystem, it is paramount that Canoe's solutions are flexible, scalable, secure and measurable. Our ability to scale is directly tied to our technical capability to interact with different distributor platforms and meet the needs of programming networks, their advertisers and their viewers. The capabilities of SAP HANA enable us to begin cost-effectively building an engine for delivering the reporting and analytics that advertisers need to engage viewers more effectively and in a secure manner to enhance the TV experience and justify their advanced television advertising spend. ”

Domenic Centofanti, VP - Chief Data Architect

© 2012 SAP AG. All rights reserved.

Medidata Solutions Worldwide

Medidata Solutions is a leader in Software-as-a-Service for Clinical Development

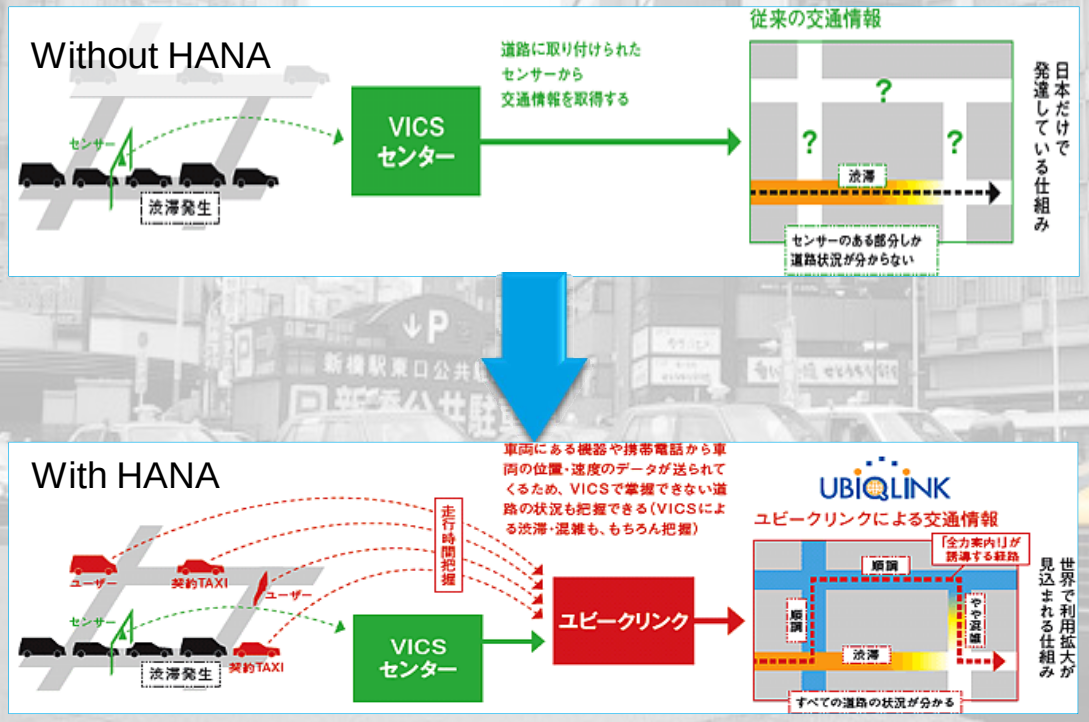
“ Medidata's innovative solutions help life science organizations optimize the efficiency of their clinical trials, a highly data-intensive process, often generating billions of data points to demonstrate the safety and efficacy of just one drug or medical device. Clinical researchers are looking for new, different and better ways to analyze operational performance in real time. SAP In-Memory Computing gives us the potential to build highly interactive solutions for our customers without requiring them to go through a lengthy traditional data warehouse implementation. ”

Glen de Vries, President

© 2012 SAP AG. All rights reserved.

The Tokyo Taxi Scenario

SAP HANA delivers in real-time the optimum predicted route to Tokyo's taxi drivers, based on real-time, geo-tagged traffic mass data from commodity smart phones.



Colgate's Dunning Process on SAP HANA

Alternative example

At Colgate, that has 154,000 B2B customers, their dunning-process is run weekly and takes 77 minutes on average, analyzing 1.8 million+ rows of data. During a typical dunning run, 1000 B2B customers are identified for collection and 70,000 collection notices are generated.

77 min – prior to using SAP HANA

13 sec with SAP HANA

We replicated everything on SAP HANA, and the entire process runs in 13sec! That's 356x times faster!

Colgate Testimonial Video

BASF is the world's leading chemical company.

" The ability to load the entire database into memory, to optimize it, the move to column-based database technology, to be able to then have an environment where both the transactional applications and the analytics are both working off the same source of data; this entire package is extremely compelling. Cost analysis (CO-PA) was the most interesting thing to look at in the first step. We saw response times reduce from about 620 seconds to about five seconds in one case. "

Andrew Pike, CIO

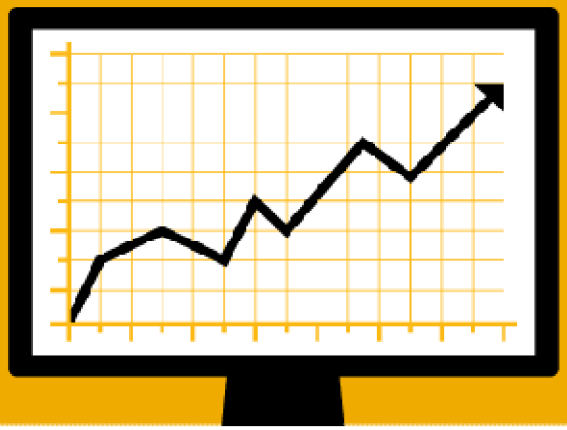
© 2012 SAP AG. All rights reserved.

Hilti serves the professional construction industry, offering high quality tools and services on a global basis

“ We see a clear need to provide flexibility to our reporting community. Flexibility means, at the end of the day, performance. That’s why Hilti was searching for an innovation like HANA. By merging the analytical and the transactional world we see a clear opportunity for business transformation. Customer analysis took two to three hours – with HANA it takes two to three seconds. ”

Christian Ritter, Head of PCC, Finance, HR and Reporting

© 2012 SAP AG. All rights reserved.



SURGUTNEFTEGAS
OPEN JOINT STOCK COMPANY

Surgutneftegas is one of the largest Russian oil companies, with more than 100,000 employees

“ Production facilities are dispersed across hundreds of kilometers. We use about 140,000 different materials, which creates several million records per year which have to be analyzed to determine which materials should go to which locations. The possibility to work directly with operational data in a real time mode with large volumes of our data is a tremendous opportunity. With SAP in-memory computing technology we can manage the provisioning and delivery of material and technical resources. And we provide managers with a lot more freedom to analyze data in new ways. I am convinced that this technology has a great future. ”

Rinat Gimranov, CIO

© 2012 SAP AG. All rights reserved.

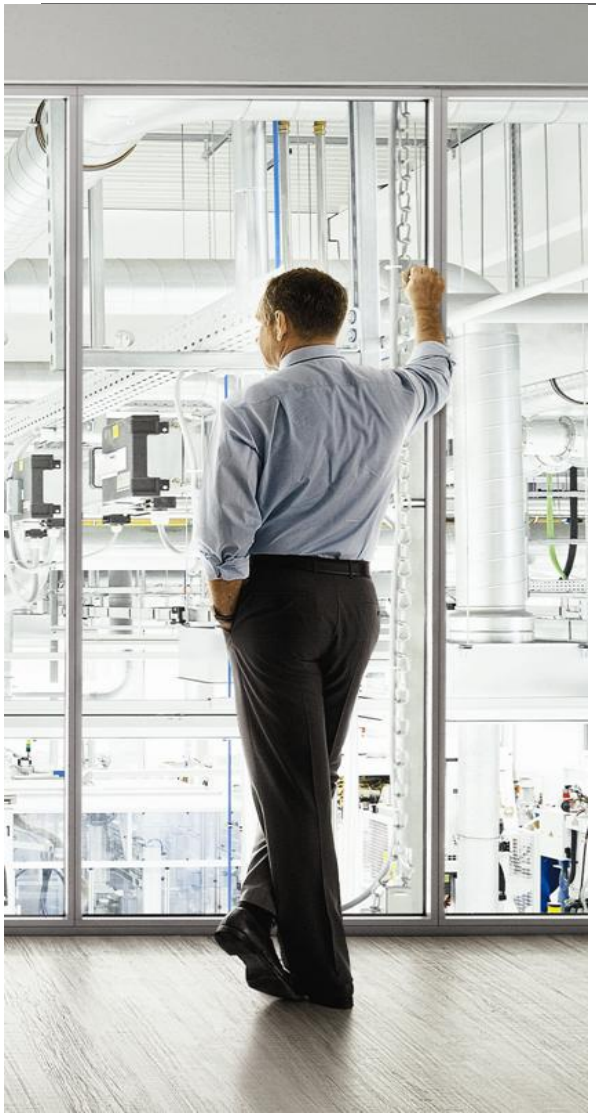
In-memory applications, powered by SAP HANA

- Sales & Operations Planning
- SAP Smart Meter Analytics
- SAP Dynamic Cash Management
- SAP Trade Promotion Management
- SAP BusinessObjects Strategic Workforce Planning
- SAP BusinessObjects Planning and Consolidation
- Profitability Analysis Accelerator for ERP (CO-PA)

Applications currently scheduled for release. More are in development.

© 2012SAP AG. All rights reserved.

Clients Recognize The Power Of In Memory Computing



"You would get to the right question, the heart of the decision-making much faster." ***- Pekka Ala-Pietila, CEO of Blyk***

"SAP needs to get In Memory to every CEO in America. They need this tool to better manage their businesses today" - ***Larry Bossidy, former CEO Honeywell***

"What excited me about In Memory is that this empowers people. In our private, non-banking finance company we have come up with an innovation where hand-held devices are now issuing receipts to the people who we give loans to. That removes the possibility of fraud and gives us instant customer credibility "-***Anand Mahindra, Vice Chairman and Managing Director, Mahindra & Mahindra***

© 2012SAP AG. All rights reserved.

Gartner's View

Gartner Summits

Gartner Business Intelligence Summit 2011
31 January – 1 February . Park Plaza Westminster Bridge . London . UK
europe.gartner.com/bi

Dear Herr Adams,

Business intelligence (BI) and analytics leaders should learn about major trends that will challenge traditional assumptions about these technology areas. The trends include mobile and tablet devices as a platform for BI, the rapid growth of advanced analytics and the integration of BI and analytics into collaborative decision-making environments.

Gartner Predicts: By 2013, 33% of business intelligence functionality will be consumed via handheld devices.

Today, the vast majority of enterprises have yet to extend BI to mobile devices. However, the fast proliferation of smartphones with larger screen sizes paired with the expected ubiquity of tablet size devices will change that quickly. At first, mobile BI will largely consist of existing reports and dashboards ported to the mobile device. By 2012, enterprises and vendors will develop mobile analytic applications for specific tasks or domains. Hear more about this issue at the Gartner Business Intelligence Summit Opening Keynote: ReBirth — Readjustment, Re-evaluation and Reorganization

Gartner Predicts: By 2014, 30% of analytic applications will use in-memory functions to add scale and computational speed.
By 2014, 30% of analytic applications will use proactive, predictive and forecasting capabilities.

Analytic applications support domain-specific use cases such as corporate performance management, Web analytics, marketing analytics or supply chain analytics. Since 2009, enterprises have increasingly used more advanced components, such as advanced visualization, simulations, forecasting, proactive and predictive analytics, and in-memory data stores to support these use cases. Several factors will help drive demand for advanced analytics in the future. At the Summit these topics will be covered in sessions such as:

- Analytic Applications – More than Just a Build vs Buy BI Decision
- Best Practices for BI, Analytics and Performance Management
- The Evolving Importance of CPM in a BI, Analytics and PM Strategy
- Best Practices Workshop: Defining Your Portfolio of Analytic Applications
- Partnering with the CFO to Ensure BI, Analytics and PM Strategy Success
- New Approaches to Budgeting, Planning and Forecasting

Gartner Predicts: By 2013, 15% of BI deployments will combine BI, collaboration and social software into decision-making environments.

Improving decision making is by far the No. 1 driver of BI investment. Despite significant BI investments, however, the vast majority of enterprises still make many decisions that hurt performance. Enterprises are starting to piece together collaboration technology, social software and BI to create collaborative decision-making environments.

At the Summit these topics will be covered in the following sessions:

- Desperately Seeking Insight? Mine the Social Networks

Gartner **Research**

Publication Date: 13 October 2011 **ID Number: G00219001**

SAP Throws Down the Next-Generation Architecture Gauntlet With HANA

Massimo Pezzini, Daniel Sholler

SAP has begun to unveil details of its long-term application infrastructure strategy (originally announced in 2010) based on in-memory database management system (DBMS), mobility and cloud. This initiative is a bold attempt to effect a generational change for the company, and to allow it to compete with industry and thought-leading architectures. The vision is very ambitious, and, at the same time, consistent with users' aspirations. This research provides CIOs, CTOs, IT planners, enterprise technology architects, application managers and project leaders with an overview of the midterm and long-term implications of SAP's emerging technology strategy.

Key Findings

- SAP application infrastructure and architecture strategy, dubbed HANA Architecture, combines cloud and in-memory technologies in a progressive, and potentially disruptive, vision.

…

Recommendations

…

determine if there are opportunities to improve their Advanced Business Application Programming (ABAP) applications with the new infrastructure.

- SAP clients and partners should consider that the HANA Architecture likely will have a significant industry impact, because it will be SAP's focus for its next-generation application strategy.
- Presently, users should adopt HANA technology, when available, primarily for high-return/fast ROI projects or for nonbusiness-critical applications, especially where complex analytics are crucial requirements.

© 2012SAP AG. All rights reserved.

AGENDA

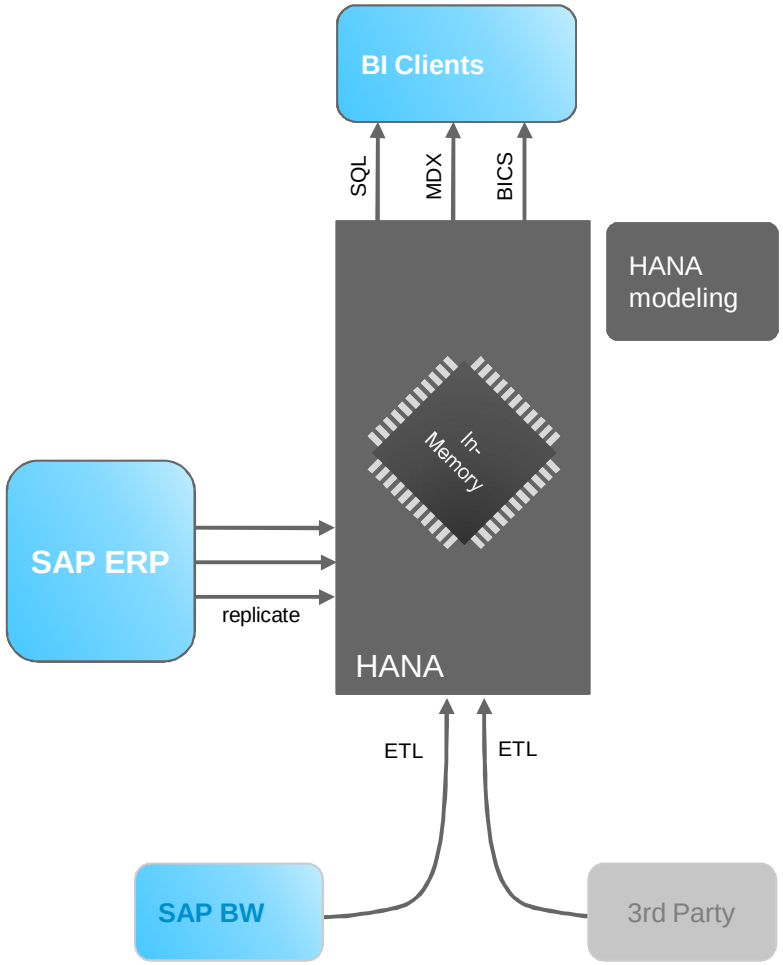
1. SAP’s In-Memory Computing Technology

2. How do you benefit?

3. SAP’s In-Memory Computing Offerings

© 2010 SAP AG. All rights reserved.

High Performance Analytic Appliance



What is HANA?

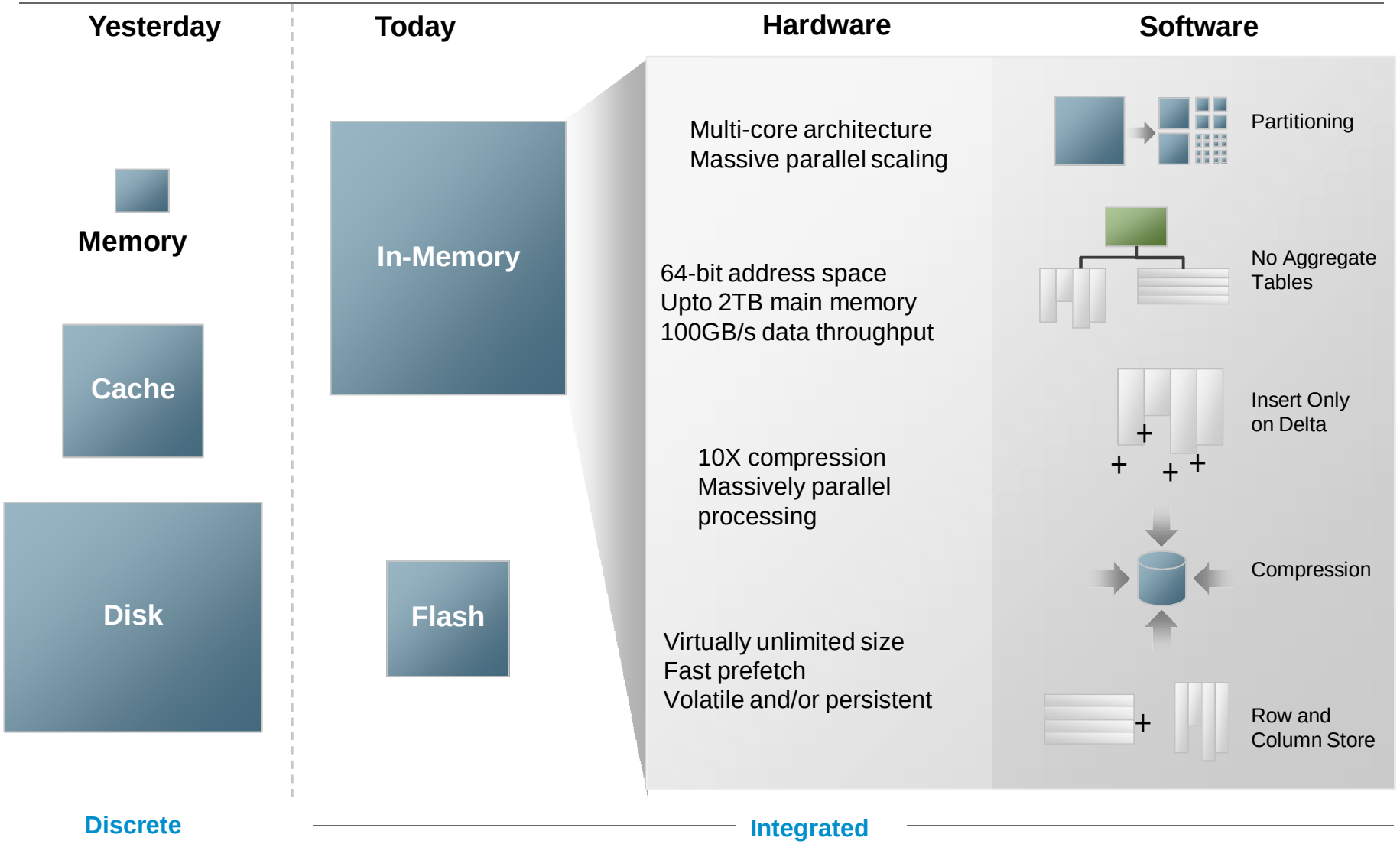
- The High Performance Analytic Appliance enables business departments to **analyze business in real-time** as it happens.
- Individuals can **create very flexible analytic models** based on real-time data originating from business applications.
- In order to cover for the **full spectrum of information** which might be relevant for business, data from other sources like BW or 3rd party databases can also be brought in and mashed up.
- Sets of **topic specific business content** provided and certified by SAP ensure a very short time to value and low risk when implementing the solution.

For whom is HANA relevant?

- Customers looking for flexible ways to analyze operations (real time)
- Customers looking for ways to rapidly create analytic models without impacting their BI production environment
- Customers looking for ways to base their daily analytics on very large volumes of datailed data (CDR, POS, ...)

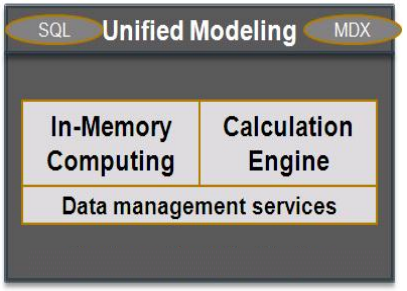
© 2012SAP AG. All rights reserved.

The Inflection Point
In-Memory Computing



© 2012SAP AG. All rights reserved.

HANA is a combination of Software and Hardware



In-Memory Computing Engine (Software)

+

Pre-Installed Systems (Hardware)
(HP, IBM, Fujitsu, Cisco, Hitachi and DELL)

HANA - High Performance Analytic Appliance

© 2012SAP AG. All rights reserved.

In-Memory Computing Supported by SAP

Ground-Breaking Technology

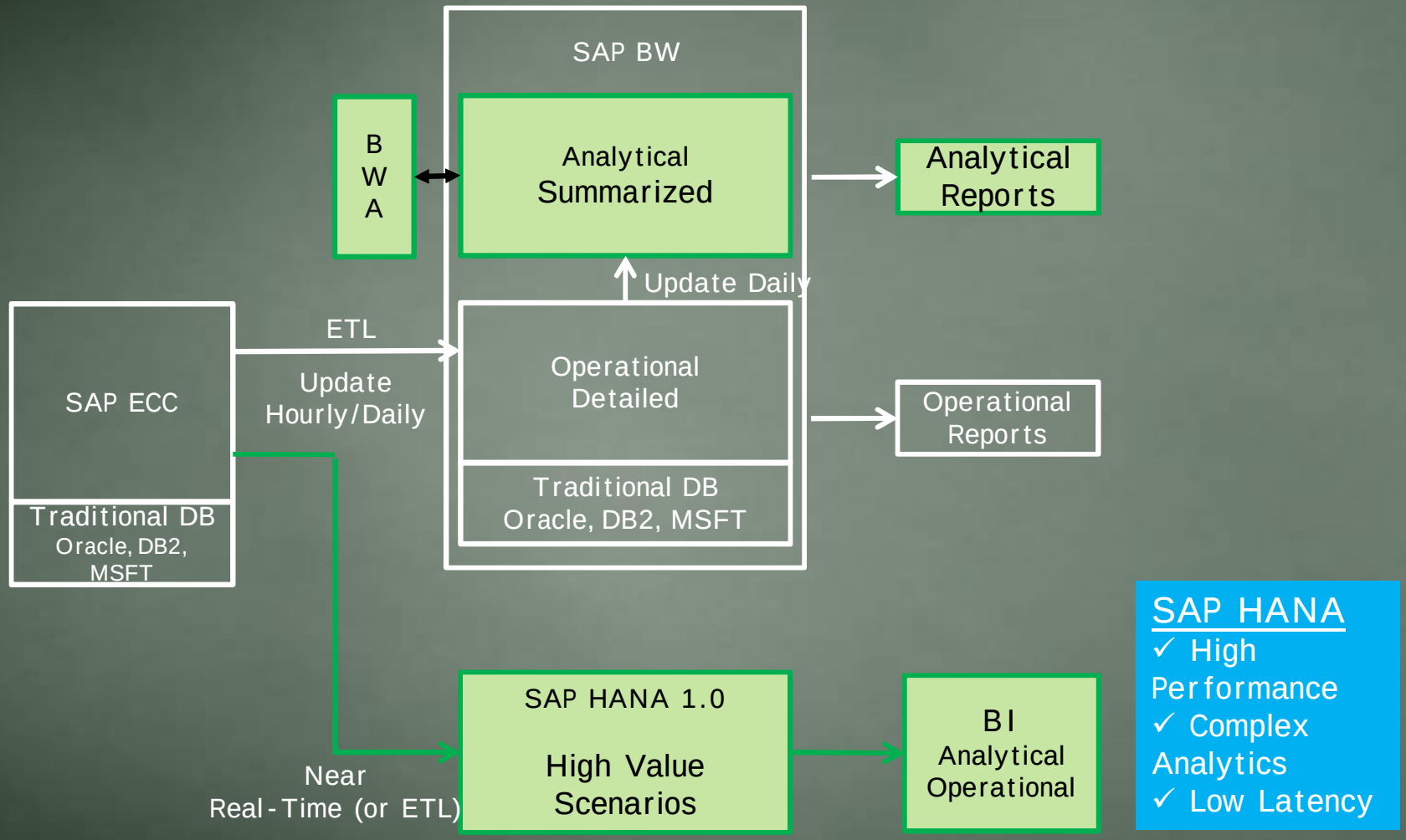
- **Only SAP** combines transactional and analytical applications enabled by **in-memory** computing
- **Only SAP** can conduct analysis, performance management, and operational execution in a single system with **real-time** links between insight, foresight, and action
- **Only SAP** can enhance existing investments with in-memory capabilities **without disruptions** or changes to IT roadmaps
- **Only SAP** collaborates with industry **leading partners** to deliver in-memory computing solutions tailored to your business

© 2012SAP AG. All rights reserved.

WHERE ARE WE GOING?

HANA Delivers Real-Time Visibility

Now

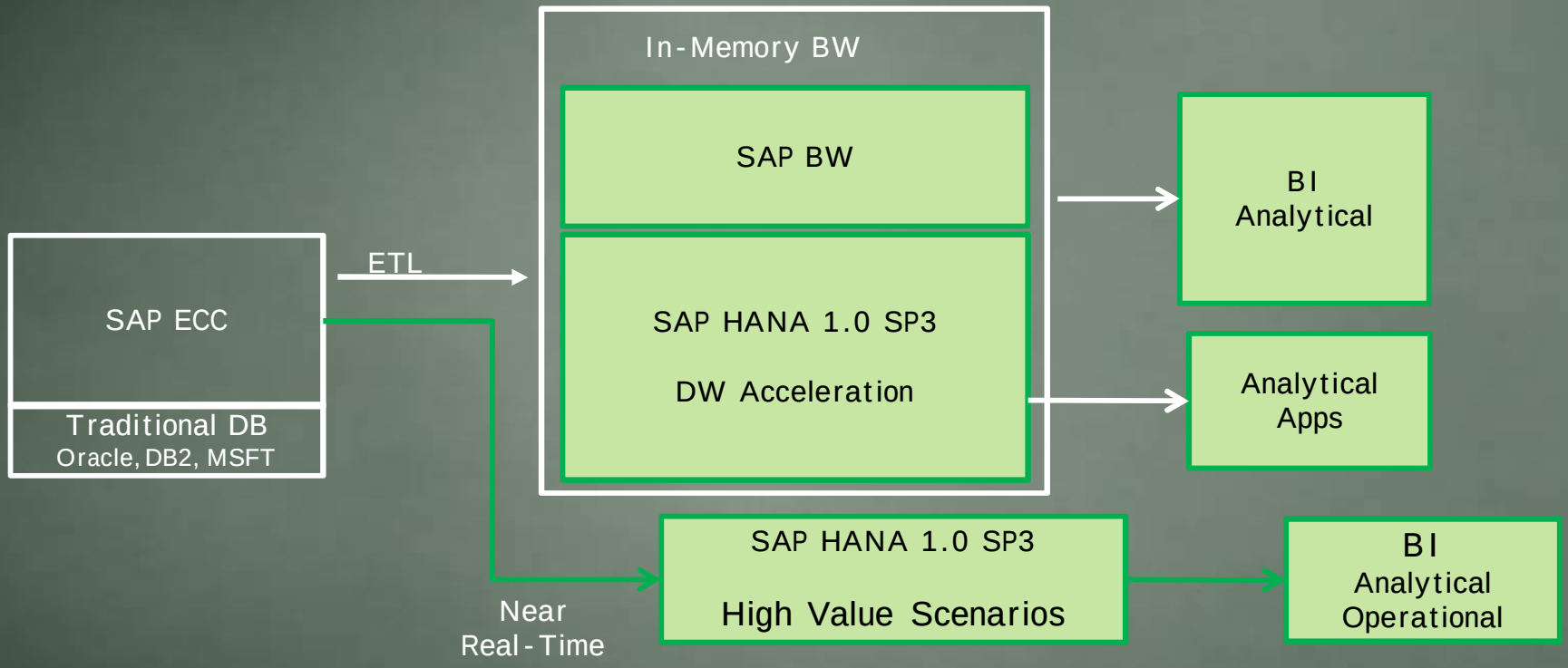


SAP HANA

- ✓ High Performance
- ✓ Complex Analytics
- ✓ Low Latency

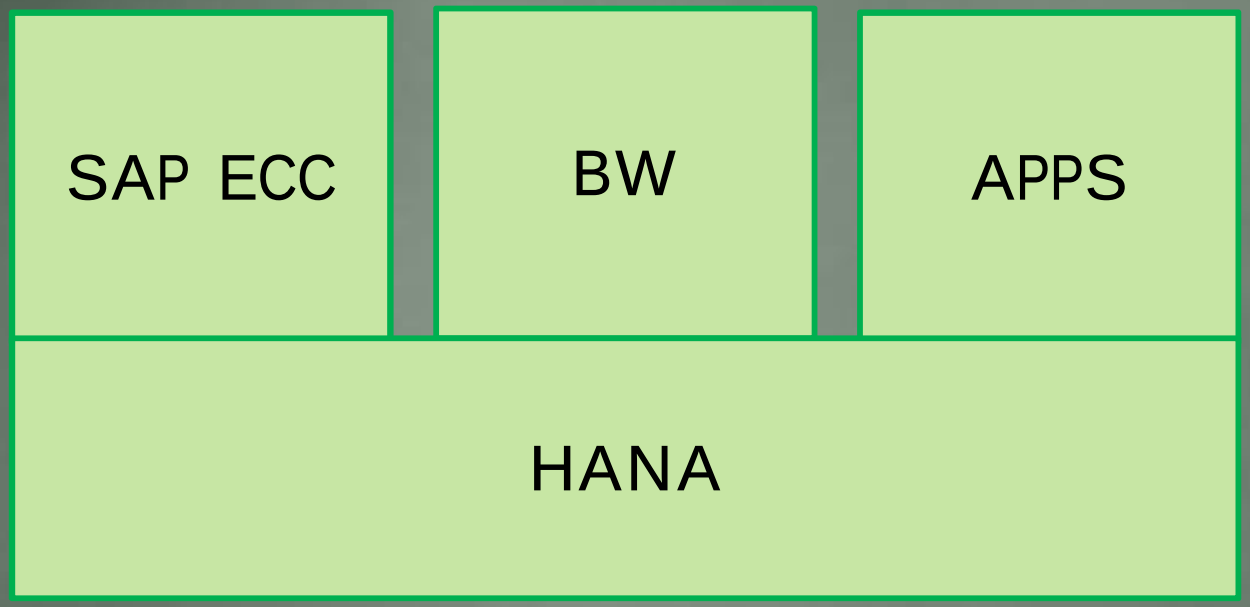
SAP HANA 1.0 SP3– Consolidate Analytics

Q4 2011 Ramp Up



SAP HANA – Nirvana

Future



Become the Real Time Enterprise now
Get HANA ready

…SAP HANA is at the heart of SAP's vision and strategy

…SAP HANA's in-memory technology revolutionizes the way companies use IT to run their business better

…Be ahead of your peers – start with real-time decision making using SAP HANA today

…more than 1500 leading companies are interested in SAP HANA – be amongst the first ones to partner with SAP

"By 2012, 70% of Global 1000 organizations will load detailed data into memory as the primary method to optimize BI application performance."
- Gartner

No Limits
In-Memory Computing
Any Questions?

Thank You!

Contact information:

Oscar Trompe
HANA lead EMEA
oscar.trompe@sap.com

© 2012 SAP AG. All rights reserved

No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission of SAP AG. The information contained herein may be changed without prior notice.

Some software products marketed by SAP AG and its distributors contain proprietary software components of other software vendors.

Microsoft, Windows, Excel, Outlook, and PowerPoint are registered trademarks of Microsoft Corporation.

IBM, DB2, DB2 Universal Database, System i, System i5, System p, System p5, System x, System z, System z10, System z9, z10, z9, iSeries, pSeries, xSeries, zSeries, eServer, z/VM, z/OS, i5/OS, S/390, OS/390, OS/400, AS/400, S/390 Parallel Enterprise Server, PowerVM, Power Architecture, POWER6+, POWER6, POWER5+, POWER5, POWER, OpenPower, PowerPC, BatchPipes, BladeCenter, System Storage, GPFS, HACMP, RETAIN, DB2 Connect, RACF, Redbooks, OS/2, Parallel Sysplex, MVS/ESA, AIX, Intelligent Miner, WebSphere, Netfinity, Tivoli and Informix are trademarks or registered trademarks of IBM Corporation.

Linux is the registered trademark of Linus Torvalds in the U.S. and other countries.

Adobe, the Adobe logo, Acrobat, PostScript, and Reader are either trademarks or registered trademarks of Adobe Systems Incorporated in the United States and/or other countries.

Oracle is a registered trademark of Oracle Corporation.

UNIX, X/Open, OSF/1, and Motif are registered trademarks of the Open Group.

Citrix, ICA, Program Neighborhood, MetaFrame, WinFrame, VideoFrame, and MultiWin are trademarks or registered trademarks of Citrix Systems, Inc.

HTML, XML, XHTML and W3C are trademarks or registered trademarks of W3C®, World Wide Web Consortium, Massachusetts Institute of Technology.

Java is a registered trademark of Sun Microsystems, Inc.

JavaScript is a registered trademark of Sun Microsystems, Inc., used under license for technology invented and implemented by Netscape.

SAP, R/3, SAP NetWeaver, Duet, PartnerEdge, ByDesign, SAP BusinessObjects Explorer, StreamWork, and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP AG in Germany and other countries.

Business Objects and the Business Objects logo, BusinessObjects, Crystal Reports, Crystal Decisions, Web Intelligence, Xcelsius, and other Business Objects products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of Business Objects Software Ltd. Business Objects is an SAP company.

Sybase and Adaptive Server, iAnywhere, Sybase 365, SQL Anywhere, and other Sybase products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of Sybase, Inc. Sybase is an SAP company.

All other product and service names mentioned are the trademarks of their respective companies. Data contained in this document serves informational purposes only. National product specifications may vary.

The information in this document is proprietary to SAP. No part of this document may be reproduced, copied, or transmitted in any form or for any purpose without the express prior written permission of SAP AG.

This document is a preliminary version and not subject to your license agreement or any other agreement with SAP. This document contains only intended strategies, developments, and functionalities of the SAP® product and is not intended to be binding upon SAP to any particular course of business, product strategy, and/or development. Please note that this document is subject to change and may be changed by SAP at any time without notice.

SAP assumes no responsibility for errors or omissions in this document. SAP does not warrant the accuracy or completeness of the information, text, graphics, links, or other items contained within this material. 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 shall have no liability for damages of any kind including without limitation direct, special, indirect, or consequential damages that may result from the use of these materials. This limitation shall not apply in cases of intent or gross negligence.

The statutory liability for personal injury and defective products is not affected. SAP has no control over the information that you may access through the use of hot links contained in these materials and does not endorse your use of third-party Web pages nor provide any warranty whatsoever relating to third-party Web pages.