In-memory computing with SAP HANA

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Hyperconnectivity across people, business, and devices give rise to a new digital economy powered by real-time data.

- 75 billion connected devices in the Internet of Things
  - Source: Business Insider

- Over 2.55 billion social media users by 2020
  - Source: www.emarketer.com

- U.S.$65 trillion in global trade through connected businesses
  - Source: SAP Corporate Fact Sheet 1/2015
As five billion people reach middle class, new challenges arise in customer expectations, workforce, and resource management.

**Rising Customer Expectations**
- 82% customers stop doing business with a company due to a poor experience
- 71% of business leaders believe that customer experience is the next battleground
- 72% of Millennials feel their current organization is not making full use of their skills
- 71% of business leaders believe that customer experience is the next battleground

**Dramatically Changing Workforce**
- High employee engagement: 3x higher operating margin

**Pressure on Resources**
- Water 1.5x by 2030
- Energy 1.5x by 2020
- Food 1.5x by 2030
- Metals 2x by 2030
- $5.6T savings through connected vehicles
- 67% increase in crop yields
- 22% increase in supply chain efficiency

77% of CEOs are creating value in the customer experience with digital technologies

Cloud
36% of all data will be stored in the cloud by 2016

Mobile
90% of the world's population over 6 years old will have a mobile device by 2020

Social
75% of customers rely on social media to influence their purchasing decisions

Big Data
44 trillion gigabytes of data generated by 2020

A breakthrough in today’s information processing architecture is needed

- **DEEP**: Complex & interactive questions on granular data
- **HIGH SPEED**: Fast response-time, interactivity
- **BROAD**: Big data, many data types
- **REAL-TIME**: Recent data, preferably real-time
- **SIMPLE**: No data preparation, no pre-aggregates, no tuning

OR

- **DEEP**: Complex & interactive questions on granular data
- **HIGH SPEED**: Fast response-time, interactivity
- **REAL-TIME**: Recent data, preferably real-time
- **SIMPLE**: No data preparation, no pre-aggregates, no tuning
10.2% or U.S.$237 billion of profits are lost by the top 200 global companies due to hidden costs of complexity.
Next-generation Software & Hardware Architecture

Removing data processing bottlenecks using latest innovations in computing

**CPU**

- **Multi-Core Architecture**
  - 8 CPU x 10 Cores per blade
  - Massive parallel scaling with many blades

- **64bit address space**
  - 1 TB in current servers
  - Dramatic decline in price/performance

**MEMORY**

- OLTP+OLAP in column Store
- Partitioning
- Insert Only on Delta
- No Aggregate tables (Dynamic Aggregation)
- Compression

**STORAGE**

- Solid State
- Flash
- HDD

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SAP HANA Platform - The in-memory computing platform for all Applications

ONE open platform
OLTP + OLAP
ONE copy of the data
Standard-based and Open

• Database Services
  – Standard RDBMS
  – ACID, SQL 92 Compliant
  – Accessible thru JDBC, ODBC, JSON, OData
  – Standard security model
  – Choice of third party administration tools
• Application Services
  – Choice of application servers and webservers
  – Eclipse based and web development tool
  – Include web server with Java Script support
  – Include HTML5 UI libraries
• Integrations Services
  – Data movement and federation with existing DBs
  – Integration with R and Hadoop

SAP HANA Platform

Application Services
Database Services
Integration Services
In-memory Database Services

- Turns data into real-time information
- No database tuning required for complex and ad hoc queries
- Run Transactions and Analytics together on one system and one copy of data
- Ready for Cloud, Hybrid, or On-premise deployment
- Not limited by the size of memory
Comprehensive advanced data processing and analytics

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**Integration Services**

- Run applications with dramatically different datatype characteristics in the same system
- Optimize graph, planning, and rules applications on the same data
- Empower your business via built-in predictive analytics, business functions, and data quality
Application Services - Web server and database in one system reducing data movements

- Deliver consumer-grade User Experiences for any device, automatically
- Support for open development standards – HTML5, JSON, Java Script
- Built-in tools to develop, version-control, bundle, transport, and install applications
Integration Services - Data from any source for a complete view of the business

- Access information stored in data silos while keeping the data in place
- Replicate and move any type of data in real-time to the cloud and on-premise when necessary
- Capture and analyze live data streams and route to appropriate storage or dashboard
- Multiple access points from HANA to Hadoop data: thru Spark, Hive, HDFS and Map Reduce functions
Comprehensive services with in-memory computing to make information available to any application

SAP HANA Platform

**Application Services**
- Web Server
- JavaScript
- Fiori UX
- Application Lifecycle Management

**Database Services**
- OLTP + OLAP
- Data Modeling
- Stored Procedures
- Multitenant Database Containers
- Dynamic Tiering
- Spatial
- Predictive
- Search
- Text Analytics
- Graph*
- Planning**
- Smart Data Quality
- Series Data
- Functional Libraries

**Integration Services**
- Smart Data Access
- Smart Data Integration
- Smart Data Streaming

* Graph is in controlled availability
Choose the right on premise deployment option

**Appliance**

- SAP HANA System
  - Software
  - Server
  - Network
  - Storage
  - Node 1
  - Node 2
  - Node n

All in one box by certified partners

**Tailored Data Center Integration**

- SAP HANA System
  - Software
  - Server
  - Network
  - Storage
  - Node 1
  - Node 2
  - Node n

Choice of components that meet SAP requirements from different vendors
High Availability (HA) and Disaster Recovery (DR)
Ensuring the most demanding service-levels

Host Auto-Failover (HA)
- Within one scale-out system
- N active nodes, M standby node(s)
- Automatically switch to standby node

System Replication (HA & DR)
- Across multiple systems / locations
- Continuous data transfer from memory
- Fast switch-over on system failure

Storage Replication (DR)
- Across multiple systems / locations
- Transfer data using storage mirroring
- Low cost option

Supports campus, metro and geo clusters with multiple hot standbys

Secondary system can be used for Dev/QA.
All SAP applications run better with in-memory computing
Common use cases

**Optimizing Business Operations**
Get instant insights into real-time transactions to optimize business operations.

**Operational Reports, Dashboards, and Analytics**
Analyze and visualize operational details to support your day-to-day activities.

**Real-time Operational Intelligence**
Run queries against operational data, streams and events to deliver real-time insights.

**Data Warehouse and Data Mart**
Deliver actionable insights on enterprise-wide or departmental data.

**Big Data**
Uncover the value in large, complex and rapidly growing data sets.

**Decision Support, Simulation and Automation**
Streamline and automate business processes with advanced analytics.

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Deliver results for business today

5,800+ SAP HANA customers

Forrester reports 37% cost savings using a single system for Analytics and Transactions

1,850+ SAP Business Suite and 1,600+ BW powered by SAP HANA customers

1,800+ startups from 57 countries innovating on SAP HANA

10,000 times faster reports

37+ SAP HANA Cloud Data Centers Worldwide (from SAP and IBM)
Run Simple.

Thank you.