SAP HANA

Reinventing Businesses through Innovation, Value & Simplicity

DI Walter Müllner, SAP Österreich

SAP

Agenda

The Existing Data Management Conundrum

SAP HANA Real-Time Analytics & Application Innovations

SAP HANA Transformational Impact at Customers

Summary

The future holds many transformational opportunities

Capitalize on the new technology frontier

Retail: From transactions to 1:1 engaging relationships

**Manufacturing: From mass production to custom 3-D printing**
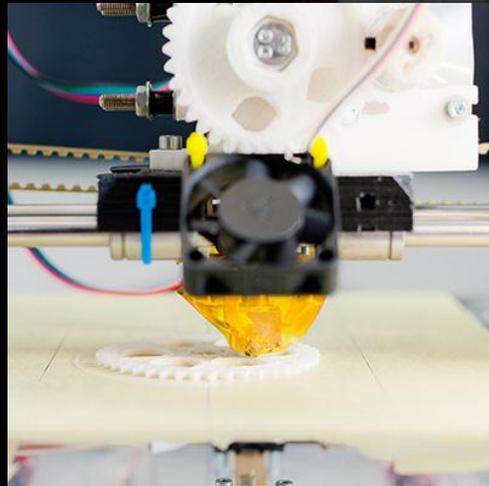
**Healthcare: From generic treatments to personalized medicine**
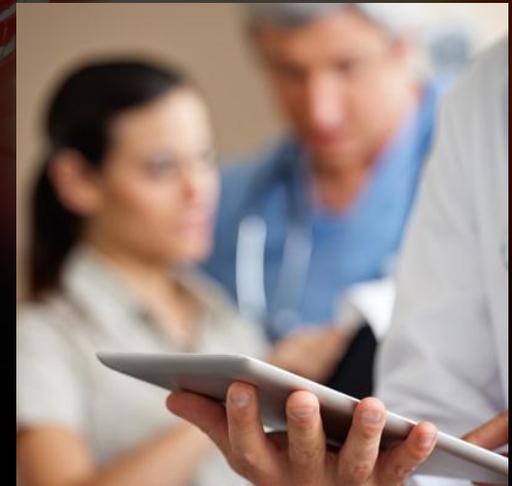
Information Processing is at a critical inflection point

Point optimization is not enough to meet the new frontiers of real-time business

IMPACT ON BUSINESS Slow Response Times | Usability Challenges | Lack Of Adaptability

Real-time Business Scenario	Sales	Customer Service	Finance and Operations	Manufacturing
	Real-time bonus calculations for consumers	Customer overdue credit calculation by product areas	Iterative period end closing with new posting into accounts constantly	New ATP strategies; MRP run for individual ATP check/instant re-planning

Planning
Predict
Monitor
Communicate
Analyze
Summarize
Aggregate
ETL
Staging
Clean-Data Quality
Collect
Transact

Order Processing	Operational Reporting	Real-time Risk & Fraud	Trend Analysis	Sentiment Analytics	Predictive Analytics	Pattern Recognition	Location Intelligence

Transactional Datastore	Data Warehouse	Sensors Data	Mobile Data	Archives	Social & Text	Geo-Spatial

IMPACT ON IT High Latency | Complexity | High Cost of Solutions

Technology today requires tradeoff

A breakthrough in today's information processing architecture is needed

OR

DEEP
Complex & interactive questions on granular data

HIGH SPEED
Fast response-time, interactivity
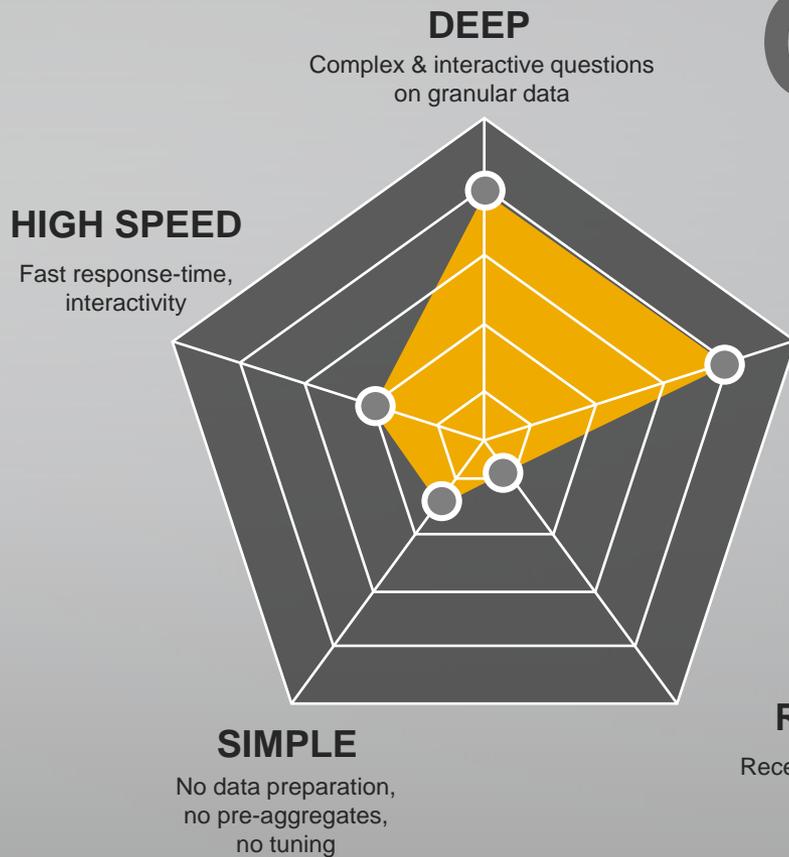
BROAD
Big data, many data types

SIMPLE
No data preparation, no pre-aggregates, no tuning

REAL -TIME
Recent data, preferably real-time

DEEP
Complex & interactive questions on granular data

HIGH SPEED
Fast response-time, interactivity

SIMPLE
No data preparation, no pre-aggregates, no tuning
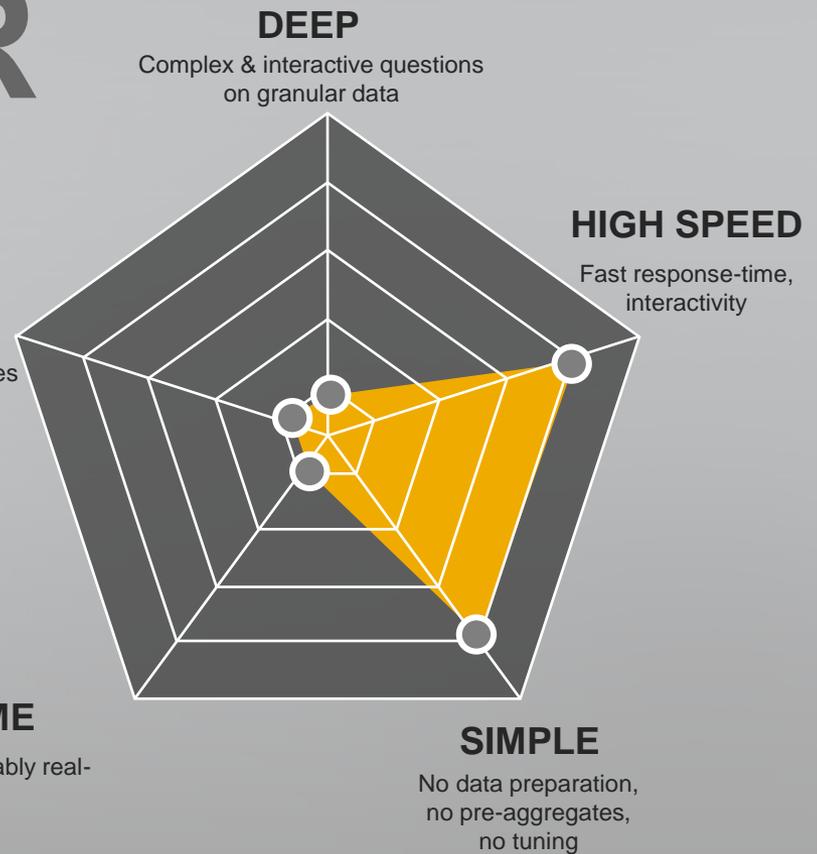
Next-generation Software & Hardware Architecture
Removing data processing bottlenecks using latest innovations in computing

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

L3 Cache   L3 Cache   L3 Cache   L3 Cache   L3 Cache   L3 Cache   L3 Cache   L3 Cache

MEMORY

OLTP+OLAP
in column Store

Partitioning

Insert Only on Delta

No Aggregate tables
(Dynamic Aggregation)

Compression

Logging and Backup

STORAGE

Solid State

Flash

HDD

Re-think Data Management with in-memory computing
Need to eliminate redundant data copies, materialization and models

A Common Database Approach for OLTP and OLAP Using an In-Memory Columnar Database

Hasso Plattner

Separated Transactions + Analysis + Acceleration processes

ETL ETL

Cache

Transact   **Analyze**   **Accelerate**

VS

One in-memory atomic copy of data for Transactions + Analysis

SAP HANA
(DRAM)
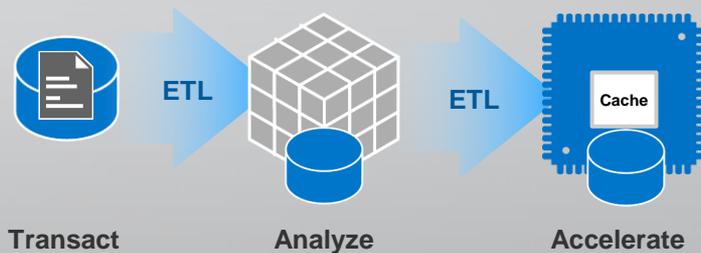
- **3 copies of data in different data models**
- **Inherent data latency**
- **Poor innovation leading to wastage**
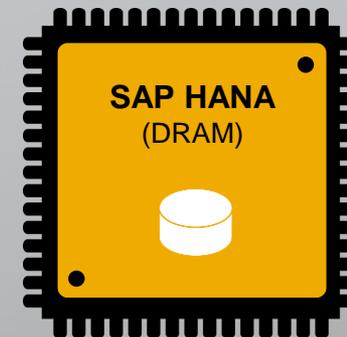
- **Eliminate unnecessary complexity and latency**
- **Less hardware to manage**
- **Accelerate through innovation and simplification**

SAP HANA Platform – More than just a database

Any Apps
Any App Server

SAP Business Suite
and BW ABAP App Server

SQL   MDX   R   JSON   Open Connectivity

SAP HANA Platform

Supports any Device

Application Development
Process Orchestration

Unified Administration
Life-cycle Management
Security

Extended Application Services

App Server| UI Integration Services | Web Server

Processing Engine

OLTP | OLAP | Search | Text Analysis |Predictive | Events | Spatial | Rules | Planning | Calculators

Database Services

Application Function Libraries & Data Models

Predictive Analysis Libraries | Business Function Libraries | Data Models & Stored Procedures

Integration Services

Data Virtualization | Replication | ETL/ELT | Mobile Synch | Streaming

Deployment: On-Premise | Hybrid | On-Demand

SAP HANA platform converges Database, Data Processing and Application Platform capabilities & provides Libraries for predictive, planning, text, spatial, and business analytics so businesses can operate in real-time.

Breakthrough Data & Application Processing
Enabling real-time computing design patterns across entire software architecture

SIMPLIFIED

**OLTP + OLAP
in Columnar database**

SAP HANA
(Main Memory)
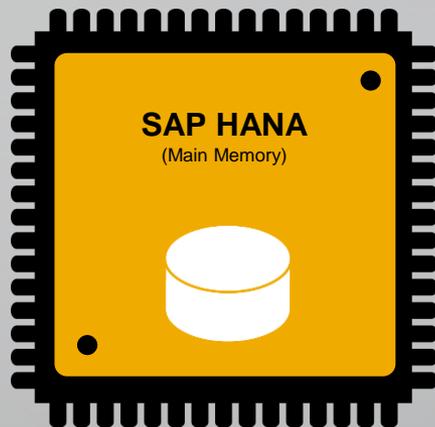
CONVERGED

**End-to-end
Data Processing**

Predictive Prescriptive

Operational Analytics Machine Learning Sentiment Intelligence

SAP HANA
(Main Memory)

Sensors Transactions Spatial/GIS

Image Text
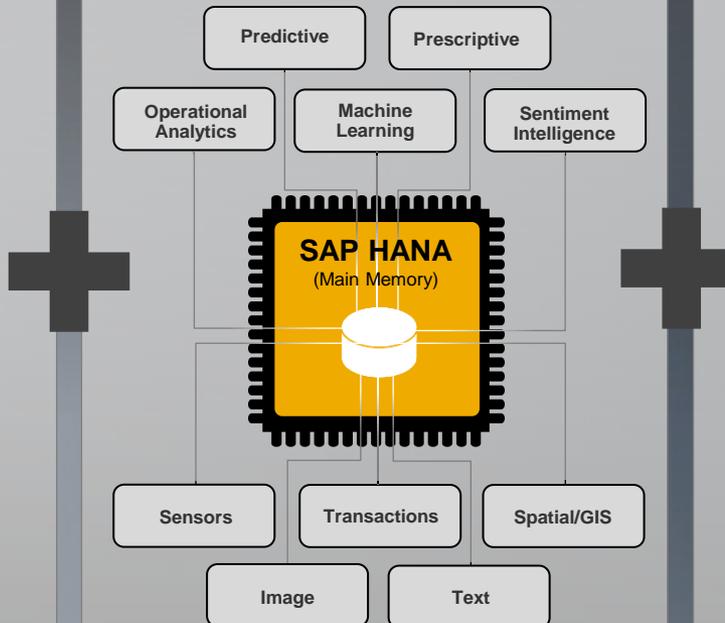
OPTIMIZED

**Application
Processing**
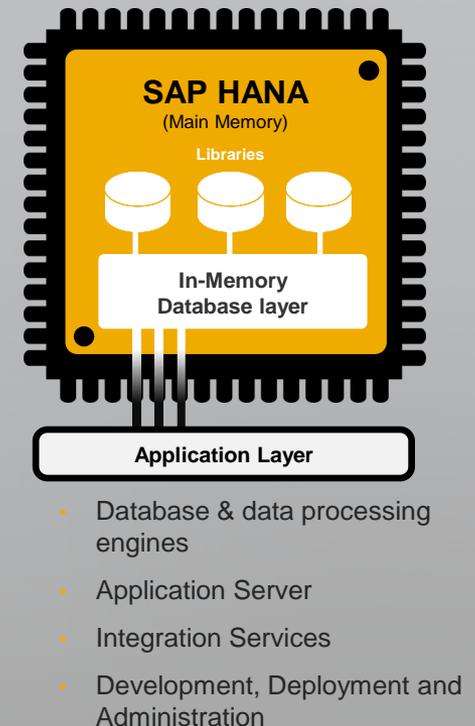
SAP HANA
(Main Memory)

Libraries

In-Memory
Database layer

Application Layer

- Database & data processing engines
- Application Server
- Integration Services
- Development, Deployment and Administration

Agenda

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Renovate existing systems while enabling future breakthroughs

| SAP BusinessSuite SAP BusinessOne | StartUps & ISV Apps | 40+ HANA Apps, Accelerators & RDS | Operational Datamarts | Enterprise Data Warehouse & BW on HANA |

REAL-TIME APPLICATIONS

Consumer Engagement

Sense & Respond

Planning & Optimization

REAL-TIME ANALYTICS

Operational Analytics

Big Data Warehousing

Predictive, Spatial & Text Analytics

SAP HANA Platform

Development

Administration

Extended Application Services

Processing Engine

Database Services

Application Function Libraries & Data Models

Integration Services
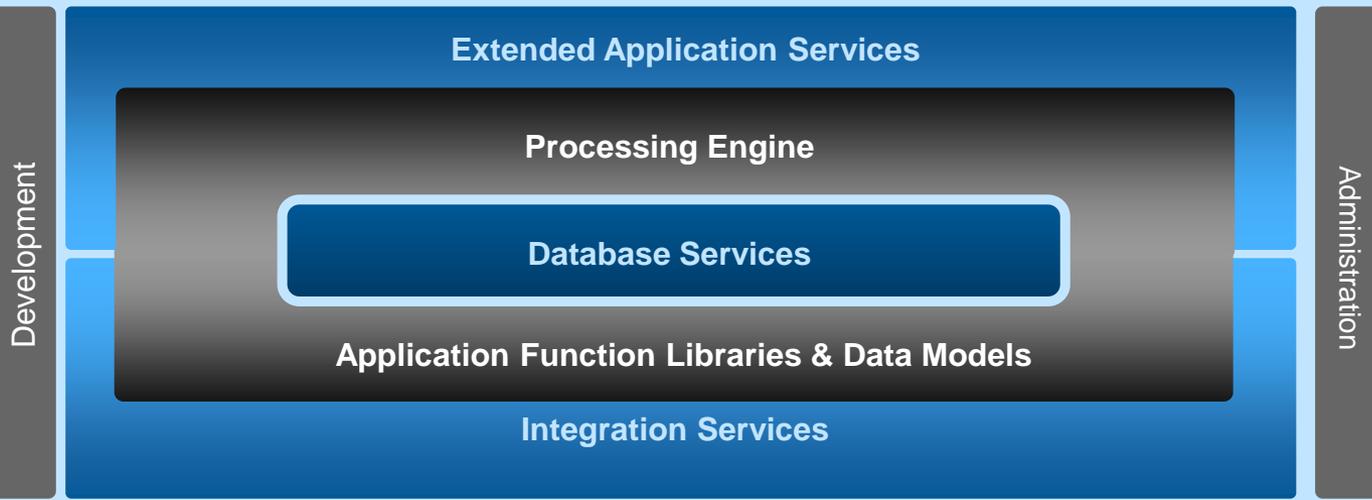
Deployment: **On-Premise | Hybrid | On-Demand**

Consumer Engagement Applications

Game-changing innovation with new applications and business models

SAP HANA PLATFORM

Real-time Engagement for consumers

Real-time insights for enterprise

- Generate real-time consumer insights

- Deliver personalized, engaging experiences

- Create more responsive business with precision targeting

- HTML-5 support
- Mobile integration
- Consumer-grade usability

- OLTP + OLAP real-time Processing
- Sentiment Intelligence
- Predictive analytics

Sense & Respond Applications for Internet of Things

Faster execution by adjusting to signals in the business environment

Connected Cars

Smart Equipment

Smart Logistics

Smart Automobile

Smart Vending

Smart House

Smart Cities
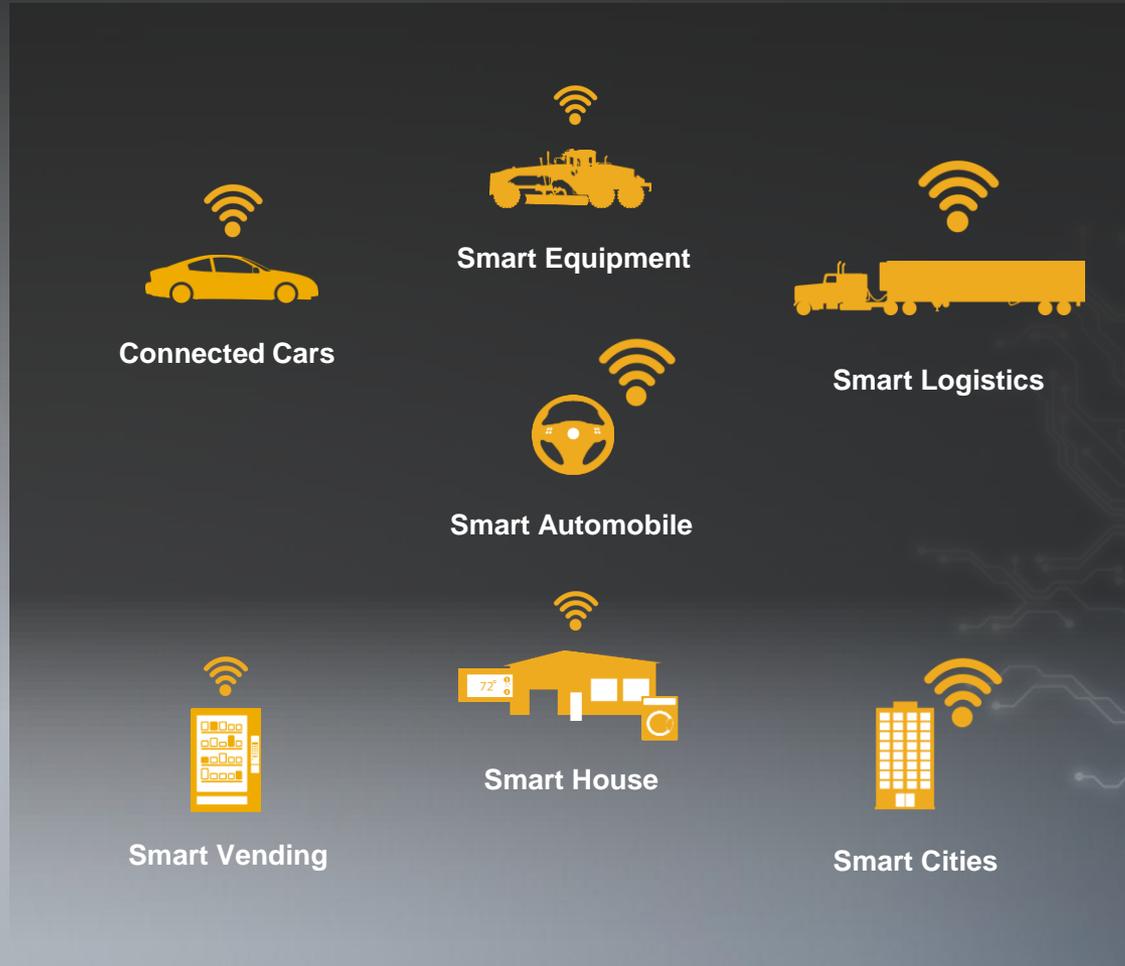
- Detect and analyze data trends by aggregating sensor data

- Benefit from more energy efficient logistics, transforming retail distribution

- Increase quality of life through intelligent buildings, robots, cars and cities

- Event stream processing (ESP)
- No data preparation
- RFID Integration

- Embedded data processing
- Machine Learning
- Spatial Processing

Planning and Optimization Applications
Faster execution to adjust to changes in the business

Sales and Operations Planning
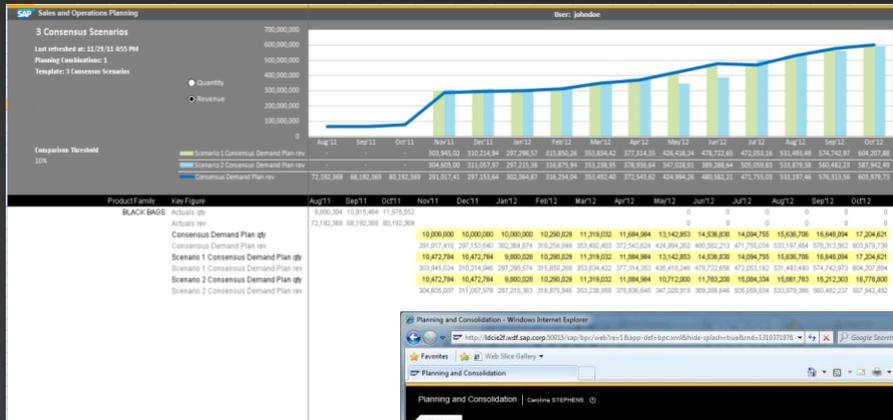
Business Planning and Consolidation
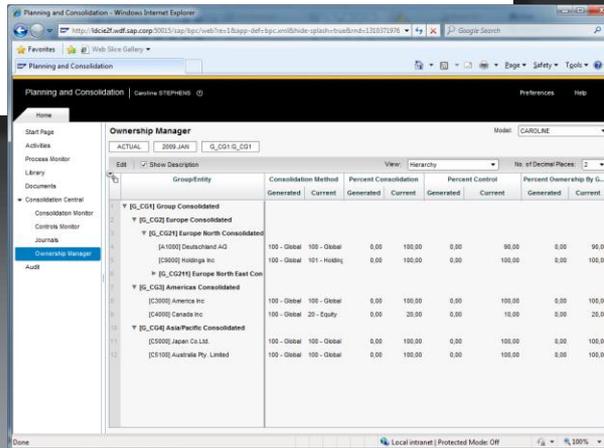
- Enable iterative period end closing with continuous posting into accounts

- Cash forecasting management

- Optimize procurement, manufacturing, transportation without limits

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- In-memory stored procedures
- Integrated Planning and Calculation engines
- Predictive Analytics and Business Functions

- Recent data, preferably real-time
- Supporting complex questions on interactive data
- Built-in Spatial Processing

SAP Business Suite
powered by SAP HANA

| SAP ERP | SAP CRM | SAP SCM | SAP SRM |

SAP HANA PLATFORM
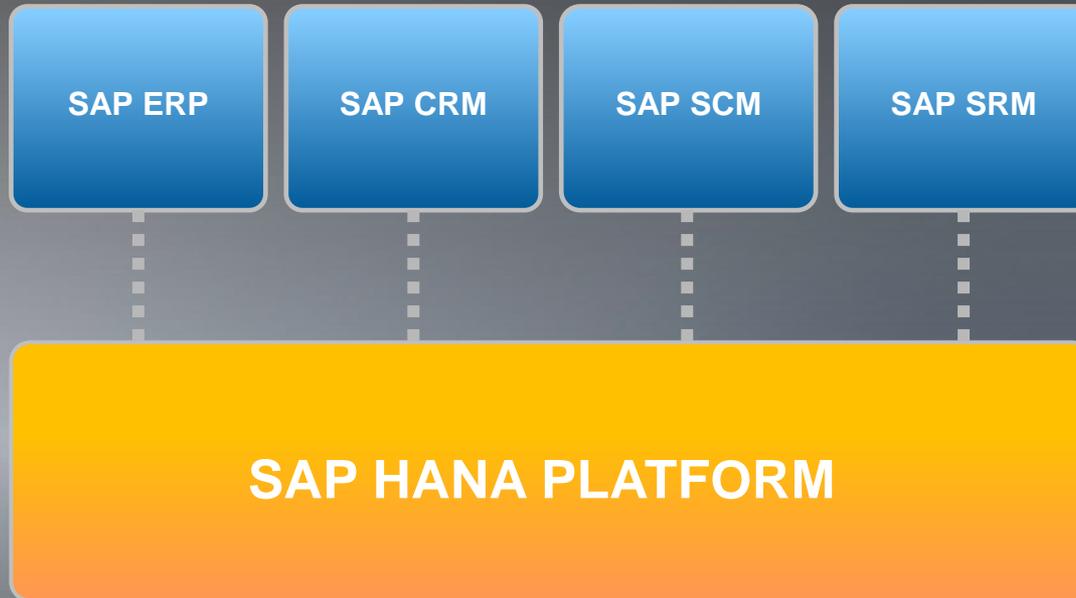
Smarter business innovations
Unlock new growth opportunities before your competitors do

Faster Business Processes
Drive your business at the speed of the market

Simpler Business Interactions
Empower people to decide and act in the business moment

Operational ad-hoc analytics and monitoring
Real-time insight into the in-the-moment business situations

Customer Service

Finance and Operations

Account Administration

SAP HANA
(DRAM)

Pricing

Accounting

Customers

Forecasting

Planning

Channel

Inventory

Products

Suppliers
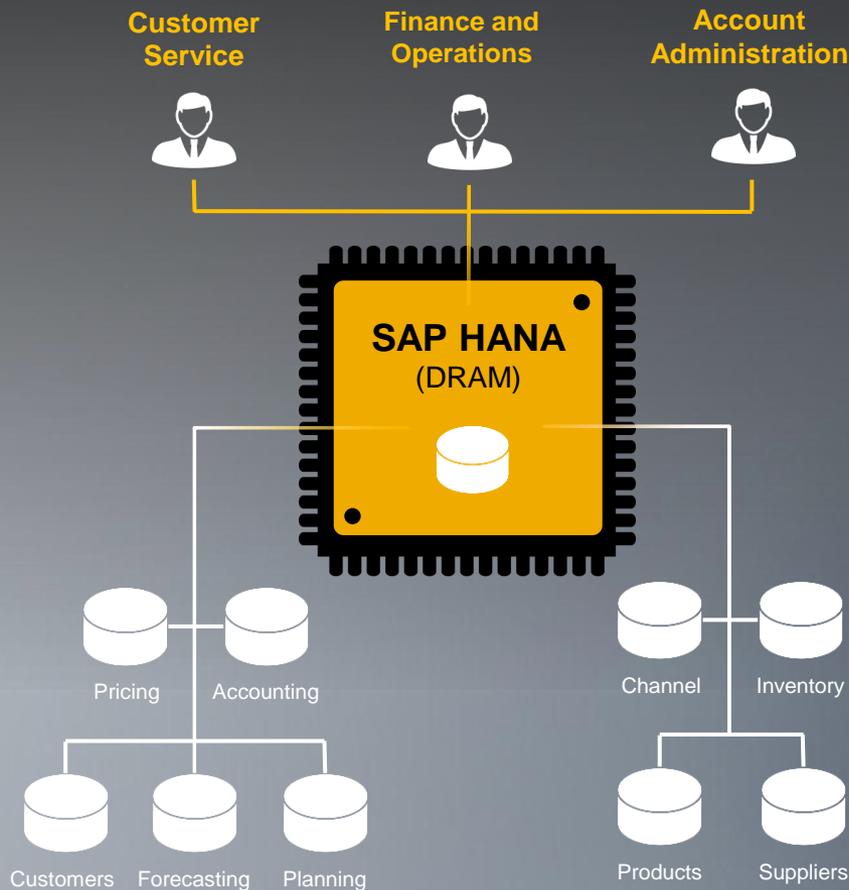
- Accelerate business decisions
  Provides vision across entire business process

- Empower front-line employees
  Provide POS data analysis as interactive session with drill-down information

- Implement real-time
  fraud detection, risk management and monitoring
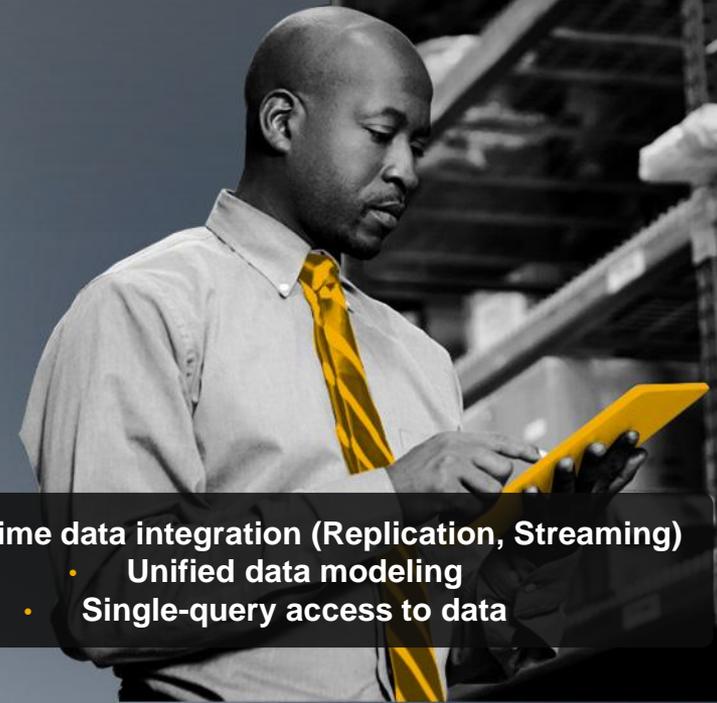
- OLTP + OLAP Processing
- SAP HANA Live
- SAP smart data access – data virtualization

- Real-time data integration (Replication, Streaming)
- Unified data modeling
- Single-query access to data

Big Data Warehousing drives big business
Deeper insights into customer needs and wants

Brand Sentiment

Predictive Maintenance

Fraud Detection

Network Optimization

360° Customer View

Insider Threats

Real-time Demand/ Supply Forecast

Asset Tracking

Propensity to Churn

Personalized Care

Risk Mitigation, Real-time

Product Recommendation

SAP HANA
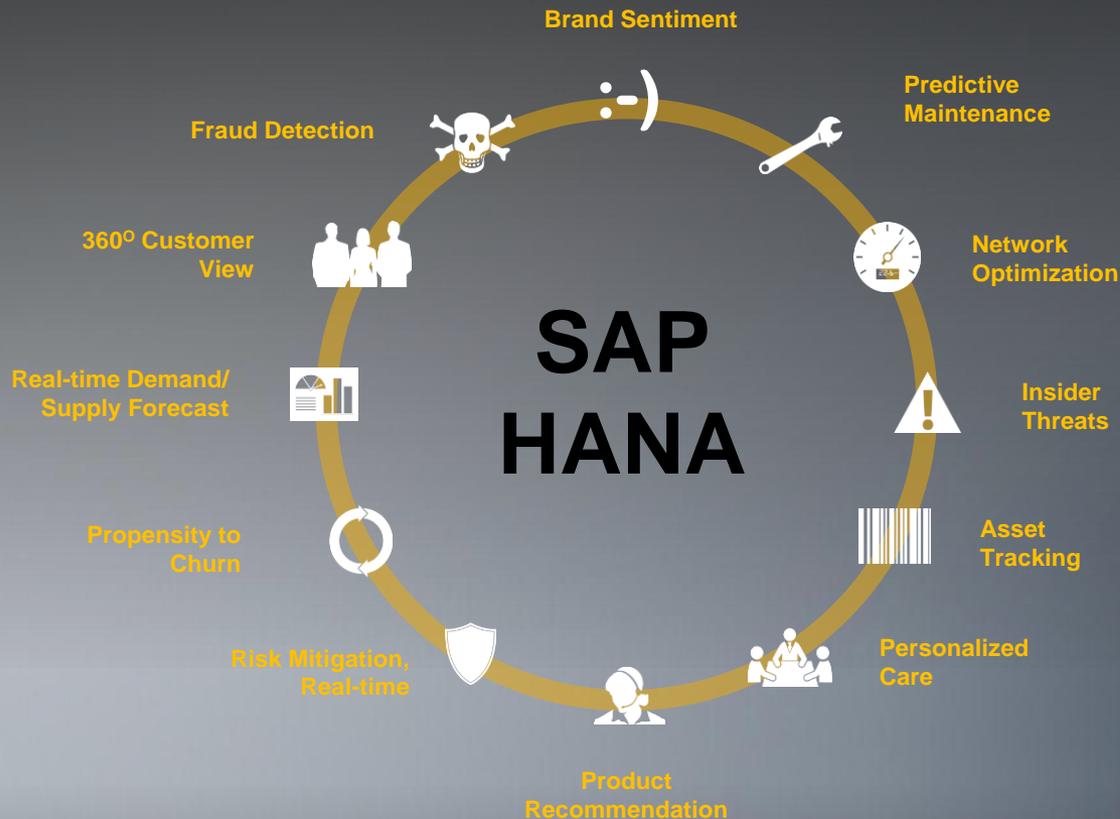
- **Extract value from big data Bring together the power of in-memory, Hadoop, predictive, text mining and spatial analytics**

- **Dramatically improved performance for decision making from variety and volumes of structured and unstructured data**

- **Create a logical data warehouse to respond to changing business environment**

- **Hadoop/R Integration**
  - **Text Search**
  - **Text Analytics**

- **SAP smart data access**
- **Real-time data integration**
  - **Predictive Analytics**

SAP BusinessWarehouse
Powered by SAP HANA

QUERY REPORTING ANALYTICS

SAP BO Business Intelligence

DATA MODELING

SAP NetWeaver BW

SAP HANA PLATFORM

Analytical / Planning Engine

Data Management

Data Storage
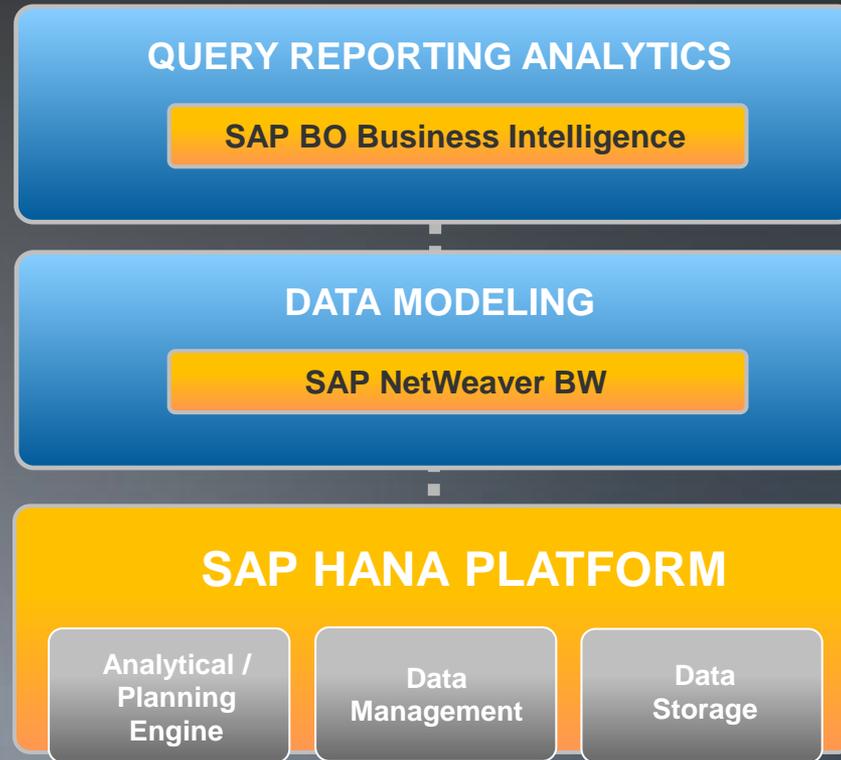
Dramatically Improved Performance

Improved decision making, faster reporting, and the most up-to-date information

**Simplified Administration and Streamlined Landscape**

Reduced administration and lower TCO

**Unlock The Power of Your Data Across The Enterprise**

Self-service access to all information at the most granular level

Predictive Analytics & Machine Learning
Transforming the Future with Insight Today
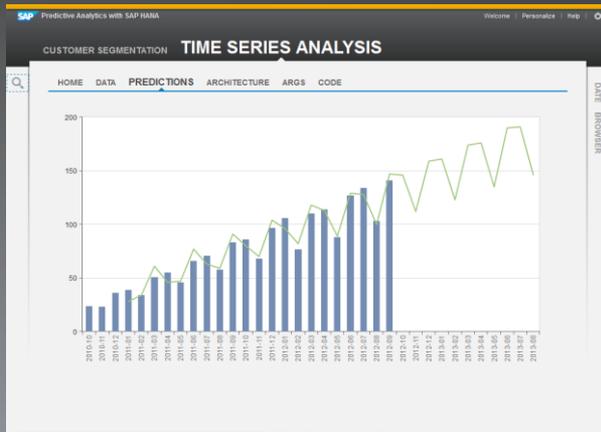
- Provide Business Analysts with sophisticated algorithms to take the next step in understanding their business and modeling outcomes.
- Perform statistical analysis on your data to understand trends and detect outliers in your business.
- Build models and apply to scenarios to forecast potential future outcomes
- Combine, manipulate and enrich data to apply it to your business scenarios. Self-service visualizations and analytics to tell your story
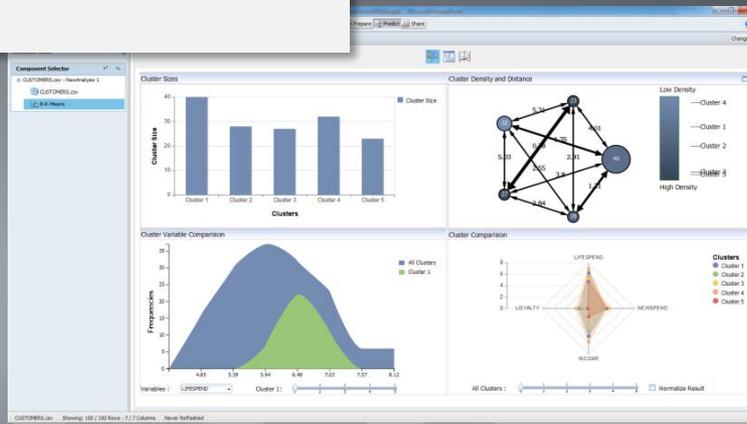
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Renovate existing systems while enabling future breakthroughs

SAP BusinessSuite & SAP BusinessOne

StartUp & ISV Apps

30+ HANA Apps, Accelerators & RDS

Operational Datamarts

EDW on HANA (BWonH)

REAL-TIME APPLICATIONS

Consumer Engagement

Sense & Respond

Planning & Optimization

REAL-TIME ANALYTICS

Operational Analytics

Big Data Warehousing

Predictive, Spatial & Text Analytics

SAP HANA Platform

Development

Administration

Extended Application Services

Processing Engine

Database Services

**Application Function Libraries & Data Models**

Integration Services
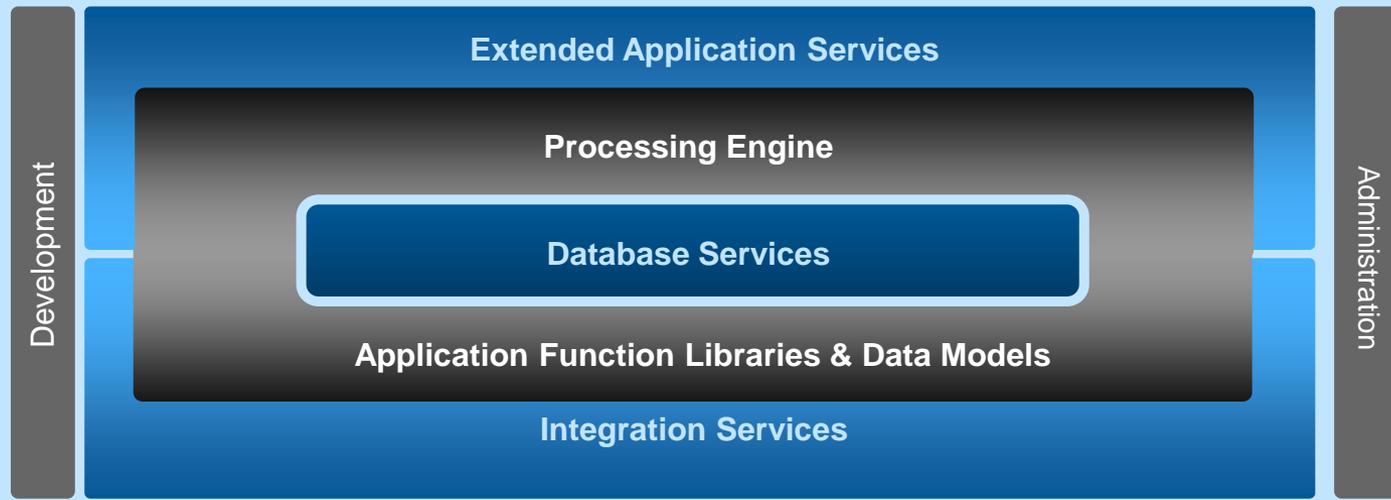
Deployment: **On-Premise | Hybrid | On-Demand**

Database & Data Processing Services Simplified & Optimized
SAP HANA PLATFORM

SAP HANA PLATFORM

Application Services

Processing Engine

| Event Processing | | Planning |
| Calculation | Predictive | Text Mining |

Database Services

| OLTP + OLAP | SIMD | X86 Commodity HW |
| MPP | CPU Cache Aware | Shared Nothing |

| Rules | Search | Predictive |
| Machine Learning | SpacialGIS | Business Fuction Libraries |

Integration Services

Deployment Services

Administration Services

Deployment Service
OnDemand | Hybrid | OnPremise

- **Fully ACID compliant, In-memory, columnar, massively parallel processing database platform**

- **In-memory stored procedures and Data virtualization with smart data access**

- **Integrated data processing for end to end analytic processing**

Scan
3.2 billion billion integer/sec/core

12.5 million aggregates/sec /core

Ingest
**1.5 million** records/sec/node

Application Platform Services
Migrate Existing or Build New Application to Process Any Data

Browser / Mobile

Custom App

Web App Server

SQL	MDX	ODBO	JSON
ADBC	ODBC	JDBC	XML/A
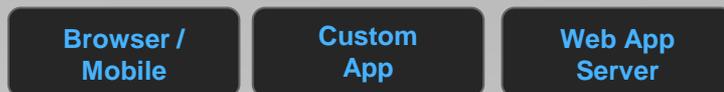
- Structured data
- Click stream
- Social network
- Customer Data
- Point of Sale
- RFID
- Machine Data
- Connected Vehicles
- Text Data
- Geospatial Data
- Smart Meter
- Mobile

SAP HANA

APP Services (Web Server)	Server JS Lib

SQL Script

R-scripts	Application Function Library

Unstructured
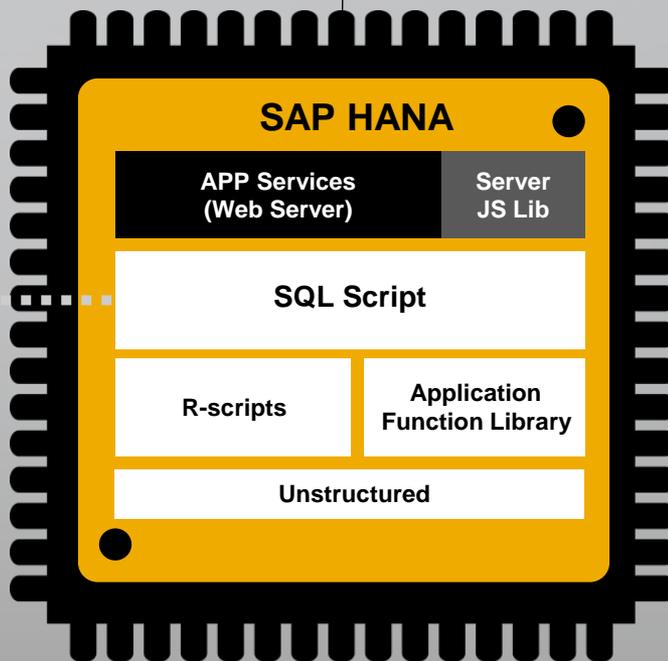
- **Easily migrate your applications. Deploy App without Re-Write**

- **Process any Data within same query with ONE SQLScript**

- **Build new web applications with any open source HTML5 / JS libraries, server-side Java script**

Comprehensive Data Provisioning
## Real-time high volume data integration from any source

Any Source

Data Movement Over Networks

Transform and Persist Data

Source	Method	Data Movement
SAP Business Suite	Trigger-Based	SAP LT Replication Server
Non-SAP Data Sources	Log-Based	SAP Sybase Replication Server
Cloud Deployments	ETL, Batch	SAP Data Services
Complex Event Data Source	Event Streams	SAP Sybase Event Stream Processor
Network Devices – Wired / Wireless	Data Synchronization	SAP Sybase SQL Anywhere
Data Sources (SP6: HANA, IQ, ASE, Hadoop, Teradata)	Data Virtualization	SAP HANA Smart Data Access

ODBC

SAP HANA

Virtual Tables

Mission-critical infrastructure
## Ensuring most demanding service-levels

Campus cluster

Geo clusters

Metro cluster
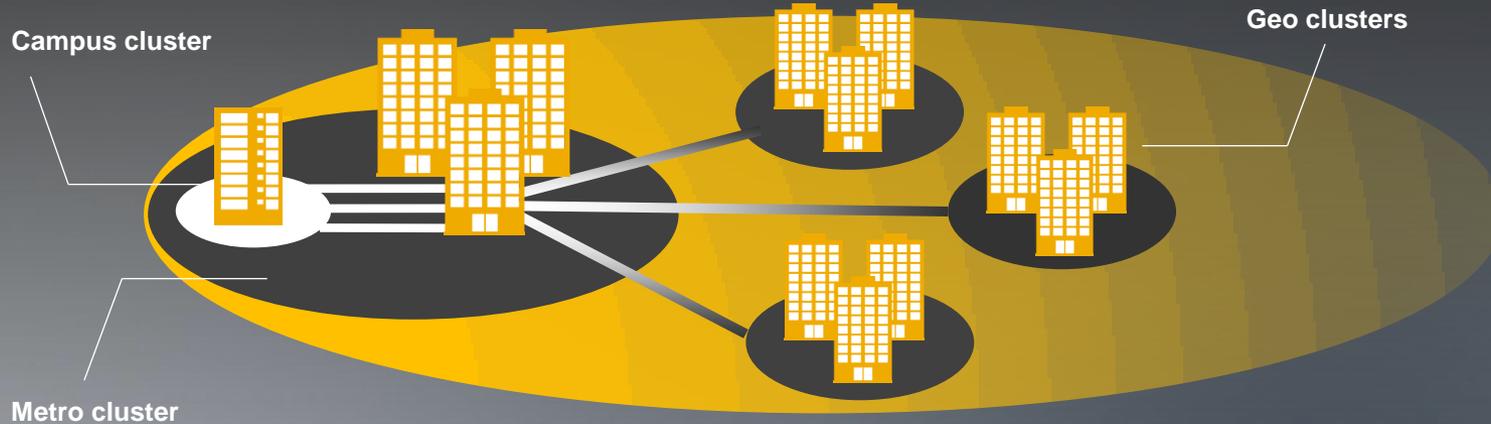
Single Server

- 2 CPU 128GB to 8 CPU 1TB
  (Special layout for Suite on HANA for up to 4 TB per host)

- Single SAP HANA deployments for data marts or accelerators

- Support for high availability and disaster recovery

Scale Out Cluster

- 2 to n servers per cluster

- Each server is either 4 CPU/512GB or 8 CPU/1TB

- Largest certified configuration: 56 servers

- Largest tested configuration: 100+ servers

- Support for high availability and disaster recovery

Choice of On-Premise, Hybrid and Cloud
Provides security, privacy, and availability

Choose and change your deployment options anytime

On Premise

Hybrid

Ariba   SuccessFactors
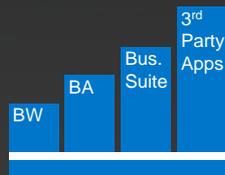
Cloud

Run All SAP Solutions on SAP HANA

- Build or deploy your own solutions on SAP HANA
- Maintain all within your firewall
- Upgrade or leverage existing infrastructure
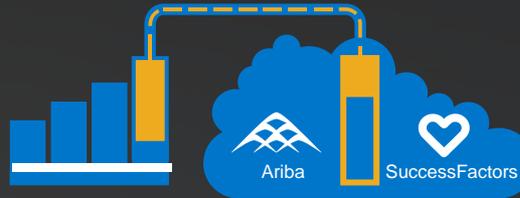
Leverage SAP Cloud

- Migrate some solutions to the cloud
- Create or deploy new SaaS apps in the cloud
- Use cloud hosting and managed services
- Deploy via SAP HANA Enterprise Cloud or public cloud

Build, Run, Deploy all Applications in the Cloud

- Consider Virtual Private Cloud option
- Enable faster innovations
- Simplify landscape
- Migrate or build new applications in SAP HANA Enterprise Cloud

BW   BA   Bus. Suite   3rd Party Apps

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Summary

Values previously unattainable
Cancer cell genomic analysis at Mitsui Knowledge Industry

MKI

Streamlining the process of providing personalized cancer drug recommendation

Innovation Previously Infeasible
Predicts and analyzes game player behavior in real-time

BIGPOINT

Real-time insights, analysis, and consumer engagement for increased revenue and decreased churn

Innovation previously unfeasible

T-Mobile USA, Inc.

Measure effectiveness of marketing campaigns real-time

- Enable targeted micro-offers in real time for optimum retention

- Real-time decisions to maximize revenue by channel

- Refine sales offers for increased adoption and profitability

Quickly fine tune campaigns to reduce churn and increase profitability

Simplicity previously unachievable
eBay Early Signal Detection System powered by Predictive Analytics

Automated signal detection system increasing accuracy of forecasts

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SAP HANA Platform: Rethink the possible

Uncover more business value while enabling breakthrough transformation

SAP HANA platform converges database and application platform capabilities in-memory to transform transactions, analytics, text analysis, predictive, and spatial processing so businesses can operate in real-time.

Thank You