

SAP HANA[®] 2

NEXT-GENERATION PLATFORM for DIGITAL Transformation

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May 2017

SAP[®]

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Agenda

Why SAP HANA Platform?

What is the SAP HANA Platform ?

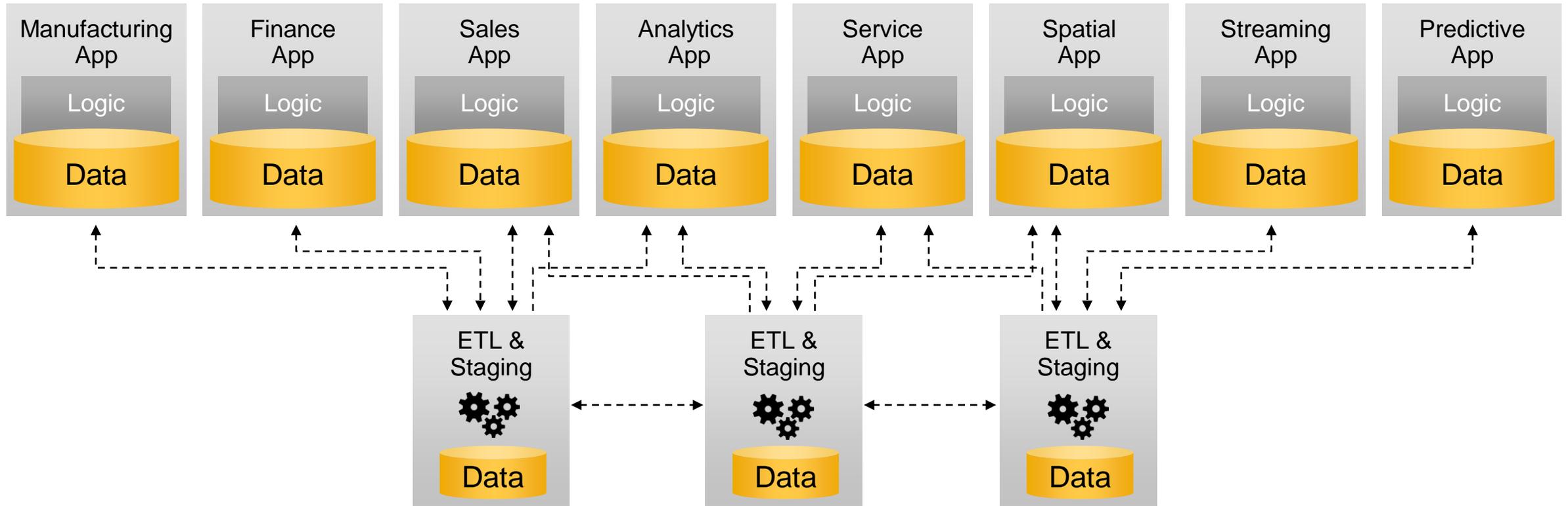
What is the new in SAP HANA Platform 2?

Q&A

Summary

The problem with current IT landscapes

Silos, delay, and complexity hinder business agility and innovation



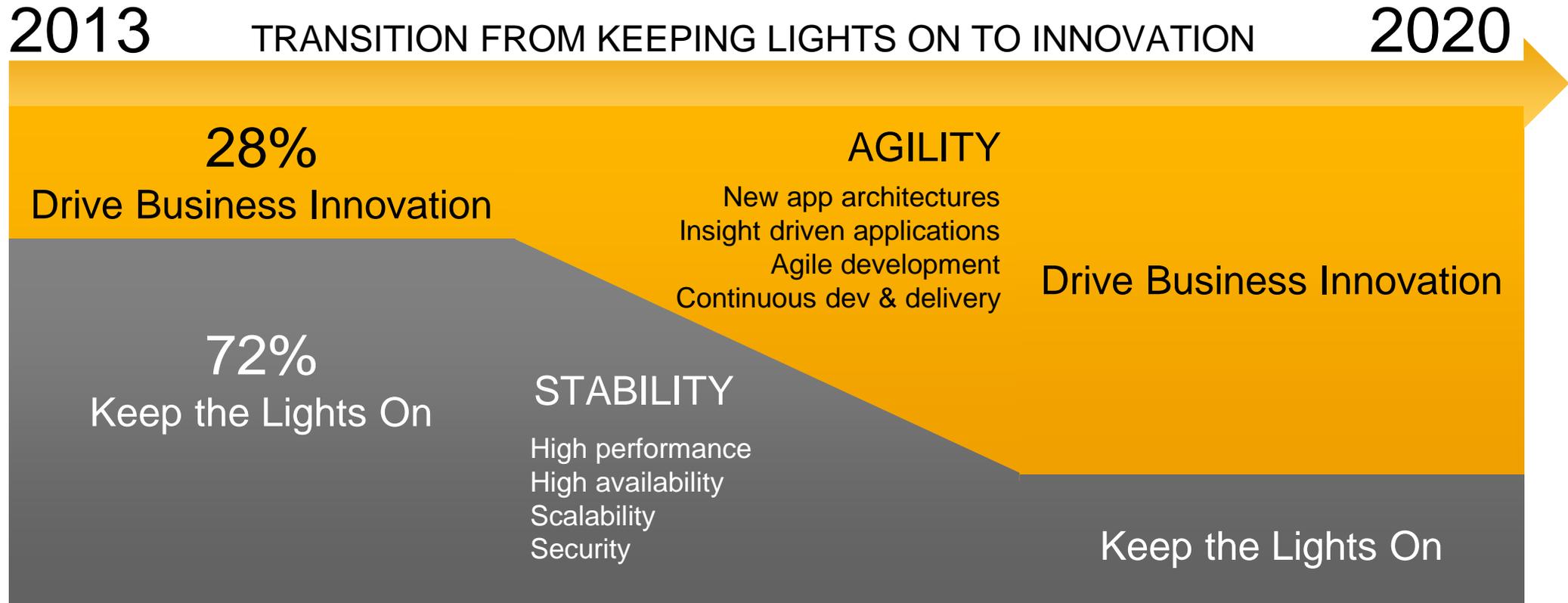
Application silos
Multiple data copies
Batch processing



Partial business view
No real-time insights
Limited ability to innovate

Barriers to building a digital foundation

Balance between agility and stability



1: Forrester IT Survey, 2013 > Amount of time spent on innovation

The Motivating Idea

1.1 Information in Real Time – Anything, Anytime, Anywhere

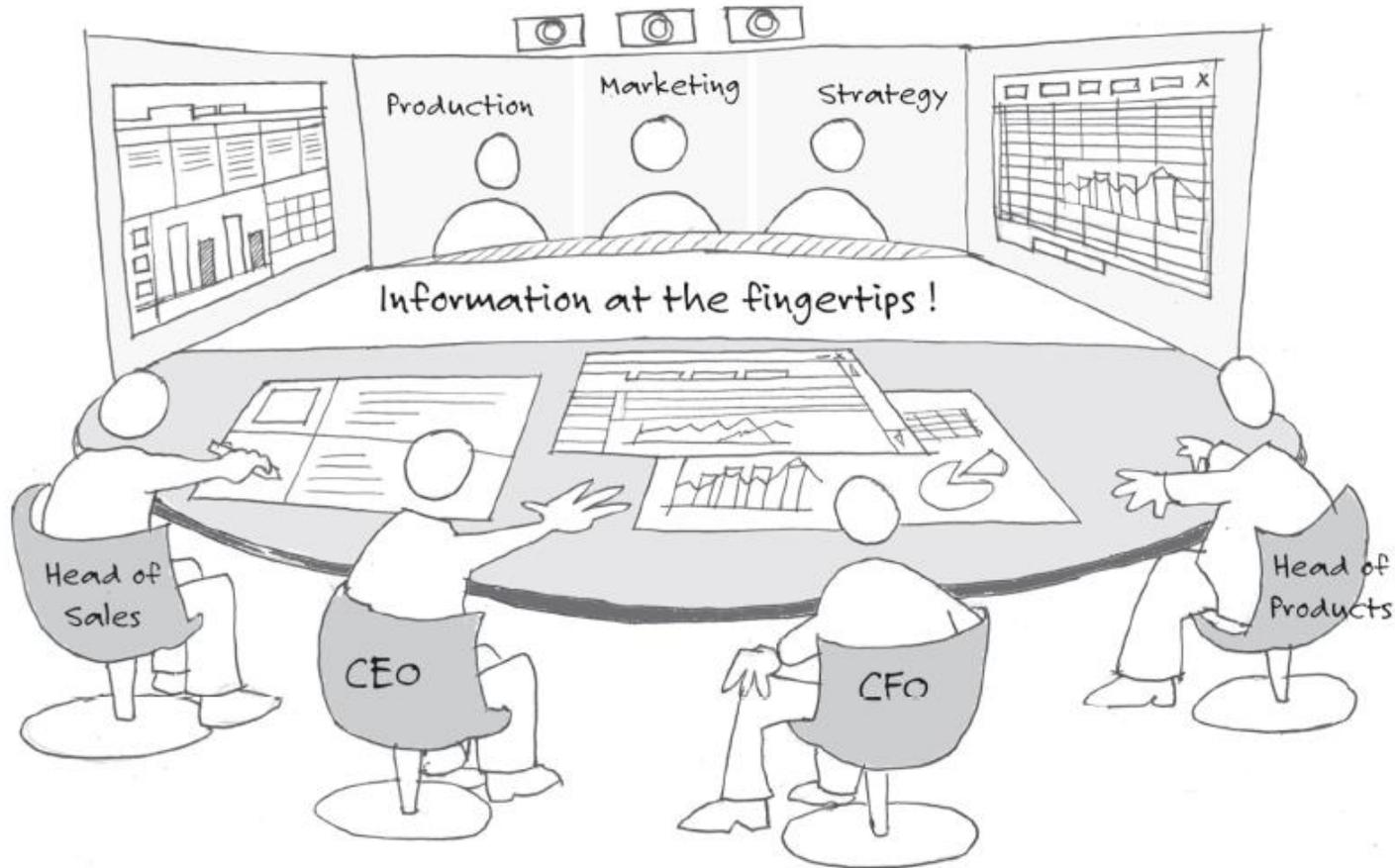


Figure 1.1: Management Meeting of the Future [2]

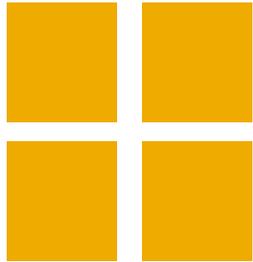


In-Memory Data Management:
An Inflection Point for Enterprise
Applications.
Hasso Plattner Alexander Zeier
ISBN 978-3-642-19362-0

The In-Memory Revolution: How SAP
HANA Enables Business of the Future
21 Apr 2015
by Hasso Plattner, Bernd Leukert

There has been a revolution in hardware

20 Years Ago



Memory

1GB

X 6,000

CPU

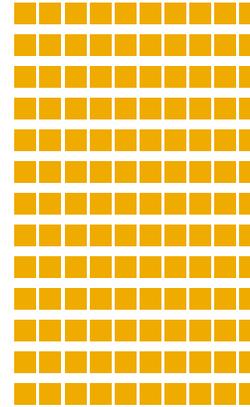
4 x 50 Mhz

X 1,800

Transistors (CPU)

~ 1 million

Now



Memory

20 TB

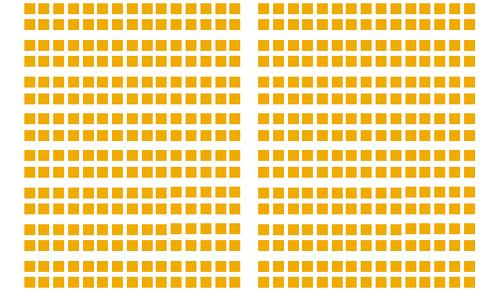
CPU

Intel EX E7 v4
(Broadwell)

Cores

768 (8 x 4 x 24)

Near Future



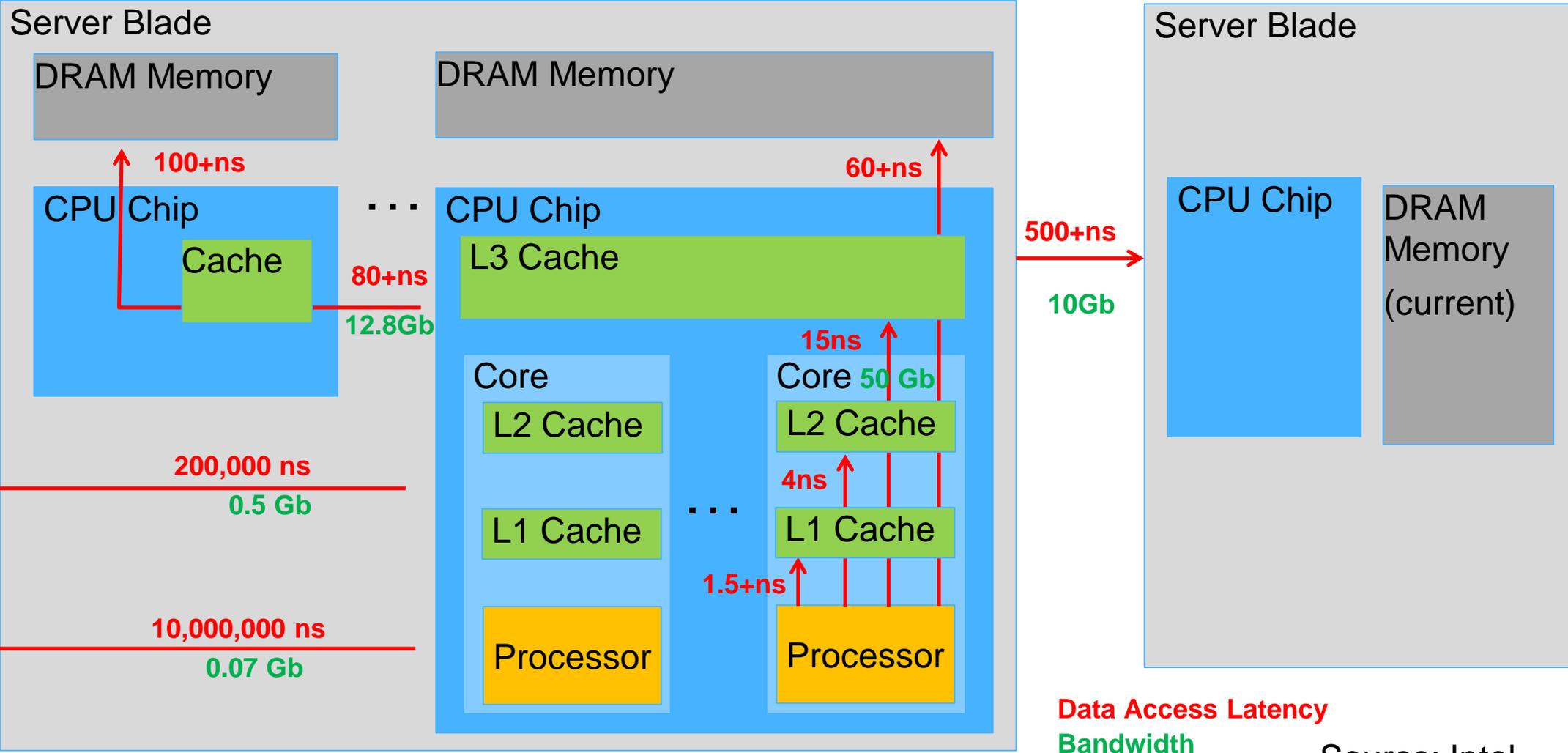
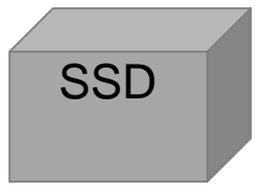
Memory

NVM DIMMs) (non-volatile
memory)

Up to 6TB for 2socket
systems

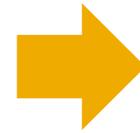
Note: Figures are for single servers

HANA, works in a fundamentally different way to other systems, this initially looks complex, but is actually easy to understand.



Source: Intel

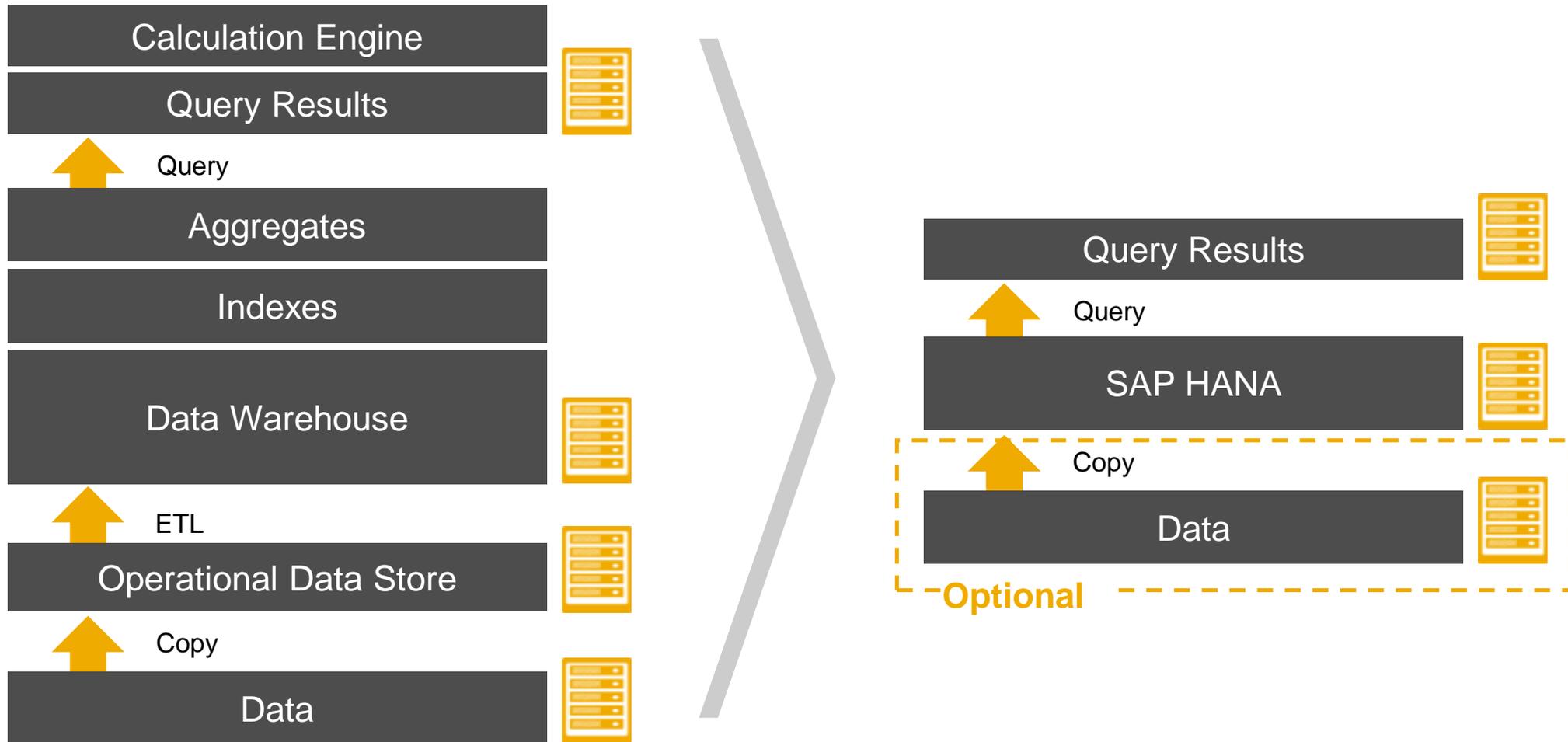
Enables Simplicity & Agility



Example – add a 3 line invoice

- Data must be added where you see the arrows
- Updates where you see the circles - this happens when you book a 3 line document
- Only 2 Boxes Remaining and accounting is done
- Now models and simulation for:
 - Cash Analysis
 - Cash Prediction
 - P&L Statement
 - Balance Sheet
 - Departmental data analysis
 - Etc.

Speed allows elimination of aggregates, indexes this alone can result in a 90%+ reduction in complexity



SAP HANA Platform

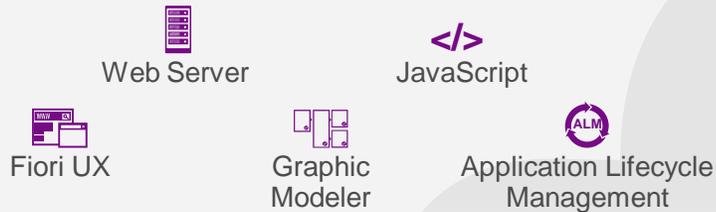
The data management and application platform for all applications

All Devices

SAP, ISV and Custom Applications

SAP HANA PLATFORM

APPLICATION SERVICES



PROCESSING SERVICES



INTEGRATION & QUALITY SERVICES



DATABASE SERVICES



ONE Open Platform

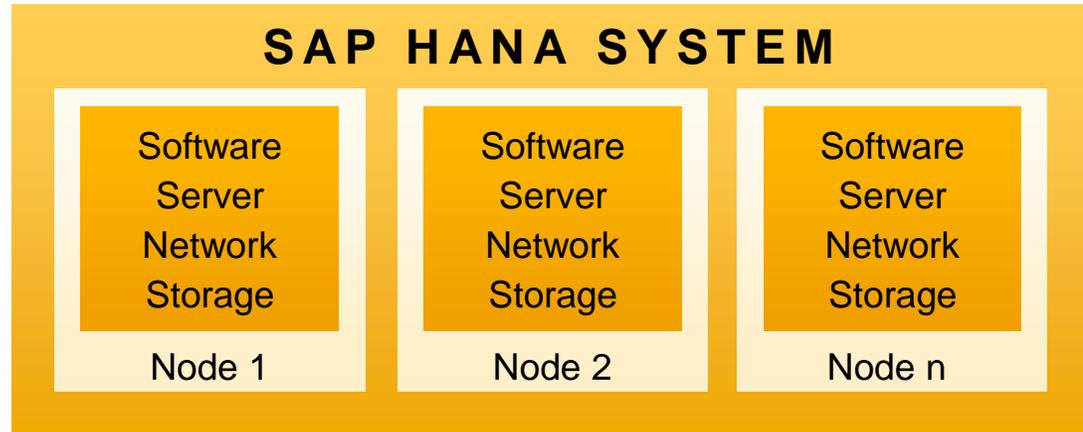
OLTP + OLAP

ONE Copy of the Data

* Graph is in controlled availability

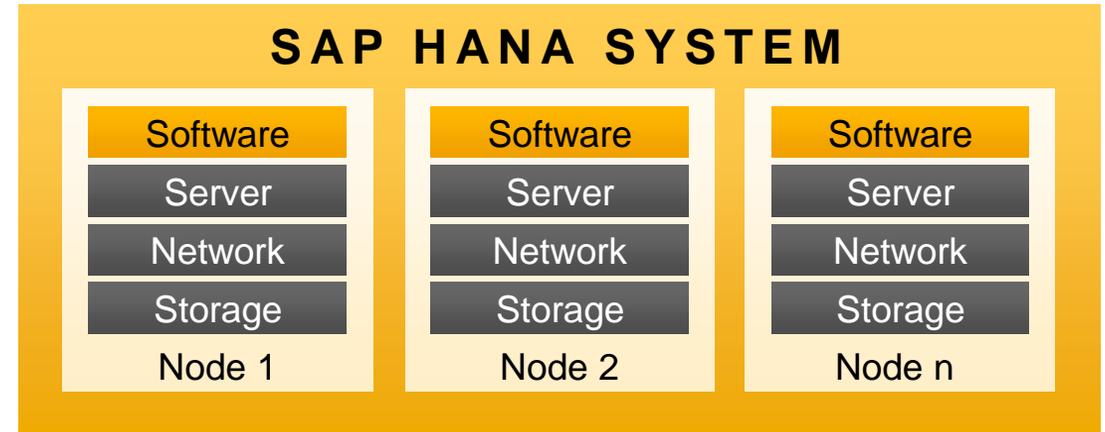
Choose the right on-premise deployment option

Appliance



All in one box by certified partners
(1100+ configurations – 128 GB to 20 TB)

Tailored Data Center Integration



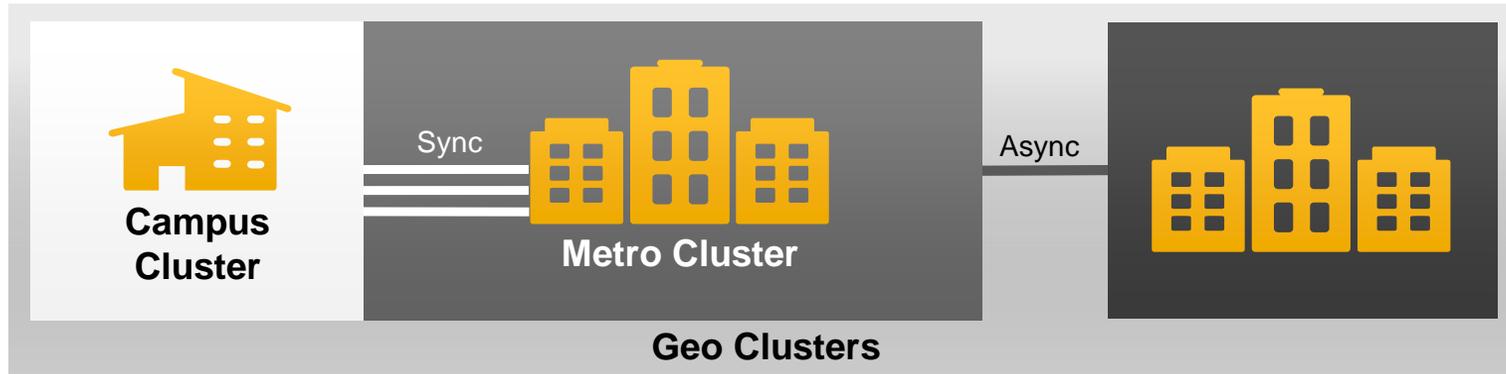
Choice of components that meet SAP requirements from different vendors



Choice of SAP HANA High Availability (HA) and Disaster Recovery (DR) options

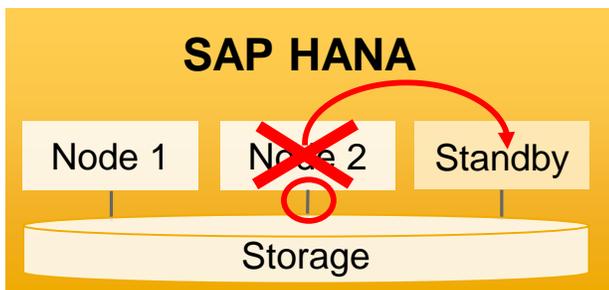
Ensuring the most demanding service-levels

Supports campus, metro, and geo clusters



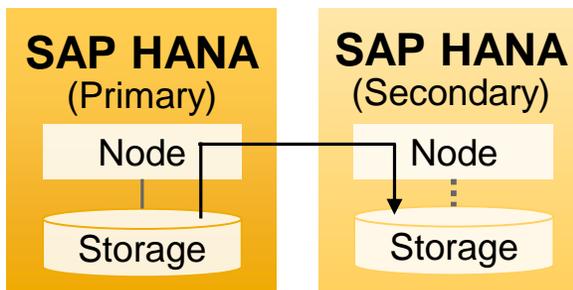
Host Auto-Failover (HA)

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



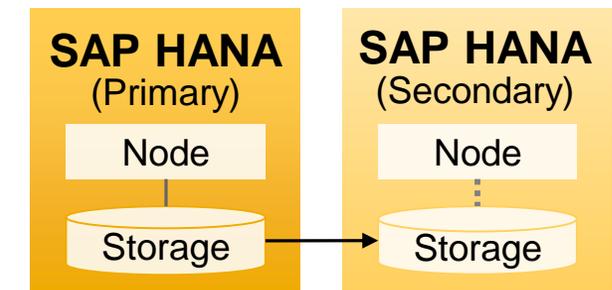
System Replication (HA & DR)

- Across multiple systems/locations
- Continuous data transfer from memory
- Fast switch-over on system failure



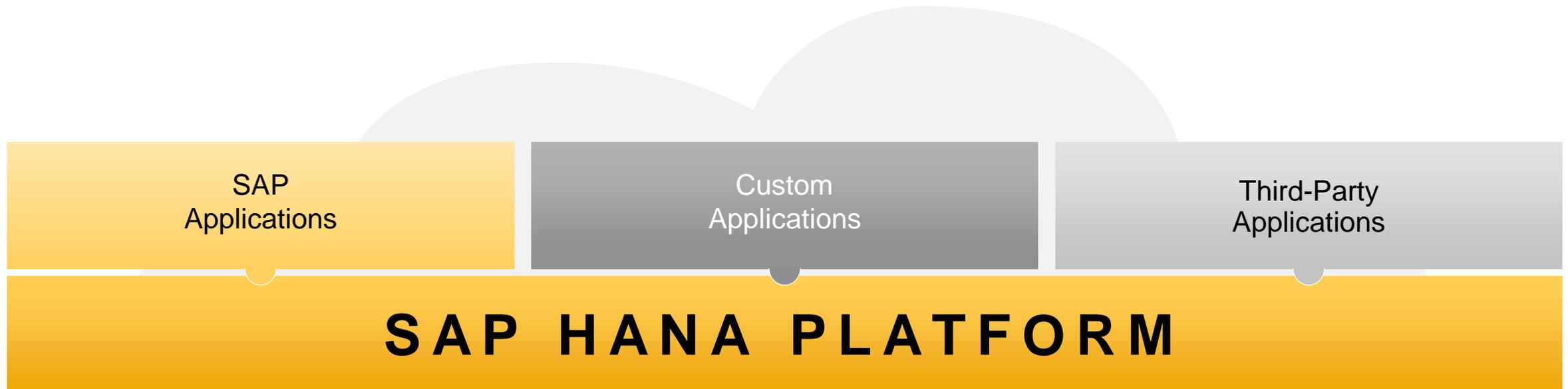
Storage Replication (DR)

- Across multiple systems/locations
- Transfer data using storage mirroring
- Low cost option



Secondary system can be used for Dev/QA

Run all applications on SAP HANA Platform



- SAP applications run better on and are architected for SAP HANA
- Custom applications are easier to build and run more rapidly on SAP HANA
- Third-party applications run faster and unchanged on SAP HANA

SAP HANA Platform 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

Customers: SAP solutions powered by SAP HANA



1,721x

Faster daily production control report
**SAP Business Suite powered by
SAP HANA, SAP HANA Live**



45%

Growth of fantasy football platform using **SAP
HANA Cloud Platform and SAP Lumira Cloud
powered by SAP HANA**



96%

Reduction in data extract, processing, and
load times **SAP BW powered by SAP HANA**



3 days

To migrate to **SAP Business Suite powered by
SAP HANA, SAP HANA Enterprise Cloud**



70%

Reduction in IT total cost of ownership **SAP Suite
on SAP HANA, SAP HANA Enterprise Cloud**



<3 seconds

Render 500 million rows of data graphically
to the user **SAP Lumira powered by SAP HANA**



Unified

Picture of sales, profits, and share targets, all in
one system **SAP S&OP powered by SAP HANA**



400%

Faster reporting speed for accelerated analysis and
planning cycles, time to action **SAP BPC powered
by SAP HANA, SAP BW powered by SAP HANA**

Announcing SAP HANA innovations

Digital foundation to transform business

SAP HANA[®] 2

- Next-generation SAP HANA platform
 - New release optimized for innovation
 - Deliver modern IT with agility and stability
-

SAP HANA, Express Edition

- Streamlined version of SAP HANA for rapid application development
- Download for free to PCs or personal servers to get started quickly

SAP HANA Microservices

- Cloud microservices that leverage SAP HANA processing in the cloud to deliver analytic insights to applications
- Pay-as-you-go on SAP Hybris as a Service (YaaS) marketplace

Transition to SAP HANA 2

Adopt Innovation at your own pace

SAP HANA SPS12

- ❑ Digital foundation to run applications without maintenance upgrade disruptions
- ❑ No new support package stacks (SPS)
- ❑ Maintenance revisions for SAP HANA SPS12 is provided until May 2019

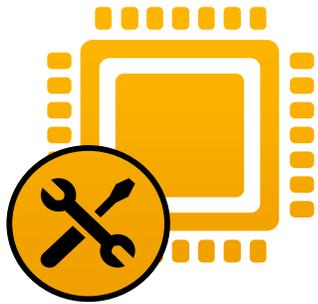
SAP HANA[®] 2

- ❑ Digital foundation to build next-generation applications using the latest technology innovations
- ❑ Twice-a-year support package stacks (SPS)
- ❑ Maintenance for SPS provided until next 2 SPSs are released (Example: SPS00 supported until SPS02 is released)

Transform IT with SAP HANA 2

Modernize IT to Enable Innovation

Free IT to
Focus on Innovation



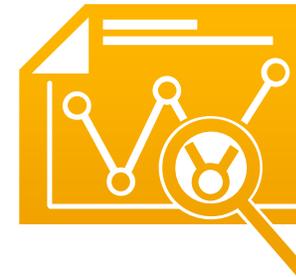
Database
Management
Transformed

Leverage All Data
to **Foster** Innovation



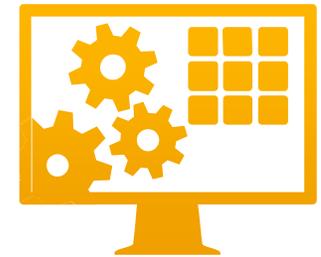
Data
Management
Transformed

Discover Insights
to **Drive** Innovation



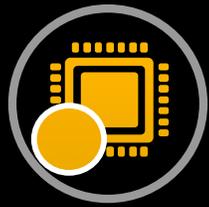
Analytical
Intelligence
Transformed

Develop Solutions
that **Power** Innovation



Application
Development
Transformed

SAP HANA[®] 2



Database Management Transformed

Database Management Transformed

High availability and disaster recovery

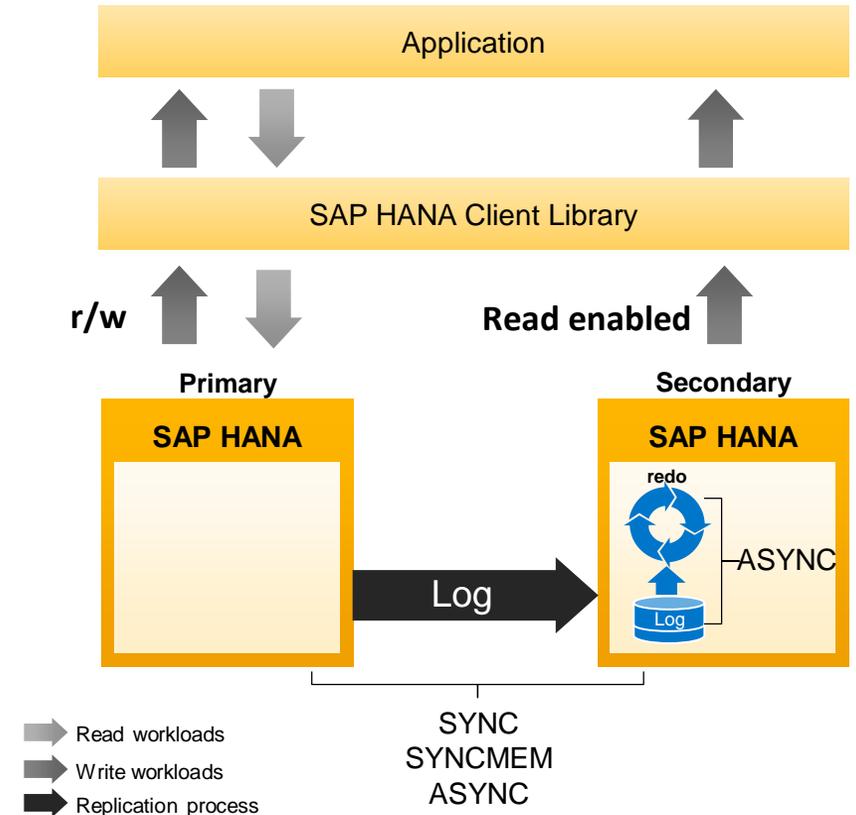
System Replication

- “Active / Active read-enabled” to utilize the secondary systems to offload read intense workloads

SAP Landscape Management*

- Expand support with automated orchestration for HA/DR processes (like takeover, zero-downtime updates, ...)

* License Separately



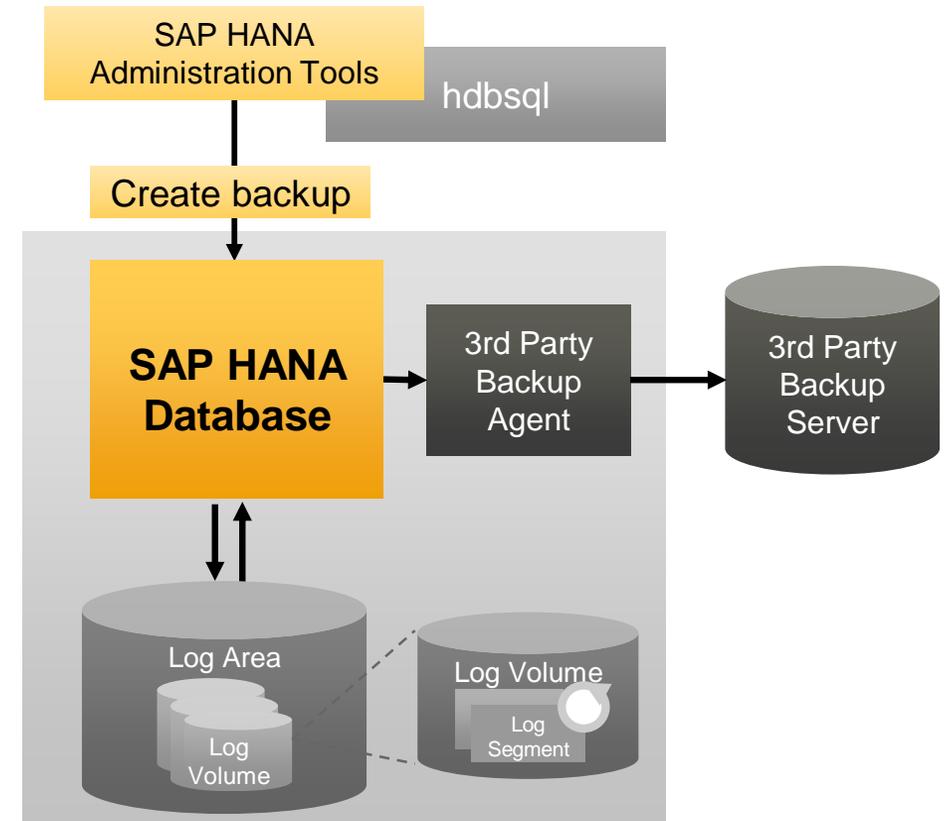
Ensure business continuity and availability to meet the most demanding SLAs

Database Management Transformed

Backup and recovery

Backup and Recovery

- Consolidate output files from SAP HANA to simplify workload for certified 3rd party backup tools
- Option to define location of backup catalog (independent of redo logs) to allow choice of backup catalogs for recovery and improve performance
- Recover a backup from a singleDB (non-MDC) system to a tenant database from an MDC system to support testing scenarios in a transition from single to MDC
- Restore SAP HANA 1.0 (needs to be SPS10+) backup to SAP HANA 2.0 system



Simplify backup and recovery operations to provide more flexibility

Database Management Transformed

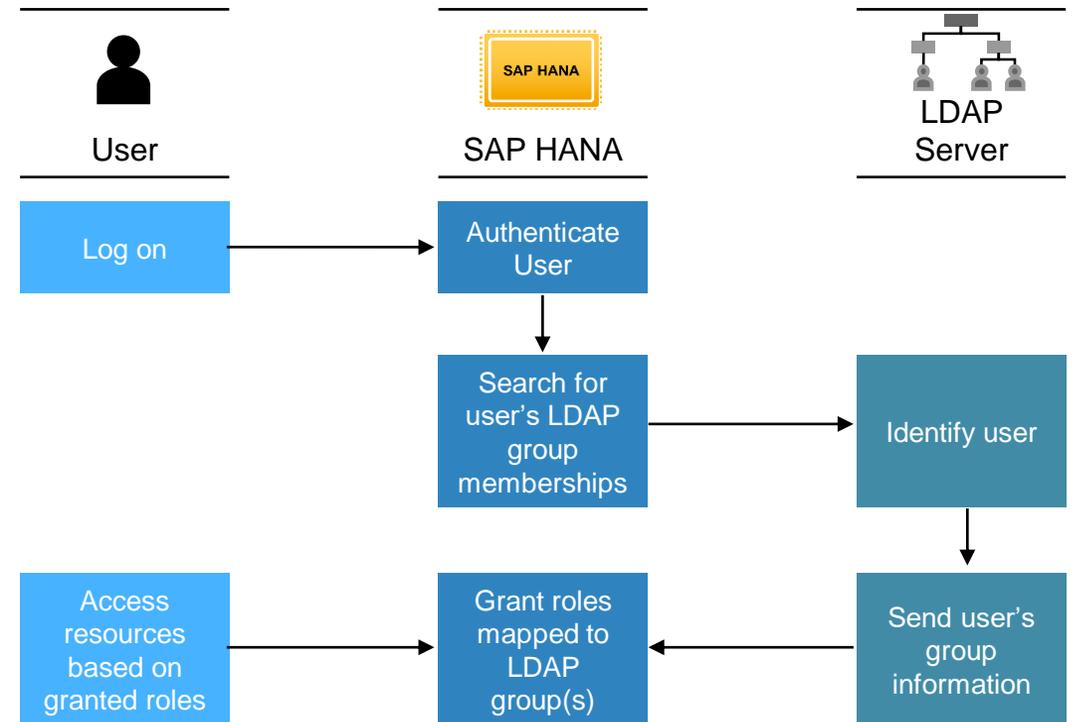
Enhanced data security and compliance enablement

Data Encryption

- Full native data at rest encryption (including redo logs, DT data volume, etc.)
- Enhanced encryption key management (i.e. changing the root key of the application encryption service that is used)

User and Role Management

- Authorization management in SAP HANA based on LDAP groups to lower operation cost
- Additional authentication and user management capabilities for XS Advanced scenarios, e.g. app-to-app SSO



Integrated security framework with authentication, SSO, user/role management, data and communication encryption, audit logging, secure configuration and secure application development for comprehensive protection

Database Management Transformed

Capture and replay / workload analyzer

Workload Capture and Replay

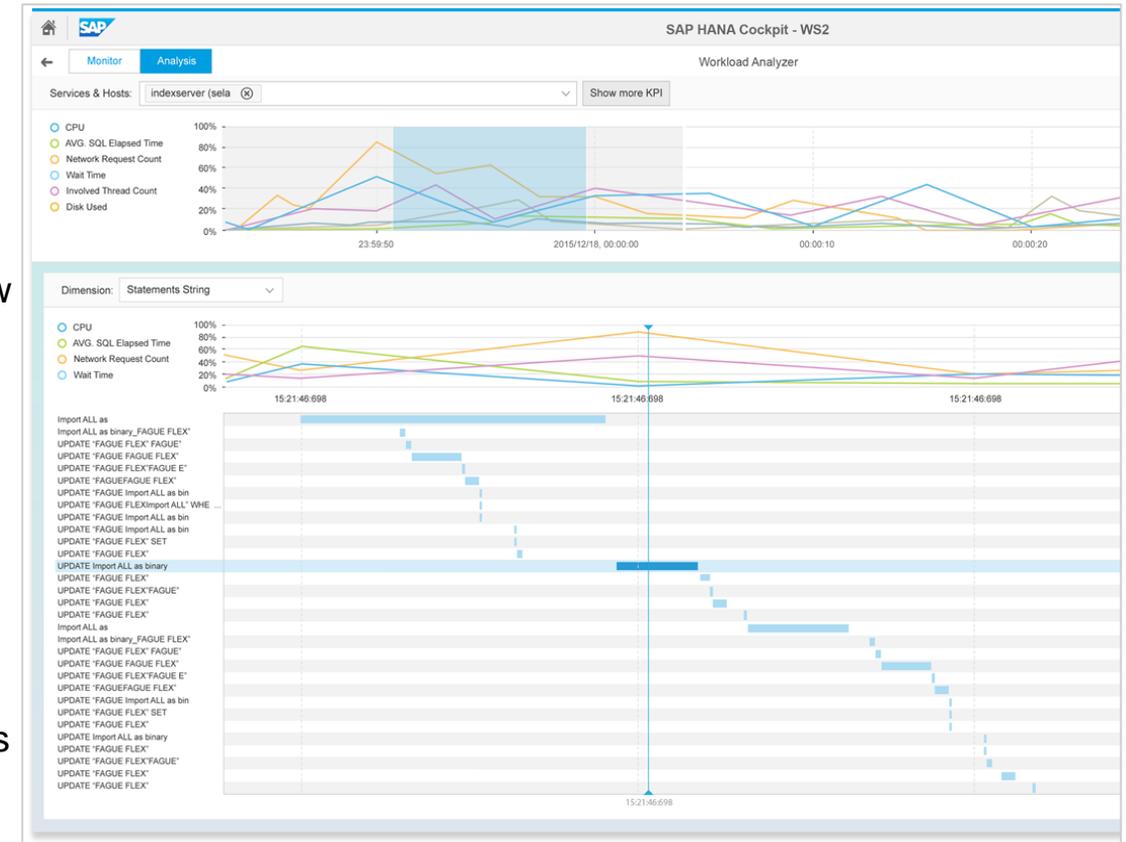
- Compare several replays coming from the same capture with each other for baseline analysis
- Resource consumption reporting allows comparison of workload on system level after replay
- Comparison of results of view-based queries based on row counts offers new insights into replay performance

Workload Analyzer

- Analyze historical sampling-based workload data in a visual form, making it easier to evaluate and draw conclusions
 - Timeline-based view, with statements structured in an execution hierarchy based on application and statement level, for better analysis and navigation
 - Analyze captured workloads, visualizing system load based on engine Instrumentation

SQL Analyzer

- Analyze individual query runtimes by providing execution overview as well as several performance details.
 - Shows multiple KPI, e.g. used tables for query or SQLScript statement execution statistics



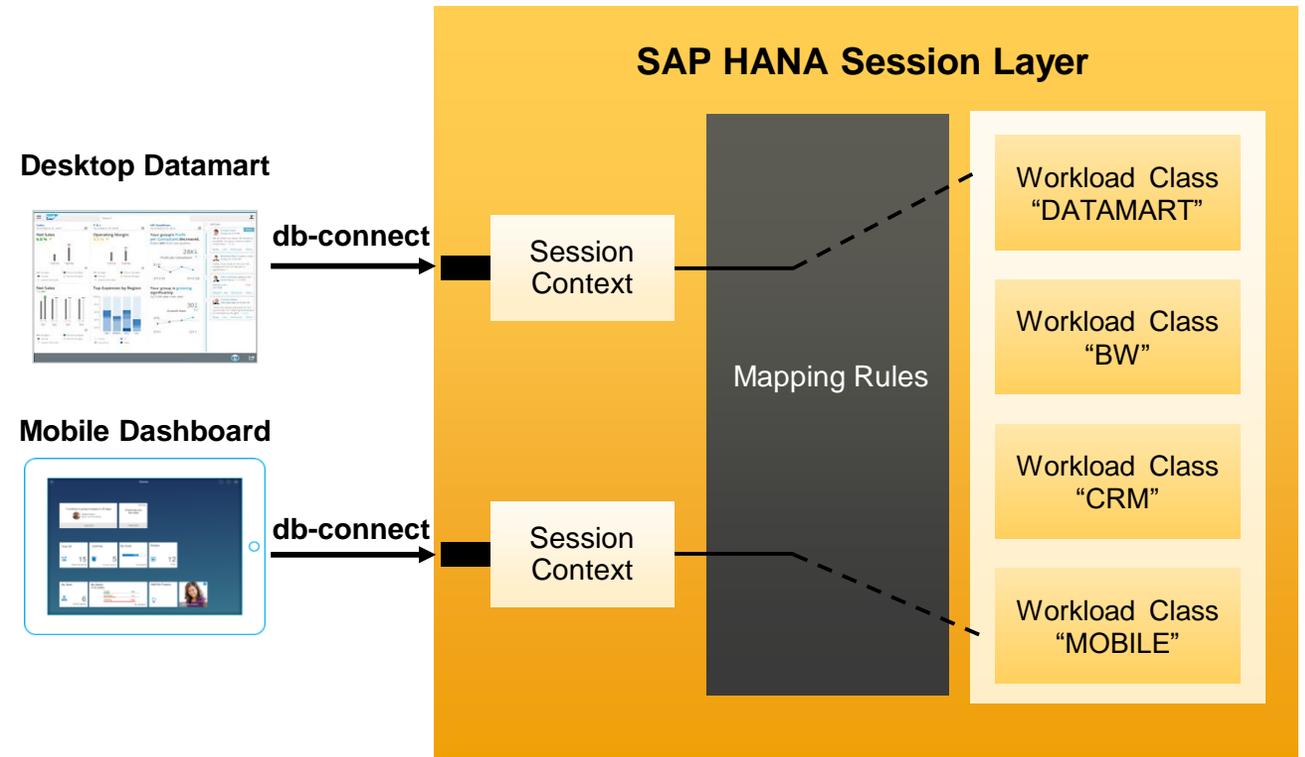
Simulate and analyze workloads to reduce time and cost when implementing change

Database Management Transformed

Workload management

Workload Management

- Initial admission control offering to automatically reject requests from the database (applications, analytics, ...) if thresholds are exceeded to avoid system-overload situations
- New option for clients to define a query timeout parameter in order to avoid run-away queries
- Support BI clients enabling workload classes at the session level for improved workload management by non-SAP clients
- Simplified enabling / disabling workload classes via the SAP HANA Cockpit to manage business processes



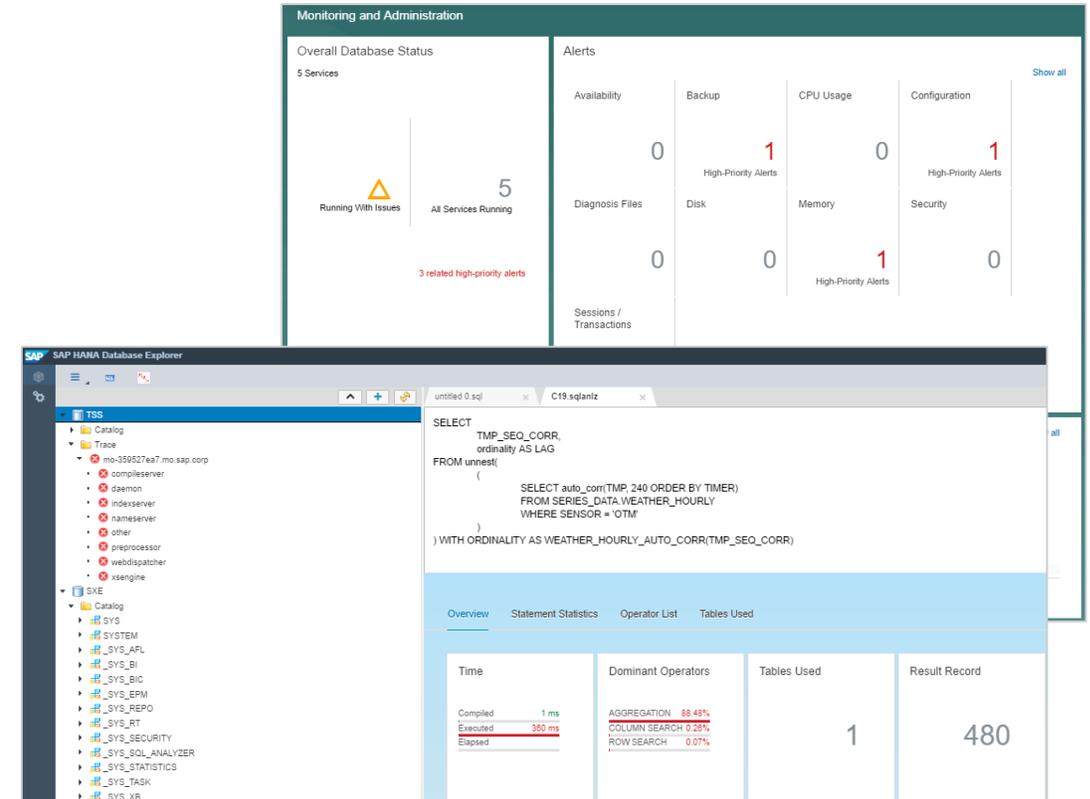
Influence dynamic resource consumption according to workload classifications to improve performance for users and applications

Database Management Transformed

Administration and monitoring

SAP HANA Cockpit

- Re-architected for optimized administration in order to
 - Unify individual, multiple database, and tenant management
 - Run without dedicated SAP HANA instance and separate administration environment from production system
 - Support on-premise or cloud implementations
- Integrated database explorer for catalog browsing, SQL console, and trace file management capabilities to increase DBA productivity
- Enhanced performance analysis of SQL plan that has been executed with related statistics to analyze the execution plan of a SQL statement in a graphical view



Simplify administration and monitoring for the digital core to improve IT efficiency

SAP HANA[®] 2



**Data Management
Transformed**

Data Management Transformed

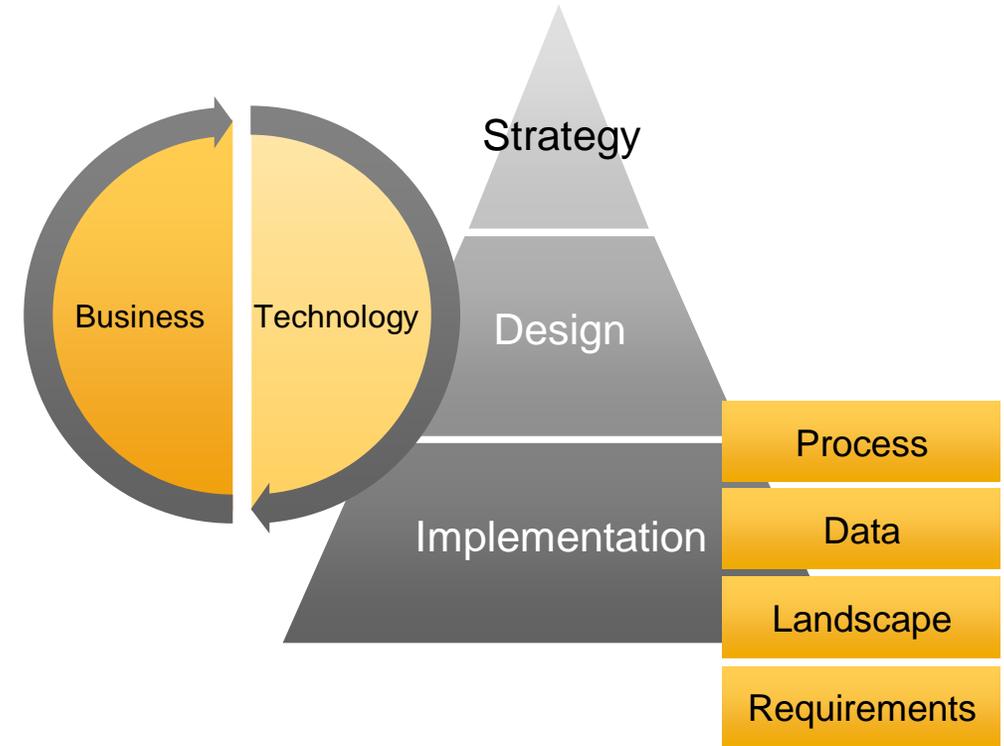
SAP Enterprise Architecture Designer, Edition for SAP HANA



SAP Enterprise Architecture Designer, Edition for SAP HANA*

- Web-based enterprise architecture modeling tool for comprehensive end to end modeling experience
- Support business process modeling
- Provide landscape, application and business capability modeling
- Provide analysis of linked items across perspectives to drive decisions for digital transformation
- Architect and plan physical data models targeting new and/or migrations to SAP HANA
- Support requirements modeling/documentation

* 5 user license with SAP HANA.



Strategy – Design – Implementation

**Create and integrate enterprise, landscape, process,
and data models to manage information and systems effectively**

Data Management Transformed

Smart data integration, Smart data quality, and Smart data access



Smart Data Integration (SDI)

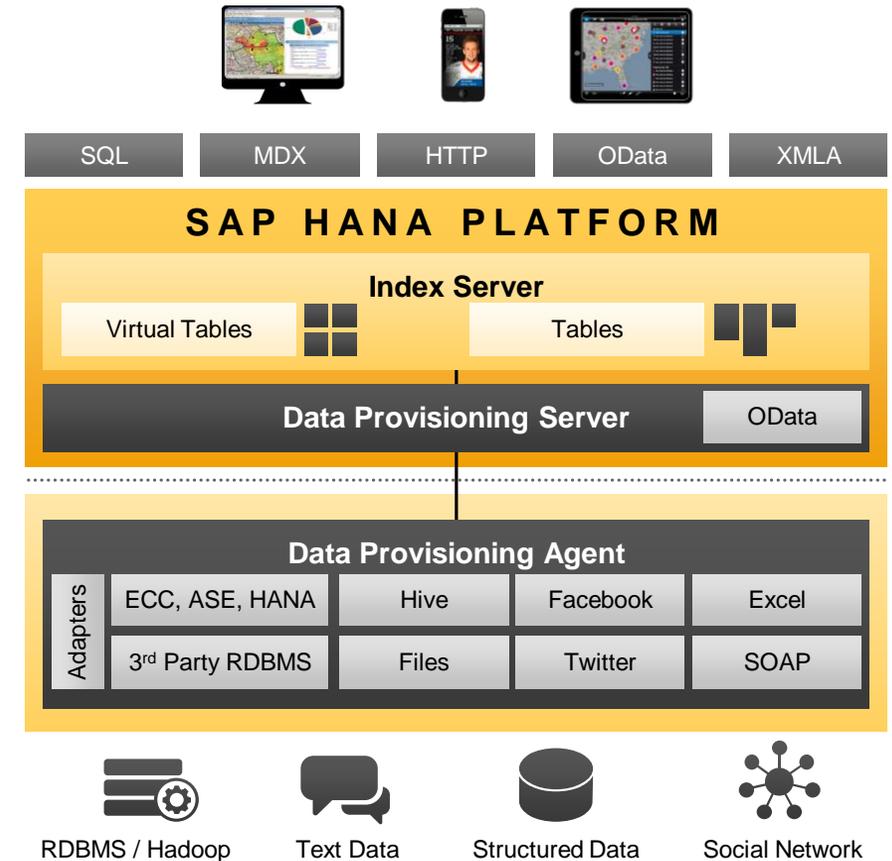
- Virtual procedure support (via BAPIs) to enable read/write scenarios with ABAP-based systems
- Support parallel data load to optimize memory consumption and improve data load performance
- Automatic recovery of real-time replication, if source system becomes unavailable, to simplify operations
- Additional data sources: MS Access and MS Sharepoint for data virtualization and integration scenarios

Smart Data Quality (SDQ)

- SDQ cleanse transform support for address suggestions to improve accuracy of address data

Smart Data Access (SDA)

- SDA Remote metadata sync via refresh command to easily maintain changing schemas



Data integration and transformation for advanced and rich processing of business data

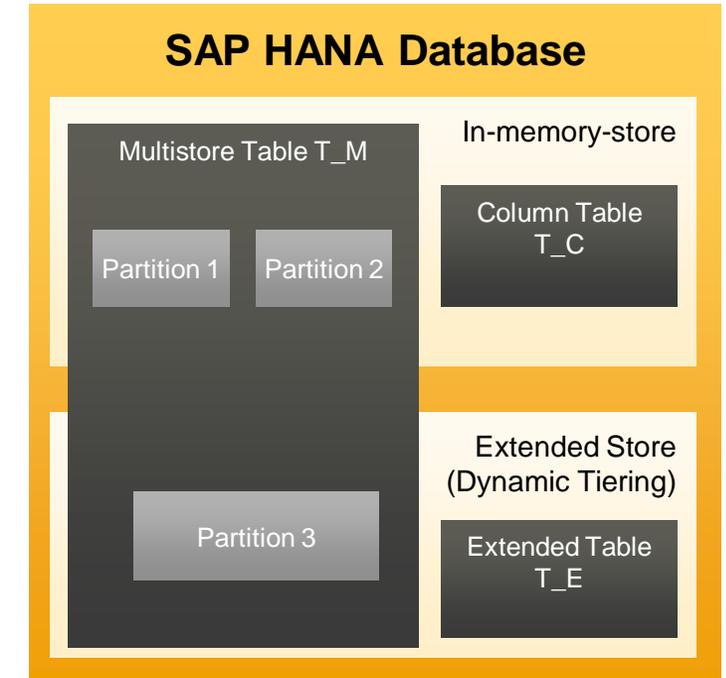
Data Management Transformed

Tiered storage



Dynamic Tiering

- Multi-store table is a partitioned SAP HANA column table with partitions distributed between memory and extended store to simplify management of large volumes of data
 - With the ability to bi-directionally move partitions between memory and extended store as the business value of data changes (like aging)
 - With runtime partition pruning, ensure query optimizer accesses only the pertinent partitions
- Support system replication for two-tier synchronous SAP HANA and extended stores for high availability
- Delta backups now support systems with both in-memory and extended store to reduce backup times and storage requirements
- Encrypt extended store for better security



Combine enhanced dynamic tiering and data lifecycle management to optimize the data management for multi temperature management

SAP HANA[®] 2



Analytical Intelligence Transformed

Analytical Intelligence Transformed

Predictive / machine learning

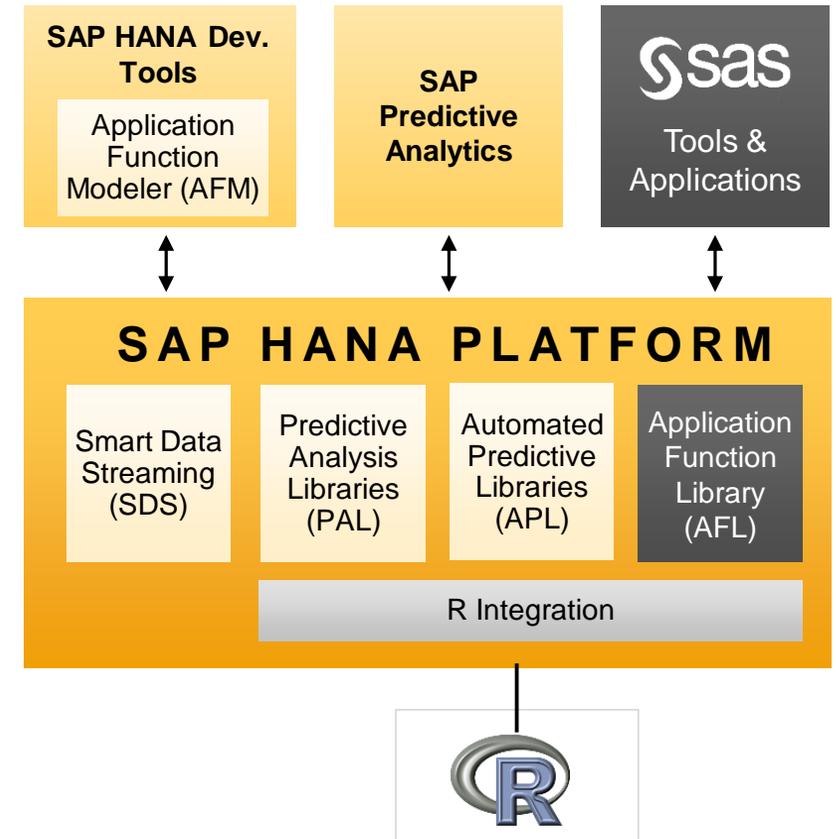


Predictive Analytics Library

- Expand existing library to include **8 new** algorithms to enable new analytical use cases
- Infrastructure enhancements (like metadata sharing) to enable SAP Predictive Analytics to easily consume new PAL functions
- Support parallel execution of PAL scoring functions to improve processing performance for large scale partitioned data

Streaming Analytics

- Guarantee message delivery via REST interface for real-time analysis use cases where data assurance is required
- New adaptors (ODATA, JSON, XML support) for greater flexibility



Rich set of native algorithms for in-database and in-memory processing exploiting analytic capabilities resulting in quicker insights and faster implementation

SAP HANA In-Memory Predictive Analytics

Predictive Analysis Library (PAL) – algorithms supported in SAP HANA 2



Classification Analysis

- CART
- C4.5 Decision Tree Analysis
- CHAID Decision Tree Analysis
- K Nearest Neighbour
- Logistic Regression Elastic Net
- Back-Propagation (Neural Network)
- Naïve Bayes
- Support Vector Machine
- Random Forests
- **Gradient Boosting Decision Tree***
- **Linear Discriminant Analysis (LDA)***
- Confusion Matrix
- Area Under Curve (AUC)
- Parameter Selection / Model Evaluation

Regression

- Multiple Linear Regression Elastic Net
- Polynomial, Exponential, Bi-Variate Geometric, Bi-Variate Logarithmic Regression
- **Generalized Linear Model***
- **Cox Proportional Hazards Model***

Cluster Analysis

- ABC Classification
- DBSCAN
- K-Means
- K-Medoid Clustering
- K-Medians
- Kohonen Self Organized Maps
- Agglomerate Hierarchical
- Affinity Propagation
- Latent Dirichlet Allocation (LDA)
- Gaussian Mixture Model (GMM)
- Cluster Assignment

Time Series Analysis

- Single/Double/ Brown /Triple Exp.Smoothing
- Forecast Smoothing
- Auto - ARIMA/ Seasonal ARIMA
- Croston Method
- Forecast Accuracy Measure
- Linear Regression with Damped Trend and Seasonal Adjust
- Test for White Noise, Trend, Seasonality
- **Fast Fourier Transform (FFT)***
- **Correlation Function***

Association Analysis

- Apriori
- Apriori Lite
- FP-Growth
- KORD – Top K Rule Discovery
- **Sequential Pattern Mining***

Probability Distribution

- Distribution Fit/ Weibull analysis
- Cumulative Distribution Function
- Quantile Function
- Kaplan-Meier Survival Analysis

Outlier Detection

- Inter-Quartile Range Test (Tukey's Test)
- Variance Test
- Anomaly Detection
- Grubbs Outlier Test

Link Prediction

- Common Neighbors
- Jaccard's Coefficient
- Adamic/Adar
- Katzβ

Statistic Functions

- Mean, Median, Variance, Standard Deviation, Kurtosis, Skewness
- Covariance Matrix
- Pearson Correlations Matrix
- Chi-squared Tests:
 - Test of Quality of Fit
 - Test of Independence
- F-test (variance equal test)

Data Summary

Data Preparation

- Sampling
- Binning
- Scaling
- Partitioning
- Principal Component Analysis (PCA) / PCA Projection

Other

- Weighted Scores Table
- Substitute Missing Values

* New in SAP HANA 2 SPS0

Analytical Intelligence Transformed

Text data processing



Text Search

- Filter on a date data type be it partial (e.g. 2016/09), decimal or string in faceted navigation applications for additional flexibility when browsing unstructured data
- Dynamically configure rule sets that require system specific parameters when used for either development, testing or production environments
- Run in “batch mode” for rule sets to detect duplicates on a set of records; goes beyond limited single row inputs

Text Analysis

- Create, test iteratively and maintain their custom dictionaries and rules in Web IDE for SAP HANA
- Offer a native SQL interface to support simple integration of text scenarios into applications
- Expand sentence-/clause-level sentiment analysis to Arabic
- Extend tokenization and custom dictionary support to all whitespace-delimited languages in the world

Run Configurations for hdbModule

Name: Run text analysis test

Data Source: Enter Plain Text

Select Input Language: Single Select (English)

Cancel

كانت لوحة المفاتيح ممتازة

StrongPositiveSentiment: ممتازة

Topic: لوحة المفاتيح

Search and analyze text hidden in unstructured sources to uncover new insights

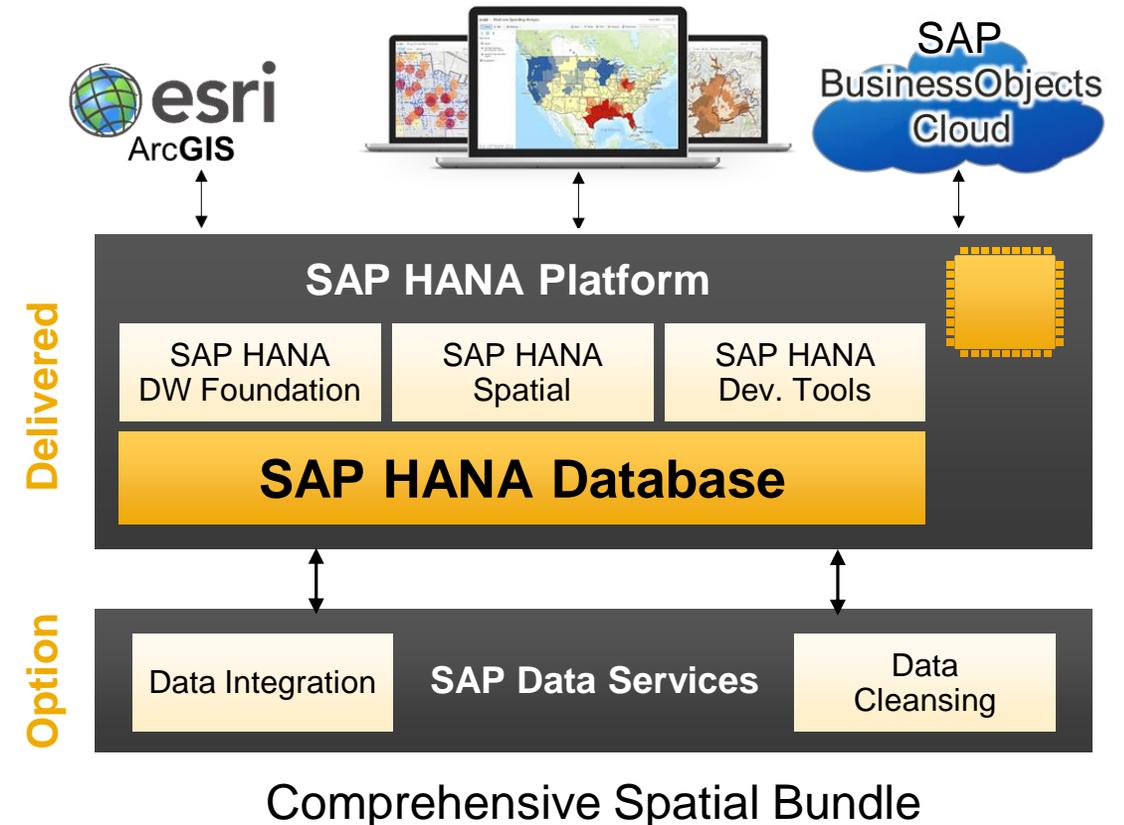
Analytical Intelligence Transformed

Spatial data processing



Spatial Data Processing

- Support spatial data type in Web IDE for SAP HANA
 - Calculated columns like calculate distance from home and office addresses
 - Output attributes to visualize spatial data in output like average revenue by region where the country boundary is in the output not the text of the region for visualization needs



Process spatial data and develop spatially-enabled applications to improve user insight and action

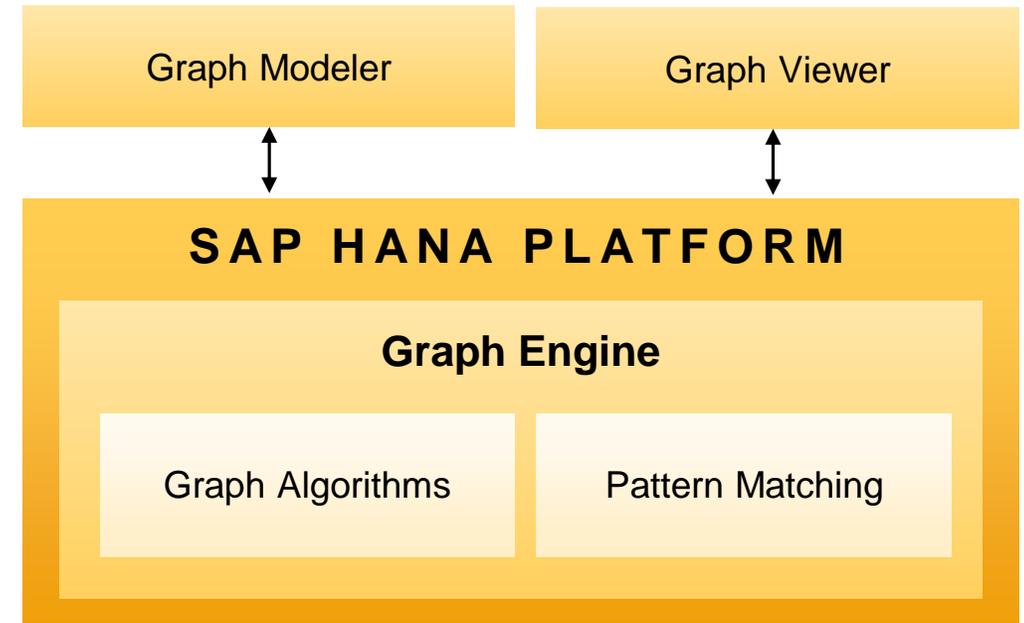
Analytical Intelligence Transformed

Graph data processing



Graph Data Processing

- Enhanced visualization in Graph Viewer for improved exploration
- Support Cypher for pattern matching to leverage existing skillsets



Traverse vast amounts of connected data, without duplication, and combine transparently with enterprise data to discover and act upon meaningful relationships

SAP HANA[®] 2



Application Development Transformed

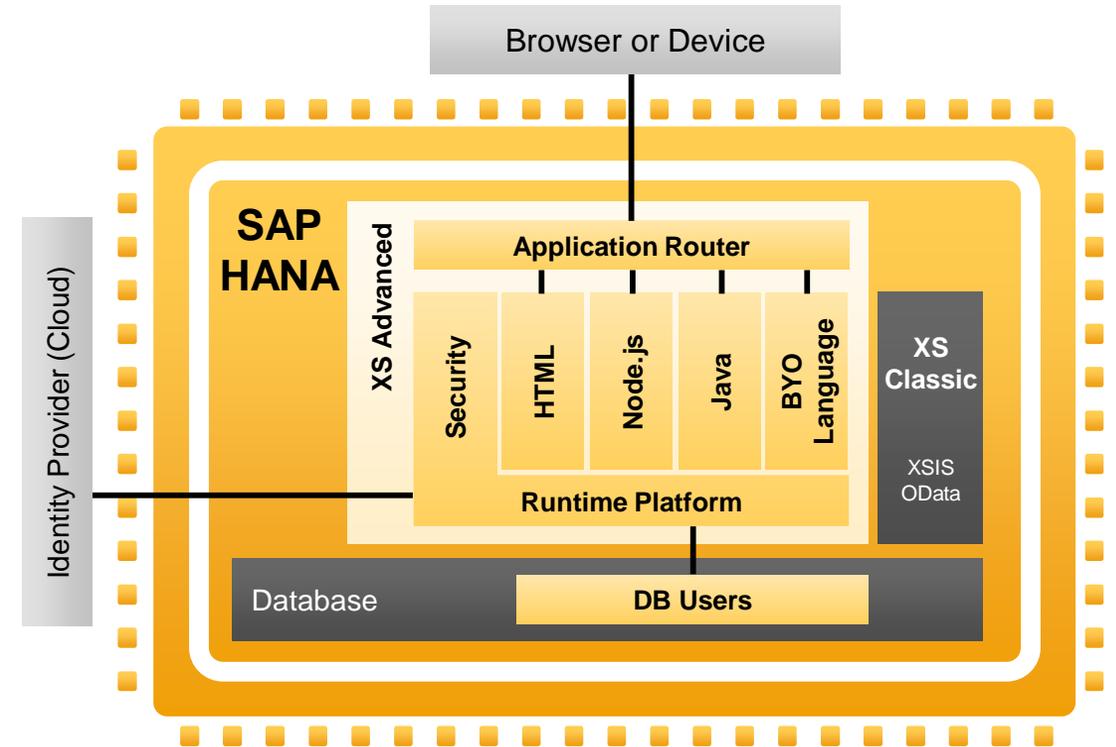
Application Development Transformed

Extended Application Server



Extended Application Server (XS)

- Bring Your Own language / runtimes to reduce TCO by running these applications within the XSA framework
- Token based authentication for job scheduling to support business users
- Improved enterprise supportability and TCO
 - Enhanced JAVA / JavaScript runtime supportability and trace features to reduce effort of supporting JAVA based applications
 - Extended web based application monitoring instead of command line for improved usability
 - Migration assistant to reduce effort of migrating existing Extended Application Services Classic (XSC) applications to XSA
 - Build native applications in MDC landscapes without restrictions
- SDI REST API to programmatically invoke a flow-graph and return the results at runtime from within an application.



Reduce application development cycles and deploy scalable applications on premise and cloud to support rapid innovation

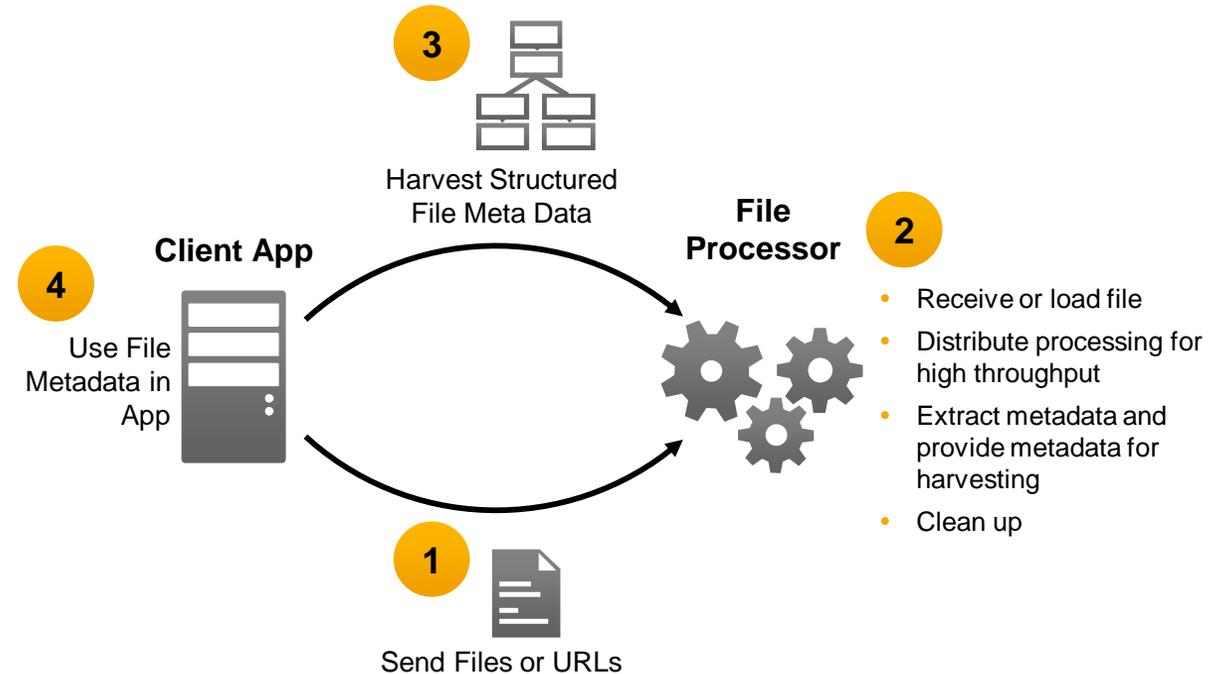
Application Development Transformed

File processor API



File Processor API

- Unlock, extract, and load tool for documents
- Embedded file filters to pull text out of binary documents (like PDF, MSOffice, ...)
- Extracts document metadata properties (like creation date, file type, author) for use in downstream processes
- Monitoring and error handling
- Fully scalable for extreme batch processing



API to enable developers to easily process, load and move documents from within applications

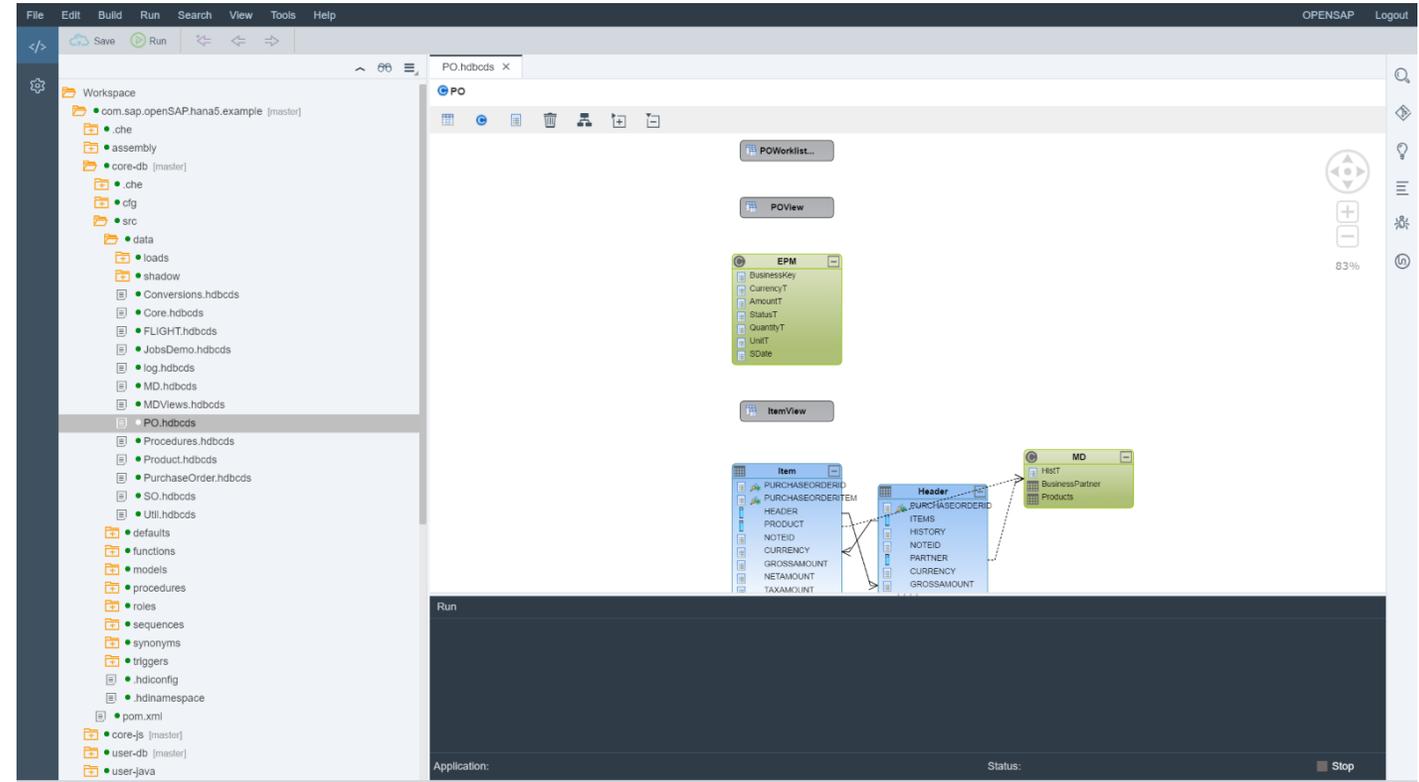
Application Development Transformed

Development and modeling tools



Web IDE for SAP HANA

- Full support for graphical data models
 - Unified model – calculation views supported in web based modeling tools for simplified modeling
 - Expanded support for spatial, graph, native data store objects, CDS, ...
- Advanced Git capabilities: version management, branch viewing, and more, for better source code management
- Improved syntax error troubleshooting
 - Expanded Impact and Lineage analysis



Comprehensive graphical modeling tools for streamlined development

Application Development Transformed

Languages

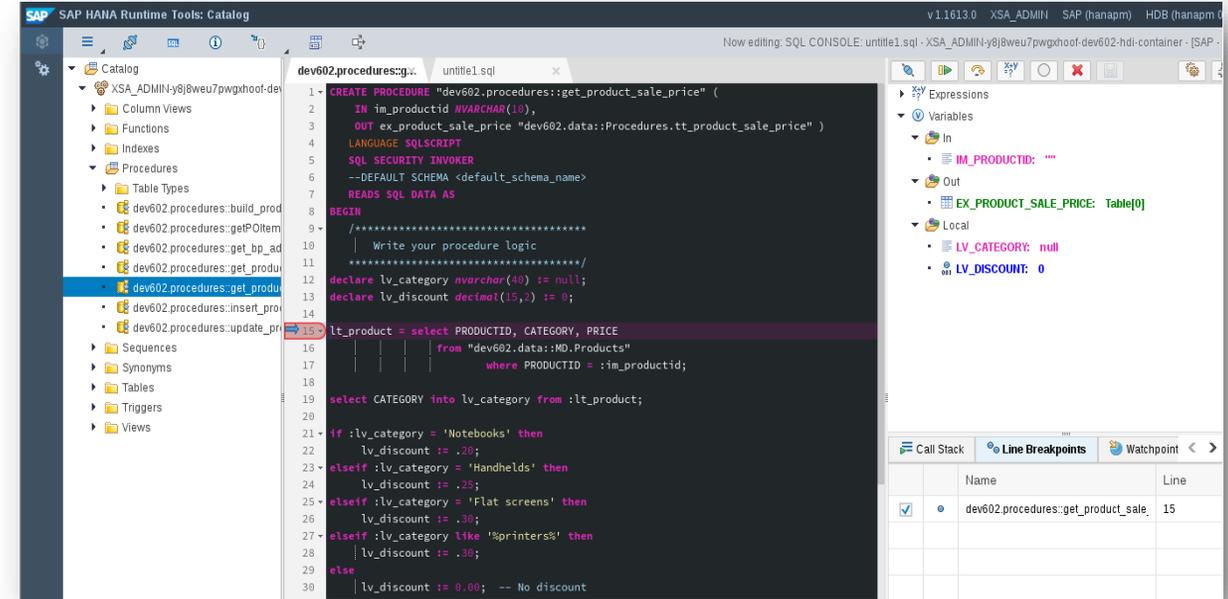


SQL

- SQL syntax to directly create and query hierarchies without dependency on the graphical modeler
- Xpath support for SQL based access to XML data structure

MDX

- MDX console: test and develop MDX based queries and statements against SAP HANA Views
- Leverage MDX via XML/A as a query language when building XSA applications
- Additional MDX capabilities
 - Develop custom/advanced calculated measures and sets
 - Flattened result sets, dynamic currencies, ...



Reduce application development cycles and deploy scalable applications on premise and cloud to support rapid innovation

The SAP HANA logo is displayed in a bold, yellow, sans-serif font. The word "SAP" is smaller and positioned to the left of "HANA", which is larger. A registered trademark symbol (®) is located at the top right of the word "HANA". The logo is set against a dark, semi-transparent rectangular background.

SAP HANA®

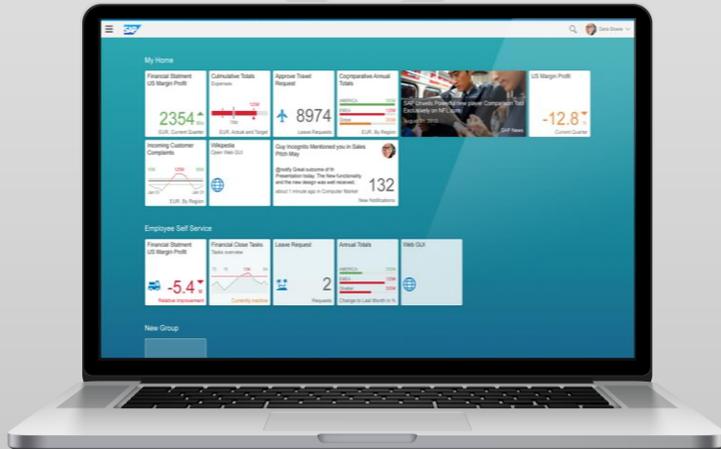
The text "Additional Solutions for Innovation" is centered in a large, white, sans-serif font. It is overlaid on a dark, semi-transparent rectangular background. The background of the entire slide is a futuristic, blue-toned image of a road with a brick-paved median and glowing architectural structures in the distance.

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- No need for hardware certification – minimum 16GB memory recommended
- Community Supported and Downloadable from [here](#)
- Allows production use

Installation Options

- Virtual Machine packages for Windows, Mac OS X, or other VM supported OSs
- Binary package for Linux (SUSE and Red Hat)
- Cloud appliance library (CAL) available through cal.sap.com



Benefits for Developers

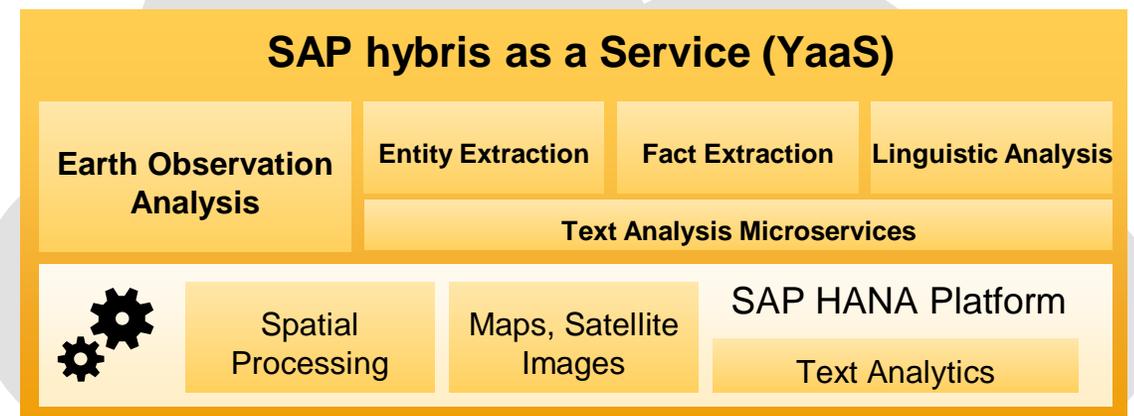
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- Microservices powered by SAP HANA in the cloud that can easily be integrated into any application to deliver analytical insight
 - **Text Analysis** microservices, including entity extraction, fact extraction, and linguistic analysis
 - **Earth observation** microservices (Beta) to query a catalog of satellite images and metadata to monitor change on earth, such as vegetation, water, soil and other spectral indexes. Co-innovated with European Space Agency (ESA)
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- Highly available, auto scalable and fully managed services
- Leverage the power of SAP HANA advanced analytics without purchasing a SAP HANA license



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Thank You