Technical Architecture for SAP HANA
A Transition to SAP HANA Initiative

SAP Active Global Support – IT-Planning
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Agenda

Transition to SAP HANA

Transition to SAP HANA - SAP AGS General Offering
Technical Architecture for SAP HANA
Planning Workshop
Delivery Model
Having data is not enough!
Are You A Real-Time Business?

Win Customers
- Will my systems deliver real-time performance for customers?
- Which customer profiles are suitable for loyalty rewards?
- How dynamic is your customer segmentation strategy?

Deliver Innovation
- How are products/services doing vs. their competition?
- Track complaints from call centers and social data in real-time?
- Where else is this part used in my company?

Drive Excellence
- IT Delivers ahead of business
- How can you predict supply chain disruptions ahead?
- How do suppliers rank by cost, quality and timeliness?
- How is my “on-time/in full” delivery rate by customer?
SAP AGS Value Based Delivery for SAP HANA
Addressing the Challenges to Support the Opportunity

The Opportunity

Run Better – Run your Best-Run Business on SAP HANA

- Unified and seamlessly integrated application and database stack
- Simplified maintenance
- Effective end-to-end operations support
- Reduced TCO
- Completely new possibilities with SAP HANA

The Challenge

Common Questions Related to the Adoption of SAP HANA...

- Will the new platform fulfill the performance requirements?
- How will SAP HANA fit into the existing infrastructure?
- What does it mean for the operations team?
- How to minimize business downtime for the transition?
- What is the project duration, related efforts and risks?

The Offering

SAP Solution Manager Based Methodology and SAP AGS Engineering Service

- Holistic approach, covering all phases and aspects of a migration project
- Address the related challenges proactively
- Apply best practices and experiences from supporting the top companies
- **Make a transition to SAP HANA safe, effective and predictable**
Support for the Transition to the SAP HANA Cloud Platform

Big Picture

Decision Making
- Help customers to comprehensively define strategic direction
- Understand the value of SAP HANA cloud platform
- Ensure that HANA platform capabilities provide benefits in future strategy

High-level planning
→ Roadmap definition
- Define a reasonable adoption roadmap – sequence of systems and projects – reflecting customer priorities (customer-specific business benefits from SAP HANA) and boundary conditions (size, HA/DR requirements, release dates, further projects,....)

Concrete Planning of Transition Project(s)
- Define a concrete project for the transition of one or multiple systems to HANA
  → migration methods, project approach, system landscape, role of MaxAttention,....

Work streams:
- Architecture & Infrastructure
- Migration & Test
- Performance & Scalability
- Operations Readiness
Transition to SAP HANA

Transition to SAP HANA - SAP AGS General Offering

Technical Architecture for SAP HANA

Planning Workshop

Delivery Model
**Designing the Technical System Landscape for SAP HANA**

**Approach**

- Introduction of typical architecture and landscape options
- Discussion of design aspects and definition of technical architecture building blocks. Major topics:
  - General SAP technical architecture
  - Availability SLAs, DC strategy & HA/DR architecture
  - IT infrastructure architecture
  - Scalability and load balancing
  - Software change management landscape
- Joint assessment of options according agreed set of evaluation criteria.

**Objective**

- Develop a technical architecture and IT Infrastructure concept for SAP solutions based on SAP HANA, considering customer’s boundary conditions.
The Technical Architecture for SAP HANA offering is delivered as a **flexible package** consisting of

- The **methodology and content implemented in SAP Solution Manager**
  - Focus on technical architecture of SAP HANA as well as the SAP application server layer
  - Best Practices and guidelines for each of the tasks
  - Templates for essential process steps

- **Onsite services**: Technical Architecture for SAP HANA – Planning Workshop
  - Tailored to the concrete customer situation
  - Delivered as independent workshop or in the context of other Transition to HANA related service offerings

**Delivery model can be tailored in a flexible way to the concrete customer situation** (partners, division of work, priorities in the project,....)
SAP Solution Manager Roadmap

Focus Areas

- Technical Architecture for SAP HANA
  - Scalability
  - HANA appliance, cloud and storage options
  - HA/DR with SAP HANA
  - PRD and non-PRD HANA solution landscape
- Technical Architecture for SAP Application Server layer
  - Sizing and scalability of SAP Solution Landscape
  - Server Platform and private cloud options
  - HA/DR for SAP application servers
Transition to SAP HANA

Transition to SAP HANA - SAP AGS General Offering
Technical Architecture for SAP HANA
Planning Workshop
Delivery Model
# Technical Architecture for SAP HANA
Areas in planning workshop

<table>
<thead>
<tr>
<th>Areas</th>
<th>HANA Landscape</th>
<th>SAP Application Server Landscape</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>01: Current and planned SAP Landscape</strong></td>
<td>• System landscape, (HW, size, DB/OS, Virtualization, DC, • Mid- and long term strategy (mergers and acquisitions, business growth, consolidation, new applications) • On-Premise – On Demand</td>
<td>• HW Platforms, virtualization, sizes, setup (2tier, 3tier, …), OS’s • SAP solution landscape - technical design (documents like TIC report, EWA …)</td>
<td>• Overview on current landscape • Future plans, assessment of change and potential risks</td>
</tr>
<tr>
<td><strong>02: SAP HANA Platform in the Private Cloud</strong></td>
<td>• Cloud definition • Major building blocks (Application layer, HANA Platform Layer, Storage Layer) • Architecture of the building blocks • SAP HANA as future platform in private cloud</td>
<td></td>
<td>• Understanding of future vision of SAP HANA platform in private cloud</td>
</tr>
<tr>
<td><strong>03: Architecture Overview</strong></td>
<td>• HANA Architecture • Appliance Model • HANA solutions</td>
<td>• SAP landscape (architecture, deployment options, …) • Solutions, instance structure, …</td>
<td>• Introduction into specific architecture topic • Presentation of architecture options which are already clear from the scoping</td>
</tr>
<tr>
<td><strong>04: Sizing, Scalability, Performance</strong></td>
<td>• Source and target system based on workload analysis (performance baseline in source system, migration to HANA, resizing, …) • Sizing methodology and approaches • Performance and scalability</td>
<td>• Size of current systems (core systems). • Scalability behavior of single systems. • Capacity planning</td>
<td>• Required capacity (&amp; future outlook) and scalability assessment • Assessment of qualitative state of the systems • (documentation of performance-critical business areas)</td>
</tr>
</tbody>
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### Technical Architecture for SAP HANA

Areas in planning workshop

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</table>
| **05: Technical platform options and architecture** | • Cloud strategy (private, ...)  
• Boundary conditions | • Single or scale out  
• Scalability options  
• SAP HANA Tailored Datacenter Integration concept  
• HANA in the cloud  
• Virtualization  
• Different HANA partner solutions | • Virtualization (architecture for SAP, basic technical configuration)  
• Server platform (UNIX / X86)  
• Decision criteria to evaluate and assess the options  
• Storage  
• SAP AS architecture (basic technical configuration)  
• Scalability, load distribution/balancing. | • Architectural outline of the options  
• Description of the options  
• Assessment along the decision criteria of the options  
• Basic technical configuration based on best practices + expected future size (deployment options) |
| **06: High Availability / Disaster Recovery / Backup & Restore** | • Availability classification and requirements (RPO / RTO)  
• Error categories  
• DC Strategy  
• Landscape aspects to backup/recovery  
• Business aspects | • High Availability and Disaster Recovery capabilities provided by the SAP HANA platform  
• DR in the cloud or on non-PRD  
• Backup and recovery solutions and integration into existing backup solutions provided by partners | • Decision on required HA / DR / backup / restore technology and architecture of entire solution stack including HANA |
## Technical Architecture for SAP HANA

### Areas in planning workshop

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| 07: PRD and non-PRD SAP System landscape | • High-level Software change management (non-PRD landscape, use cases, …)  
• Number, size, … of non-PRD  
• Data quality in non-PRD (QA, …)  
• HANA options for non-PRD systems  
• HANA stacking options (MCOD, multi-SID, Virtualization) | • Stacking options (if applicable)  
• SAP system landscape platform usage and distribution (virtualization, server platform,) | • Complete Picture of SAP system mapping to servers platforms  
• HA DR backup technology  
• RZ setup |
| 08: Future Planning | • Project setup  
• Roles and responsibilities  
• Partner relationships (HW, hosting partner, implementation, …)  
• Risks collection | | • Next Steps  
• Roles and responsibilities plan |
Scalability, Sizing and Performance Overview and Procedure for HANA Sizing

**Preparation**

- BW on HANA
  - Run ABAP report (see note 1736976)
  - Housekeeping (reduce PSA and ChangeLog)

- HANA
  - Estimate upcoming data volume (e.g. analyze current ERP tables)

**Sizing Calculation**

- Memory Sizing
  - Row Store
  - Column Store
  - Additional Caches

- CPU Sizing
  - Determine by memory size and hardware offerings

- Disk Sizing
  - Data Volume (persistence)
  - Log Volume

**Infrastructure**

- Single Node
  (Total Memory < 4 TB*)
  - Not possible for BW on HANA

- Scale-Out
  (Total Memory > 750 GB)
  - Shared Storage
  - BW on HANA needs at least 3 nodes
  - Additional Stand-by node possible

* Certification pending as of today
Scalability, Sizing and Performance
Sizing for Growth – Example

Calculation of system growth over time and the impact on the memory areas (Scale-out scenario)

Add one more node

Add a further node

→ **Proactive** and seamless extension of the hardware capacity

![Graph showing memory growth over time with timelines for 01.01.2013 to 01.01.2018 with colored bars for different memory areas and a line graph indicating growth over time.]

<table>
<thead>
<tr>
<th>Area</th>
<th>Affected by growth?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system</td>
<td>No</td>
</tr>
<tr>
<td>HANA caches / services</td>
<td>No</td>
</tr>
<tr>
<td>HANA working memory</td>
<td>yes, indirectly</td>
</tr>
<tr>
<td>Business Data (column store)</td>
<td>yes</td>
</tr>
<tr>
<td>Meta data (row store)</td>
<td>partially, if growth affects DDIC entries or meta data</td>
</tr>
<tr>
<td>Space for business growth</td>
<td>Yes, decreases if other memory areas grow</td>
</tr>
</tbody>
</table>
Technical platform options and architecture

SAP HANA scales from small servers to large clusters

**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
### Technical platform options and architecture

**SAP HANA Storage Scalability – HANA Tailored Datacenter Integration**

<table>
<thead>
<tr>
<th>SAP HANA Appliance without internal Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SAP HANA Single-Node</strong></td>
</tr>
<tr>
<td><strong>Extend or replace server nodes and increase central storage</strong></td>
</tr>
<tr>
<td><strong>Central Enterprise Storage System</strong></td>
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</table>

<table>
<thead>
<tr>
<th>SAP HANA Scale-out</th>
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<tbody>
<tr>
<td><strong>Add server nodes and increase central storage</strong></td>
</tr>
<tr>
<td><strong>• SAP HANA appliance extension may require new server rack and network components.</strong></td>
</tr>
</tbody>
</table>

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Technical platform options and architecture
SAP HANA Infrastructure - Use Existing Enterprise Storage for all Workloads

SAP HANA Tailored Datacenter Integration
Technology Foundation for SAP HANA Platform in the Private Cloud

Enterprise Storage - SAP HANA Tailored Datacenter Integration
- Existing enterprise storage used for HANA data volumes & all other data volumes of customers IT landscape
- Storage scales with changing business requirements
- Existing storage infrastructure and management infrastructure in place and used for HANA workload
High Availability / Disaster Recovery, Backup & Restore

Data Center Setup Options

A 2 nearby Data Centers
- Protection against infrastructure failures
- Protection against loss of DC, but **no protection** against regional disasters
- Prerequisite: Stable, low latency network

B 2 distant Data Centers
- Protection against infrastructure failures and regional disasters
- Higher cost for infrastructure protection than (A), more hardware redundancy required

C Star Setup with 3 Data Centers
- Extension of 2 DC options to maximize data security and availability
- Different options for the setup of 3rd data center, depending on recovery time requirements:
  I. Data protection: Storage of backup devices / tapes
  II. Data protection: Storage systems only + asynchronous replication of data
  III. Data + infrastructure protection: Full server and storage hardware + asynchronous replication of data
High Availability / Disaster Recovery, Backup & Restore
Technical Building Blocks for Your HA/DR Strategy

SAP HANA Host Auto Failover
- Failover to standby server nodes in same appliance
- Failover control automated within SAP HANA
- Short recovery time, no data loss
- For scale-out configurations

SAP HANA System Replication
- Synchronous or asynchronous standby database
- Technical corruption protection (block corruption on storage level)
- Hardware of standby database can be reused for non-production systems
- Short recovery time, no data loss (or limited if async mode is used)
- For scale-up or scale-out appliances
Pragmatic & server virtualization approach

3 system landscape
- Use of virtual machines from VMware is supported for non-PRD on HANA single nodes
- The use of virtual machines depends on the size of the planned HANA non-PRD systems
- Disadvantage with this implementation is that QAS is from a HW perspective not comparable to the PRD system e.g. to test performance aspects during development projects

Pragmatic & server virtualization approach
multi system landscape
- With the use of a pre-PRD system the above mentioned aspect is solved
Agenda

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Delivery Model
This offering delivered via the SAP MaxAttention and SAP ActiveEmbedded support engagement model means …

- … **tailored** to concrete customer situations
- … **leveraging experiences** from many years of working with companies in all industries and **providing them in a consistently consumable way via SAP Solution Manager**
- … **providing different delivery options** – ranging from provisioning of best practices to remote enabling to onsite services – creating flexibility to define a project in a customer-specific way
- … laying the foundation to **ensure a consistent quality** of migration projects independent of which company or partner executes the tasks
## Benefits
Holistic DB Migration Offering to SAP HANA or SAP Sybase ASE

<table>
<thead>
<tr>
<th></th>
<th>Benefits</th>
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<tbody>
<tr>
<td>1</td>
<td>Risk mitigated</td>
</tr>
<tr>
<td></td>
<td>Keep risks under control</td>
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<tr>
<td>2</td>
<td>Fast time-to-value</td>
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<tr>
<td></td>
<td>Benefit from existing knowledge to speed up migration</td>
</tr>
<tr>
<td>3</td>
<td>Tailor fit</td>
</tr>
<tr>
<td></td>
<td>Flexible plan service to local customer situation</td>
</tr>
<tr>
<td>4</td>
<td>Content</td>
</tr>
<tr>
<td></td>
<td>Leverage the SAP Solution Manager roadmap</td>
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Thank you

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