Suite on HANA Migration – Best practices & Lessons Learned
Introduction

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• Senior Principal SAP HANA Architect, Infosys Consulting
• SAP HANA Distinguished Engineer
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>How can HANA help me simplify my IT landscape and reduce cost?</td>
<td></td>
</tr>
<tr>
<td>How can I make sense of all the various HANA options and identify those that work best for me?</td>
<td></td>
</tr>
<tr>
<td>How can we better manage the ever increasing infrastructure &amp; license cost of the HANA platform and realize the promised value?</td>
<td></td>
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<tr>
<td>How can I put a business case together that covers total value and cost of a HANA transformation to get funding?</td>
<td></td>
</tr>
<tr>
<td>How can I show that HANA helps me increase profitability and top-line revenue impact in order to get funding?</td>
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<tr>
<td>Should I start my journey with Suite on HANA or is S/4 HANA the way to go?</td>
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</tr>
<tr>
<td>Is my current system ready for HANA? Is my organization and staff ready?</td>
<td></td>
</tr>
<tr>
<td>What is the best way to start my journey – functional and technical?</td>
<td></td>
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<tr>
<td>Will my analytics landscape change with S/4 HANA?</td>
<td></td>
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<tr>
<td>How can I simplify my analytics landscape and remove silos for my business users realizing the vision of Fast and Big Data?</td>
<td></td>
</tr>
<tr>
<td>What licensing implications exist for my existing licenses and HANA based licenses?</td>
<td></td>
</tr>
<tr>
<td>How can we reduce maintenance cost and increase release cycles on our BW/BI on HANA solution?</td>
<td></td>
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<tr>
<td>What is the impact on my existing architecture and operational processes?</td>
<td></td>
</tr>
<tr>
<td>Are there any tools and accelerators that can decrease time and risk of implementation?</td>
<td></td>
</tr>
<tr>
<td>What is my path to a single source of truth and true BI self-service with a current landscape that has multiple analytics solutions and a high TCO?</td>
<td></td>
</tr>
</tbody>
</table>
Table of Contents

- Project Methodology and Deliverables
- Migration Approach and Tools
  Migration overview using SAP DMO approach
- Troubleshooting, Best Practices, and Lessons Learned
- S/4HANA Migrations
- Q&A
Identifying the drivers and roadmap is a critical first step.

**HANA Journey – Client Example**

**Phase 1/2016**
- SAP NW 7.4
- SAP BW 7.4 SPS12
- SAP BPC 10.1
- RHEL 6.6x
- SAP HANA SP10

**Phase 2/2017**
- SAP NW 7.5
- SAP ECC 6 EHP8
- SAP Portal/SolMan
- RHEL 6.6x
- SAP HANA SP11

**2018+**
- S/4 HANA
- SAP Fiori
- BI on HANA
- BW Simplification

**Infrastructure**
- 3 Data Centers
- VCE VBLOCK 340
- Cisco B460 M4 Intel Haswell 1.5TB
- EMC VNX 7600 TDI Compliant

**Business & Technology Drivers**
- Platform End-of-Life
- Faster Everything
- Technical Debt
- Simplified Infrastructure
- Future Proof Platform
An assessment is a great first step

### Architecture Assessment

**Landscape & Monitoring**
- SAP Landscape impact
- Environment and system consolidation
- Integration impact
- Operational Excellence incl. Monitoring

### Infrastructure Assessment

**Data Center Analysis**
- Data center impact (racks, energy, etc.)
- Network, Security, Storage & Compute impact
- **Application** consolidation via virtualization
- Delivery, deployment & consumption models

**Performance Analysis**
- Cost vs performance optimized
- SLAs review and adoption
- Scalability and capacity
- HA/DR and Backup capabilities

**Financial Analysis**
- Summarize hardware and software cost, including maintenance, warranty, facility, etc.
- Cost-replacement modeling from current to future state
- ROI modeling (Cloud vs On-Premise)

### Technical Assessment

**Upgrade Analysis**
- EHP and SP process based impact analysis
- Custom code and authorization analysis
- Interface & Third Party impact analysis
- Panaya supported analysis

**Migration Analysis**
- Migration approach analysis
- Custom code remediation assessment
- Panaya and HANA CMO supported analysis
- Security impact assessment

**Capacity Planning Analysis**
- Sizing options and requirements
- Sizing process and approach
- Sizing analysis (with HW vendor)
- Data Volume Management & Archiving

### Testing Approach Analysis

- Test approach assessment – risk based, full, select
- Testing process
- Test automation assessment
- Tool leverage

### Software and versioning

- Software (SAP/OS) and HW impact incl. dependency matrix
- Patching and Upgrade impact
- SAP Add-on and Bolt-on Impact

### Financial Analysis

- Business Case Template
- So Readiness Assessment Template
- Timeline

- Effort
- Staffing
- Cost (Software, Infrastructure, Labor)

- Training & KT
- Challenges & Risks
- RACI

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1 Week per productive instance

PMO

- Effort
- Staffing
- Cost (Software, Infrastructure, Labor)

---

3 Weeks
Suite on HANA Migration Approach

Project Preparation
- Perform Project planning - Scope, Resources, Plans Standards etc.
- Validate Infrastructure and Dev/QA Sys, sizing
- Review Impact analysis from assessment
- Housekeeping in source system
- Develop Testing / Remediation plans
- Develop Change management approach and plan

Migration and Testing
- Perform initial DMO migration in sandbox / POC
- Perform DMO cycles in Dev/QA including Mocks
- Perform analysis and remediation of objects
- Perform Testing – SIT, Performance, Platform etc.
- Dual maintenance of existing environments and Project
- Prepare Training materials
- Communicate and engage with stakeholders
- Conduct QA reviews

Go-live Preparation
- Perform User Acceptance Testing
- Simulate Cutover activities within the go-live window
- Conduct business user training
- Conduct Knowledge Transfer
- Establish the Hypercare model and associated processes
- Conduct Go-No-go readiness checks
- Establish Operational support model
- Conduct QA reviews

Go-live and Support
- Go-Live
- Validation of migrated production system
- Transition from Hypercare to Support team
- Perform maintenance of the new HANA system(s)
- Monitor and measure support issues per Service Level Agreements

Initial planning + analysis completed
Remediation + Systems Testing completed
Business + System readiness achieved
Transition to support completed
What is the overall timeline?

- **Kickoff**: Oct 7
- **DMO #1**: Oct 19
- **DMO #2**: Nov 9
- **DMO #3**: Dec 7
- **DMO #4**: Jan 11
- **DMO #5**: Feb 1
- **DMO #6 Go-Live**: Mar 20

2015

- **Project Prep**: Oct 5
- **Deployment and Migration**: Oct 26
- **Final Preparation & Go-Live**: Nov 23
- **Premium Care**: Dec 14

2016

- **Object Analysis**: Oct 12
- **Object Remediation**: Nov 11
- **Unit Testing**: Nov 23
- **Defect Fixing**: Dec 16
- **Smoke Testing**: Oct 20
- **System Testing**: Nov 27
- **Performance Testing**: Dec 10
- **User Acceptance Testing**: Jan 18
- **Cutover plan complete**: Jan 20
- **Go/No-Go**: Feb 15

**Sources/Target System Ready Date**

- **DMO Preparation complete**: Oct 19
- **DMO Execution complete**: Nov 9
- **DMO testing complete**: Dec 7
- **HA/DR testing complete**: Jan 1
- **Go/No-Go**: Feb 1

**Quality Management/Testing**

- **System Testing**: Nov 27
- **Performance Testing**: Dec 10
- **User Acceptance Testing**: Jan 18
- **Defect Fixing**: Dec 16
- **Cutover plan complete**: Jan 20
- **Go/No-Go**: Feb 15

**Infrastructure/Basis**

- **Sandbox - Mock #1**: Oct 5
- **Development**: Oct 26
- **QA**: Nov 23
- **UAT**: Dec 14
- **Production - Mock #2**: Jan 18
- **Production - Go-Live**: Feb 15

**Application/Development**

- **Object Analysis**: Oct 12
- **Object Remediation**: Nov 11
- **Unit Testing**: Nov 23
- **Defect Fixing**: Dec 16
- **Smoke Testing**: Oct 20
- **System Testing**: Nov 27
- **Performance Testing**: Dec 10
- **User Acceptance Testing**: Jan 18

**QM/Testing**

- **System Testing**: Nov 27
- **Performance Testing**: Dec 10
- **User Acceptance Testing**: Jan 18
- **Defect Fixing**: Dec 16
- **Cutover plan complete**: Jan 20
- **Go/No-Go**: Feb 15
# Testing Cycles & Environment Mapping

<table>
<thead>
<tr>
<th>Cycles</th>
<th>Month</th>
<th>Systems</th>
<th>Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMO1</td>
<td>M1-2</td>
<td>Sandbox</td>
<td>- Impact Analysis for code remediation&lt;br&gt;- Prepare and execute unit test, functional and performance testing</td>
</tr>
<tr>
<td>DMO2</td>
<td>M3</td>
<td>Development</td>
<td></td>
</tr>
<tr>
<td>DMO3</td>
<td>M4-5</td>
<td>QA</td>
<td>- ITC 1&lt;br&gt;- Functional and Performance testing</td>
</tr>
<tr>
<td>DMO4</td>
<td>M6</td>
<td>Pre-Prod</td>
<td></td>
</tr>
<tr>
<td>DMO5</td>
<td>M7</td>
<td>Prod/Prod DR</td>
<td>- ITC 2 - UAT&lt;br&gt;- Regression test</td>
</tr>
<tr>
<td>DMO6</td>
<td>M8-9</td>
<td>Prod/Prod DR</td>
<td>- End to end Regression testing&lt;br&gt;- Performance testing</td>
</tr>
<tr>
<td>DMO7</td>
<td>Go Live</td>
<td>Prod/Prod DR</td>
<td>- Cutover &amp; Go-Live</td>
</tr>
</tbody>
</table>
Sample Depiction of HANA Migration Process

- **Mock migration**
  - DMO #5 (mock run) on the TO-BE Production hardware
- **Technical testing incl. HA/DR**

**ECC on Any DB**
- Support Landscape
  - DV1
  - QA1
  - PRD

**Suite on HANA**
- Manual retrofit

**PRD migration**
- DMO #6 Production migration
- **17.** DMO #6 Production migration
- **18.** Shutdown old REG, DV1 and QUA
- **19.** Refresh DV1 from DEV
- **20.** Refresh QUA from REG or make REG as QUA as Q system
- **21.** Enable Replication for HA and DR

**Legend**
- EHP6
- EHP7
- Sunsetting

**Key drivers**
- Architecture and Landscape
- Target platform and version
- Risk Appetite

**Testing guidelines and policies**
- In-flight projects and competing initiatives
- Cost

- “SID” given for reference purpose ONLY
Infosys tools and accelerators – DMO technical plan

• “DMO Technical Plan” consists of over 600 line items for end-to-end DMO execution, to make the process consistent, accurate, efficient, and repeatable

• Field tested and validated by SAP MaxAttention

• “DMO Technical Plan” is refined during each migration cycle and becomes the guide for final cutover

• Organized to be used efficiently by WhatsApp cutover team group

System to perform the task on (e.g. Source ECC)

Environment/DMO cycle

Task Examples:
4.40 Check RS* tables (rowstore list) (Execute transaction DB20 and analyze tables)
4.54 Execute HANA sizing program (post-cleansing) /SDF/HANA_ECC_SIZING
6.11 Prepare the SAPHostAgent and DMO according to the following Notes: 1799545, 1843776, 1878193
7.6 Start the Software Update Manager (SUM/DMO UI) and specify the correct download directory & stack.xml file: http://<server>.<domain>.<ext>:1128/lmsl/upgrade/<SID>/doc/
8.51 Check correctness of tables (program RSDU_TABLE_CONSISTENCY). Run in background and set parameter to repair issues.

Phase of execution:
01 - Hardware Provisioning
02 - Access Management
03 - Source ECC Preparation
04 - Housekeeping
05 - Export Preparation
06 - DMO Benchmarking
07 - DMO Uptime Execution
08 - DMO Downtime Migration
09 - Post Migration
10 - Cutover
Infosys tools / accelerators – DMO Runbook

- Includes step-by-step instructions on how DMO tasks are performed and how issues are resolved

- Initial DMO Runbook as a starting point for source and target platform

- DMO Runbook with more than 100 pages with screenshots

- Updated multiple times throughout migration cycles

- Effective escalation tool with SAP

DMO Runbook will create an accurate and repeatable process starting with first migration cycle, and refined through each subsequent DMO cycle.
Understand exactly the impact on your custom objects

What is changing due to Upgrade?

Panaya CloudQuality for SAP

What is changing due to Migration?

HANA CMO

Analysis summary (no. of issues by priority)

<table>
<thead>
<tr>
<th>Priority</th>
<th>No. of Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority 1</td>
<td>136</td>
</tr>
<tr>
<td>Priority 2</td>
<td>335</td>
</tr>
<tr>
<td>Priority 3</td>
<td>2512</td>
</tr>
<tr>
<td>Total</td>
<td>2983</td>
</tr>
</tbody>
</table>

Analysis details

- Unsecure use of FOR ALL ENTRIES: 294
- Analysis of WHERE Condition for SELECT: 293
- Search DB Operations in Pool/Listen Tables: 6
- Analysis of WHERE Condition in UPDATE/DELETE: 3
- Table Attributes Check: 1
- Tool Existence of a Procedure: 1302
- Critical Statements: 48
- Total: 1036

How much can CMO tool fix?

- Automatic by CMO Tool: 1036
- Manual fix: 136
- Total: 1172

Effort estimation

- Analysis & Development effort: 600
- CMO Tool Execution Effort: 84
- Unit testing effort: *674
- Grand Total: 1448

All estimates in person-hours
Remediation approach to cover all identified objects

1. Panaya Impact analysis
2. Review remediation and testing task list
3. SPAU & SPAU_ENH corrections
4. Custom code adaptation for EHP upgrade
5. Security role remediation
6. Custom code remediation for HANA compliance
7. Unit testing
8. Review & Sign off
Production cutover without surprises

Plan with multiple scenarios and back out option

Detailed tracker updated during execution with resource coverage and trend analysis

WhatsApp group to keep everyone informed and engaged
DMO Procedure: In-Place Upgrade and Migration

1. Uptime processing creates SHD REP
2. Uptime migration copies SHD REP
3. Downtime migration (App data)
4. Kernel switch & finish
DMO in Interaction with the New SAPHostAgent

SAPUI5: Javascript based (jQuery) converts XML to HTML

SL Common UI

Classical SUM Maintenance

Primary Application Server (PAS) host

Web Browser

1129
XML HTTPS

SAP HostAgent

SUM

AS ABAP System

4239

SDT GUI

HTTP connect to SAPHostAgent starts SUM (i.e. SAPup)
gt: graphics type
scroll | httpserver
httpchannel only used by SAPHostAgent

gt=httpchannel
DMO Phases

**Uptime activities**
- Preparation
  - Extraction
  - Configuration
  - Checks
  - Preprocessing

**Downtime activities**
- Execution Downtime
  - Post processing

**DMO**
- Extraction
- Configuration
- Checks
- Pre-processing

**DMO completion status**
- Data Load

**Kernel Switch**

**Preparation:**
- Hardware provisioning
- Access management
- Source system preparation
- House keeping

**DMO completion status:**
- ~22%
  - Objects locked
  - No repository changes
  - 62%
  - System Down
  - End users blocked
  - Basis-only access

**Post-processing:**
- 100%
  - Objects remediation
  - Developer access
DMO Benchmarking

- Part of the SUM tool
- The benchmarking tool offers a fast check for possible migration speed prior to the DMO run
- The source system will continue to run
- Gives you the ability to select specific tables, or use a specific percentage of all tables
- The ability to benchmark the export from the source system only, or benchmark the export and the import to the SAP HANA DB
Downtime Optimization levers

- Introduction of SSD flash storage on source DB & SUM directory: Reduction by 50%
- Introduction of Migration Server: Reduction by 20%
- R3 load and table splitting: Reduction by 20%
- Other optimizations possible based on OS, DB parameters, DMO parameters: Downtime optimized DMO Reduction by 70%
## Classic vs. Downtime optimized DMO

<table>
<thead>
<tr>
<th>Classic</th>
<th>Downtime Optimized DMO</th>
</tr>
</thead>
<tbody>
<tr>
<td>All tables are replicated as part of the downtime</td>
<td>Large tables are replicated as part of the uptime using SLT</td>
</tr>
<tr>
<td>Longer downtime duration</td>
<td>Reduced downtime duration</td>
</tr>
<tr>
<td>Any SUM version</td>
<td>Use SUM 16.0, since SUM 17.0 is not supported (it is only beta)</td>
</tr>
<tr>
<td>No need to add the DMIS in stack.xml generation</td>
<td>Manually add DMIS in the Maintenance Optimizer (MOPz) to create the stack configuration file (stack.xml)</td>
</tr>
<tr>
<td>No Restrictions</td>
<td>Products supported:</td>
</tr>
<tr>
<td></td>
<td>• SAP ECC 6.0</td>
</tr>
<tr>
<td></td>
<td>• SAP ECC 5.0 (SUM SP14 and higher)</td>
</tr>
<tr>
<td></td>
<td>• SAP CRM</td>
</tr>
<tr>
<td>No Restrictions</td>
<td>Restrictions on Tables which cannot be replicated in uptime:</td>
</tr>
<tr>
<td></td>
<td>• Pool tables</td>
</tr>
<tr>
<td></td>
<td>• Tables without primary key</td>
</tr>
<tr>
<td></td>
<td>• Tables which start with /BI in the name</td>
</tr>
</tbody>
</table>
## Lessons Learned and What’s Next – Client Example

<table>
<thead>
<tr>
<th>What We Learned</th>
<th>What Is Next For Us</th>
</tr>
</thead>
<tbody>
<tr>
<td>Validate Hardware and OS/DB Setup</td>
<td>ERP Modernization</td>
</tr>
<tr>
<td>System Refresh with Data Ageing and Scrambling needs to start earlier</td>
<td>Suite on HANA EHP8</td>
</tr>
<tr>
<td>Ensure clear communication and ownership of defects</td>
<td>S4 Finance</td>
</tr>
<tr>
<td>Use of tools such as Panaya and CMO increased confidence in accuracy of estimates and project plan</td>
<td>Analytics Modernization</td>
</tr>
<tr>
<td>Ensure correct access for SAP to remote troubleshoot</td>
<td>BI on HANA</td>
</tr>
<tr>
<td>Daily standup meetings kept everyone up to date on status</td>
<td>Embedded Analytics</td>
</tr>
<tr>
<td>Knowledge Transfer is crucial and was well received</td>
<td>User Experience</td>
</tr>
<tr>
<td>Aggressive timeline did initially not allow for team collaboration</td>
<td>Mobility</td>
</tr>
<tr>
<td>Burning in the production target infrastructure and validating HA/DR boosted confidence</td>
<td>SAP Fiori</td>
</tr>
<tr>
<td>Performance testing adds tremendous value in proofing direct/indirect benefits</td>
<td></td>
</tr>
<tr>
<td>The assessment output greatly simplified the RFP creation process</td>
<td></td>
</tr>
<tr>
<td>Having experienced OS/DB resource on board is KEY!</td>
<td></td>
</tr>
<tr>
<td>Challenge</td>
<td>Mitigation Approach</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Generation of stack.xml                       | • Please make sure to select both source & target versions correctly  
|                                               | • Vistex installable not available in service market place                                                                                 |
| Export performance slow during migration      | • Make sure the statistics have been updated in source DB2 database during the preparation. Not-updated statistics on source tables will lead to poor data select performance. |
| Resource bottleneck observed on PAS during DMO| • Split ASCS and PAS, or install additional PAS for DMO process.                                                                                   |
| Table partitioning not happening correctly    | • There was bug in SUM 14 version which is fixed in the next version                                                                                |
| Time zone, time difference issues during migration | • 1551454 - Illegal system time zone - use UTC only  
|                                               | • 1932132 - Large time difference bet appl. server and HANA DB  
|                                               | • 2086087 - SAP DMO migration HDB_MIGCHECKS_TIMEDIFF & 2137138 - Time zone name incorrect after DST switch                                       |
| SSFS not working in DB2                      | • There is no need to have SSFS for DB2 which was confirmed by sap                                                                              |
Transition to SAP S/4HANA

New Implementation
- ERP System
- Non-SAP System

- Example: New or existing SAP customer implementing a new SAP S/4HANA system with initial data load

System Conversion
- ERP System

- Example: Complete conversion of an existing SAP Business Suite system to SAP S/4HANA

Landscape Transformation
- ERP System - Region A
- ERP System - Region B
- ERP System - Region C

- Example: Consolidation of current regional SAP Business Suite landscape into one global SAP S/4HANA system or selective data migration
Transition Paths to move to SAP S/4HANA - Overview

- The transition to SAP S/4HANA does not require the source system to be already on SAP HANA DB.
- SAP S/4HANA Finance oP is the first offering under the SAP S/4HANA product family.
- The decision to go for SAP S/4HANA Finance oP should be based on the business benefits, but it is not a mandatory prerequisite for any system conversion.

System Conversion Paths (basically)

1. From SAP Business Suite (ERP6.0, EHP xx, AnyDB or SAP HANA DB) to SAP S/4HANA Finance oP
2. From SAP Business Suite (ERP6.0, EHP xx, AnyDB or SAP HANA DB) to SAP S/4HANA oP
3. From SAP S/4HANA Finance to SAP S/4HANA oP

One-Step-procedure

- For older SAP Business Suite releases or systems on Non-Unicode an additional step to SAP ERP 6.0 EHPxx is required.
- System has to be an AS ABAP-only system. Dual-stack systems (AS ABAP and AS Java combined in one system) are not supported for the conversion. If your system is a dual-stack system, you have to split it before doing the conversion.
## S/4HANA Migration Process

<table>
<thead>
<tr>
<th>Step</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Maintenance Planner Checks</td>
<td>Checks add-ons and business functions to ensure compatibility with SAP S/4HANA. Creates stack file used for actual conversion process.</td>
</tr>
<tr>
<td>2</td>
<td>Pre-checks / Transition checks</td>
<td>Check report delivered through a note. Identifies steps to take, ensure system is compatible with conversion process.</td>
</tr>
<tr>
<td>3</td>
<td>Custom Code Checks</td>
<td>Check custom code against a list of simplifications developed for SAP S/4HANA.</td>
</tr>
<tr>
<td>4</td>
<td>Application Specific Preparations</td>
<td></td>
</tr>
</tbody>
</table>
  - Master Data: Activation of Business Partner Approach (Customer-Vendor Integration)  
  - Inventory valuation: Switch to material ledger (activation supported via report). |
| 5    | Software Update Manager     | Automates the conversion process, including XPRA run.                                                                                     |
| 6    | Application Specific Follow-up Activities | Post conversion configuration for application areas.                                                                                     |