SAP Solution Manager 7.2 – Test Suite

Test Automation of functional tests

Solution Management, DBS, SAP SE
April 2018
Agenda

1. SAP Solution Manager 7.2 – Test Suite
3. Guidance for selection of Test Automation tools from SAP and certified Partners
4. Create automated tests for single business transaction
5. Create automated tests for business processes
6. Test Data refresh of test systems
7. Test Data identification, planning, validation and provisioning for automated tests
8. More Information for SAP customers and partners
9. Appendix
SAP Solution Manager 7.2
Test Suite
SAP Solution Manager - Test Suite
A full-blown application for manual / automated testing and change impact analysis

Functional Scope
- Manual and automated functional tests
- Automated change impact analysis of maintenance activities for test scope optimization of regression tests
- New requirements triggering semi-automated test planning for user acceptance tests and functional integration tests
- High degree of test automation possible
- Supports agile development approach within requirements-to-deploy process through Focused Build for SAP Solution Manager
- Seemlessly integrated with SAP Solution Manager Process Management, Solution Documentation, ChaRM, ITSM, ...

SAP and non-SAP Solutions
- SAP Business Suite
- SAP S/4HANA (On-Premise, Cloud Edition)
- Non-SAP applications (On-Premise, Cloud)

Integration
- Test system refresh
- Partner: test data identification, validation and provisioning
- Partner: test automation tools

Single Source of Truth
- All related information in 1 central SAP Solution Manager system
- No complex data replications

The Test Suite of SAP Solution Manager 7.2 is a comprehensive test solution fitting the needs for the vast majority of SAP customers
SAP Solution Manager – Test Suite
Capabilities

Solution Documentation
- Executable Library
- Process Step Library
- Business Processes

Change Impact Analysis
- Scope and Effort Analyzer (SEA)

Test Cases
- Manual Tests
- Automated Tests

Test Plan Management
- Test Plan
- Test Packages
- Test Sequences
- Tester assignment

Test Execution
- Manual Test Execution
- Automated Test Execution
- Defect Management

Test Suite Analytics
- Gap reports
- Status reports
- Progress reports
- Dashboard

Test scope estimation before upgrade
Test scope optimization during change events (fix, enhance, innovate, upgrade)

Solution Documentation

Change Impact Analysis

Test Cases

Test Plan Management

Test Execution

Test Suite Analytics

Test Data
- SAP TDMS
  - Lean test system setup and refresh

Test Data Container (TDC)
  - Test data storage for manual and automated tests

Decesoft DTD (test data identification, validation and provisioning)

Test Automation Framework
- SAP Test Suite - CBTA (Component Based Test Automation)

  MicroFocus UFT
  WorkSoft Certify
  Tricentis Tosca
  other 3rd party

Supported UI technologies by CBTA: SAPGUI, WD-ABAP, CRM Web-Client, SAPUI5, Fiori, …
Partner test tools: SAP and non-SAP UI technologies
SAP Solution Manager - Test Suite
Test Suite for SAP S/4HANA

- SAP Solution Manager 7.2 – Process Management will be used to import SAP Best Practices and document business processes used in S/4HANA (On-premise or Cloud edition)
- SAP Solution Manager 7.2 – Test Suite will be used for manual and automated tests of implemented or changed business processes for all functional test types

- Business Processes are activated from SAP Best Practices and/or customer defined process implementation
- Business Processes are based on SAP standard software and optional custom code, modifications and integrated partner apps

- Business Processes are activated from SAP Best Practices plus limited extension options
- Business Processes are based on SAP standard software and optional extensions using white-listed APIs and partner apps
# Most Common Vendors for SAP-Centric Test Management

<table>
<thead>
<tr>
<th>Functional Test Organization Manual Tests Analytics and Reporting</th>
<th>SAP Solution Manager</th>
<th>Micro Focus*</th>
<th>Other vendors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Suite</td>
<td>Application Lifecycle Management (ALM)</td>
<td>Tricentis Tosca Testsuite</td>
<td></td>
</tr>
</tbody>
</table>

### Change Impact Analysis
- Scope and Effort Analyzer (SEA)
- Business Process Change Analyzer (BPCA)

### Automated Tests
- Component-based Test Automation (CBTA)
- Test Automation Framework

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<tr>
<td>Mobile Center</td>
<td>Perfecto Mobile</td>
<td></td>
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<tr>
<td>LoadRunner</td>
<td>Worksoft Performance</td>
<td></td>
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<tr>
<td>Fortify</td>
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</table>

### Mobile Testing
- Mobile Center

### Test Data Provisioning
- DeceSoft Test Data (DTD)

### Load and Performance Tests
- LoadRunner

### Security Tests
- Fortify

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**Legend**
- **SAP Solution Manager and complementing tools**
- **Alternative products with overlapping functionality to SAP Solution Manager** (requires additional integration and on-going data replication)

* Former software division of Hewlett Packard Enterprise is now part of Micro Focus
SAP Solution Manager - Test Suite
Capabilities of SAP Solution Manager Test Suite and Focused Build

Focused Build for SAP Solution Manager
- Prepare
- Explore
- Realize
- Deploy
- Run

Test Suite related
- Requirements / Work Package based Test Plan Generation
- Manual Testing: Test Steps
- Test Execution: My Test Executions
- Test Suite Dashboard

SAP Solution Manager – Test Suite
- Solution Documentation
- Change Impact Analysis
- Test Planning
- Test System Setup
- Test Execution and Analytics

- Manual Test Cases
- Automated Test Cases
- Test Automation Framework with 3rd party test tool integration
- Test Composition Environment to manage SAP and partner tools
- Change Impact Analysis
- Test Plan and Test Package Management
- Test Execution of manual and automated tests
- Test Data Management
- Gap and Completeness Analytics
- Test Execution Analytics
SAP Solution Manager 7.2 – Test Suite
Delivers all you need

✓ **Tests for SAP and non-SAP**: covers SAP Business Suite, S/4HANA, Concur, Ariba, SuccessFactors, … and non-SAP solutions

✓ **On-premise, Cloud, Hybrid**: Supports functional tests for on premise, cloud and hybrid solutions

✓ **All under one Roof**: no integration setup and ongoing data replication required

✓ **Integration**: seamless integrates with project management, process management, change and release management, defect and incident management, custom code management

✓ **Requirements to Deploy**: Supports waterfall and agile development approaches, including Enterprise DevOps

✓ **Manual Tests**: Easy to use manual tests for business users

✓ **Automated Tests**: for all SAP and non-SAP processes – certified integration of market-leading partner test tools for test planning, execution and reporting

✓ **Test Data**: semi-automatically identify, validate and provide suitable test data for all tests

✓ **Change Impact Analysis**: reduce test scope based on software changes and smart calculations

✓ **Test Planning**: automatically proposes test plan fitting the needs of the upcoming test cycle

✓ **Analytics**: automatically provides full transparency of test status and test progress for all involved parties
Functional Regression Tests: **Test Automation** of Business Processes and Process Steps
Motivation for automated functional Tests

Motivation

- Software changes to SAP Solutions take place on a regular basis
- The change scope and change frequency is increasing – especially when moving to Enterprise DevOps
- Functional regression tests shall act as accelerator - not hurdle for the pace of innovation projects

Advantaged

- Cover more business processes with regression tests through functional test automation
- Identify more Defects in QAS environments through automated tests
- Cost reduction to cover recurring costs for manual tests
Test Suite
Best Practice approach for functional test automation

1. Select test automation tools from SAP and/or certified partners

2. Create automated tests for single business transactions (SAP, non-SAP)

3. Create automated composite tests for business processes (SAP, non-SAP)

4. Identify and validate test data and assign to automated tests

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**Test Automation Framework**

5. Derive test plan with automated regression tests via BPCA change impact analysis

6. Schedule and run automated tests online or in “lights-out” mode

7. Analyze test execution results and assess status

8. Create Defects for application errors and “Damage” for damaged test cases
Test Suite of SAP Solution Manager
Activities to create automated tests using SAP or Partner test automation tool

- CBTA / SAP
- UFT / Micro Focus
- Certify / WorkSoft
- Test Automation / Tricentis

Business Process or Process Step

Test Composition Environment (TCE)

Test Automation Tool

Select BP or PS

Create new Test Case

Record automated Test

Refine new Test Case

Execution of business transaction

Test Data Container

Assign test data
Test Suite of SAP Solution Manager

Execution of automated tests using SAP or Partner test automation tool

1. User starts test execution in "lights-out" or adhoc mode

2. Test data selected from TDC

3. Test execution: handover of Test Script + Test Data + SUT info

4. Logon and automated business process execution

5. Test results and test tool logs

Test Configuration

- Test Script
- Test Data
- System under Test

Test Data Container (TDC)

SAP or non-SAP application
Guidance for selection of Test Automation Tools from SAP and certified Partners
Functional Test Automation tools from SAP and / or certified Partners

SAP Customer Situation

- A typical SAP customer uses SAP, custom-developed and non-SAP solutions to execute business processes
- A particular business process can include hybrid scenarios with SAP and non-SAP process steps

|------------------|--------------------------|----------------|----------------|----------------|--------------------------|

Scope of available functional test automation tools

- The Test Suite of SAP Solution Manager provides a Test Automation Framework allowing SAP customers to choose the test automation tool of their choice
- SAP test automation tools can automate SAP business transaction – SAP standard and custom developed, using SAP user-interfaces including SAPGUI, CRM web-client, WebDynpro, SAPUI5, Fiori, …
- Partner test tools can be used to automate SAP and non-SAP business transactions, but require additional licenses
- Test Suite of SAP Solution Manager enables composition of automated tests using SAP and Partner tools.
### Alternatives to select Functional Test Automation Tools for Test Suite

<table>
<thead>
<tr>
<th></th>
<th>Alternative 1</th>
<th>Alternative 2a</th>
<th>Alternative 2b</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Test Scope</strong></td>
<td>SAP business transactions</td>
<td>SAP and non-SAP business transactions</td>
<td>SAP and non-SAP business transactions</td>
</tr>
<tr>
<td><strong>Test Tools</strong></td>
<td>CBTA / SAP Solution Manager</td>
<td>CBTA / SAP Solution Manager plus 1 partner tool</td>
<td>1 partner tool</td>
</tr>
<tr>
<td><strong>License</strong></td>
<td>No additional license for customers under SAP Enterprise Support (SAP ES)</td>
<td>CBTA – no add.licenses (SAP ES) Partner tool – add.licenses required</td>
<td>Partner tool – add.licenses required</td>
</tr>
</tbody>
</table>
| **Details**      | Customers looking for functional test automation of business transactions limited to SAP user-interfaces  
• SAP GUI  
• CRM web-client  
• Web-Dynpro  
• SAPUI5  
• Fiori  
• … | CBTA used for test automation for all business transactions using SAP user-interfaces  
Partner tool used for test automation of non-SAP business transactions  
• **Advantage**: cost savings since add.licences only needed for non-SAP test automation  
• **Disadvantage**: Test Team needs to learn 2 test automation tools | Partner tool used for test automation of SAP and non-SAP business transactions  
• **Advantage**: Test Team needs to learn only test automation tool  
• **Disadvantage**: higher license costs, since test cases have to be built for all business transactions with partner tool |
**Test Automation Tools integrated with Test Suite**

SAP and certified Partners

<table>
<thead>
<tr>
<th>Product</th>
<th>Scope</th>
<th>License</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component Based Test Automation (CBTA)</td>
<td>SAP applications</td>
<td>No add. license required for SAP customers with SAP Enterprise Support contract</td>
</tr>
<tr>
<td>Unified Functional Testing (UFT) *</td>
<td>SAP and non-SAP applications</td>
<td>additional license required</td>
</tr>
<tr>
<td><strong>Certify</strong></td>
<td>SAP and non-SAP applications</td>
<td>additional license required</td>
</tr>
<tr>
<td>**Test Automation ***</td>
<td>SAP and non-SAP applications</td>
<td>additional license required</td>
</tr>
</tbody>
</table>

* Former software division of Hewlett Packard Enterprise is now part of Micro Focus

** Focused solutions circle partner: [https://support.sap.com/solution-manager/focused/focused-solutions-circle.html](https://support.sap.com/solution-manager/focused/focused-solutions-circle.html)

*** no specific product name available for Tricentis Tosca functional test automation product
Create automated tests for single business transactions
Automated Tests
Test Configuration and its building blocks

**Business Processes**

- Order to Cash (Variant 1)
- Order to Cash (Variant 2)
- Create Quotation
- Sales Order Creation from Quotation Ref
- Create Outbound Dir. with Order Ref.
- Create TO for Delivery
- Change Outbound Delivery
- Create Billing Document

Starting point to create / maintain automated tests

**Test Configuration**

- **Test Script**
  - CBTA, eCATT
  - UFT
  - Certify

- **Test Data**

<table>
<thead>
<tr>
<th>Test Data Container</th>
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</thead>
<tbody>
<tr>
<td>CBTA 1</td>
</tr>
</tbody>
</table>

- **System under Test**

<table>
<thead>
<tr>
<th>System under Test</th>
<th>SAP ERP</th>
<th>SAP CRM</th>
<th>SAP SCM</th>
<th>SAP S/4HANA</th>
<th>Non SAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order Type</td>
<td>Customer</td>
<td>Product</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td>C1000</td>
<td>P-100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td>C2000</td>
<td>P-200</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Composite Tests** for E2E business processes covering SAP and non-SAP process steps

SAP customers have a choice of test automation tools integrated with SAP Solution Manager through the Test Automation Framework
Test Suite
Flow to build an automated test - using CBTA / SAP Solution Manager or partner tool

Process Management

Alternative 1:
Process Management. User selects tile Solution Documentation and navigates to business process or process step.

Test Suite

User creates new Test Config by selecting Test tool, e.g. CBTA.

Alternative 2:
Test Suite. User selects tile Test Repository – Test Configuration.

Test Composition Environment (TCE)

Tab Attributes: on the ‘Attributes’ tab, user defines test configuration title, Test Profile and Executable that shall be used to create the automated test.
User starts the test case recorder.

Tab Test Script: User saves script, default data and test configuration.

Tab Parameters: edit parameters

Tab Test Data: assign test data from TDC via new Test Data Assignment Wizard.

Component-based Test Automation (CBTA)

User executes SAP Business transaction in managed system via CBTA PFA.
PFA creates test components and compose test script.

Test Data Container

Test Data assignment from Test Data Container (TDC) to CBTA Script Parameters via Test Data Assignment Wizard.
Create automated tests for business processes
Automated Tests for Business Processes
Test Suite - Test Composition Environment (TCE)

Typical Business Process

Steps to build an automated process test

1. Create Test Scripts for each Process Step with export / import parameters
   - Test Script 1
     Output parameter: Quotation Number
   - Test Script 2
     Import parameter: Quotation Number
     Output parameter: Sales Order Number
   - Test Script 3
     Import parameter: ...
   - Test Script ...

2. Build Composite Test using TCE
   - Test Composition Environment
     Composite Test

3. Assign Test Data using Test Data Assignment Wizard
   - Test Data Assignment Wizard
   - Test Data Container

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Test Data refresh of tests systems
Data refresh of test systems

**Test System Preparation**
- Setup of lean test systems (QAS) from PRD or Pre-PRD systems
- Copy of master data and selective transactional data
- Data refresh on a regular basis

**SAP Products**
- SAP TDMS (Test Data Migration Server)
- SAP LaMa (SAP Landscape Management)
1. Data Selection (cluster)
2. Data Deletion
3. Data Transfer
4. Scrambled Data
SAP TDMS
Reduction of test data

Assumption:
80-90% of the production data is stored in 10 – 20% of client-dependent tables

Time-based Reduction
Administration Data
Transaction Data
Storage Savings
Client DB – Time based reduction ~25%

Object Oriented Reduction
Administration Data
Transaction Data
Storage Savings
Client DB – After OO reduction < 10%
SAP TDMS
Typical Use Case Example: Refresh of Data in Q, T, D Systems

**Before SAP TDMS**

- **PR1**: 1.5 TB
- **TRN1**: 1.5 TB
- **QA1**: 1.5 TB
- **DEV1**: 200 GB

No easy way to bring current data to DEV

**With SAP TDMS**

- **PR1**: 1.5 TB
- **TRN1**: 300 GB
- **QA1**: 300 GB
- **DEV1**: 500 GB

Reduced copies

Selective data copies possible into DEV

Current data
Test Data
Identification, planning, validation and provisioning
for automated tests
Test Data for Automated Tests
Test Data Container (TDC)

Test Data Container

- Test Data – required for manual tests and automated tests – can be stored and provided via Test Data Container (TDC) of SAP Solution Manager
- TDC can provide test data for single tests and business process tests
- Business Process Experts and Test Engineers can enter suitable test data manually in TDC
- SAP Partner application DTD* supports test data identification, planning, validation and provisioning for manual and automated tests

* Focused solutions circle partner: https://support.sap.com/solution-manager/focused/focused-solutions-circle.html
Test Data for Automated Tests
DeceSoft DTD for test data identification, planning, validation and provisioning for manual / auto tests

DeceSoft DTD identifies and validates data from your SAP systems - suitable to test your business transactions
Test Data for Automated Tests
DeceSoft DTD: 4 approaches for test data identification and planning

- Online Planning with access to SAP system
- Offline Planning (MS Excel) plus DTD online validation
- Derive data from posted business documents
- High volume usage analytics of posted business documents

DTD planning grid to identify / plan Test Data Records
Test Data for Automated Tests
DeceSoft DTD: Usage Analytics of posted documents to identify suitable test data

Thousands / millions of posted documents

Usage Analysis for selected business transaction

<table>
<thead>
<tr>
<th>ABC</th>
<th>Order Type</th>
<th>Sales Org</th>
<th>Document Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>OR</td>
<td>S-01</td>
<td>1,500,000</td>
</tr>
<tr>
<td></td>
<td>...</td>
<td>S-02</td>
<td>800,000</td>
</tr>
<tr>
<td>B</td>
<td>...</td>
<td>...</td>
<td>75,000</td>
</tr>
<tr>
<td>C</td>
<td>...</td>
<td>...</td>
<td>50,000</td>
</tr>
</tbody>
</table>

Generic
Flexible selection of important fields per business transaction (Test Data DNA) – generic approach – no specific coding

Automatic
Automatic derivation of fields with interdependencies – generic approach

Fast
Very fast retrieval of valid combinations from PRD systems with subsequent ABC usage analysis

Drilldown
Drilldown to analyze used field values of other entities of the business transaction

Test Data
Automatic generation of test data from ABC analysis
Test Data for Automated Tests
DeceSoft DTD: test data validation for SAP Systems

Test Data Records for Executable ...

<table>
<thead>
<tr>
<th>Record</th>
<th>Order Type</th>
<th>...</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OR</td>
<td></td>
<td>M-100</td>
</tr>
<tr>
<td>2</td>
<td>OR</td>
<td></td>
<td>M-200</td>
</tr>
<tr>
<td>3</td>
<td>AB</td>
<td></td>
<td>M-300</td>
</tr>
</tbody>
</table>

- Test Data validity can be checked against any selected SAP system
- DTD validation reports provide meaningful explanations and user guidance to correct the test data
Test Data for Automated Tests

DeceSoft DTD: test data provisioning. Use Case 1: push validated test data into TDC of Test Suite

Select validated test data and push into Test Data Container
Assign TDC to automated tests
Create Test Plan and assign automated tests

Automated tests fail less often due to incorrect test data and identify application errors

Test Automation Tools
- SAP CBITA
- Micro Focus UFT (ex HP QTP)
- WorkSoft Certify
- Tricentis Tosca

ok Test Case 1
ok Test Case 2
failed Test Case 3
ok Test Case 4
Test Data for Automated Tests
DeceSoft* DTD for test data identification, planning, validation and provisioning for manual / auto tests

Fast and efficient way to identify test data for functional tests of SAP business transactions

Sophisticated validation of test data to ensure correct test data before start of test cycles

Efficient way to understand how org.units post business transactions plus test data generation

Convenient Test Data provisioning via MS Excel or SAP Solution Manager (TDC)

* Focused solutions circle partner: https://support.sap.com/solution-manager/focused/focused-solutions-circle.html
Test Suite – Test Automation

Summary
Customer benefits

- SAP customers can choose the tool they want to use for test automation from SAP as well as certified partners.
- Business Analysts or Test Engineers can build automated functional tests without technical detail know-how.
- One integrated environment provided by SAP Solution Manager to manage all tasks to build, run and analyze test automation.
Test Suite - Test Automation Framework

How-To Guide

Comprehensive description on how-to

- Setup test automation with SAP Solution Manager 7.2
- Create test scripts
- Build composite tests
- Assign test data
- Available for customers in partners in our Test Suite Wiki

SAP Solution Manager 7.2 – Test Suite
Delivers all you need

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SAP Solution Manager – Test Suite
More Information for Customers and Partners
Test Suite – more information for customers and partners

SAP Solution Manager WIKI – Test Suite

- Audience: customers and partners
- Positioning presentations
- How to configure and administration
- Tips and tricks
- Offline demos

**SAP Solution Manager Learning Resources Overview**

Build up your knowledge and skills

### Available Learning Resources

From Interest to Expert Knowledge

<table>
<thead>
<tr>
<th>Platform</th>
<th>Resources</th>
</tr>
</thead>
</table>
| YouTube  | - Overview Videos  
- Virtual Roadshow |
| SAP Books | - Overview Publication  
SAP Solution Manager for SAP S/4HANA |
| SAP.com  | - Overview Information |
| SAP Support Portal | - SAP Solution Manager Homepage  
(support.sap.com/solutionmanager)  
Processes, Product, Release, and Support Info  
Focused Solutions  
Ready-to-run solutions for SAP Solution Manager |
| Media Center | - SAP Solution Manager Media Center  
Product Videos, System Demos, Tutorials |
| SAP Community | - System Landscapes  
Private Cloud System (CAL), Public Demo System, Internet Demo System |
| SAP Demo Systems | - Live Expert Sessions & e-Learnings  
Get empowered by the SAP Enterprise Support Academy |
| SAP Education | - Classroom Trainings  
Setup, configuration, and functional overview |
| SAP Help Portal | - Product Documentation  
Application Help, Release Notes, Installation, Upgrade, and Security Guides |

### Management Competence

(Introduction)

- **Overview Videos**
- **Virtual Roadshow**

### Core Competence

(Key Value Chains)

- **Overview Publication**
- SAP Solution Manager for SAP S/4HANA
- **Overview Information**
- **SAP Solution Manager Homepage**
- Processes, Product, Release, and Support Info  
Focused Solutions  
Ready-to-run solutions for SAP Solution Manager
- **SAP Solution Manager Media Center**
- Product Videos, System Demos, Tutorials
- **System Landscapes**
- Private Cloud System (CAL), Public Demo System, Internet Demo System
- **Live Expert Sessions & e-Learnings**
- Get empowered by the SAP Enterprise Support Academy

### Expert Competence

(Functional Areas)

- **Expert Publication**
- Monitoring and Operations with SAP Solution Manager
- **Technical Documentation**
- Supported languages, browsers, and databases  
**Expert WIKIs**
- Functional Areas Expert Content
- **SAP Solution Manager Community**
- Blogs & Questions
- **Product Documentation**
- Application Help, Release Notes, Installation, Upgrade, and Security Guides