Overview Test Option 1
Test Management and Execution with SAP Solution Manager

ALM Solution Management, AGS, SAP AG
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Agenda

Testing of SAP-centric Business Processes

Change Impact Analysis

Test Management with SAP Solution Manager 7.1

Further Information
Testing of SAP-centric Business Processes
Test Management
Test Management Process embedded in the SAP Application Lifecycle

Type of Change
- New SAP Solution
  - Implementation of new SAP Solution
- SAP Solution Update
  - SAP Support Packages
  - SAP Legal Change Packages
  - SAP Enhancement Packages
  - Customizing changes
  - Custom Code
  - Interface changes

Test Scope Identification
- Business Blueprint
  - Business Blueprint Design
  - Solution Configuration
- Change Impact Analysis
  - Business Blueprint Update
  - Identification of Business Processes affected by SAP Solution Updates
  - Recommendation of business processes for regression tests

Test Planning
- Test System Setup

Test Execution
- Development of Test Cases
- Test Plan setup
- Compilation of Test Packages
- Assignment of Testers
- Setup of Test System
- Creation of Test Data
- Manual tests
- Automated tests
- Integration Validation
- Incident Management
- Performance tests
- Test status and progress reporting
- Test sign-off

Change Deployment
- Deployment of changes through transports from Test to Production system
- SAP Support packages, Legal Change Packages, Enhancement Packages
Test Management
End-to-End Testing of SAP-centric Solutions

Customer Pain Points
1. Tests in heterogeneous system landscapes
2. Software updates affecting mission-critical business processes
3. Test system setup and test data management
4. Effort for creation and maintenance of automated tests

SAP Strategy for Test Management
- SAP Solution Manager acts as central hub to manage SAP change events and E2E Integration Testing
- Superior functionality from risk-based test planning, manual /automated functional and performance testing to status reporting and sign-offs
- Integration of Partner Test Suites
Test Management
Products and Capabilities integrated with SAP Solution Manager 7.1

Business Blueprint
- Order to Cash (O2C)
- Quotation
- Sales Order
- Outbound Delivery
- Goods Issue
- Billing

Test Option 1
- SAP Solution Manager
  - Work Center
  - Test Workbench
- SAP Solution Manager
  - Test Automation Framework
  - HP QTP and other integrated ISV test automation tools

Test Option 2
- SAP Quality Center by HP
- SAP TAO

Test Option 3
- Rational software
  - Quality Manager, ReqPro, ...

New SAP Solution
SAP Solution Update
Change Impact Analysis

Test Planning
Test System Setup
Test Execution
Change Deployment
E2E Test Management
Capabilities of Test Option 1 with SAP Solution Manager 7.1

Goals with SAP Solution Manager 7.1

1. Extended functionality of BPCA for risk-based test scope identification
2. Improved usability for manual testers
3. Smooth integration of 3rd party test automation tools with SAP Solution Manager
Change Impact Analysis
**Business Process Change Analyzer (BPCA)**

**Motivation and Approach**

**Motivation**

**SAP Solution updates occur frequently**
- SAP triggered: Support Packages, Enhancement Packages
- Customer triggered: Customizing changes, Custom code development

**Pain Point**

*Which critical business processes are affected by planned changes?*

**Approach**

**SAP Solution Update**

- Identification of business processes affected by change
- Risk-based Test Recommendation

**Change Impact Analysis**

**Test Planning**

- Test Case review and creation of missing test cases
- Test Plan generation

**Test Execution**

- Regression Tests
  - Manual Tests
  - Automated Tests
**Business Process Change Analyzer (BPCA)**

### Preparation

- **Business Blueprint**
  - Order to Cash (O2C)
  - Quotation
  - Sales Order
  - Outbound Delivery
  - Goods Issue
  - Billing

- **Trace to identify objects by process**
  - Manual execution of process step
  - Automated

- **BPCA Trace Result (TBOM)**
  - Transactions
  - ABAP Code: Function modules, ...
  - UI: Dynpro 1000, ...
  - Tables: Customizing, Master Data

### Change Impact Analysis

- **“Which critical Business Processes will be affected by planned changes?”**

- **BPCA use cases**
  1) Customizing changes
  2) Custom code development
  3) Business Function activation
  4) SP and EhP deployment

- **BPCA Change Impact Analysis**
  - Order to Cash
    - **Sales Order** → code change
    - Delivery
    - **Goods Issue** → UI change
    - Billing
    - Procure to Pay
    - **Create PO** → customizing change

### Risk-based Test Scope Identification

- **“Can I get a recommendation for regression tests?”**

- **BPCA Test Scope Optimization and Test Plan Generation**
  - Identification risk-based test scope based on affected process steps
  - Test Scope Optimization
  - Semi-automatic test plan generation (automated for Test Option 1)
Test Management with SAP Solution Manager 7.1
E2E Test Management
Capabilities of Test Option 1 with SAP Solution Manager 7.1

Goals with SAP Solution Manager 7.1

1. Extended functionality of BPCA for risk-based test scope identification
2. Improved usability for manual testers
3. Smooth integration of 3rd party test automation tools with SAP Solution Manager
Manual Test Execution
with SAP Solution Manager 7.0

Tester Worklist

<table>
<thead>
<tr>
<th>Test Plan</th>
<th>Errors</th>
<th>No Result</th>
<th>OK</th>
<th>Test Case</th>
<th>Test Object</th>
<th>Status</th>
<th>Message</th>
<th>Note</th>
<th>Status Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order-to-Cash</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create Sales Order</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create Outbound Delivery</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Errors, Retest Required</td>
</tr>
<tr>
<td>Post Goods Issue</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Untested</td>
</tr>
<tr>
<td>O2C_Create_FRP_Sales_Order</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VL01N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test Script

Start of Business Transaction

Test Status and Incident

Test result documentation
Manual Test Execution with SAP Solution Manager 7.1
Convinient access for manual Testers

Tester Worklist

1. Easy access for manual testers from Work Center Test Management
2. Test Packages assigned to Tester including status
3. Test Cases of selected Test Package
   - Start of execution
   - Test status
   - Test Notes
   - Incidents
Manual Test Execution with SAP Solution Manager 7.1
Convinient test case execution for manual Testers

Create Sales Order

1 Prerequisites
Master data for products and customer, as well as sales organization

2 Test Data
Standard test data is included in the following test script. Please use the value help functionality in the SAP test system to obtain additional test data.

3 Test Execution
Your test package includes a button to start the business transaction Create Sales Order (transaction code QA01).

<table>
<thead>
<tr>
<th>Step</th>
<th>Activity</th>
<th>Default Test Data</th>
<th>Expected result</th>
<th>Actual result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Initial screen</td>
<td>Enter data for the following fields: Order Type (001), Sales Org (1000), Distribution Channel (10), Division (00),</td>
<td>Entered data is checked and accepted. Next screen will be processed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Print entry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Standard Order Overview</td>
<td>Enter data for the following fields: Sold-to-party (1000), Ship-to-party (1000),</td>
<td>Entered data is checked and accepted.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Print entry</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Manual Test Execution with SAP Solution Manager 7.1
Convinient test case execution for manual Testers

Manual Test Case

1. Test script is displayed to Tester
2. Start Execution → direct launch of SAP transaction in assigned test system
3. Tester enters Test Status
4. Test Note: Tester enters actual test results / screenshots
5. Messages: direct creation of incidents
Project Setup using SAP Solution Manager

**Project Setup**
- Setup of implementation project and assignment of systems with their roles like DEV, TST, PRD

**Business Blueprint**
- The structure of the project is mapped in the Solution Manager on detailed level – including transactions

**Customizing**
- All relevant customizing object are tracked in the Solution Manager on the specific level of the project and can be directly accessed from it by the link to the IMG (Customizing).

**Documentation**
- SAP Solution Manager is used as the repository for all the project documentation (business blueprint, technical specifications, test cases). The documentation is uploaded on the specific process level.
- An approval process for the documentation was implemented within the Solution Manager.
Test Case setup
• Starting from the business process the user defines test cases and assigns them to the business process

Test plan and test package creation
• Starting from the defined structure it is possible to generate a test plan
• Multiple test packages can be derived from the test plan

Test assignment to user
• It is possible to assign tests to the users and track the results
### SAP Customer: Ferrero

Test Execution using test management capabilities of SAP Solution Manager

#### Perform Test

<table>
<thead>
<tr>
<th>Test Case</th>
<th>Test Configuration for the Order to Cash</th>
<th>TC_O2C_Create_Sales_Order</th>
<th>TC_O2C_Create_Delivery</th>
<th>TC_O2C_Post_Order_Late</th>
<th>Billing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Errors</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ok</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Test Object</td>
<td>0</td>
<td>VAB1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Status</td>
<td>Ok</td>
<td>Ok</td>
<td>Ok</td>
<td>Ok</td>
<td>Ok</td>
</tr>
</tbody>
</table>

#### Manual test case execution

- It is possible to manage the collaboration between users and development team during the test (create internal messages, log tests, review the testing status)

#### Automated test case execution

- eCATT has been used as tool to automate the testing process and to create test data for user acceptance test

#### Reporting

- Status Info System enables Test Coordinator to view the progress of all test packages and test plan
- Drilldown to tester notes and incidents allows tracking of critical tests
- Test cases, test packages and test plan can be locked
## Required Effort to setup Manual Testing

<table>
<thead>
<tr>
<th>Basic Configuration (one-time activities)</th>
<th>Approx. Effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activate Solution Manager Services</td>
<td></td>
</tr>
<tr>
<td>Setup Work Center for Test Management</td>
<td></td>
</tr>
<tr>
<td>Activate Workflow Functionality</td>
<td></td>
</tr>
<tr>
<td>Set-Up Automatic E-Mail Notification for Testers</td>
<td></td>
</tr>
<tr>
<td>Activate BI Reporting</td>
<td></td>
</tr>
</tbody>
</table>

*Based on a Project comprising 3 Processes with an average of 10 Process Steps per Process.*

How-To Guide available at SAP Service Marketplace

http://service.sap.com/testing ➔ More Information
## Manual Testing
Disadvantages of manual testing compared to automated testing

<table>
<thead>
<tr>
<th>Test coverage within tight timelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Lack of time to execute regression tests may potentially compromise Performance &amp; Reliability</td>
</tr>
<tr>
<td>- Overcompensating scope of testing may result in more testing than may be really required and project delays</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Defects in Production Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Insufficient test coverage leads to a higher amount of defects not found before cut-over of changes from test to production landscape</td>
</tr>
<tr>
<td>- Testing accuracy due to not being able to test all variants</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>- High costs for manual testers involved in recurring regression tests</td>
</tr>
<tr>
<td>- High costs to fix errors in production landscape</td>
</tr>
<tr>
<td>- Finding errors late in the development process could delay delivery</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Complexity</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Complexity increasing with added business processes and modules implemented</td>
</tr>
<tr>
<td>- Manual testing cannot keep pace with expansion of applications</td>
</tr>
</tbody>
</table>
New SAP Offering for Test Automation

**Goal**
Support SAP customers to move from manual to automated regression tests in a convenient, reliable and cost efficient fashion for SAP and non-SAP applications.

<table>
<thead>
<tr>
<th>Offering</th>
<th>What’s new?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SAP Solution Manager 7.1</strong></td>
<td><strong>Test Automation Framework</strong> to manage and integrate automated test scripts like HP QTP, test data, system under test, etc.</td>
</tr>
<tr>
<td><strong>HP Quick Test Professional 11</strong></td>
<td><strong>HP QTP</strong> with extended functionality for test data and test system handling for automated tests of SAP und non-SAP applications</td>
</tr>
<tr>
<td><strong>2 Licenses of HP QTP</strong></td>
<td><strong>2 licenses of HP QTP</strong> for all SAP customers with SAP Enterprise Support, PSLE or Max Attention contract</td>
</tr>
<tr>
<td></td>
<td>Access: <a href="https://service.sap.com/testing">https://service.sap.com/testing</a></td>
</tr>
</tbody>
</table>
SAP Solution Manager 7.1
New Test Automation Framework integrates 3\textsuperscript{rd} party Test Automation Tools

- Seamless integration of 3rd party test automation tools with Business Process hierarchy of SAP SollMan
- Test Data for parameters of test script provided by Test Data Container
- Test System info linked with test script

(2) Test Case Execution
- Scheduling for unattended execution of automated tests
- Exception reports and Workflows

(3) Integrated Reporting
- Status and Progress Reports integrated with 3rd party test logs

(4) Accelerated Test Case Repair
- Workflow-based repair order after failed test execution from Tester to responsible Test Engineer
- Central repair environment for Test Engineer with integrated BPCA
Test Automation Framework
(1) Definition of automated Tests and assignment to Process Steps

- Seamless creation of automated test cases from SAP Solution Manager business process hierarchy with 3rd party test automation application.
- SAP Solution Manager provides Test Data and System Landscape to auto Test Case
- SAP provides 2 interfaces to link 3rd Party Test Automation tools with Test Management of SAP Solution Manager. 3rd party tool vendors can receive an SAP certification.

Business Processes

- Order to Cash (O2C)
  - Quotation
  - Sales Order
  - Outbound Delivery
  - Goods Issue
  - Billing

Test Configuration

- Test Script
  - QTP
- Test Data
  - Doc Type | Customer | Product
  - OR | C 1000 | P-100
  - OR | C 3500 | X-500
- System Data

other test automation tools
Test Automation Framework
Fast Test Script Creation

Direct access from SAP Solution Manager → Editor of 3rd Party Test Automation Tool → SAP Test System

Business Processes
- Order to Cash (O2C)
  - Quotation
  - Sales Order
  - Outbound Delivery
  - Goods Issue
  - Billing

HP QTP

SAP Test System
Test Automation Framework
Parameterization of test scripts and SAP Test Data Container

SAP Test Configuration

1. New test script

2. (Automatic) Replacement of static value (customer „C1000“) with parameter (I_SOLD_TO_PARTY)

3. Test Data variant generated by script parameters

4. Wizard to map test data from TDC to Test Configuration

Test Data Container (TDC)

<table>
<thead>
<tr>
<th>Order Type</th>
<th>Customer</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR</td>
<td>C1000</td>
<td>P-100</td>
</tr>
<tr>
<td>OR</td>
<td>C2000</td>
<td>P-200</td>
</tr>
</tbody>
</table>
Test Automation Framework
System Data Container - Assignment of Systems under Test

SAP Solution Manager

System Landscape Documentation

<table>
<thead>
<tr>
<th>Solution</th>
<th>System Role</th>
<th>Test execution</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP ERP</td>
<td>DEV</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>TST</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>PRD</td>
<td>not allowed</td>
</tr>
<tr>
<td>SAP CRM</td>
<td>DEV</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>TST</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>PRD</td>
<td>not allowed</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

Test Configuration

- Test Script
- Test Data
- System Data

Client (Laptop / Desktop)
Execution of Test Scripts

No hard coded system information

Handover of system access information (RFC, ...)

Customer Test System Landscape (SAP ERP, …)
**UI Technologies used in SAP-centric Business Processes**

**Goal**
Provide **test automation** for all typical business processes used by SAP customers including SAP and non-SAP applications.

<table>
<thead>
<tr>
<th>SAP vs. non-SAP Business Process</th>
<th>Example</th>
<th>UI Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>100 % SAP</strong></td>
<td>SAP CRM, SAP ERP, SAP Portal</td>
<td>SAPGui, Web-Dynpro ABAP, BSP, ...</td>
</tr>
<tr>
<td><strong>SAP-centric</strong></td>
<td>SAP CRM, SAP ERP + partner product for price determination</td>
<td>SAPGui, Web-Dynpro ABAP, BSP, html, .Net, JavaScript, ...</td>
</tr>
<tr>
<td><strong>Non-SAP</strong></td>
<td>Partner application or non-SAP application for HR processes</td>
<td>Html, .Net, JavaScript, ...</td>
</tr>
</tbody>
</table>

(*) see HP website for a complete list of supported UI technologies
Test Automation Framework

(2) Test Execution

- Tester Worklist - manual and automated tests can be executed from the same html-based Work Center
- Exception reports support the tester to identify failed tests
- Scheduling of tests enable unattended test execution at night time with subsequent exception reports the next morning

Test execution from Tester Worklist

Scheduling of automated Tests for unattended execution

Analysis
Test Automation Framework

Test Execution

SAP Solution Manager
Work Center “Test Management“ – Tester Worklist

Test Script
Test Data
Test Systems

User starts test execution

Test Automation Framework

Test Config reads test data

Test System
SAP and non-SAP

Test execution
handover of Script + Test Data + Test System

run

TDC
Test Data Container (TDC)
Test Automation Framework
Scheduling of unattended automated tests

Scheduling
Scheduling of unattended automated tests in local or remote locations

Test Engineer - Location 1

Test PCs - Location 2

Unattended Test Execution
Unattended execution of automated test on Test PCs

Analysis
Notification about test execution status and subsequent failure analysis

Business Analyst

Test result analysis

Test System Landscape (SAP ERP, SAP CRM, ...)

<table>
<thead>
<tr>
<th>Errors</th>
<th>No Result</th>
<th>OK</th>
<th>Messages</th>
<th>Scheduled</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Test Automation Framework

(3) Integrated Test Status and Progress Reporting

- Multiple reporting options for Test Coordinators, Test Engineers, Testers and Project Manager
- Management of Test Plans: Completeness and gap reports for included test cases
- Test status and trend reports to monitor progress of test activities and problem solving
- Drilldown from test status reports to 3rd party test tool logs and dashboards
Test Automation Framework
(4) Accelerated repair of damaged tests

- Software changes of SAP Solutions can damage automated test cases → fast repair required
- Workflow to request repair activities - from Test Executor to Test Engineer
- Environment for test engineer to access the log, re-run the test and display/edit the test script
- Change Impact Analysis (BPCA) integrated into test case maintenance

**Workflow:** Tester requests repair activity after failed test case execution

**Central Repair Environment** for Test Engineer to repair test case

**Change Impact Analysis** for damaged test cases
Test Automation Framework
Workflow & Analysis for accelerated repair of damaged tests

1. Requests repair activity after failed test case execution

Tester

2. Receives message in Damaged Test Case Worklist
3. Analyses and repairs the test case

Test Engineer

Central environment for analysis and repair

4. Requests retest

5. Performs retests
6. Confirms successful repair
Test Automation Framework

Customer Benefits

**Test Coverage**
- More business processes can be tested in a testing cycle
- Defects are caught earlier in test system before they move to production system

**Flexibility**
- Customers can jump-start their test automation project with 2 licenses of HP QTP
- All major vendors providing test automation tools are integrated via certifiable SAP interfaces

**Costs**
- Save cost by engaging less manual testers
- Fast Return on Investments

**Accelerated Approach**
- Workflow and analysis functions speed of the identification and repair of damaged test case
- Central repair environment for Test Engineer
More Information for SAP Customers and Partners

1. How To Guide „Test Automation Framework“
2. How To Guide „HP QTP“
4. Detailed Presentation
5. Offline Demos
6. Download and Activation Key for HP QTP

Available via SAP Service Marketplace
http://service.sap.com/testing ➔ Additional Information ➔ Test Management
Further Information
Best Practices / Next Practice: Regression Testing of SAP-centric Business Processes

Leverage the experience of other SAP customers and find out what works best for them.

Content

- Regression tests as integral part of the software change process
- 9 Recommendations for regression testing
- Customer use cases from Colgate-Palmolive, Ferrero, Sara Lee, ConAgra Foods, Soka-Bau

Best Practice available at

SDN: http://www.sdn.sap.com/irj/sdn/alm-test-management
Test Management – Information Sources

Infos, Presentations, Demos
http://service.sap.com/testing

ALM Infos, Presentations, Demos
http://service.sap.com/alm

SAP AGS Whitepaper Test Management
http://service.sap.com/supportstandards

SAP Enterprise Support
http://service.sap.com/alm-services

Professional Services
www.sap.com/services/testing

Remote Service
Expert Guided Implementation
http://service.sap.com/alm-services

Classroom Training E2E220

Testing SAP Solutions
Test Management
Overview and Detail Presentations and Offline Demos

SAP Service Marketplace: http://service.sap.com/testing

Information
- Overview Presentations
- Detail Presentations
- Offline Demos

More Information: http://service.sap.com/testing -> Additional Information
Thank You!