E2E Test Management
Test Management with SAP Solution Manager, SAP Quality Center and SAP TAO
ALM Solution Management, Active Global Support (AGS), SAP AG
Agenda

Testing SAP-centric Business Processes

Lean Documentation of Business Processes

Change Impact Analysis

Test Option 2

SAP Solution Manager Adapter for SAP Quality Center by HP

SAP Quality Center by HP

SAP TAO

Further Information
Testing 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
  - Development of Test Cases
  - Test Plan setup
  - Compilation of Test Packages
  - Assignment of Testers
  - Setup of Test System
  - Creation of Test Data

Test Execution

- 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
Advanced SAP Customer: Change Management and Test Activities

Activities:

- **Planning of changes – scope and dates**
- **Sign-off**
- **Blueprint update**

- **Spec & Design**
- **Configuration**
- **Development**
- **Unit Testing**

- **Create scenario test plan & sign-off**
- **Execute manual scenario tests**
- **Update Config / Dev as needed**
- **Document and resolve defects**

- **Cycle 1 manual** integration tests of changed processes
- **Cycle 2 automated** regression tests of remaining prio 1 processes
- **Cycle 3** UAT by Business Users

- **Create performance test plan & sign-off**
- **Execution of Performance Tests**
- **Review of test results, validation, documentation and sign-off**

- **Final transport from TST to PRD**
- **System and process verification**
Test Management
End-to-End Testing of SAP-centric Solutions

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

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
Lean Documentation of Business Processes


"Lean" Solution Documentation
As Prerequisite for Test Management

Technical Landscape Documentation

Business Process Documentation

- Lean documentation of process steps
- Business Requirements
- Interface and Custom Code documentation
- ARIS integration
- Test Case assignment (Test Option 1)
- Trace results (TBOM) assignment for BPCA

Setup

- SAP Solution Manager Setup Wizard - guided procedure with help sections and log files for semi-automatic and fast setup

SAP ERP

SAP CRM

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

Setup

- SAP Business Suite content: BPR*
- Re-documentation with SoDocA**
- Manual documentation
- Utility to upload existing documentation

* BPR: Business Process Repository  ** SoDocA: Solution Documentation Assistant

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Change Impact Analysis
Business Process Change Analyzer
Motivation and Approach

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

Customer Pain Point
Which business processes are affected by planned changes?

Approach

SAP Solution Update

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

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)
TBOM generation using test automation tools

Business Scenario
“Order to Cash”

Business Blueprint

Test Option | Test Management                                | Test Automation Tools                          |
------------|------------------------------------------------|-----------------------------------------------|
1           | SAP Solution Manager – Test Automation Framework | HP QTP, SAP eCATT, WS Certify, ...             |
2           | SAP Quality Center                              | SAP TAO                                       |
Business Process Change Analyzer
SAP Solution Manager 7.0 SP18

BPCA Use Case 1: Customizing Changes*

Example: „Create Sales Order“ – input field „Purchase Order: optional → mandatory

Customizing Changes

Transport

Identification of impacted business processes

Generation of Test Plan

Change Impact Analysis

Test Recommendation

(*) Note: BPCA of SAP SolMan 7.1 SP01: additional precision through tracing of key fields of SAP customizing tables
BPCA Use Case 2: **Custom Code Developments**

**Example:** Extension of existing SAP screen with custom required field.

1. Custom Code Developments
2. Transport
3. Identification of impacted business processes
4. Generation of Test Plan
5. Change Impact Analysis
6. Test Recommendation
Business Process Change Analyzer
SAP Solution Manager 7.0 SP23

BPCA Use Case 3: **Planned activation of inactive Business Functions**

**Example**: inactive Enterprise Business Function „Advanced Order Processing and Billing“

- deployed EhP
- DEV
- TST
- PRD

**Change Impact Analysis**

Identification of impacted business processes **before** BF activation

**Test Recommendation**

- Generation of Test Plan
- End-user training plan
BPCA Use Case 4: SP / EhP Deployment and Test Scope Optimization

Example: Deployment of EhP 4 for SAP ERP

SAP Support Package / Enhancement Package Deployment

DEV  SP / EhP  TST  PRD

Change Impact Analysis

Identification of impacted business processes

Test Recommendation

Generation of Test Plan with risk-based test scope
Business Process Change Analyzer
Test Scope Optimization for SAP Support Packages and EhPs

Key Message

- Test Scope Optimization: identification of test cases based on # changed SAP objects and test effort
- Approach: changed SAP objects should be tested at least once
- Not all affected process steps have to be included in the regression test
Test Management with SAP Solution Manager 7.1, SAP Quality Center 11 and SAP TAO 2.0
E2E Test Management
Capabilities of Test Option 2 with SAP Solution Manager 7.0 and 7.1

**Test Option 2**

- **Solution Manager Business Blueprint**
  - Setup of business process hierarchy
  - Business requirements

- **Solution Manager Business Process Change Analyzer**
  - Identification of business processes affected by code / customizing changes

- **Quality Center**
  - Test requirements
  - Test planning

- **SAP TAO**
  - Accelerated test case generation & maintenance

- **SAP TDMS**
  - Setup of lean test systems

- **LoadRunner**
  - Performance Tests

- **Quality Center**
  - Test Lab
  - Defect management

**New SAP Solution**
- Business Blueprint

**SAP Solution Update**
- Change Impact Analysis

**Test Planning**
- Test System Setup

**Test Execution**
- Change Deployment
SAP Solution Manager Adapter for SAP Quality Center by HP
SAP Solution Manager
SAP Solution Manager Adapter for SAP Quality Center by HP

Goal
Exchange of business processes, business requirements, test assets, incidents and test results between SAP Solution Manager and Quality Center

**Outbound**
- Business Blueprint
- Bus. Requirements
- Test Objects
- Documents
- Incidents / Defects

**Inbound**
- Test Results
- Incidents / Defects

* additional license required
SAP Quality Center by HP
SAP Quality Center by HP
Design Time: Activities to create Test Requirements and manual Test Scripts

1. Select Business Blueprint
   - Order to Cash (O2C)
     - Quotation
     - Sales Order
     - Outbound Delivery
     - Goods issue
     - Billing

2. Transfer
   SAP Solution Manager
   SAP SolMan Adapter for QC

3. Create Test Requirements
   SAP Quality Center by HP

4. Create Test Scripts
   SAP Quality Center by HP
   Assign to

5. Define Test Set
   SAP Quality Center by HP
   Consists of

5. Assign to Tester
SAP Quality Center by HP
Run Time: Test execution of manual tests

1. Email notification
   Test Coordinator → Tester

2. Open Test Set
   Test System

3. Read Test Script
   Test System

4. Execute test
   Test System

5. Enter test results

6. Create Defect
   SAP SolMan – Service Desk

7. Auto-create Incident
   Configurator / Developer

8. Solve Incident
Test Management
SAP Quality Center by HP – Test Plan Module

Goal
Test Planning and definition of manual Test Cases

Scope
- Enables central planning, development and management of manual and automated test cases
- Bidirectional traceability allows tracking requirement and defect coverage

Benefits
- Centralized management of manual and automated test assets
- Ensure all business critical requirements are planned for testing

* additional license required
Test Management
SAP Quality Center by HP – Quick Test Professional

**Goal**
Test Automation for SAP and non-SAP Applications

**Scope**
- Definition of automated test cases
- Support for SAP Applications covering SAPGUI and html-based user-interfaces
- Support of non-SAP applications, thus allowing to create automated test cases for heterogeneous business processes
- Record and playback, scripting and key-word approach to create test cases

**Benefits**
- Very mature functionality for test automation of SAP and non-SAP applications
Goal
Test Execution of manual and automated tests

Scope
- Definition and scheduling of test cycles and test sets
- Guidance for manual testers to execute manual test steps
- Scheduling of automated tests
- Integration with defect module

Benefits
- High usability for non-technical users
- Guidance for end users on how to perform manual test
- Comprehensive functionality to document test results and defects
Test Management
SAP Quality Center by HP – Defect Management Module

Goal
Defect creation after manual or automated test execution

Scope
- Track defects from requirements through all stages of test management and execution
- Alert key stakeholders through automated emails

Benefits
- Mitigate risks by finding and resolving defects earlier in the application lifecycle
- Prioritize defects based on impact to the business
Test Management
SAP Quality Center by HP – Dashboards and Reporting

Goal
Reporting of test status and progress suitable for different types of users

Scope
- Custom and role-based reports
- Coverage graphs with drilldown

Benefits
- Comprehensive and holistic overview about test progress
- Out of the box reports
- Various reporting types usable for a wide range of users from manual testers to senior management

* additional license required
New Approach for manual Testing: HP Sprinter

- Floating windows with test step guidance for Tester
- Smart Defects
- Recording of User Actions (list) and Story Board (screenshots)
- Full integration with Quality Center for Test Script selection and results
- Data injection – partially working for SAPGUI
## Manual Testing

Disadvantages of manual testing compared to automated testing

<table>
<thead>
<tr>
<th>Test coverage within tight timelines</th>
<th>Lack of time to execute regression tests may potentially compromise Performance &amp; Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overcompensating scope of testing may result in more testing than may be really required and project delays</td>
</tr>
<tr>
<td>Defects in Production Systems</td>
<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></td>
<td>Testing accuracy due to not being able to test all variants</td>
</tr>
<tr>
<td>Costs</td>
<td>High costs for manual testers involved in recurring regression tests</td>
</tr>
<tr>
<td></td>
<td>High costs to fix errors in production landscape</td>
</tr>
<tr>
<td></td>
<td>Finding errors late in the development process could delay delivery</td>
</tr>
<tr>
<td>Complexity</td>
<td>Complexity increasing with added business processes and modules implemented</td>
</tr>
<tr>
<td></td>
<td>Manual testing cannot keep pace with expansion of applications</td>
</tr>
</tbody>
</table>

SAP TAO along with SAP Quality Center by HP helps customers to create automated test cases – fast ROI within 2-3 test cycles
SAP TAO
Test Automation of Business Processes using SAP TAO

Business Processes

SAP TAO Process Flow Analyzer

Business Analyst executes the transaction from SAP TAO

SAP Quality Center by HP

Test Components for each SAPGUI subscreen with parameters for all fields

Test Case* composed out of Test Components with parameters for all input fields

File with Test Data for each input parameter

(*) Note: Further test case refinement might be needed, e.g. Test engineer may add more validation steps and consolidate the test case for performance improvement.
SAP TAO
Test Automation of E2E Business Processes

SAP TAO test scripts

- Test script variants can be built easily via additional Test Components, Flows and Test Data
- Scenario tests can be built easily through composition of the appropriate single test
SAP Test System

During test execution test data is entered into input fields of the SAP business process.

Test data file

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DT_Transaction</td>
<td>DT_SALES_DOC_TYPE DT_SALES_ORG</td>
</tr>
<tr>
<td>2</td>
<td>VA01</td>
<td>OR</td>
</tr>
<tr>
<td>3</td>
<td>VA01</td>
<td>OR</td>
</tr>
<tr>
<td>4</td>
<td>VA01</td>
<td>OR</td>
</tr>
</tbody>
</table>

Test results

<table>
<thead>
<tr>
<th>Iteration</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td># 1</td>
<td>Passed</td>
</tr>
<tr>
<td># 2</td>
<td>Passed</td>
</tr>
<tr>
<td># 3</td>
<td>Failed</td>
</tr>
</tbody>
</table>
Typical software changes affecting automated tests

1. Customizing changes for process step (optional field → mandatory, ...)

2. Custom Code changes for process step (add mandatory fields, screens, ...)

Customer benefit: SAP TAO provides accelerated repair functionality through rapid and semi-automated exchange of central test components
Accelerated Repair of SAP TAO test scripts

After software change in SAP Solution

1. Identify affected SAP TAO tests scripts
   → info from change team, failed execution, BPCA analysis

2. Repair SAP TAO test scripts
   → provide parameter value for new screen field or
   → insert missing test components

3. Consolidate SAP TAO test script and scenario test

4. Provide input data in test data file

After repair of SAP TAO test scripts

Business Process changed via SAP Customizing

1. Identify affected SAP TAO tests scripts
   → info from change team, failed execution, BPCA analysis

2. Repair SAP TAO test scripts
   → insert missing test components or
   → inspection and exchange of outdated test components

3. Consolidate SAP TAO test script and scenario test

4. Provide input data in test data file
SaraLee Reduces Risk After an Upgrade via SAP® Test Acceleration and Optimization

**QUICK FACTS**

**Sara Lee Corporation**
- Location: Downers Grove, Illinois
- Industry: Consumer products
- Products: Coffee, meat, bakery goods
- Revenue: US$10.7 billion
- Employees: 33,000
- Web Site: www.saralee.com
- SAP Solutions: SAP Test Acceleration and Optimization, SAP Solution Manager application management solution, SAP Quality Center application by HP.
- Implementation Partners: FocusFrame Inc. and Accenture

“With SAP Test Acceleration and Optimization, we’ve reduced the number of issues found by our users after going live with an upgrade or software changes, which has boosted continuity and reduced risk.”

**Joost Knoop**
Solution Architect
Sara Lee corporation

**Challenges and Opportunities**
- Optimize core operations by upgrading to the latest version of the SAP® ERP Application
- Ensure business continuity and meet quality objectives
- Perform sufficient functional and regression testing in tight time frame

**Objectives**
- Reduce testing time and effort with automated testing solutions
- Find, fix, and centrally manager defects before software changes are used by the business

**Implementation Highlights**
- Upgrade completed in 8 months across international IT landscape
- Partner built and maintained test scripts

**Why SAP**
- Trusted solution provider
- Comprehensive test automation solution optimized for existing SAP Software landscape

**Benefits**
- 80% reduction in the cost of comprehensive regression testing
- 90% decrease in the number of defects found by operations (after changes went into production)
- 70% reduction in test execution time
- Elimination of all critical defects before going into production
- More time and resources available to perform testing of 80% to 90% of critical functionality (up from 10%) and 80% of noncritical functionality

"With SAP Test Acceleration and Optimization, we’ve reduced the number of issues found by our users after going live with an upgrade or software changes, which has boosted continuity and reduced risk.”

Joost Knoop
Solution Architect
Sara Lee corporation
CA uses SAP Test Acceleration and Optimization to Automate End-to-End Testing

Challenges and Opportunities
- Need for regression testing around major releases or during the application of support packs
- Inadequate manual testing; processes not tested within project timeframes
- Prior automation approach of using record-and-play not scalable to changes

Objectives
- Decrease costs of using contracted employees to do testing
- Decrease internal testing costs for the business users
- Reduce time of E2E test cycles
- Improve end user and customer satisfaction
- Increase accuracy and efficiency by reducing human factor and increasing automation
- Increase test coverage

Implementation Highlights
- Automated 40 test cases during pilot
- Discovered that out of 1,231 test cases included in E2E, only 211 were unique
- After completion, 62 E2E test sets will be included in test bed against SAP ERP, SRM, and Portal for future releases

Why SAP
- SAP TAO works with complete testing toolset (QC, BPT, QTP) that we already use
- Cost-effective solution
- Offers best of breed software

Benefits
- Decreased external contractor costs
- Easier to maintain in a rapidly changing environment
- Relieved business users from out-of-scope testing duties
- Testing is more consistent, accurate and efficient
- Broadened testing scope and shortened testing cycles
- Allows for more frequent deployments

QUICK FACTS
CA
- Location: Islandia, NY
- Industry: Application Software
- Products and Services: IT Management Software
- Revenue: 4.34B
- Employees: 13,700
- Web Site: www.ca.com
- SAP Solutions and Services: SAP Quality Center by HP, SAP Test Acceleration and Optimization
- Implementation Partners: SAP Consulting, FocusFrame, Inc.

“In our organization, change is the only constant. I can’t imagine how it would be feasible to maintain a complete E2E test bed without a robust tool like TAO and BPT to allow for quick mass modifications.”

Liza Galano
Project Manager
CA

“In our organization, change is the only constant. I can’t imagine how it would be feasible to maintain a complete E2E test bed without a robust tool like TAO and BPT to allow for quick mass modifications.”

Liza Galano
Project Manager
CA
ConAgra Foods leverages SAP® Solution Manager, SAP Quality Center and Test Acceleration and Optimization

QUICK FACTS

ConAgra Foods
- Location: Omaha, Nebraska
- Industry: Consumer Foods Group
- Products and Services: Healthy Choice, Chef Boyardee, Egg Beaters, Hebrew National, Hunt’s & Banquet and others.
- Revenue: US$11.6 billion
- Employees: 25,000
- Web Site: www.conagrafoods.com
- SAP Solutions and Services: SAP® ECC 6.0, SAP SCM, SAP SRM, SAP SEM, SAP NetWeaver® BI, SAP Solution Manager, SAP TAO, SAP Quality Center
- Partner: SAP Consulting, FocusFrame

“By implementing SAP Solution Manager, HP Quality Center and the SAP Test Acceleration and Optimization application (TAO), we have increased our ability to complete Testing on-time and with much higher quality”

Kevin Needham
Director Information Technology
ConAgra Foods

Challenges and Opportunities
- Testing was manual and labor intensive
- Conversion of critical business process manual test cases into automated scripts leveraging SAP Test Acceleration and Optimization
- Implement automation as efficiently as possible with a pre-selected group of teams to include P2P, OTC/OIR, RM, FI and ALM.

Objectives
- Increase the quality of testing through automation of pre-existing test cases
- Decrease the amount of time and resources required for testing while increasing quality

Implementation Highlights
- Implemented automation for parts of 3 super macro processes included in ConAgra’s end-to-end integration test phase
- Increased the amount and quality of testing that could be completed within approved test cycle timeframes for unit, scenario and integration test phases

Why SAP
- The SAP Test Acceleration and Optimization application allowed us to implement a test strategy that didn’t require an overly technical team to automate critical business processes
- The SAP TAO allowed us to automated tests quickly and efficiently with less maintenance than standard record and playback automation

Benefits
- Automated majority of End to End test cases
- Decreased test execution time for teams that have automated test scripts
- Automation has helped process teams to meet very aggressive schedules and produce quality releases using fewer resources
- Enhanced ability to implement quarterly releases and multiple plant rollouts with confidence, high quality and on-time
Manual vs. Automated Testing by SAP TAO
Customer specific ROI calculation

Questions to calculate customer-specific ROI for manual vs. SAP TAO based tests

- # of business processes for regression tests?
- # of regression test cycles per year?
- # of manual testers – internal and external?
- ... Expected percentage of test automation?
- Day rates for internal and external manual tester?
- Costs for disruption and problem fix in PRD Landscape

ROI calculation

Please contact SAP Professional Services for a customized ROI calculation!
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

Accelerated Approach
- Fast, convenient and semi-automatic way to generate automated test cases
- Simple, easy and streamlined approach for maintenance of test cases

Costs
- Save cost by engaging less manual testers
- Fast ROI with in 2-3 test cycles

Tangible Benefits
- Up to 40% reduction in testing effort.
- Up to 30% savings in maintenance of test cases
Further Information

Links and Contacts
Test Management – Information Sources

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

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

Classroom Training E2E220

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

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

SAP Enterprise Support

Testing SAP Solutions

Professional Services
www.sap.com/services/testing
Additional Information
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
Best Practices: Regression testing of SAP-centric Business Processes

9 Recommendations

1. Lean documentation of important business processes
2. Setup of lean test systems
3. Test automation for critical business processes
4. Comprehensive test data for automated regression tests
5. Provisioning of easy to use manual tests
7. Unattended (‘lights out’) execution of automated regression tests
8. Manual test execution with guidance for business users
9. Management of the change process
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 and SAP Contacts

### Information

- SAP TAO: [http://service.sap.com/saptao](http://service.sap.com/saptao)
- Application Lifecycle Management: [http://service.sap.com/alm](http://service.sap.com/alm)

### Regional SAP Contacts

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<th>Region</th>
<th>Product Sales</th>
<th>Professional Services</th>
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Thank you