End-to-End Integration Testing of SAP Solutions

Business Process Change Analyzer

ALM Solution Management
Active Global Support (AGS)
SAP AG
1. Customer Pain Points and SAP Approach
2. Business Process Change Analyzer - Overview
SAP has compiled best practices for E2E Solution Operations based on the experience from customer engagements over three decades.

Pain points are addressed by best practices: SAP Standards* for E2E Solution Operations.

Changing SAP Solutions

Customer pain points

1. Tests in heterogeneous system landscapes
   - E2E Integration Tests of business processes in system environments interfacing SAP with non-SAP solutions

2. Change Impact Analysis
   - Identification of critical business processes affected by change events such as SAP Support Packages
   - No test recommendations for SAP Enhancement Packages

3. Test Data Management
   - Test Systems with outdated test data
   - Productive System copy is too expensive and rework intensive
   - Creation of appropriate test data for automated test cases

4. Test Automation
   - Creation of automated test cases is time consuming and expensive to maintain via skilled QA specialists
   - Automated test cases get damaged by change events and need time consuming repair by QA Specialist
E2E Integration Testing of SAP Solutions
Test 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
- 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
- Test Execution
  - Manual tests
  - Automated tests
  - Integration Validation
  - Incident Management
  - Performance tests
  - Test status and progress reporting
  - Test sign-off

Deploy Changes to Production
- Deployment of changes through transports from Test to Production system
  - SAP Support packages, Legal Change Packages, Enhancement Packages

Note: Test Project Preparation as first step including: test strategy review, definition of test objectives, test tools, test budget, timeline, roles & responsibilities
E2E Integration Testing of SAP Solutions
Options for SAP Customers

Option 1

Test Scope Identification
- SAP Solution Manager Business Blueprint
- SAP Solution Manager Business Process Change Analyzer*

Test Planning
- SAP Solution Manager Test Workbench
- SAP TDMS

Manual Tests
- SAP Solution Manager Test Workbench

Automated Tests
- SAP Solution Manager eCATT
- HP QTP
- CPWR:TestPartner
- eCATT: Application Logic Tests

Option 2

Test Scope Identification
- SAP Solution Manager Business Blueprint
- SAP Solution Manager Business Process Change Analyzer*

Test Planning
- HP Quality Center
- SAP TDMS

Manual Tests
- HP Quality Center

Automated Tests
- SAP TAO
- HP QTP

* Availability with SAP Solution Manager 7.0 EhP1
1. Customer Pain Points and SAP Approach

2. Business Process Change Analyzer - Overview

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 change?

Approach

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

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

- Regression Tests
  - Manual Tests
  - Automated Tests
SAP Solution Manager
Business Process Change Analyzer

Preparation

Order to Cash
- Sales Order
- Delivery
- Goods Issue
- Billing

Execution of mission-critical business processes by Business User

Trace Result:
Technical Bill of Material (T-BOM)
- Code: Function modules, …
- UI: Dynpro 1000, …
- Tables: Customizing, Master Data

Change Impact Analysis

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

Planned Change
- SAP Support Packs
- SAP EhPs
- Custom Code
- Customizing changes

Business Process Change Analyzer

Order to Cash
- Sales Order → code change
- Delivery
- Goods Issue → UI change
- Billing
- Procure to Pay
- Create PO → customizing change

Risk-based Test Scope

“Can I get a recommendation for regression tests?”

Business Process Change Analyzer

- Identification of business processes impacted by software changes
- Support decision making whether planned change shall be executed
- Automatic test plan generation for SAP Test Workbench
Business Blueprint

- SAP Solution Manager BPCA creates trace (T-BOM) of all used SAP objects

Alternatives to provide Business Blueprint

1) Business Blueprint already available within SAP Solution Manager „project“ or „solution“

2) Activation of SAP Business Content: Business Process Repository (BPR)

3) Manual setup for mission-critical processes

4) Semi-automatic setup via SAP Solution Manager – Solution Documentation Assistant

Technical Bill of Material (T-BOM)

Business User activity:

1) Execution of mission-critical business processes
   - Background: SAP Solution Manager BPCA creates trace (T-BOM) of all used SAP objects

2) T-BOM auto assignment to Business Process
   - Code: Module pools, function modules, …
   - User interfaces: Dynpro,…
   - Tables: Customizing, Master Data, …
SAP Solution Manager
Business Process Change Analyzer - Analysis

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

Planned software changes
- SAP Support Packages
- SAP Enhancement Packages
- SAP Legal Change Packages
- Custom Code
- Customizing changes

Business Processes with T-BOM

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

Business Process Change Analyzer

Order to Cash
- Sales Order → code change
- Delivery
- Goods Issue → UI change
- Billing
- Procure to Pay
  - Create PO → customizing change

Customer Benefit: Increased insight into effects of software change events
“Can I get a recommendation for regression tests?”

Risk-based Test Scope Recommendation

BPCA Analysis: affected Business Processes

Order to Cash
- Sales Order → code change
- Delivery
- Goods Issue → UI change
- Billing
- Procure to Pay
- Create PO → customizing change

Business Blueprint with assigned test cases

Customer Benefit: Semi-automatic Regression Test Plan generation for affected processes
**SAP Solution Manager**
**Business Process Change Analyzer**

**BPCA supporting SAP Upgrades**

**Approach**
- Technical upgrade, e.g. from SAP R/3 to SAP ERP
- Additional transports from the source system to the upgraded target system
- BPCA can identify business processes affected by these additional transports and provide guidance for required regression testing

**Customer benefits**
- Precise information about affected business processes after changes subsequent to technical upgrade
- Accelerated test scope identification for regression tests
Precise insight
- Identification of critical business processes affected by planned change events

Improved handling of change events
- Support for customer’s change committee to decide on SPs, EhPs or Custom triggered changes for SAP production system

Risk-based Test Planning
- Recommendation for subsequent regression tests
Quick Facts
- Location: Wiesbaden, Germany
- Industry: Insurance
- Total assets: 4.8 bn € (2008)
- Total employees: 1,200 (2009)
- Website 1: soka-bau.de
- Website 2: soka-it.de
- SAP Solutions: SAP ERP, SAP BW, SAP EP, SAP Solution Manager
- Partner: SAP Consulting

Challenges and Opportunities
- Extention of the proven test management capabilities of SAP Solution Managers via utilization of functional enhancements of EHP1

Objectives
- Optimization of test planning through Business Process Change Analyzers (BPCA) of SAP Solution Manager
- Optimization of test execution via deployment of test sequence functionality of Test Workbench
- Increased user and process efficiency through html-based Workcenter for Test- and incident management
- Increased quality of SAP solution documentation through deployment of Solution Documentation Assistent (SoDocA)

Implementation Highlights
- New Wizard for setup of basic configuration of SAP Solution Manager within 3 hours
- Tool-based test scope identification and automated test plan generation
- Email notification for all status changes of test cases
- Central access and administration for all test relevant information.

Why SAP
- End-to-End functionality and excellent integration into existing SAP solution landscape
- Reuse of already achieved results

Benefits
- Significant time savings within test preparation
- Risk-based test scope identification leading to significant reduction of test effort
- Streamlined communication during test execution
- Role-based approach for all test activities supported by new WorkCenter

„Test efforts resulting from software changes affecting our SAP solution operations can be significantly reduced by using a risk-based test scope identification provided by the Business Process Change Analyzer of SAP Solution Manager.“

Roland Krüger
Manager SAP Customer CoE
SOKA-IT

SOKA-BAU and SOKA-IT
SAP Solution Manager including BPCA and Test Workbench
Agenda

1. Customer Pain Points and SAP Approach
2. Business Process Change Analyzer - Overview
Test Management – Access to test capabilities via new Work Center „Test Management“
SAP Solution Manager
Business Process Change Analyzer – Preparation

Work Center Test Management – Access to Solution Manager Project
Work Center Test Management – Launch Report to check status of Business Processes

- Project

- Apply filter to restrict view to top priority processes
  - Note: Process priority is based on customer attribute
Status Report: Check BPCA preparation status - T-BOM available for all Prio 1 Bus. Processes?

<table>
<thead>
<tr>
<th>Project Structure</th>
<th>Object</th>
<th>Name</th>
<th>Type</th>
<th>In Scope</th>
<th>Standard</th>
<th>Test Cases</th>
<th>T-BOM Status</th>
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<tbody>
<tr>
<td>Business Processes in Logistics</td>
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<td></td>
<td>Delivery</td>
<td>VL01N Create Outbound</td>
<td>Transaction</td>
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<td>Goods Issue</td>
<td>VL01N Create Outbound</td>
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<td>Billing</td>
<td>VL02N Change Outbound</td>
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</tr>
</tbody>
</table>

TBOM available

TBOM missing
Set priority for mission-critical Business Processes (optional via customer defined attribute)
SAP Solution Manager
Business Process Change Analyzer – Preparation

Set priority for mission-critical Business Processes (optional via customer defined attribute)
Select Business Process for T-BOM creation (Tab: Transaction and select transaction)
Create T-BOM within Business Blueprint

**Attributes Maintenance**

- **Object ID**: VA01
- **Object Name**: Create Sales Order
- **Object Type**: Transaction
- **Logical Component**: Z_CTE_001

**Technical Bill of Materials (TBOM)**

- **Description**: MW_02C-Sales Order-Z_CTE_001-BMTA-VA01
- **Created at**: 15.10.2008 16:53:53
- **TSTWC_INT_99**
- **Updated at**: 0:00:00
- **Locked at**: 22.10.2008 16:10:49
- **TSTWC_INT_99**
- **Overall Status**: Created

**TBOM Reference**

- **Managed System/Client**: CTE (001)

**TBOM Creation Mode**

- **Dynamic**
- **Static**
From Solution Manager: Start execution of Business Process in assigned SAP system

Solution Manager automatically launches the transaction in the assigned SAP System

Example: Create Sales Order
SAP Solution Manager

Business Process Change Analyzer – Preparation

Business Blueprint within SAP Solution Manager

Solution Manager automatically launches the transaction in the assigned SAP System
T-BOM example for transaction **Create Sales Order (VA01)**

<table>
<thead>
<tr>
<th>PgID</th>
<th>Obj</th>
<th>Obj Name</th>
<th>Cl Type</th>
<th>Cl.Value</th>
<th>Soft.Component</th>
<th>Comment</th>
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<tr>
<td>R3TR</td>
<td>PROG</td>
<td>SAPMV45A</td>
<td>SAP_APPL</td>
<td>Modulpool of T-Code VA01(*)</td>
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<tr>
<td>LIMU</td>
<td>DYNP</td>
<td>SAPMV45A</td>
<td>SAP_APPL</td>
<td>UIs / Dynpros for Modulpool</td>
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<td></td>
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<tr>
<td>R3TR</td>
<td>TABU</td>
<td>TVAK</td>
<td>TABC</td>
<td>G (Cust)</td>
<td>Customizing: Document Type</td>
<td></td>
</tr>
<tr>
<td>R3TR</td>
<td>TABU</td>
<td>T685</td>
<td>TABC</td>
<td>C (Cust)</td>
<td>Customizing: Conditions: Access Sequence</td>
<td></td>
</tr>
</tbody>
</table>

(*) **Modulpool for Transaction VA01**: SAPMV45A
Filters can be assigned to limit the BPCA analysis results

- Include filter criteria for SAP objects that shall **not appear** within BPCA analysis results.
- Example: SAP Objects of Software Component SAP Basis.
- Filter can be defined by user (optional).
- Filter are based on T-BOM GUID.

### Maintain Filters - Display

<table>
<thead>
<tr>
<th>TBOM GUID</th>
<th>User Name</th>
<th>Program ID</th>
<th>Object Type</th>
<th>Object Name</th>
<th>Cl.Type</th>
<th>Cl.Value</th>
<th>Soft.Comp.</th>
<th>Package</th>
<th>TBOM Description</th>
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<td>TSTWC_INT_9C</td>
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<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>SAP_BASIS</td>
<td>*</td>
<td>MW_O2C-Sales Or</td>
</tr>
</tbody>
</table>

Criticality can be assigned to categorize criticality of BPCA analysis results.

- Analysis results can be flagged by criticality (low to very critical).
- Setup of criticality during T-BOM creation / update.

### Maintain Criticalities - Display

<table>
<thead>
<tr>
<th>Row</th>
<th>TBOM GUID</th>
<th>User Name</th>
<th>Program ID</th>
<th>Object Type</th>
<th>Object Name</th>
<th>Cl.Type</th>
<th>Cl.Value</th>
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<td>Normal</td>
<td>MW_O2C-Sales Or</td>
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</tbody>
</table>
Preparation

Order to Cash
Sales Order → Delivery → Goods Issue → Billing

Execution of mission-critical business processes by Business User

Trace Result:
Technical Bill of Material (T-BOM)
- Code: Function modules, …
- UI: Dynpro 1000, …
- Tables: Customizing, Master Data

Change Impact Analysis

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

Planned Change
- SAP Support Packs
- SAP EhPs
- Custom Code
- Customizing changes

Business Process Change Analyzer

Order to Cash
Sales Order → code change
Delivery
Goods Issue → UI change
Billing
Procure to Pay
Create PO → customizing change

Risk-based Test Scope

“Can I get a recommendation for regression tests?”

Business Process Change Analyzer

- Identification of business processes impacted by software changes
- Decision whether planned change shall be executed
- Automatic test plan generation for SAP Test Workbench
Customizing Change

- IMG (T-Code SPRO) – Sales & Distribution – Sales Document Type
- Example: Transport Request: **CTEK000558** (Task: CTEK000559)

Customizing change: transaction „Create Sales Order“ requires to enter PO number
ABAP Workbench Change

- ABAP Workbench for Program SAPMV45A (Dynpro 0101)
- Example: Transport Request: **CTEK000560** (Task: CTEK000561)
Support Packages for SAP Basis

- Analysis of SAP Basis Support Packages Nr 32 – 36 for R/3 4.6c
- Example: Transport Requests: **SAPKB46C32 - SAPKB46C36**

<table>
<thead>
<tr>
<th>Request/Task</th>
<th>Short Description</th>
<th>Type</th>
<th>Status of request/task</th>
<th>Owner</th>
<th>Date</th>
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<tr>
<td>SAPKB46C32</td>
<td>Basis Support Package 32 for 4.6C</td>
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</table>
Analysis of Customizing Change

- Transport Request: CTEK000558 (example)
- Content of Transport Request: Customizing change regarding Sales Document Type
- BPCA result number 261 (example)
Analysis of Customizing Change

- Transport Request: CTEK000558 (example)
- Content of Transport Request: Customizing change regarding Sales Document Type
- BPCA result number 261 (example)

Project affected by customizing changes

Identified Business Processes
- Sales Order
- Outbound Delivery
Analysis of Customizing Change

- Transport Request: CTEK000558 (example)
- Content of Transport Request: Customizing change regarding Sales Document Type
- BPCA result number 261 (example)

<table>
<thead>
<tr>
<th>Request/Task</th>
<th>PgiD</th>
<th>Obj.</th>
<th>Object Name</th>
<th>Criticality per TBOM Item</th>
<th>Classification Type</th>
<th>Software Component</th>
<th>Referenced Object</th>
<th>Project</th>
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<tbody>
<tr>
<td>CTEK000559</td>
<td>R3TR</td>
<td>TABU</td>
<td>T685</td>
<td>Critical</td>
<td>TabClass (A,W,C,E,S,L)</td>
<td>SAP_APPL</td>
<td>VA01</td>
<td>MMV_O2C</td>
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<tr>
<td>CTEK000559</td>
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<td>VA01</td>
<td>MMV_O2C</td>
</tr>
</tbody>
</table>

Result interpretation

- Customer plans to transport a customizing change from Dev system → Test system → PRD system
- BPCA identified a priority 1 business process „Create Sales Order“ as impacted by this change event

Details:
The transport request includes customizing changes to tables T685 (Access sequence for conditions) and TVAK which controls the document type of T-Code VA01
Analysis of Program Change

- Transport Request CTEK000560 (example)
- Content of Transport Request: Code and UI change of Program SAPMV45A
- BPCA result number 262 (example)
Analysis of Program Change

- Transport Request CTEK000560 (example)
- Content of Transport Request: Code and UI change of Program SAPMV45A
- BPCA result number 262 (example)
Analysis of Program Change

- Transport Request CTEK000560 (example)
- Content of Transport Request: Code and UI change of Program SAPMV45A
- BPCA result number 262 (example)

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<td>DYNP</td>
<td>SAPMV45A0101</td>
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<td>Business Function</td>
<td>SAP_APPL</td>
<td>VA01</td>
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</table>

Result interpretation

- Customer plans to transport a program change from Dev system → Test system → PRD system
- BPCA identified a priority 1 business process „Create Sales Order“ as impacted by this change event

Details:
The transport request includes program and UI changes of program SAPMV45A which is the Modulpool for transaction VA01
Analysis of SAP Basis Support Packages

- Transport Requests SAPKB46C32 - 36 (example)
- Content of Transport Requests: SAP Basis Support Packages
- BPCA result number 263 (example)
Analysis of SAP Basis Support Packages

- Transport Requests SAPKB46C32 - 36 (example)
- Content of Transport Requests: SAP Basis Support Packages
- BPCA result number 263 (example)

<table>
<thead>
<tr>
<th>Request/Task</th>
<th>PgID</th>
<th>Obj.</th>
<th>Object Name</th>
<th>Criticality per TBOM Item</th>
<th>Classification Type</th>
<th>Software Component</th>
<th>Referenced Object</th>
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<td>FUNC</td>
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<td>VA01</td>
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</table>

**Result interpretation**

- Customer plans to activate SAP Basis Support Packages in Dev system → Test system → PRD system
- BPCA identified a priority 1 business process „Create Sales Order“ as impacted by this change event
- BPCA results are classified as „normal“ and not „critical“ based on User defined Criticality for Software Component „SAP Basis“ → no retest recommendation for this change event
Risk-based test recommendation based on test cases assigned to Business Processes

Direct link from BPCA change impact analysis ...

... to semi-automatic generation of test plan for SAP Solution Manager Test Workbench
Appendix

Information available for SAP Customers and Partners
E2E Integration Testing of SAP Solutions

Customer Benefits

**End to End Integration Testing**
- Methodology and capabilities to test business processes from start to finish
- Rich functionality from functional and regression testing to root-cause analysis

**Customers have choices**
- SAP provides rich capabilities for ALM including test management
- Highly integrated partner test suite from HP

**Risk-based test planning**
- Analysis capability to check impact of planned changes on critical business processes

**Integrated Solution**
- SAP Solution Manager acts as central hub to access included and integrated test capabilities
Global Testing Solutions

<table>
<thead>
<tr>
<th>Target Testing Services Portfolio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Advisory &amp; Strategy</strong></td>
</tr>
<tr>
<td>QA &amp; Test Advisory, Audit, Methodology, Approach &amp; Strategy Services</td>
</tr>
<tr>
<td><strong>Test Project Management</strong></td>
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<tr>
<td>Day-to-day Delivery Management</td>
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<tr>
<td><strong>Test Analysis &amp; POC</strong></td>
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<tr>
<td>Test Analysis &amp; Execution</td>
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<tr>
<td><strong>Performance Testing</strong></td>
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<tr>
<td>Delivery Frameworks, Script Analysis, Build Out &amp; Execution</td>
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<td><strong>Functional Automation</strong></td>
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<tr>
<td>Automation Frameworks, Script Analysis, Build Out &amp; Execution</td>
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<tr>
<td><strong>Environment Management</strong></td>
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<tr>
<td>Change Configuration &amp; Release Management, Data &amp; Environment Solutions, Visualization etc.</td>
</tr>
<tr>
<td><strong>Training &amp; Enablement</strong></td>
</tr>
<tr>
<td>SAP Test Solution Training &amp; Partner Enablement</td>
</tr>
</tbody>
</table>

Info: [www.sap.com/services/testing](http://www.sap.com/services/testing)
SAP Standards for Solution Operations:

- Definition of support processes for mission-critical operations
- Provide Best Practices and Implementation Roadmaps
- Based on a general organizational model
- Trainings / Certifications are available
- Available for download at http://service.sap.com/supportstandards

The standards allow to set up best-in-class operations
E2E Integration Testing of SAP Solutions
Information and SAP Contacts

Information

SAP Standard for Test Management: http://service.sap.com/supportstandards
E2E Integration Testing: http://service.sap.com/testing
SAP TAO: http://service.sap.com/saptao
SAP Solution Manager: http://service.sap.com/solutionmanager
SAP Solution Manager e-learning material: http://service.sap.com/rkt-solman

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