The Economics of Automated Testing for Packaged Enterprise Applications

Warren Kaufman
Director, Governance
Warren_Kaufman@colpal.com

Shoeb Javed
CTO, Worksoft Inc.
sjaved@worksoft.com
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IBM Software
Innovate2012
The Premier Event for Software and Systems Innovation
Part 1 – The Overall Approach

Shoeb Javed
CTO, Worksoft Inc.
sjaved@worksoft.com
The Challenge

- Increasing complexity in packaged application landscapes
- High rate of change—and getting faster
- It’s common to be multiple upgrades/enhancements behind
- Migration to the cloud and mobile computing stretching resources even further
- Validating changes consumes 40 cents of every dollar spent supporting packaged applications
Why Automate Packaged Application Testing?

- Be more agile
- Spend less money “keeping the lights on”
- Just in time documentation of business processes
- Reduce risk
- Streamline compliance
Traditional Quality Assurance – The V-Model

- Designed around how software is built
- Results in 1000s of manual test cases
- Does not focus on highest risk to business
  - Does not focus on lowering TCO
Test Automation – It’s not about quantity

“I have 1000’s of manual test cases from my original implementation. Should I simply automate them all?”

- Your 1000’s of test cases are based on functional / departmental scenarios, not end-to-end business processes.
- Breakpoints and handoffs between functional areas / departments are where the most opportunity for errors occur.
- Functional / departmental testing does not give a true representation of the overall flow of business information and business rules.
- Automating 1000’s of manual tests will be extremely time consuming and will not produce a better end result.
The Business Process View

- Standard Order Processing
- Credit Memos
- Quotations
- Intercompany Transfer

Order to Cash

- Procurement
- Intercompany Purchase
- Stock Transports

Procure to Pay

- Discrete Make to Stock
- Kan Ban
- Replenishment
- Materials Resource Planning

Plan to Produce

- Cycle Counting
- Stock Transfers
- Delivery
- Asset Processing

Warehouse Management

- Forecasting
- Transportation Planning
- Picking and Packing

Supply Chain Management

- Hiring
- Termination
- Rehire
- Payroll
- Time Management

Hire to Retire

- Discrete Make to Stock
- Kan Ban
- Replenishment
- Materials Resource Planning

Plan to Produce

- Cycle Counting
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Warehouse Management

- Forecasting
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Supply Chain Management

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- Termination
- Rehire
- Payroll
- Time Management

Hire to Retire
The Business Process View
Business Process Validation (BPV)

- Designed around how software is used
- Focus on areas of greatest risk
- Rate defects by operations impact
- More efficient

“I need to make sure that critical business processes continue to work when I make changes”
## Business Process Validation

<table>
<thead>
<tr>
<th></th>
<th>QA</th>
<th>BPV</th>
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</thead>
<tbody>
<tr>
<td><strong>What assets are built?</strong></td>
<td>Test Cases</td>
<td>Business Processes</td>
</tr>
<tr>
<td></td>
<td>• Based on system design, requirements, defects</td>
<td>• Based on critical business processes, risks to the business</td>
</tr>
<tr>
<td><strong>What is the scope?</strong></td>
<td>Functional Areas</td>
<td>End-to-End Processes</td>
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<tr>
<td><strong>What is measured?</strong></td>
<td>Software Defects</td>
<td>Operational Issues</td>
</tr>
<tr>
<td></td>
<td>• System failures</td>
<td>• Process failures, performance, end user experience</td>
</tr>
<tr>
<td><strong>What is the objective?</strong></td>
<td>Find Software Bugs</td>
<td>Protect Business Processes</td>
</tr>
<tr>
<td><strong>Who is the customer?</strong></td>
<td>Development</td>
<td>Business</td>
</tr>
<tr>
<td><strong>What is the value?</strong></td>
<td>Software Quality</td>
<td>Operations Assurance</td>
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</table>
People

Executive Sponsor
- Understands the value of automation
- Wants to be more agile & realize cost savings

Automation Champion
- Responsible for delivering the ROI
- Measured on success of automation

Business Users
- Have domain expertise
- Understand how business processes are supposed to work

Testing Professionals
- Have testing expertise
- Can define and implement an overall testing strategy & plan
## Product – What to look for in an automated testing solution

<table>
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<th>Simple</th>
<th>Fast</th>
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| Allow business users to build tests  
No programming skills required | Automate 60-70% of core business processes in 90 days or less  
Run lights out regression tests daily/weekly |

<table>
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<th>Resilient</th>
<th>Complete</th>
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| Automated tests need to be resilient to changes in underlying applications  
Simple test maintenance | Support all underlying software technologies  
Domain knowledge and expertise in packaged application being tested |
Time Savings

**Manual Testing**
- Requirements & Impact Analysis
- Design & Development
- Test Execution
- Manual Test Script Development

**Automated Testing**
- Requirements & Impact Analysis
- Design & Development
- Test Execution

**Project Timeline**
Typical packaged application project

**PROJECT**

- **Design**
- **Build**
- **Test**
- **Final Prep**
- **Go Live**

**TESTING**

- **Regression Test**
  - 60 Man days
  - 2 weeks * 6 teams * 1 people/ team

- **Integration Test 1**
  - 450 Man days
  - 5 weeks * 6 teams * 3 people/ team

- **Integration Test 2**
  - 450 Man days
  - 5 weeks * 6 teams * 3 people/ team

- **UAT**
  - 450 Man days
  - 5 weeks * 6 teams * 3 people/ team

- **Authorizations Testing**
  - 12 Man Days
  - 100 Roles
Projected Test Cycles for Project Rollout

<table>
<thead>
<tr>
<th>Module</th>
<th>INT 1 (*)</th>
<th>INT 2</th>
<th>UAT</th>
<th>Reg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Man days</td>
<td>450</td>
<td>450</td>
<td>450</td>
<td>60</td>
</tr>
</tbody>
</table>

Create: 10
Run: 0
Maintain: 0

Workload Manual vs. Automated:
- Manual: 640
- Automated: 1420
Real World Examples of ROI

- **Large chip manufacturer** - 14 people supporting the testing of support packs and enhancement packs for their SAP environment reduced to 4

- **Global process manufacturer** - 280 ETE test processes executed weekly in a 6 hour window. One FTE maintains all the tests, and has time to build new ones. Estimated to be 80%+ test coverage for critical business processes

- **Aerospace company** - 50 ETE test developed by 2 SAP Functional SMEs part time and one college intern in 15 weeks.

- **A large transportation company** - 2500 regressions test run every night, the maintenance and new development team is 2 people.

- **Agricultural company** - 53,758 automated regression test, with test growth of 24% (15,159) annually. Agile development environment with 3 release per year and 6 – 8 iterations per release.

- **Large technology company** - SAP Deployment, Reduce SI Testing resources from 65 to less than 20, while building additional tests.

- **Large Process manufacturer** – 200 ETE process validation tests run monthly for project deployment, 45 Role Authorization test validate correct authorization on 650 SAP Transactions
Part 2 – Automated Testing of SAP at Colgate-Palmolive

Warren Kaufman
Director, Governance
Warren_Kaufman@colpal.com
Colgate-Palmolive Company

- A leading global consumer products company with over $16 billion in sales
- Serving people in over 200 countries and territories
- Focused on strong global brands in core businesses – oral care, personal care, household care, and pet nutrition
End to End SAP Strategy

Application Portfolio

CBP/TPM Trade Promotion Management
eSales Customer Service & Sales
CRM Focus on the Profession
PLM New Product Development
SCM Supply Chain Management
eBuy(EBP) Procure to Pay
BPC Financial Consolidation System
HCM Human Resources Systems

Integrated Business Information: SAP ECC 6.0

Access & Optimization

Governance Risk & Compliance (GRC)
Solution Manager Change Manager PPM
Identity Management (To SAP & no-SAP systems)

Master Data Management

BI Reporting & Analytics (Business Objects suite)

HANA

Enterprise Search

Mobile Solutions (Sybase)
Colgate Palmolive: Current Situation and Development Request

Current situation at Colgate-Palmolive

- Leverage SAP Test Workbench (SAP TWB) for test planning and manual testing with 1,600 users, 300-400 concurrent users at any time
- Various options including SAP TAO, HP & IBM solutions without compromising our significant investment in Solution Manager

Development Request from Colgate-Palmolive for Test Automation

- Extend SAP E2E Integration Testing - „Test Option 1“
  - by integrating SAP Test Workbench (for test planning and manual testing) with auto testing tool for business processes spanning multiple instances and types of user interfaces
  - Reduce maintenance costs for automated test cases via detection of damaged test cases after change event supporting the repair of damaged test cases
  - Leverage Business Process Change Analyzer and “Lights Out“ testing
Test options for functional testing of SAP-centric business processes

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

- **Test Option 1**
  - SAP Solution Manager 7.1
  - Test Workbench
  - Work Center TM
  - Test Automation Framework

- **Test Option 2**
  - SAP Quality Center
  - SAP TAO

- **Test Option 3**
  - Rational Quality Manager
  - Worksoft Certify
SAP Solution Manager 7.1
New Test Automation Framework integrates IBM Rational for SAP

(1) Test Case Setup
- 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
Vendor Selection

- Open to co-innovation

- Meet our requirements from a technical perspective as well as licensing perspective

- Vendor who had a vision – Gartner Quadrant

- History of success
<table>
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<th>Aerospace and Defense</th>
<th>Oil and Gas</th>
<th>Utility</th>
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Gain Management Support

- Define value statement
- Senior management buy-in
- Align our support organization on the ground
ROI Model

If I need funding what would I need to do?
ROI Model

1. Define Use Cases
2. Apply Organizational Responsibility
3. Review Actuals
5. Percentage of Testing Time to Total Project

If I need funding, what would I need to do?
ROI Model

If I need funding, what would I need to do?

- Define Use Cases
- Review Actuals
- Define KPIs
- Apply Organizational Responsibility
- Percentage of Testing Time to Total Project
- Map Actuals to Use Case & Org.
- Convert Time into NVO
- Salary
- FTE

Percentage of Testing Time to Total Project

ROI Model
ROI Model

If I need funding what would I need to do?

Define Use Cases

Apply Organizational Responsibility

Percentage of Testing Time to Total Project

Define KPIs

Review Actuals

Map Actuals to Use Case & Org.

Convert Time into NVO

Projection & What-if

Review Strategy

Salary

Savings

FTE

ROI Model
2011-12 Project Approach

Q1-2011
- Vendor shortlist
- Solution Manager Evaluation Copy

Q2-2011
- POC
- Scope for Pilot
- Plan Implementation

Q3-2011
- Solution Manager Upgrade
- Certify Install on Citrix
- Integrate Solution Manager
- Outline best practices

Q4-2011
- Certify / Solution Manager Training
- Automate Scripts
- Evaluation
- Plan 2012

2012
- Global Bundle
- Implement Critical Processes
- Apply Europe Upgrade
- Enhancements
- ROI Measurement
Proof of Concept

SAP
• Feedback on evaluation release
• Framework functional at customer site

Worksoft
• First opportunity to validate integration
• Opportunity for Certification from SAP

Colgate
• First time accessing the release
• Validate our requirements being met
• Assess the applicability
• Alignment “on the ground” of our solution
## POC Results

<table>
<thead>
<tr>
<th>Function</th>
<th>Processes</th>
<th>Transactions</th>
<th>Steps</th>
<th>Manual Test Time</th>
<th>Automated Test Time</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChaRM</td>
<td>Creation of SM</td>
<td>Znotif create</td>
<td>32</td>
<td>20 min</td>
<td>90 sec</td>
<td>92.50%</td>
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<tr>
<td>ChaRM</td>
<td>Display SM</td>
<td>Zmonitor</td>
<td>15</td>
<td>20 min</td>
<td>45 sec</td>
<td>96.25%</td>
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<tr>
<td>Demand</td>
<td>SO Create, Change, Credit Release, Delivery, Invoice</td>
<td>VA01, VA02, VKM3, VL01N, VF01</td>
<td>202</td>
<td>30 min</td>
<td>4.5 min</td>
<td>85%</td>
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<tr>
<td>FICO</td>
<td>Product Costing</td>
<td>OKKS, CK11N, CK24, CK13N, KP27, GR55, KKS5</td>
<td>116</td>
<td>25 min</td>
<td>3.5 min</td>
<td>86%</td>
</tr>
<tr>
<td>Supply</td>
<td>Purchase Order, Goods Receipt</td>
<td>ME21N, MIGO</td>
<td>72</td>
<td>30 min</td>
<td>2.5 min</td>
<td>91.60%</td>
</tr>
</tbody>
</table>
2011-12 Project Approach

Q1-2011
- Vendor shortlist
- Solution Manager Evaluation Copy

Q2-2011
- POC
- Scope for Pilot
- Plan Implementation

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- Solution Manager Upgrade
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Q4-2011
- Certify / Solution Manager Training
- Automate Scripts
- Evaluation
- Plan 2012

2012
- Global Bundle
- Implement Critical Processes
- Apply Europe Upgrade
- Enhancements
- ROI Measurement
### Dual Pilots

#### New Jersey
- 16 weeks
- 1 FTE consultant
- .25 FTE from SAP
- Built infrastructure
- Setup pilot standards
- Issue Resolution
- Use Case – Global Development release CRM & JAVA UI
- Total 8 processes automated

#### Mumbai
- 14 weeks
- 3 FTE consultants
- .5 FTE from SAP
- 24 developers were trained/mentored
- Use Case – Regression testing of critical processes covering Fin, Dmd, Supply, TPM, APO
- Total 22 processes automated
### Project Plan

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th></th>
<th>2012</th>
<th></th>
<th>2013</th>
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<tbody>
<tr>
<td></td>
<td>Nov</td>
<td>Dec</td>
<td>Jan</td>
<td>Feb</td>
<td>Mar</td>
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<tr>
<td>Global Bundle</td>
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<td>Monthly Maint</td>
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<td>Europe ERP</td>
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<td>Asia ERP</td>
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#### Key Events
- **Global Bundle**:
  - Released: 2011 Nov
- **Monthly Maint**:
  - Blueprint & Scope: 2012 Apr
  - Certify Capture: 2012 Jun
- **Europe ERP**:
  - Automated Testing – Concord I & II: 2012 Jul
  - EHR5 Testing: 2013 Jan
- **Asia ERP**:
  - Lights Out & BI: 2012 Sep
  - Rapid Repair: 2013 Dec
- **C2O Support**:
  - Script Development: 2012 Aug
  - C2O Support: 2013 Nov
Applying Automation to Europe

Europe
- Defined Business Blueprint
- Outlined Business Scenarios, Processes and Steps
- uPerforms/Certify Captures

Support Org
- Automation Development
- Defining Component Library
- Map the components into the test scripts
  - Apply to Test Plan

<table>
<thead>
<tr>
<th>Func Area</th>
<th>Business Scenario</th>
<th>Seq</th>
<th>Process</th>
<th>Transaction codes</th>
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<tbody>
<tr>
<td></td>
<td>CS&amp;L Order to Invoice</td>
<td></td>
<td>Delivery Creation</td>
<td>Create Delivery (&amp; display)-VL10A/VL01N/VL03N</td>
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<tr>
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<td></td>
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<td>Process Delivery Due List-VL10A / VL01</td>
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<td></td>
<td></td>
<td>Create Shipment-VT01N</td>
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<td></td>
<td>Create shipping cost document (if required)-VI03</td>
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<td>Deliveries to be Picked-VL06O</td>
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</table>
Beyond 2012

- Apply learnings

- Expanding globally
  - Expand to our global projects across the organization
  - Part of Agile development lifecycle

- Continue to automate critical business processes

- Expand our Global Bundle of Delivery
  - Business Warehouse
  - “Lights Out” testing
  - Accelerated Repair
  - Business Process Change Analyzer (BPCA)
Lessons Learned

- Automation Framework working on all scenarios & Uis
- Tools are easy of use and learn but requires effort
- Our initial efforts indicate a strong ROI
- Need to define a Test Data Strategy
- Need to be Evolutionary vs. Revolutionary
- Buy-in from bottom-up as well as top-down
- Start small and look for quick wins
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