


Challenges in Test Automation

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Abstract

This paper deals various challenges in test automation. In real time, test automation is bit more challenge to achieve 100% road map of customer's expectation. The customer stands on test automation should be increase regression test coverage within a small time but the actual returns of investment and implication difficulties makes customer disappointment in the industry. The reason behind the scenario is lack of awareness about the tools, process and etc. My experience says about what actually happening in the industry and how to mitigate such kind of problems. Every one knows that Test Automation swallows considerable budgets and efforts. This presentation takes you how to get good returns by adopting good practices in terms of development of scripts, maintenance and execution. All the lessons that I have experienced would be help full the world of test automation projects to avoid the issues and confusions. Here I furnished the lessons learnt experiences under the following topics.

- *Customer Expectation*
- *Automation Strategy*
- *Tool Selection*
- *Resource Selection*
- *Test Estimation*
- *Technical Issues*
- *New Technology*
- *ROI*

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Lesson 1 – Customer Expectation

- **Business Case**
 - 628 scripts to be executed within 3 hours
 - Expectation changes from GUI to non GUI based functional testing
 - Minimal time for script maintenance
 - 100% unattended script execution
- **What it happened**
 - Disappointed customer expectation
 - Temporary project suspension

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- **Issues Faced**
 - Customer does not aware
 - Principles and Behavior of testing tool
 - Technology used in Tools
 - Customer's wrong belief
 - Automation can be completed less amount of time with the Tool's intelligence
 - Tools can generate Test Data for automation
 - Scripts runs irrespective of platform, environment and hardware
 - Scripts captures all defects
 - Customer Attitude
 - Customer never minds
 - Test automation process
 - Test script maintenance effort

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Solution – Customer Expectation

- **Educate Customer about**
 - Practical Vs Theoretical variances
 - Test Automation Process and benefits
 - Testing Tools, its Pros and Cons
 - Test Automation Framework and ROI
 - Update of Technological advancement of Testing Tool and AUT
 - Metrics to be collected, controlled and monitored
- **Lessons Learnt**
 - Continuous Customer Education and Update

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Lesson 2 - Automation Strategy

•What it happened

- Ad hoc Test Automation strategy
 - One Test Case – One Script Automation approach
 - Disadvantage
 - High maintenance cost of large script suits
 - Result Analysis and reporting takes huge time for a releases
 - Lack of process in identifying tests to be automated.
 - No guidelines for test case identification
 - Inefficient process in place

•Issues Faced

- Higher effort/time for maintenance
- Lower Regression test coverage

Solution - Automation Strategy

- Defined Test Automation Process implementation
- Requirement Driven approach for test automation
 - Minimizes Scrap and Rework
 - Maximum Coverage with minimum tests
 - Customizable test execution suites based on the build
 - Highly portable test scripts
- Implementation of Test Script Design techniques like **Behavior Model**
- **Lessons Learnt**
 - Process Implementation
 - Implementation of Requirement driven approach through relevant Test Design techniques.

Lesson 3 – Tool Selection

•What it happened

- Lack of script backward compatibility

•Business Case

- Application – SAP R/3 (MM and PP)
- Total number of Test scenario automated is 1339 in Quick Test Pro (QTP) 8.0
- 90 Person Month Effort Spent for development of script.
- To execute the same scripts in 8.2, it requires around 75% of development effort for maintenance.

Last Execution in QTP 8.0 was Dec. 2005.

Test Case	Test Step	Status	Date
...	Dec. 2005
...
...

Solution

- Tool Selection Team should be formed before selecting a tool.
- Automation team should ensure
 - Analysis of backward compatibility of various versions.
 - Tool's incapability and defects.
 - Continuous evaluation of Tool upgrades.
 - Compatibility with configuration management tools.
- 24 X 7 Customer Support from Vendor
- **Lessons Learnt**
 - Tools selection is based on Tool Selection Team's recommendations and project requirements.

Lesson 4 – Resource Selection

•What it happened

- Lack of skilled resources
- Use of Sub contractors in team
- Use of fresh resources

•Business Case 1

- For web based Automation project.
 - Interviewed 100 candidates for 5 open requirement.
 - Project was delayed 2 months because of non availability of right resources.

Cont...

•Business Case 2

- While project at critical stage
 - Subcontractor quits the project
 - Not able to meet the project dead line because of resource crisis

•Business Case 3

- Fresh resources are inducted
 - Rigorous training is executed to cope up with project deadline.
 - Slow learning curve in business as well as tools.
 - More script defects leads failure to uncover application defects.
 - Customer lost confidence on Test Automation
 - Lost customer good will.

Solution

- Efficient Knowledge Transition process in place
- Back up plan for each resource.
- Manual testing team should also be involved in the automation aspects.
- Form tool excellence committee in team for R&D – a food for knowledge update
- Minimize resource attrition and retain resources by motivations, awards and etc..
- Weekly Technical Issuance meeting to be conducted

•Lesson Learnt

- Incorporation of Knowledge Transition Process
- Resource back up plan.
- Motivation of People

Lesson 5 – Test Estimation

•What it happened

- Project execution based on monthly plan and estimation.
- Estimation based on the test steps in the Manual test cases
- Complexity was derived based on the number of steps in the manual test cases
- Control Factors were calculated based on experiences, not by statistically proved data
- No estimation refinements
- Test Data creation effort was not accounted in the estimation

•Issues Faced

- Schedule Overrun
- Budget Overrun
- Lost customer good will

Solution

- Follow "Test Point Analysis" estimation technique.
- Key points to be considered for estimation
 - Size of the Application
 - Test Strategy
 - Productivity
- Derive Test Points from Functional Points.
- Figure out Dynamic Test Points and Static Test Points.
- Factors to be considered
 - Environment Factor
 - Productivity Factor
 - Quality Factor

Cont..

- Represent effort break up in terms of percentage, for example
 - Planning & Preparation - 20 %
 - Design & Coding – 40%
 - Debug – 10 %
 - Integration with Test Management Tool – 10%
 - Execution – 15%
 - Completion – 5%
- **Lessons Learnt**
 - Implementation of Test Point Analysis Methodology

Lesson 6 – Technical Issue

•What it happened

- Tools not recognized Third Party objects/controls in the application
- On the fly GUI object / object property change
 - Object handles, ordinals change in every build
- Objects names are not meaningful and unique
- Color Code validation is not successful
- Graphical outputs and Image validations are not successful
- Multi browser and multi platform validations are not successful
- Testing Tool's bug

•Issues Faced

- Critical functionality in the application were not effectively automated.
- Additional manual steps required to carry out the automation.
- Unattended execution concept is heavily impacted.

Solution – Technical Issue

- Identify non-recognizable objects in early phases of automation
- Work collaboratively with Design and Development team.
- Define Scope in, Scope Out in Test Automation Plan.
- Create utility scripts.

•Lessons Learnt

- Well defined process for Plan and Design phases.
- Create Utility scripts through R& D.

Lessons 7 - New Technology

•What it happened

- Implementation of Service Oriented Architecture (SOA) in the web based application.
- Implementation of AJAX technology in web based application
- XML Parsing and Validation

•Issues Faced

- Limitation of Testing Tools, for example
 - Quick Test Pro 8.0 is not capable enough to test AJAX technology
 - Win Runner 8.2 is not capable to test SOA testing
 - Win Runner 8.2 is not flexible enough to validate XML

Solution

- Define a process to get software and support from vendor.
- Define flexible test strategy to find an alternate solution.
- Research on plug ins for existing tool which is compatible.

•Lessons Learnt

- Plan and find workaround for testing new technology
- Efficient collaboration with tool vendors for getting Solution, Software and Support for any upcoming new technologies.

Lesson 8 - ROI

•What it happened

- Schedule and Effort over run due to higher degree of script maintenance.
- Negative impact on SLA compliance for script execution.
- Higher degree of challenges in unattended execution

•Issues Faced

- Unnoticed UI and Object property change
- Frequent functional change
- Application Performance Instability
- Redundant script debugging steps.

Solution - Increase ROI

- Implement Process for Test Automation
 - Requirement Driven approach
 - Develop Core Regression Test Bed
 - Implement Design methodology – Behavior Modeling
 - Defect Analysis and Reporting
- Lucid functional test cases and detailed inputs to develop automation script.
- Implement Automation Frame Work
 - Data Driven approach
 - Action Word approach
 - Class Library approach

Cont..

- Implement Measurement Strategy
 - Selective Metrics collection and controlling
- Plan and organized scripts execution for each build
 - Risk Based Execution
 - Maximize unattended execution
- **Lessons Learnt**
 - Implementation of Frame Work
 - Planned and organized execution