STC 2012

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Optimize your Automation approach to improve test execution efficiency

- A step towards realizing 'TRUE' ROI

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To Speak about…

Problem Statement

What impedes traditional automation

Solution Approach

Case Study

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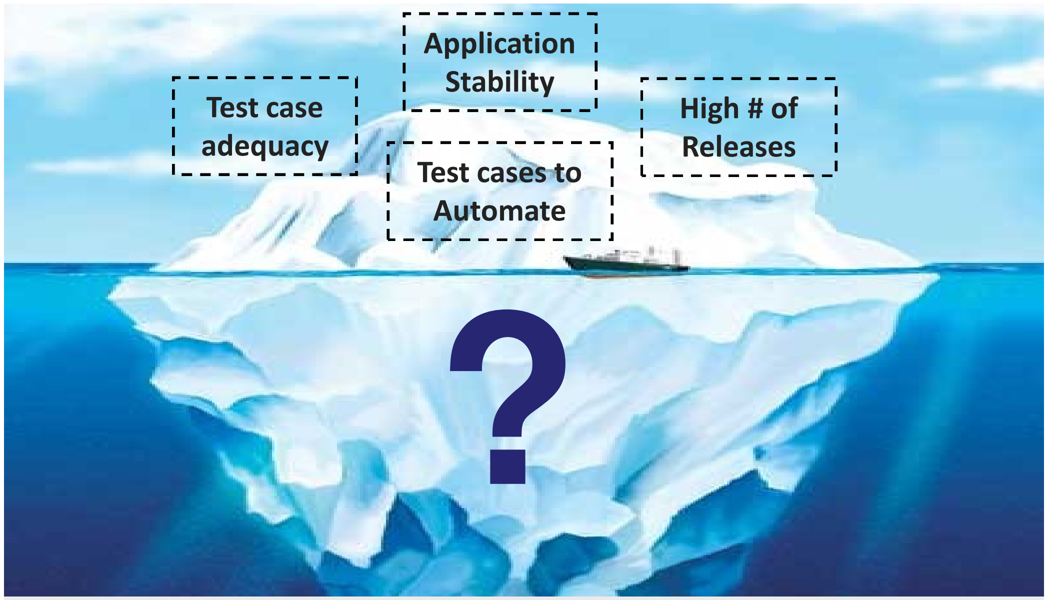
Organizations have been investing in automation but have they been able to realizing the True ROI?

TRUTH
Organizations have invested test automation to reduce costs and improve testing cycle time

MYTH
Once scripted, automated test execution is just one click away to realize ROI

Traditional criteria for Test Automation SUCCESS !!!


Application Stability
Test case adequacy
High # of Releases
Test cases to Automate
?

So what lies under the Hood

Traditional Test Automation Process – Do we have the right focus?

- ☐ Test scripts are designed for each manual test case, i.e. *One – One mapping approach where each test case is associated to one test script*
- ☐ Test scripts are designed overlooking the pre-conditioning, data requirements and business flow

Leads to

- ☐ **Increased execution time** - *Script isolation, Repetitive Test Data*
- ☐ **Increased maintenance effort** - *Redundancy of code*
- ☐ **Inability to execute in lights-off mode** - *Challenges to consolidate into a batch*

Results In

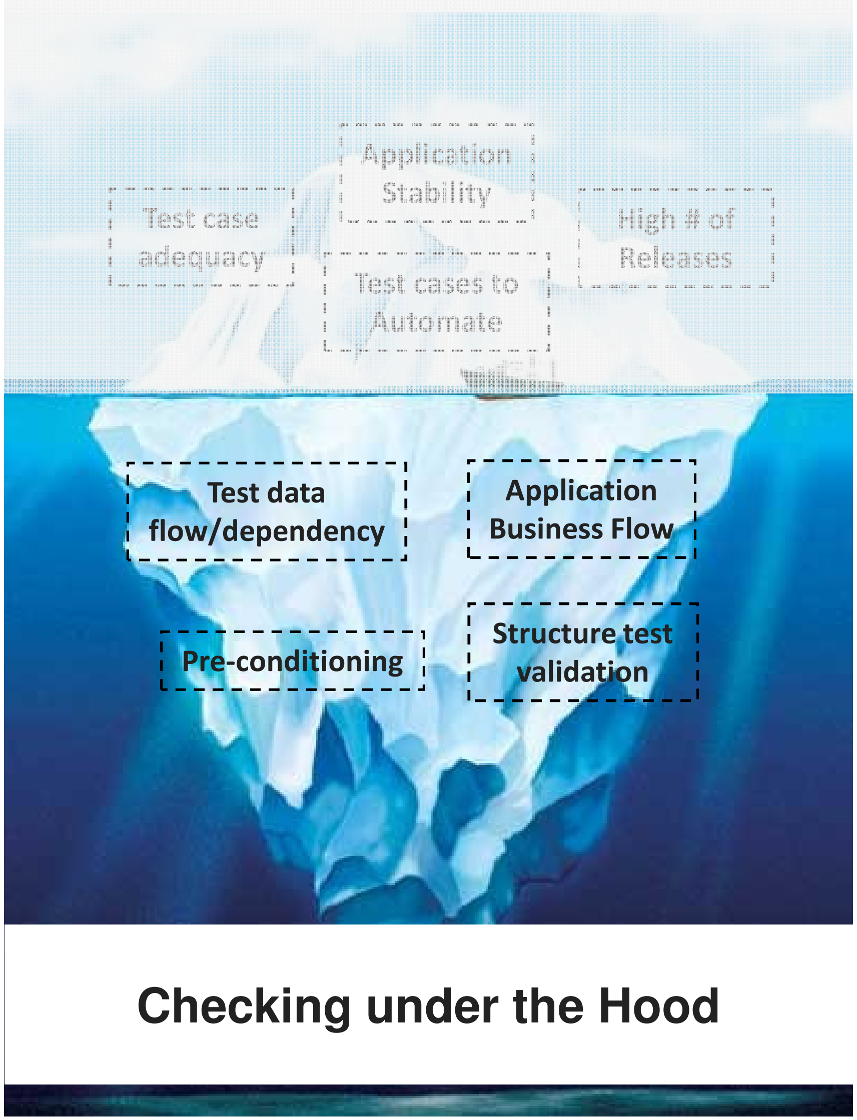
Significantly high execution efforts due to more **manual intervention required to fulfil the pre-conditions and test data requirements** Before actual automation execution

To achieve the significant ROI in projected timeline the automated execution efforts should typically be 15-20% of manual test execution efforts.

Poor test case design results in automation execution time to be very close to the manual execution time, hence no ROI

Revised Test Automation Process

– Focus on test design and execution approach/process


Application Stability
Test case adequacy
High # of Releases
Test cases to Automate
Test data flow/dependency
Application Business Flow
Pre-conditioning
Structure test validation

Checking under the Hood

Test Design

- ☐ Analyse the regression suite
- ☐ Identify end to end business flows
- ☐ Analyse the Test data flow/dependency
- ☐ Structure the test validation and Data as per business/data flow

Test Execution

- ☐ Classification of the scripts into Data dependent & independent categories
- ☐ Scripts sequencing
- ☐ Dynamic data generation

Solution Approach – Deep Dive

Optimize Test Design approach/process

Business Case

❑ Test scripts are designed for each manual test case by overlooking the re-conditioning, data requirements and business flow
❑ Each script becomes isolated which lead to redundancy of code and increases the maintenance efforts
❑ Increases the execution time as the similar set of action will be executed in each script.

Execution efforts will be significantly high as there would be comparatively more manual intervention required to fulfil the pre-conditions and test data requirements. All of the above leads to increase of effort and hence reduces the ROI.

Factors considered for optimized approach/process

❑ Create Reusable Components
❑ Consolidate the test validation as per business flow
❑ Structure the test validation as per data flow

Implementation of Solution

❑ Analysis the application business and data flow and Inter-dependency of module.
❑ Test validations were merged/ demerged to fit in a business flow and dependency.
❑ Design approach fused the test suite in such a way that the outcome of one scripts becomes the input for other script instead of an isolated unit.
❑ Test data was injected by automated scripts to eliminate the manual intervention

❑ Easy script maintenance reduces scripting effort
❑ Reduces scripting Effort and Execution time
❑ Effort saved in Test Data creation by reusing existing test data

❑ Highly coupled Business components can reduce flexibility

Solution Approach – Deep Dive

Optimize Test Execution approach/process

Business Case

- Test scripts are designed by overlooking the pre-conditioning, data requirements.
- More manual intervention required to fulfill the pre-conditions and test data requirements
- difficulties' to consolidate into a batch and execute in lights-off mode.

Execution efforts will be significantly high as there would be comparatively more manual intervention required to fulfil the pre-conditions and test data requirements. All of the above leads to increase of effort and hence reduces the ROI.

Factors considered for optimized approach/process

- Classification of the scripts
- Scripts sequencing
- Dynamic data creation

Implementation of Solution

A streamlined execution process can help to reduce the test execution cost and improve the cycle time on testing activities:

- Classification of the scripts into Data dependent & independent categories.
- Scripts sequencing - Data dependent scripts can be sequenced such that the output/data generated by the previous script will be consumed by the next script for execution, thus saving the data preparation time.
- Automated process like dynamic data fetching from a database using a SQL, to create test data will significantly save effort and increases the accuracy of test data.

- Scripts can be readily executed in lights-off mode
- Reduces test data dependency
- Significantly reduced the manual intervention during automated test execution and improved the execution efficiency

- All scripts in the sequence need to be executed.Cascading failure

Case Study - Optimization of Automation Design approach/process

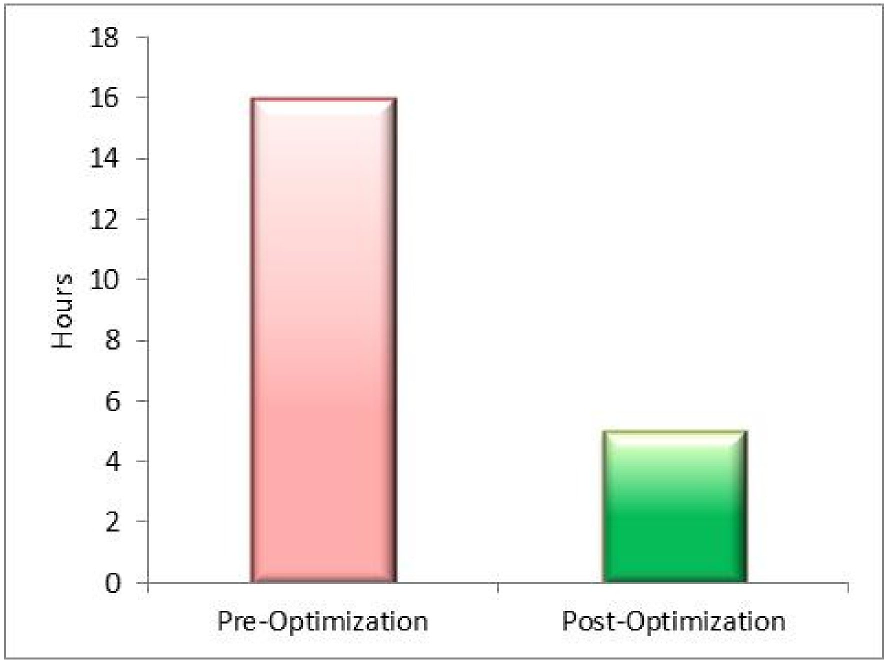
Design Approach Adopted

In order to realise the outcome the optimised approach/process, the solution was implemented on running as well as new projects.

Design approach was optimized for new projects, initiated with Feasibility Analysis. There were around **150 Test cases** picked up for an application and after thorough analysis of test cases, existing design approach was optimized by considering the application business and data flow and Inter-dependency of module.

Test validations were merged/ demerged to fit in a business flow and dependency of test data was eliminated by automating *the* test pre-conditions and by dynamic data fetching. This design approach fused the test suite in such a way that the outcome of one scripts becomes the input for other script instead of an isolated unit.

As the data was fusion by automated scripts, and by that manual intervention was eliminated, the scripts execution in batch reduced the execution efforts significantly.



- ❑ 60-70% test execution time saved post-optimization of design approach compare to similar nature of other project.

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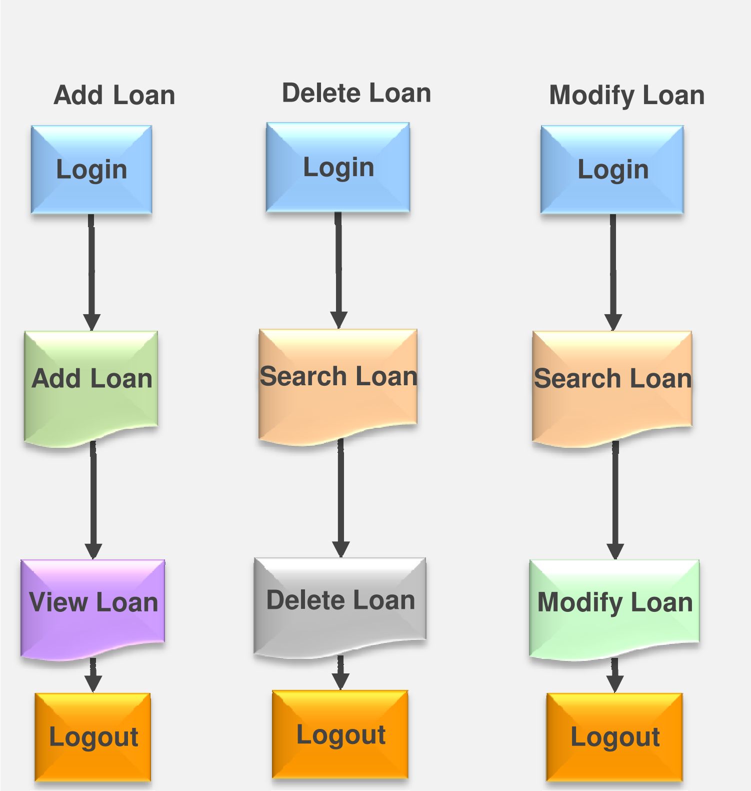
Sample Scenarios - Optimization of Automation Design approach/process

Scenario 1:



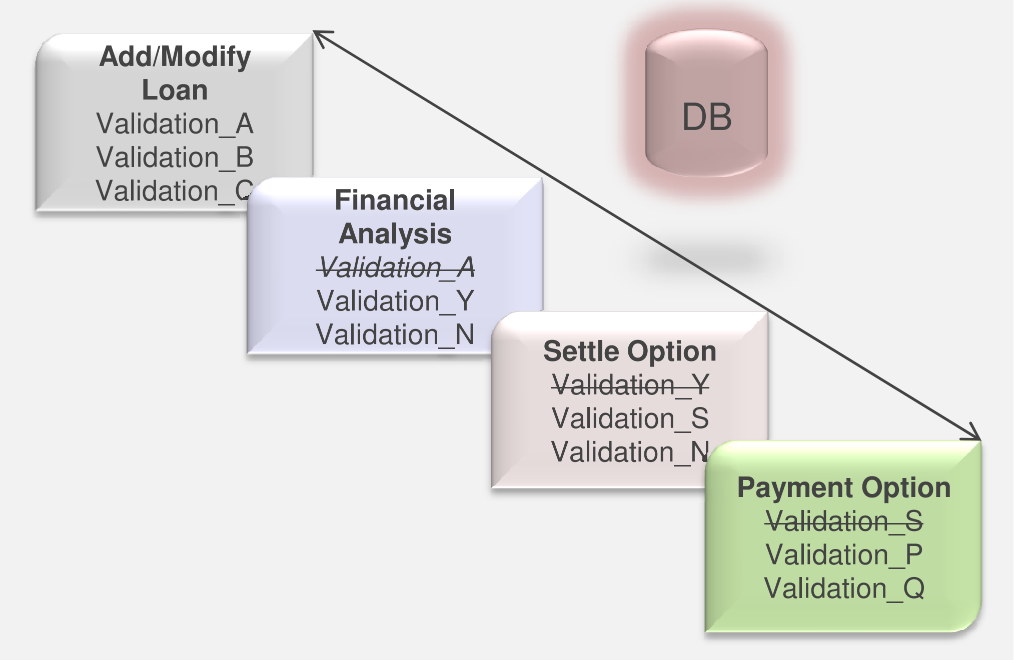
Add Loan
Login
Add Loan
View Loan
Logout

Delete Loan
Login
Search Loan
Delete Loan
Logout

Modify Loan
Login
Search Loan
Modify Loan
Logout

Business Units are built in such a way that they can be reused across multiple business flows.

Scenario 2:



Add/Modify Loan
Validation_A
Validation_B
Validation_C

Financial Analysis
~~*Validation_A*~~
Validation_Y
Validation_N

Settle Option
~~Validation_Y~~
Validation_S
Validation_N

Payment Option
~~Validation_S~~
Validation_P
Validation_Q

DB

Sample Business Units:

- ✓ Add/Delete/Update Loan
- ✓ Financial Analysis - Yes/No
- ✓ Settle Option – Short Sale / Non Short Sale
- ✓ Payment option -1/2/3/4
- ✓ Manager Approve/Decline

Case Study - Optimization of Automation Execution approach/process

Execution Approach Adopted

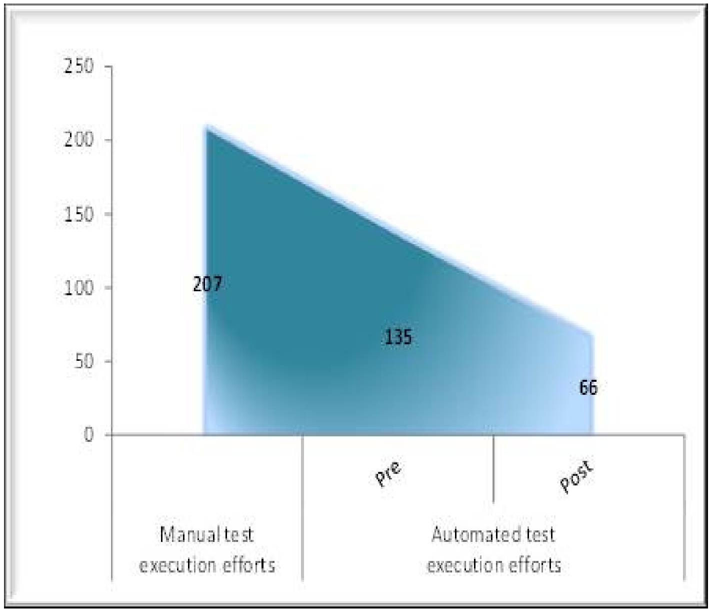
Solution was implemented on completed/running projects. **900+ Test cases** considered for this exercise.

To start with, scripts were analyzed and categorized into data dependent/independent. Pre-conditions and data requirement was analyzed for data dependent scripts. To eliminate the dependency, a feasibility analysis to automate the pre-conditions and data creation was done. Code was injected to the existing test suite for data requirements and to fulfill the test pre-conditions.

Alternatively, existing automated scripts were sequenced with some code correction to work as input for data dependent scripts. This significantly reduced the manual intervention during automated test execution and improved the execution efficiency.

To further reduce the execution time, automated suite was fragmented in small batches (considering data dependencies) and executed on multiple systems simultaneously.

The automated test execution efforts (in Hours) reduced by 50% which in turn reduced the ROI time frame.



- ❑ Overall test execution effort savings are around 70% using automation scripts
- ❑ Around 35% improvement in automated test execution savings post-optimization of execution process

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Sample Scenarios - Optimization of Automation execution approach/process

Scenario 1:

Module X
TestCase_X1
TestCase_X2
TestCase_X3
TestCase_X4
TestCase_X5
TestCase_X6
TestCase_X7
TestCase_X8
TestCase_X9
TestCase_X10

Independent Scripts

Module X
TestCase_X1
TestCase_X3
TestCase_X5
TestCase_X7
TestCase_X8

Dependent Scripts

Module X
TestCase_X2
TestCase_X4
TestCase_X6
TestCase_X9
TestCase_X10

Scenario 2:

Independent Scripts

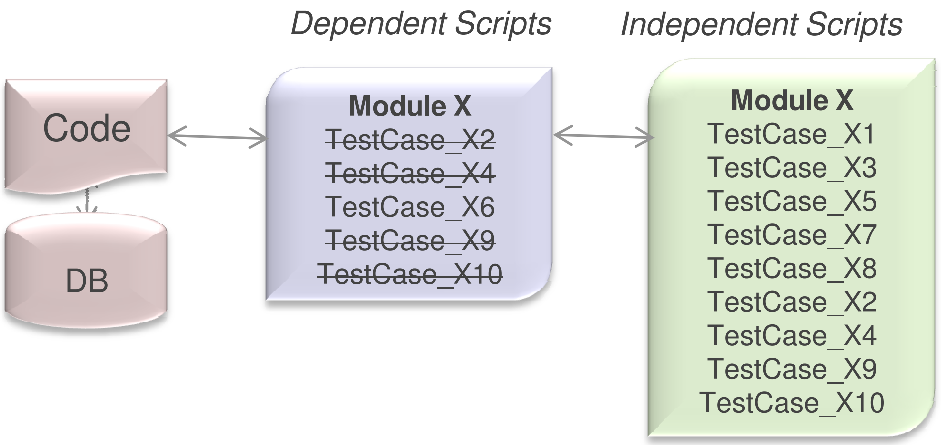
Module X
TestCase_X1
TestCase_X3
TestCase_X5
TestCase_X7
TestCase_X8

Dependent Scripts

Module X
~~TestCase_X2~~
TestCase_X4
TestCase_X6
~~TestCase_X9~~
TestCase_X10

Module X
TestCase_X1++
TestCase_X2
TestCase_X3
TestCase_X5
TestCase_X7
TestCase_X8++
TestCase_X9

Scenario 3:



Dependent Scripts

Module X
~~TestCase_X2~~
~~TestCase_X4~~
TestCase_X6
~~TestCase_X9~~
~~TestCase_X10~~

Independent Scripts

Module X
TestCase_X1
TestCase_X3
TestCase_X5
TestCase_X7
TestCase_X8
TestCase_X2
TestCase_X4
TestCase_X9
TestCase_X10

- ☐ Scenario 1 : Classification of scripts
- ☐ Scenario 2 : Scripts Enhancement
- ☐ Scenario 3 : Data control

Conclusion

The focus is to leverage the Automation benefits by streamlining the design and execution process. This will help the organization to achieve an effective automation ROI. However, since every project is unique in nature, the cost, time and effort involved in automation must be assessed to ensure acceptable ROI.

Advice for Implementing

This paper is not intended as a primer on implementation best practices, but here are a few "lessons learned" and considerations for other companies to adopt the streamlined test design and execution process Conclusion s to achieve the significant ROI.

Q&A

Thank You

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