ATC Model Based Testing
Intermediate POC Results

v1.0
04/03/14
Author: David Ronsse & Philippe Stroobandt

AXA GROUP SOLUTIONS
redefining / shared solutions

Objectives

- Intermediate results of the Proof Of Concept performed with All4Tec on the EPM Wave 2 project
- Document the potential benefits and the disadvantages of Model Based Testing
- Document the financial model including an estimate model for the benefits
- Identify the type of project where this approach would bring the most benefits and identify the pre-requisites

Agenda

- POC Context
- POC Results Observations
- POC Results Facts & Figures
- Model Based Testing Advantages & Disadvantages
- Target Projects & Prerequisites
- Financial Model

POC Context

- **Perform a Proof of Concept of Model Based Test Design, using the MaTeLo, a model based test design tool from All4Tec**
- **The POC is performed on the project EPM Wave 2, sprint 3**
  - Scope of EPM Wave2 is to provide centralized access management for every internal employee, with a strong dependency on HR data for Joiner, Mover and Leaver processes. The sprint 3 is focused on re-certification processes.
- **Setup: All4Tec team (1 person) in parallel with the ATC Test Team (1 Offshore TA who designed + 1 Onshore TA who reviewed) over a period of 3 weeks**
- **Input: both teams used the same input : '*User stories*' (no at use case or business rule level)**
- **Output: test cases**
- **Advantages of Model Based Testing to be validated during the POC**
  - Better test coverage based on risk and priority analysis
  - High quality delivered on time
  - Reduced Time To Market, by decreasing test duration
  - Easy to use tool supporting the tester in his activities
- **Other advantages of Model Based Testing outside of the POC scope**
  - Fast ROI on test design, execution and maintenance
  - Defects revealed earlier and business impacts limitation
  - No « pesticide paradox » by generating new test suites

POC Results - Observations

Topic	Result	Model Based Testing
Ease of use of the tool	☺	Tool is easy to use but will require 2 days of training and then the users could be coached via a mixed team a few days to get it tool in the fingers
Test Cases in ALM	TBC	Test Cases generated were not loaded ALM date – this will be done the last week of March with the version 5
Documentation	☺	Using Model Based testing allows to create models including the expected results. This can serve as documentation for the project team. Especially in an agile project this is a good basis for the design
Reusability	☺	The big advantage is that changes to the model allow to quickly (re-)generate the test cases and this with full traceability
Multi-language	😐	Models can be done in English. The resulting test cases would be reviewed and once the input / output is accepted these would be translated. Such a setup limit the benefits for recreation of the test cases
Test Case Completeness	☺	By using equivalence class (set of values for which the behavior of the system is expected to be the same, Employee 1, 2…) , the tester will be able to create different test cases from the generic one. A set of in-build algorithms for the test case generation allows to cover users stories by a sufficient or exhaustive test suite. The Test Lead / Test Analyst confirmed that the test cases designed by the All4Tec team were more complete
Test Automation	TBC	Same scope than the test designed by day if the model is automated. Matelo can generate both the test cases & automated tests. This will be tested during the 2nd part of the POC

POC Results – Facts & Figures

Measure	Model Based Testing	Manual Testing
Test Cases designed	9	20
Average Number of Steps / Test Case	23	6
Number of days of Test Design	15	23
Test Steps designed /day	**=9*23/15=14**	**=20*6/23=5,2**

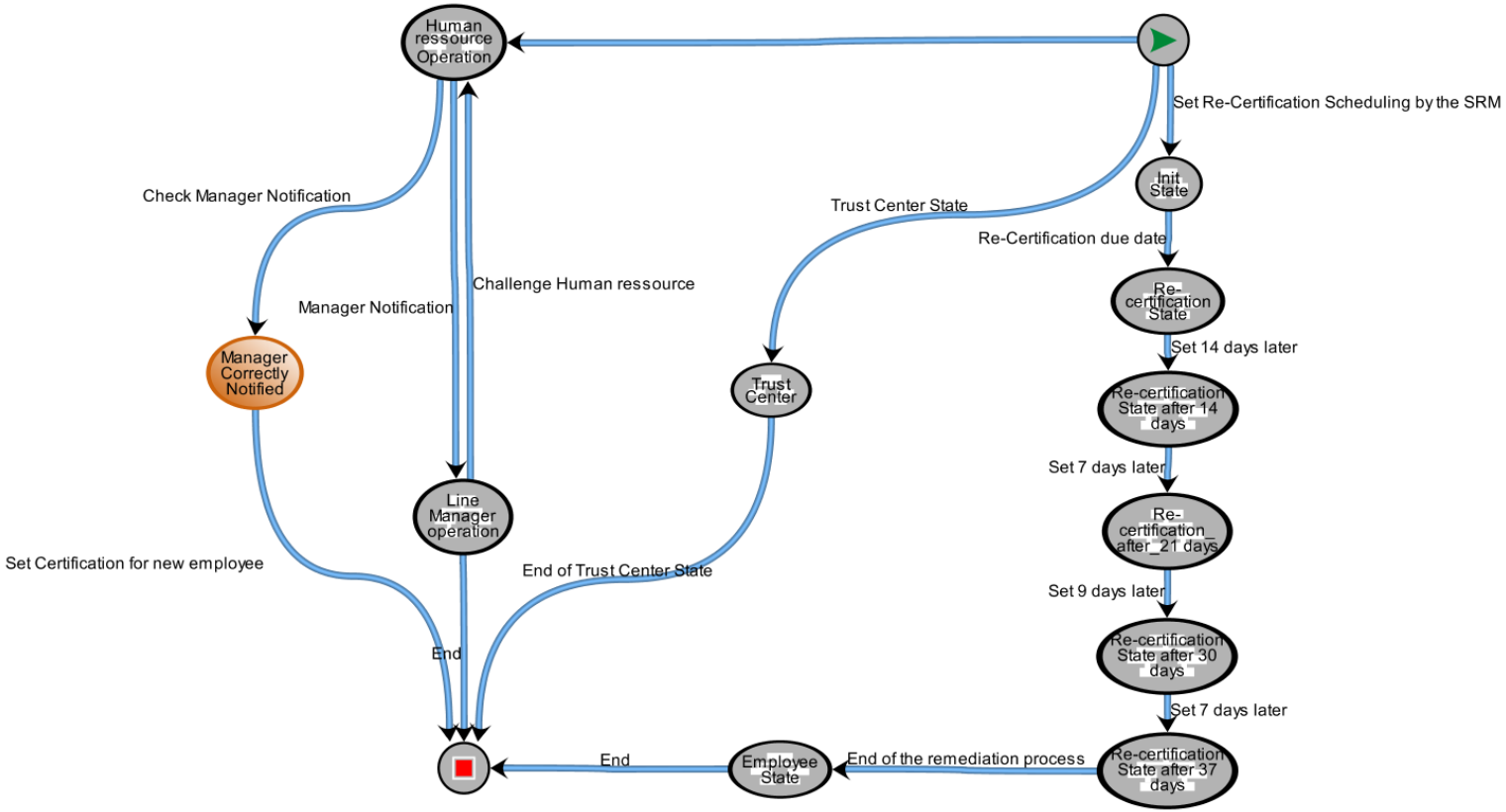
Measure	Weight	Model Based Testing	Manual Testing
Inputs Number (Stimulations)	25%	19	9 (estimated)
Outputs Number (Verifications)	25%	31	15
Data Structures Used (Nbr)	15%	2 (employee, manager)	2
Average Attribute by Structure (Nbr)	15%	10 (Account, Role, Appl,…)	0
Physical Structures Used (Nbr)	20%	6 (An de Pauw, Alain L, …)	0
Test Coverage		**15,5**	**6,3**
Covered User stories		23	12
Man Day		15	23
User Stories /days		=23/15=1,53	=12/23=0,52

Conclusion

- **Based on the POC observations MaTeLo can certainly help for projects implementing new technology with limited integration**
- **Agile projects are good candidates as the creation of the model based testing immediately also documents the flow and allow better comprehension by the developers, while test cases can quickly be regenerated**
- **Ideally the model based testing is done by a joint team of BA & TA at the onset of the project – whereby the BA and the TA use the tool together to define the model. Two days of training are necessary and then on-the-job experience**
- **While the quality of the requirements remains important for Model Based Testing, the Model Based Testing allows to compensate partially as the tool forces/helps the tester to think through the processes and the different cases**
- **Quality of test cases doubles – impact on the test scope remains to be analyzed (can we test less due to better quality covering the same risk?)**
- **In the scoping matrix the following elements will be impacted when working in Model Based Testing:**
  - Test Design: -30% (to -50%)
  - Participation in the license cost

Attachments

Model Based Testing – Data Flow example



MaTeLo provides more detailed Test Case design

Standard Test Case

Pre-condition2

Description:

Manager should have revoked employee transaction

Pre-condition3

Description:

Challenge the managers decision of revoking access exception and transaction

Expected Result:

Employee should be able to challenge the manager's decision

Model Based Test Case

Revoke employee data / access

Input : Revoke employee data

- Employee :
  - Name : **Annemie**
  - Account Type : **AD**
  - Line manager : **An De Pauw**
  - Role : **Employee**
  - Application1 :
    - Status : **Revoked**
    - ApplicationID : **IMS-application1**
    - Transaction : 0x **0x11**
    - Authorization Level : **LEVEL1**
  - Application2 :
    - Status : **Complete**
    - ApplicationID : **IMS-application2**
    - Transaction : 0x **0x2**
    - Authorization Level : **LEVEL2**
  - Application3 :
    - Status : **Complete**
    - ApplicationID : **IMS-application4**
    - Transaction : 0x **0x44**
    - Authorization Level : **LEVEL5**
  - Account Access : **Authorized**

Requirements : *AEWT-411*

ERA : Check challenge mail sent by the employee to the manager

- Employee_Challenge_revokation :
  - EMPLOYEE : == **Annemie**
  - APPLICATION : == **IMS-application1**

ERA : Check manager selected

- Manager : == **An De Pauw**