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Re using Model Based Testing in Industry

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ALL4TEC
Génie Logiciel

 SEI Partner
CMMI

Jean Noël MARTIN
European Sales Manager

jeannoel.martin@all4tec.net + 33 (0) 685 666 960

Odyssee E - 2, rue des Femmes - 91300 MASSY
Tél. : + 33 (0)2 43 49 75 30 - Fax : + 33 (0)2 43 49 75 33 - www.all4tec.net

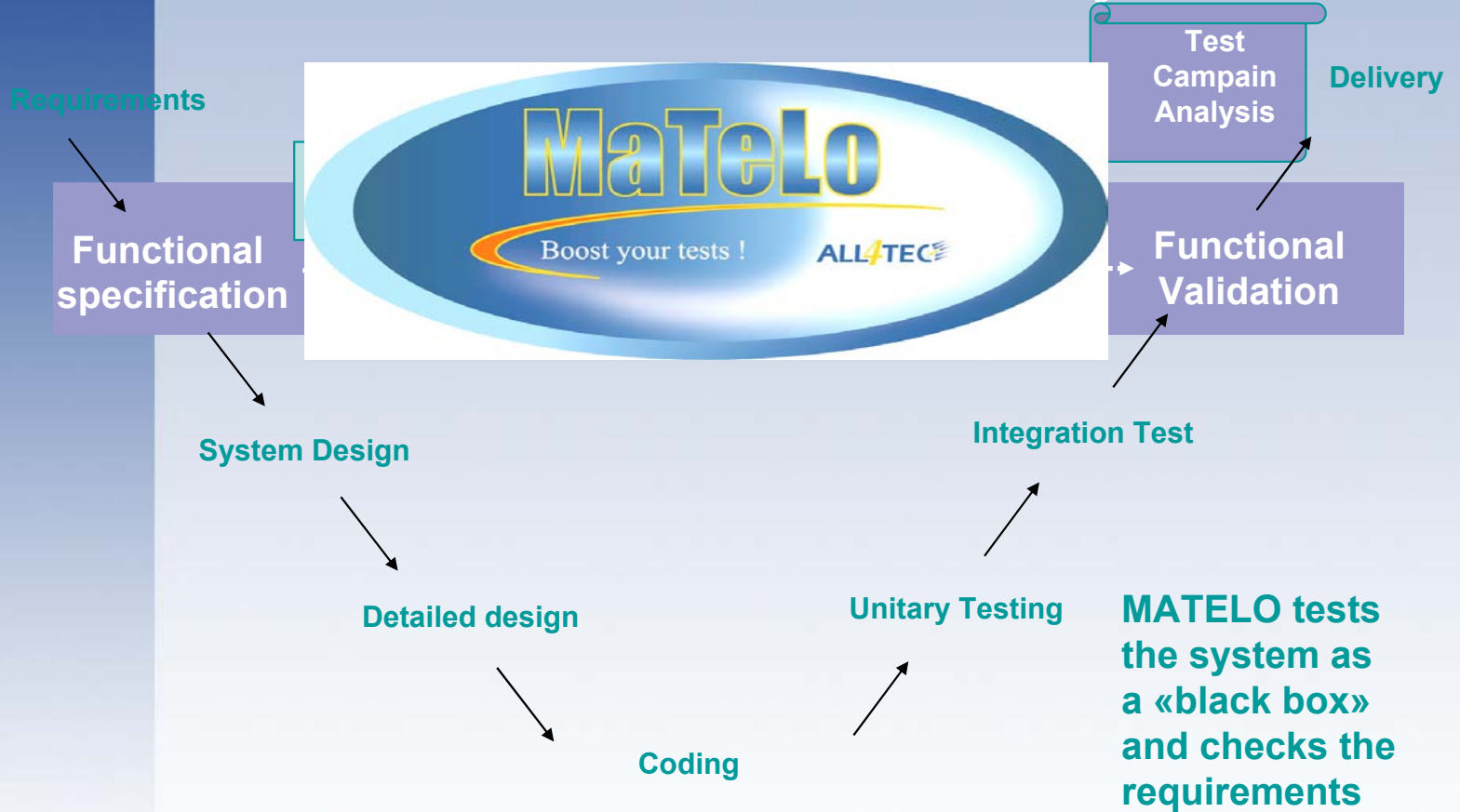


Agenda

- Matelo Tool
- Return of 2 industrials experiences
 - Project 1: progressive enrichment of the MaTeLo models
 - Project 2: Model sharing between 2 operators
- Extrapolation
- First conclusion



MaTeLo in the V-Cycle





Assumption

- 2 different contexts of Model Based Testing approach with:
 - State machine based generation
 - Simulation capability,
 - Deterministic transition modelization capability
 - Test Script based the use of TestStand from National Instrument for automated tests execution.



Context n°1

- Automotive sector
- An equipment provider develops product lines for an OEM
- During three years
- A large equipment range
(3 projects, lower line, middle line and first line)



Figures Context n°1

- Price of testing were 140 wd for the first project 90 wd for the 2 project and 46 days for the third project.
 - These figures seems to be on line with traditional reuse experiment
- | | | | | | |
|-------------------|----------|----------|-----------|-----------|-----|
| • Number of reuse | 1 | 2 | 3 | 4 | n |
| • Reuse Rate % | 0 | 40 | 70 | 80 | 88 |
| • Project Cost % | 100 | 60 | 30 | 24 | 19 |
| • Overall Cost % | 100 | 100 | 100 | 104 | 107 |
| • MBT | % | 0 | 35 | 66 | |



Second Context

- Automotive sector
- Two industrial partners starting using MaTeLo in the same time on the same project :
 - the equipment provider on one hand
 - and the OEM on the other hand.
- One year
- Only one project



Second context: Organization

- The first MaTeLo model was issued by the equipment provider on the specification provided by the OEM.
- Then the model was shipped to the OEM which applied the model against equipment test simulator (SIL).
- The specification and the Model were reworked to incorporate the findings of the simulation.
- The model was shipped to the equipment provider, and the model was used against the prototype of the system.
- Finally the OEM used MaTeLo TestStand generation feature to feed its TestStand capable test bench, and tracked the remaining defects



Facts and figures Context n°2

- Cost of modelling for the project was 40 days
- Reworking of the model through simulation was 8 days
- Test time is rated as near twice of the time depict of the fact that test time is lower when there is no more defect to fix.



First extrapolation

Raw data	Std rate	manually generated	automatically executed	Model based testing automated	Model based testing with reuse
Test plan writing	20%	20	30	6	3,8
Test execution	40%	40	6*	2	3,2
Fixing defects	40%	40	45	39	36
TOTAL		100%	81%	47%	43%
				34,00%	38,00%
		* assuming 20 hours/day			
Prudent data					
Test plan writing	0,2	20,00	30,00	13,00	7,60
Test execution	0,4	40,00	6*	4,00	4,33
Fixing defects	0,4	40,00	45,00	40,00	38,00
TOTAL		100,00%	81,00%	57,00%	49,93%
				24,00%	31,07%



Conclusion

- MBT is a new approach
- No standards for the moment
- A first generation of tools
- Improvement is a reality
- Challenging over 30% in the test costs using MBT reuse