

Automation of back-to-back tests MIL-SIL and MIL-PIL on Jenkins servers

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Bosch Power Solutions Our product portfolio









Context Code industrialization based on Simulink model from OEM



Challenges



Need high level of automation due to cost reduction objectives



Back-to-back tests for Safety code ASIL B to D



Bosch specific code generation Target MDX (derived from ERT Target)



Processor-in-the-Loop required to test the Safety code



Different ways to implement embedded C code Applicative SW and Middleware @ Bosch France



Toolchain for Unit Test : "one fits for all"



Definition of MIL / SIL / PIL



BOSCH

Our legacy process for back-to-back tests



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The starting point of this automation IT development team vision and mission



Within our department, mainly composed of embedded systems teams, the vision of IT development team is to create innovative and cuttingedge services for our engineering activities.





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The starting point of this automation Our legacy process



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The starting point of this automation The identification of automation needs





The starting point of this automation The identification of automation needs





A one-click solution highly automated



TPT not adapted to high automation level



A one-click solution highly automated



Difficulties to increase further the automation level







Goal : use full Simulink toolchain



Turning point : technical feasibility demonstrated by MathWorks consulting service



Strategy : full integration in Simulink => single tool vendor



Support Software-In-the-Loop and Processor-In-the-Loop



Support MDX and AUTOSAR Targets



MATLAB scripts for SIL / PIL developed by MathWorks consulting service => master limitations of MDX Target



Toolchain for back-to-back tests



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Toolchain for back-to-back tests Tests Cases generated with Simulink Design Verifier



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Toolchain for back-to-back tests Call HighTec compiler to build the execution .elf file



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Toolchain for back-to-back tests Back-to-back tests MIL-SIL and MIL-PIL with Simulink



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Toolchain for back-to-back tests Back-to-back tests MIL-SIL and MIL-PIL with Simulink



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Toolchain for back-to-back tests **Test Manager**



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A one-click solution highly automated





A one-click solution highly automated With back-to-back tests MIL-SIL and MIL-PIL







A robust infrastructure



For complex Simulink models, MIL-SIL and MIL-PIL back-to-back tests consume a lot of resources and time on our servers



A **robust** and **reliable infrastructure** is **mandatory** for the implementation of this automation



An intern solution : Build Infrastructure as a Service





A robust infrastructure Build Infrastructure as a Service (BlaaS)





A robust infrastructure Benefits of BlaaS









Conclusion



High added value of MathWorks consulting service



Transition in progress from legacy to Simulink toolchain for series projects



Requires a minimum number of models to amortize the investments



Start support of a 2nd compiler with a 2nd microcontroller family



Improvements planned for faster execution and code coverage measurement

AUT@SAR Less limitations with AUTOSAR Target in comparison with MDX Target

