ROSAS

Continuous Integration in the Loop for automatic firmware testing

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Background/Vision

Contrinex SA develops Smart Sensor with embedded code for processing, analysis, statistics and many more application.

With industry 4.0 System are getting more smart

Consequences:

- System architecture is getting more sophisticated
- Increase in the implementation of smart functions

Challenges:

- Time to market increases due to the testing
- Cost are increasing, while testing needs to be even more specialized

How can we improve this and simplify it for industry?

Implementation/Solutions

Implementation based on xIL (Everything-in-the-Loop) using principles of UVM (Universal Verification Methodology).

Testing with the power of CI/CD (Continuous Integration/Continuous Development).

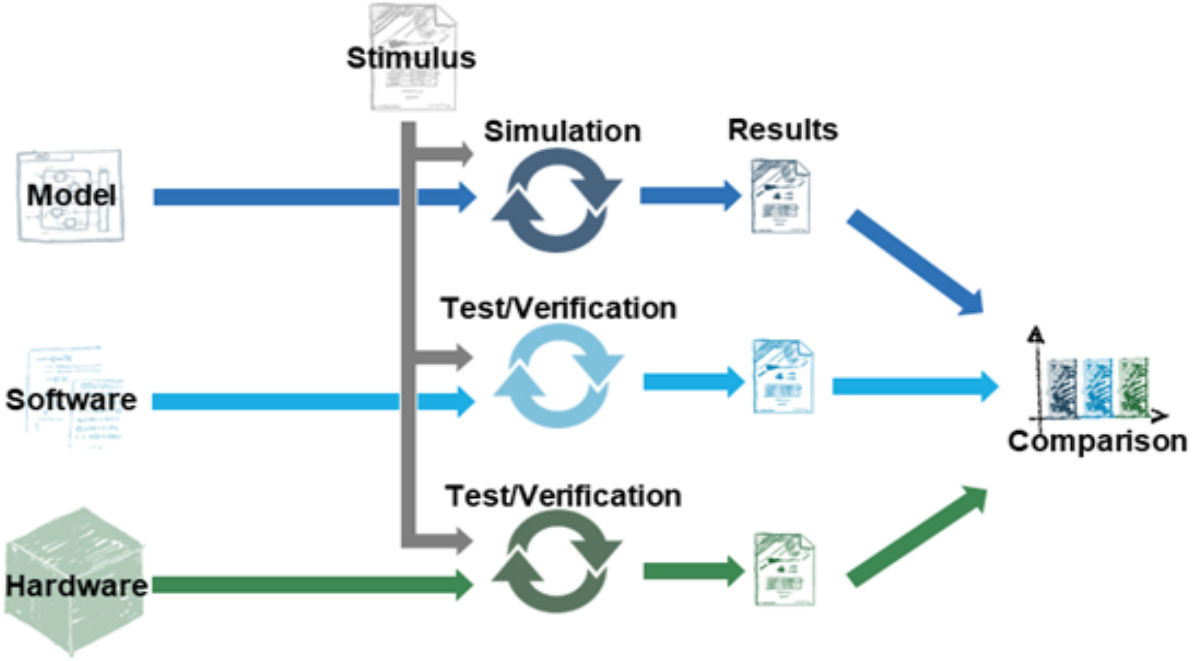
A **model** in SysML was used to elaborate the specification of the functions needed to be tested.

Test sequences were **automatically** and **randomly** generated based on the concepts of UVM (Universal Verification Methodology) and System Verilog.

Specific test sequence were manually engineered focusing on a precise aspect, for instance edge cases.

Software was pushed on **GitLab** were the CI ran the **test pipeline**.

Hardware is integrated on a **real time machine** to test the actual code on the target processor.



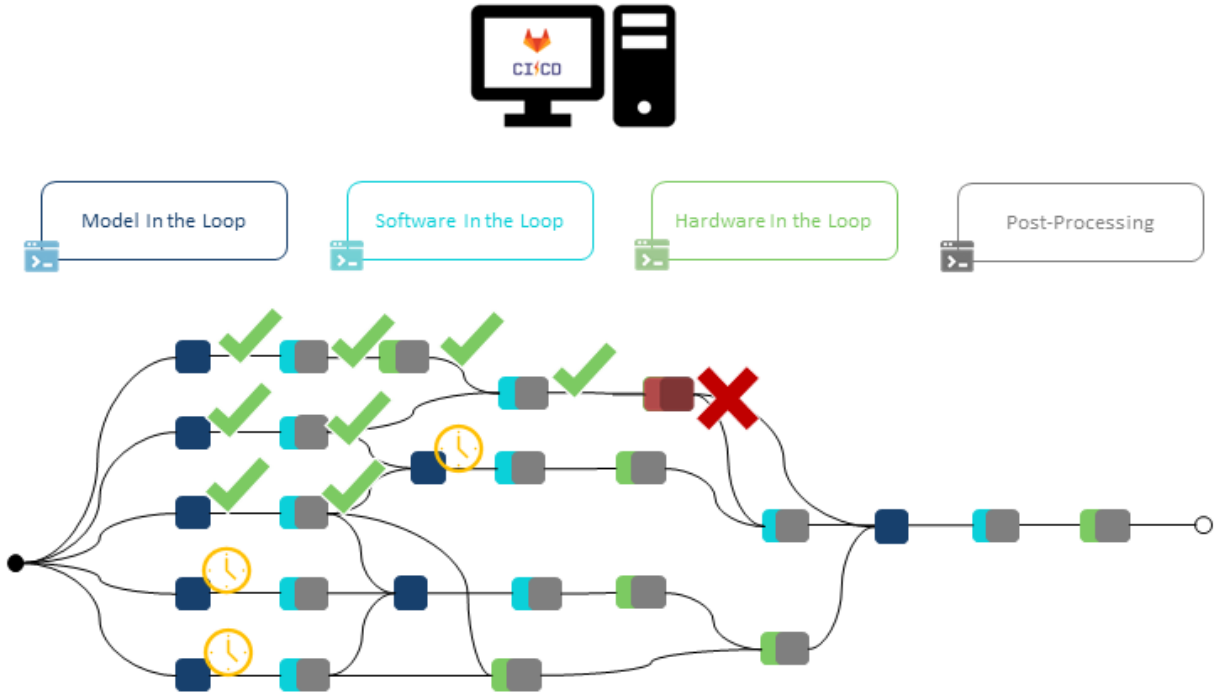
Concept of implementation of the project

Benefits

"Testing Time reduction"

"Agile software and firmware development"

"Improvement of product reliability"



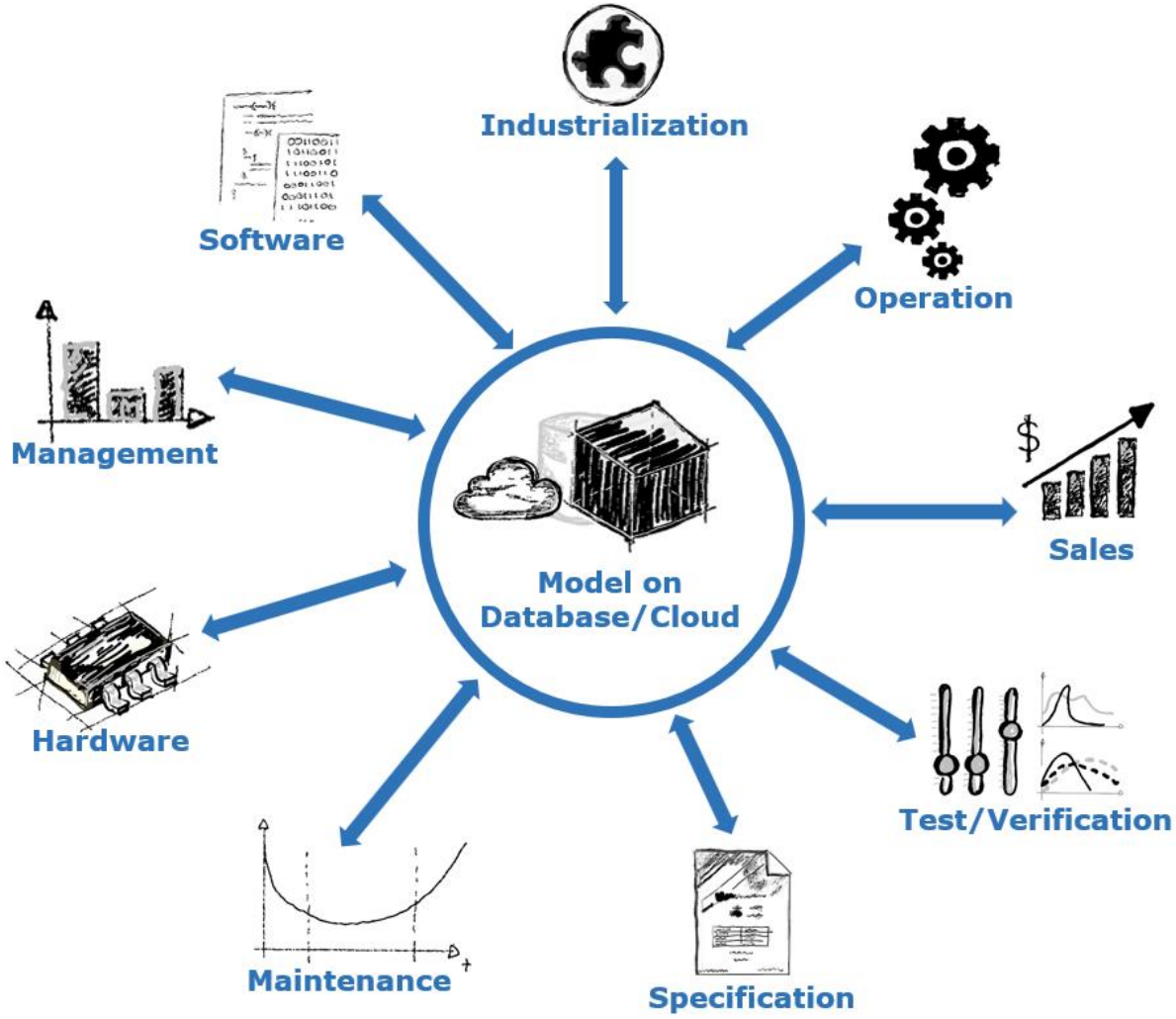
Test pipeline inside the CI environment

- Application of xIL for development and integration of the software unit
- Automatic verification of Software units by applying randomized and tailored test cases
- Engineers can work in parallel on different problems.
- Increase confidence level of the code verification with repeatable test sequences and scenarios

Enhancement and future work

This CI/CD methodology is mostly derived and refined for software development and testing.

However, we see that it can be enhanced and it is applicable for **hardware development** as well as **system design** and throughout the **entire product life-cycle.**



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