Project #35

Managing Modelling Inconsistencies

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MÄLARDALEN UNIVERSITY
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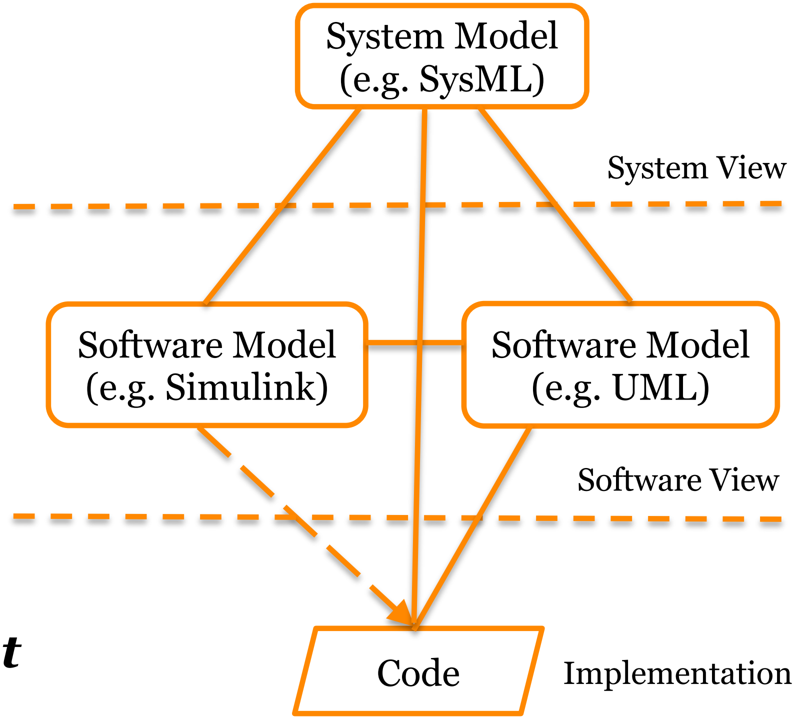
Project context

- Combining many different ***artefacts*** during development of software systems

- Possible many other artefacts
  - Created in different tools
  - And different (modeling) languages
  - Existing in different ***versions***
  - And in different ***variants***

- Goals:
  - Ensuring that they are ***consistent***


System Model (e.g. SysML)
System View
Software Model (e.g. Simulink)
Software Model (e.g. UML)
Software View
Code
Implementation

Outcomes of earlier sprints

- Paper on interview study at 3 companies
  - Main topic: ***combining*** continuous integration (***CI***) and model-based development (***MBD***)
  - Most interesting findings:
    - Most important experienced and expected challenges (of 14): ***tool interoperability*** and ***model synchronization.***
    - In some scenarios ***not useful***, sometimes ***too large gap*** between models and code to make short development increments work.
    - So then, focus on ***closing the gap*** between those models and code through support for model synchronization.

Robbert Jongeling, Jan Carlson, Antonio Cicchetti. "Impediments to Introducing Continuous Integration for Model-Based Development in Industry." 45th *Euromicro Conference on Software Engineering and Advanced Applications (SEAA 2019).*

Outcomes of earlier sprints

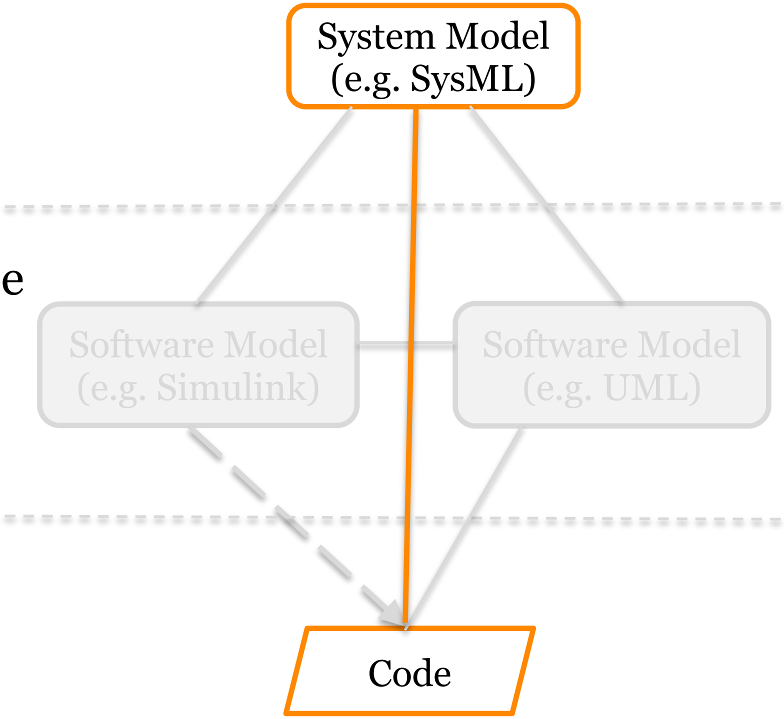
- Paper on inter-model consistency checking approach
  - Three main requirements
    - Should be ***lightweight,*** minimal input required
    - Structural ***inter-model*** consistency checks
    - Inconsistency is inevitable, so we should “*allow, but warn*”
  - Two main ingredients
    - Define only what elements should be linked at highest hierarchical level
    - ***Generate*** executable consistency ***checks*** that traverse the hierarchy
  - One main result
    - Tool implemented to check ***structural*** consistency between SysML and Simulink models refining them

Robbert Jongeling, Federico Ciccozzi, Antonio Cicchetti, Jan Carlson. “Lightweight Consistency Checking for Agile Model-Based Development in Practice.” *15th European Conference on Modelling Foundations and Applications (ECMFA 2019).*

Focus during next sprint

Continuation of projects at two partners

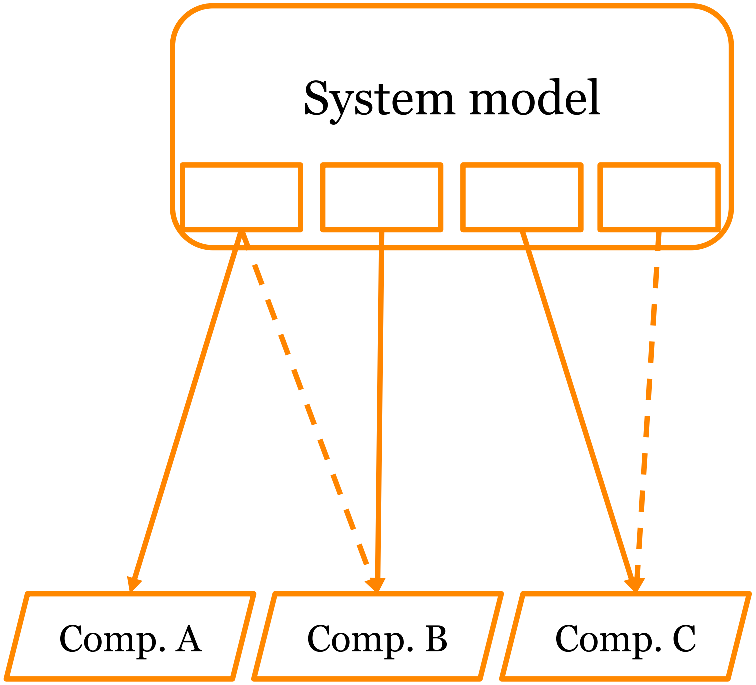
- Automatically detecting ***correspondences*** between ***system model*** (SysML) and ***code*** (C++)
  - To what extent is the code fulfilling the specification in the model?
  - Can we visualize the degree of consistency in the system model?



Focus during next sprint

Continuation of projects at two partners

- ***Extend*** existing ***model-code gap analysis*** to deal with different model ***versions*** and different ***variants*** and ***versions*** of ***software components***
  - Components can exist in several versions and variants of the system
  - Components might be third-party/open-source



Software Center

www.software-center.se

In sprint 18: project #35 *MAIN*
Questions, ideas, suggestions, collaborations? ☺

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