

Software Intensive Systems Modeling - A Methodological Approach

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Abstract:

The quality of a product depends much on the quality of its requirement and design specifications. Missing, vague or sloppy specifications lead to wrong implementation, inaccurate testing and poor product usability.

Modeling techniques and languages are increasingly used for software engineering, replacing textual specifications with visual ones.

However, in many software-intensive systems, modeling is not applied appropriately, according to lack of modeling methodology, complexity of languages and tools and inconsistencies between development levels - particularly between the system level and the software level.

We propose a methodological approach to software-intensive system modeling, which provides systematic modeling for all system breakdown levels, consistency within and between system and software level models and simple and "just enough" application of modeling elements (UML/SysML).

The approach is based on the fundamentals of systems engineering definitions and processes and is organized in 4 unified views for every system / software element (either compound or primitive). A model organization is also introduced, based on five typical "levels of interest" for software-intensive systems.

Current and future research directions will be discussed.