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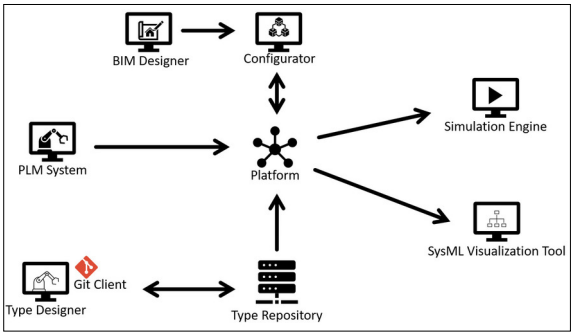
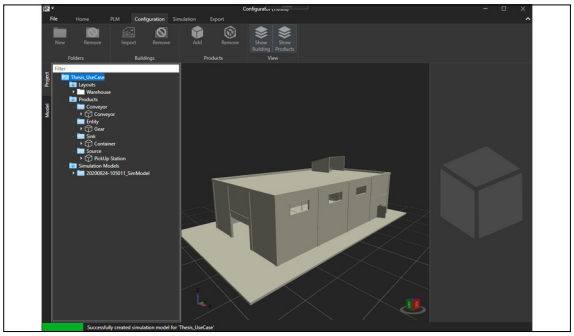
Subject Area	Innovation in Products, Processes and Materials - Business Engineering and Productions

PLM-Sim: PoC introducing DES to the Product Development Process

For the planning of Manufacturing Plants to enable Fast-Prototyping



The proposed system's architecture. We focused on the configurator and data structures used between the tools.
Own presentment

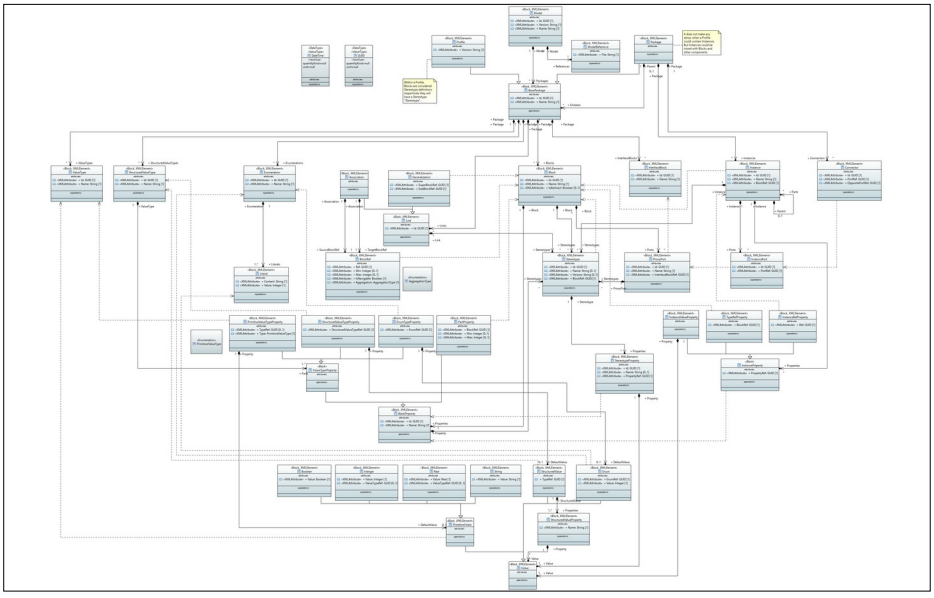


The configurator developed as part of this thesis. The tool loads IFC files and creates a single visualization.
Own presentment

Objective: Creating models for discrete event simulation (DES) is not an easy task. Thus, we want to automate the generation of such models as far as possible to avoid rework. For example, within a simulation tool we need to place our elements according to a floor plan. But this planning has already been done. What if we could take the plan and place the elements automatically. And while having the plan as IFC model (BIM), why not use this model also directly in the simulation to increase the look of the model. Doing this, we need to access data from several other systems that work with different data structures and formats. And trying to be vendor independent, we want to rely just on open source and freely available components.

Approach: In this thesis, we propose an agile process how discrete event simulations and product development can work together. Based on this process and the data we can access, we defined an open model structure that uses concepts of SysML and is defined and stored as XML. Using this definition, we stored and managed product structures extended with stereotypes to keep some metadata from the product lifecycle ecosystem. To attach simulation specific metadata, we defined additional types that will be bound to components of a product, but do not interfere with their structure.

Result: We found tools and libraries that were freely available and could show that the process will work. We were also able to show that from a technological point of view, the problem is feasible. Besides showing how it could be done, we also provided tools and a library that could be used to access our models with other programs. The tools are currently not finished and lack some key features, but we were able to solve all the difficulties introduced by the process at least once.



The subset of SysML we defined, implemented and used to store models in XML.
Own presentment