



1st VMAP User Meeting 2024

SEMANTIC CONCEPTS TO STORE AND ACCESS VMAP-BASED SIMULATION DATA

Philipp Spelten^{1,2,3}, philipp.spelten@phd.h-brs.de

¹ Fraunhofer Institute for Algorithms and Scientific Computing – SCAI, Sankt Augustin, GERMANY

² PROSTEP AG, Darmstadt, Germany

³ Institute of Technology, Resource and Energy-Efficient Engineering (TREE), Bonn-Rhein-Sieg University of Applied Sciences, Sankt Augustin, Germany

Integrating physical simulation data into data ecosystems challenges the compatibility and interoperability of data management tools. Semantic web technologies and relational databases mostly use other data types, such as ERP or design data.

VMAP as an industrial standard offers novel possibilities when compared to other standardization approaches such as the archival-oriented ISO standard STEP (ISO 10303 “Standard for the Exchange of Product model data”). While the latter has included simulation data in its CAD modules, this has not proven feasible in industry contexts. On the other hand, enhancing VMAP with semantic capabilities promises to finally bridge the gap between product and simulation data management (PDM and SPDM).

This presentation showcases a prototype of a new application methodology based on VMAP. The architecture integrates access and analysis processes for large quantities of structured simulation data. This enables data permeability from the global digital twin level (i.e., ERP, design, measurement data, etc.) to the detailed numerical values of data entries (i.e., singular values or post-processed key indicators) in a three-step approach: (1) A file is represented in a knowledge graph, (2) the file’s metadata is queried, and (3) access and analysis processes are represented semantically and are thus found in the knowledge graph and executed to create and instantiate new metadata.