Project Multi-scale, Multi-physics Software Infrastructure

Software Infrastructure for Multi-scale, Multi-physics Simulations on High-performance Computers

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Summary

Available computing power in high-performance computing systems is increasingly used to improve realism in simulations by coupling multiple physical models on multiple scales in space and time. This type of application leads to new challenges in efficient simulation software especially with respect to petascale architectures consisting of thousands of multi-core processors supported by specialized coprocessors.
The aim of this project is to provide a software infrastructure that supports the development of multi-physics, multi-scale applications. It will be based on the Distributed and Unified Numerics Environment (DUNE) that already support (parallel) single-physics, single-scale applications. Focus of the project will be the development of coupling mechanisms, the investigation of the load-balancing problem as well as the incorporation of the components into a workflow and visualization environment.