

Challenges of Exascale Computing for General Purpose Finite Element Libraries

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Abstract

Developing general purpose finite element libraries for modern computer architectures with high numbers of cores per node and offloading of numerical work to specialized coprocessors differ from those faced by single purpose specialized code. For instance, we cannot assume the one and only element with ideal structure for vectorization and communication, but have to develop solutions for ranges of finite elements. Similarly, a single solver is not sufficient, but instead a multilevel framework with interface to problem adapted smoothers and mesh transfers is needed. We discuss some of these challenges in detail and present solution strategies we are developing for the deal.II library.

References

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