Efficient Exascale Discretizations

Efficient exploitation of exascale architectures requires a rethink of the numerical algorithms used in large-scale applications of strategic interest to the DOE. Many large-scale applications employ unstructured finite element discretization methods—the process of dividing a large simulation into smaller components in preparation for computer analysis—where practical efficiency is measured by the accuracy achieved per unit computational time.

The Center for Efficient Exascale Discretizations (CEED) is pursuing a crosscutting approach that includes working with hardware vendors, software developers, and computational scientists to meet the needs applications relevant to the DOE mission. The CEED co-design center is a focused team effort to develop the next-generation discretization software and algorithms that will enable a wide range of finite element applications to run efficiently on future hardware.

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