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# In-situ Meshing to Enable Advanced Analysis Workflows on Next Generation Platforms

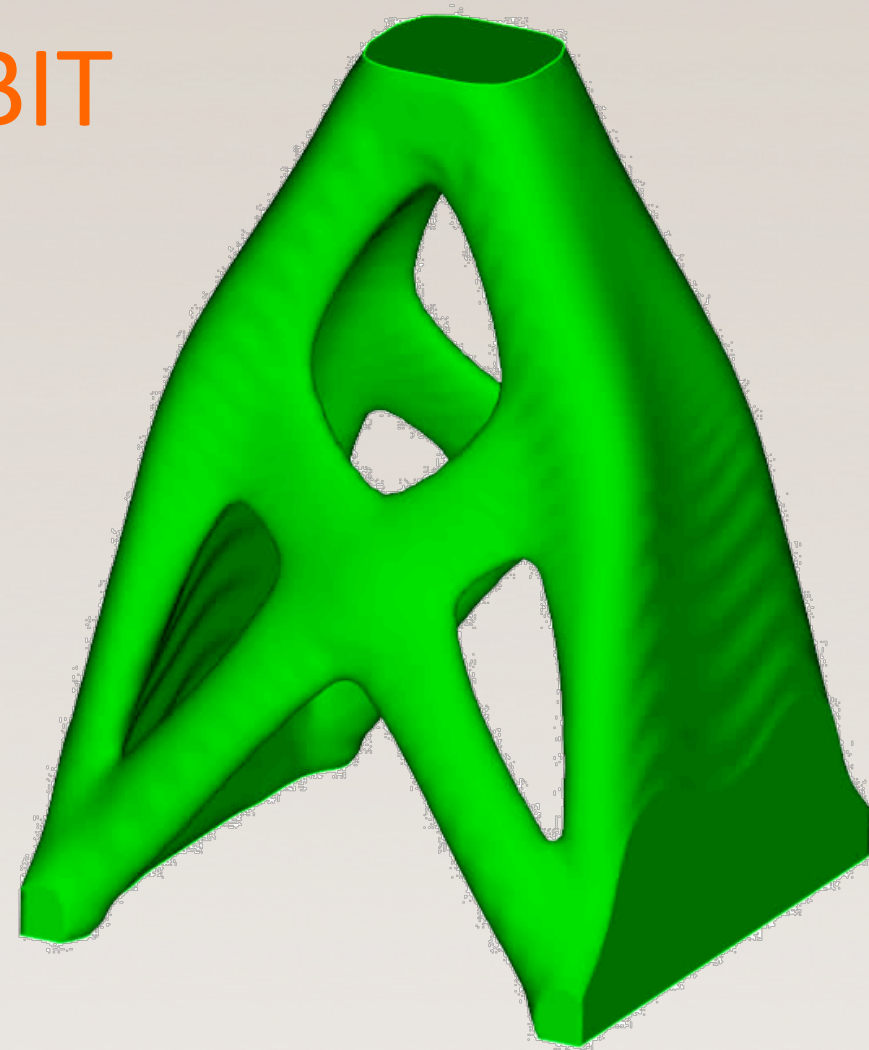
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**Goal:** To enable in-situ meshing by integrating interoperable software components for advanced analysis workflows such as mesh sensitivity analysis, uncertainty quantification, and optimization.

## Software Architecture

### CUBIT



- CUBIT supports offline geometry creation and geometry import in multiple formats including ACIS
- Supports various geometry modification operations
- Supports boundary conditions via blocks, sidesets, & nodesets
- Exports geometry in STL format

ACIS

STL

### ATDM Apps

- Build ATDM App input deck
- Specify the STL file path to read geometry
- Specify the meshing parameters such as mesh scheme, mesh size, number of process, threads per process, etc.
- Specify the solver parameters
- Specify analysis output format (default is Exodus)

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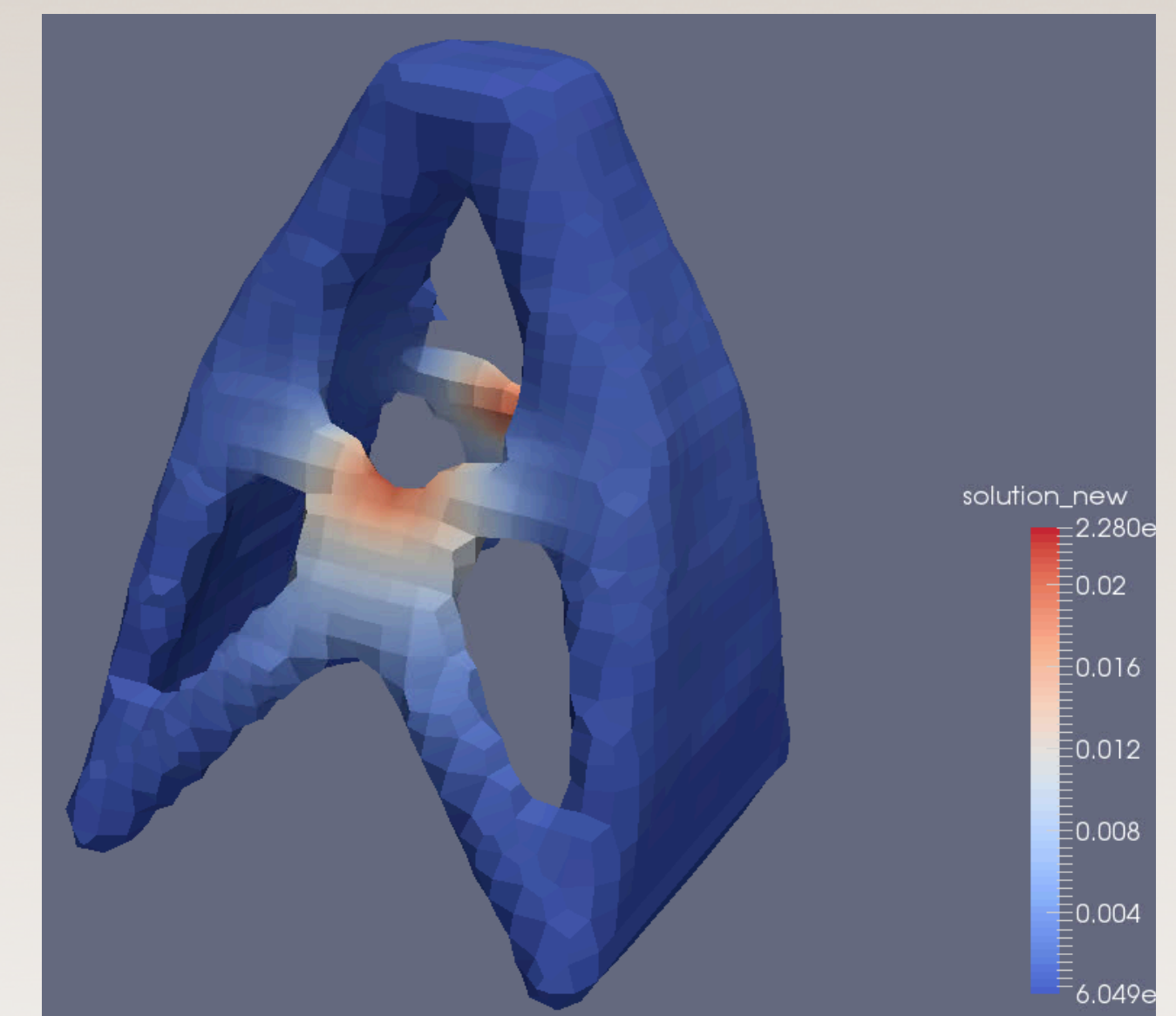
EMPIRE

AERO

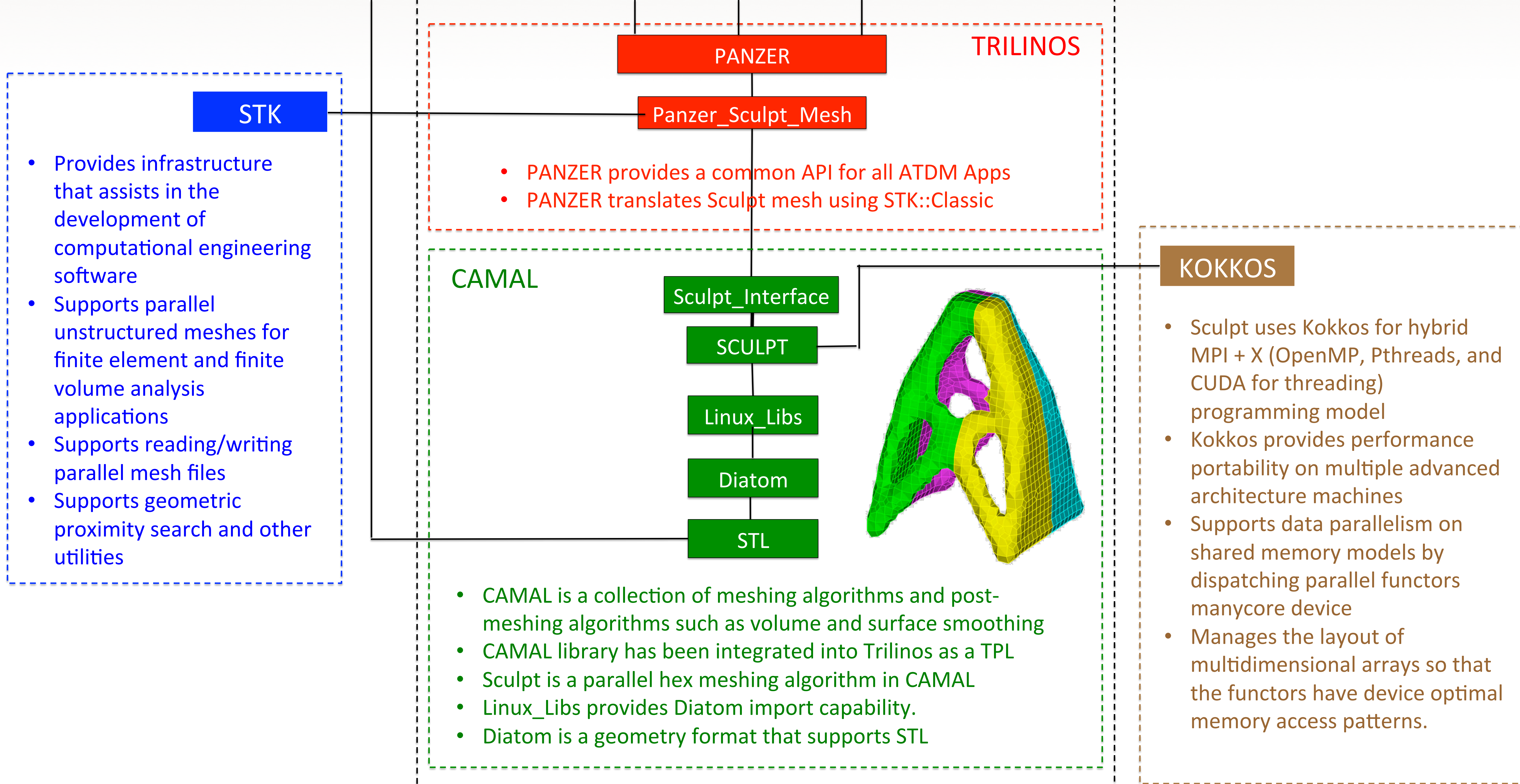
LSO

EXO

### PARAVIEW



- PARAVIEW is a data analysis and visualization application
- Uses qualitative and quantitative techniques to visualize solution field of LSO



## Conclusion:

Achieved in-situ meshing on a proxy ATDM app called LSO by integrating multiple components such as CUBIT/lib, CTH/Diatom, CAMAL/Sculpt, Trilinos/Panzer, Kokkos, and STK. This work should enable in-situ meshing in the ATDM Apps such as EMPIRE and AERO for advanced analysis workflows on the next generation platforms.