

Prototyping next generation AMT management of UQ ensembles with Dakota + Legion

Scientific Achievement

- Prototype ensemble management based on Asynchronous Many-Task (AMT) systems using Dakota + Legion.

Significance and Impact

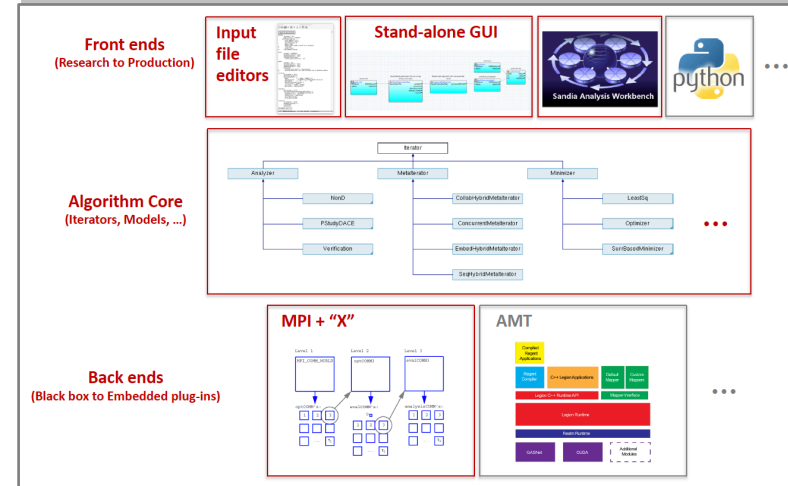
- Exploit large-scale hybrid architectures
- Dependency-driven task management eliminates artificial synchronization and streamlines workflows
- UQ elevates task management and provides new opportunities for optimizing aggregate task sets

Research Details

Progress among multiple axes:

1. *Intrusive simulation integration*: Dakota embedded as ensemble generator in Legion-based simulation (Soleil)
2. *Non-intrusive simulation management*: batch evaluator developed for external management of AMT ensembles
3. *Exploration of clean-sheet UQ algorithm development leveraging heterogeneous ensembles*: MLMC workflow demonstrated within Regent / Legion

Modular architecture for Dakota-MPI, Dakota-X, Py-Dakota, ...



Joint Capability Roadmap for AMT ensemble management

