



U.S. DEPARTMENT OF
ENERGY

Office of
Science

CESD Cyberinfrastructure Working Groups

Software Engineering and Interoperability

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Motivation and Challenges

Motivation

High quality community driven software supporting CESD mission

Challenges

- ❑ changing architectures and programming models
- ❑ complex multiscale models (coupling, interoperability)
- ❑ diverse interdisciplinary teams
- ❑ integration of legacy and new capabilities across projects

Near-Term Activities

Identify a best practice for model-related data in repositories.

- ❑ Survey existing data practices, formats. Include both internal and external people. “What data do we have?”
 - ❑ Construct a survey and circulate to eight participating projects, compile results
 - ❑ Construct preliminary classification scheme and share with WGs
- ❑ Determine “What success looks like?”
 - ❑ How do we present, support, and ensure adoption



Near-Term Activities

Identify the needs of the APIs being developed for CESD applications.

- inter-model and workflow model communication
- Survey existing capabilities for data mediators
- Survey existing interfaces in CESD
 - Compare and contrast Alquimia vs implied ALM interface between soil physics and biogeochemistry
 - Study other “interfaces of the pie”
- Analyze existing interfaces, in terms of “best practices”
- Identify low-hanging fruit -- what comes next?



Community Perspective and Outreach

- ❑ Open source codes with **Software Productivity and Sustainability Improvement Plans** (PSIPs), a roadmap concept from IDEAS.
- ❑ Participation in the broader community, e.g.,
 - ❑ CSDMS annual meeting, modeling clinics
 - ❑ International Soil Modelling Consortium (ISMC) workshop
 - ❑ CUAHSI Community Modeling Working Group
- ❑ Increasing participation in Model Intercomparison studies
 - ❑ Subsurface Environmental Simulation Benchmarking Workshop V
 - ❑ 2nd Integrated Hydrologic Model Intercomparison Project
- ❑ Contribute to and be part of larger modeling community **using HPC as needed, but not just about HPC.**
- ❑ Develop a “web” presence
 - ❑ share, communicate, coordinate - how do we make this useful?