



U.S. DEPARTMENT OF
ENERGY

Office of
Science

CESD Cyberinfrastructure Working Groups

Software Engineering and Interoperability

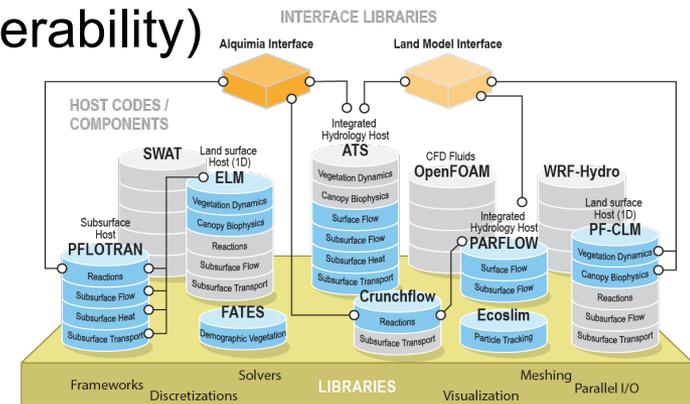
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Interests and Scope

A high quality community driven **open-source software ecosystem of interoperable components** that can be assembled in flexible configurations within a common framework **supporting ModEx and the Virtual Laboratory:**

- ❑ integration of legacy and new capabilities across projects
- ❑ rigorous – but rapid – testing and validation of model-data integration capabilities
- ❑ changing architectures and programming models
- ❑ complex multiscale models (coupling, interoperability)
- ❑ performing quantitative and formalized UQ
- ❑ diverse interdisciplinary teams, and training
- ❑ increased scientific productivity



Near-Term Goals

Identify best practices for model-related data in repositories.

- Survey existing data practices, formats
- Determine how to **present, support, and ensure adoption** of identified best practices.

Identify the needs of the APIs and services in CESD applications.

- Inter-process (coupling) and model workflow communication
- Survey needs and existing capabilities of data mediators
- Survey existing interfaces used and identify targets based on immediate needs.

Publish/share high-resolution model output and analysis

- Reduce gap between HPC and Non-HPC modelers and domain scientists
- Develop Use Cases (approach, requirements, and prototype) for publishing large data sets arising from Integrated Hydrology simulations

Community Perspective and Outreach

- Open source codes with **Software Productivity and Sustainability Plans** (roadmap concept from IDEAS)
 - Leverage and extend “policies” work in the xSDK
- Participation in the broader community, e.g.,
 - CSDMS annual meeting, modeling clinics
 - International Soil Modelling Consortium (ISMC) workshop
 - CUAHSI Community Modeling Working
- Co-lead/participate in Model Intercomparison studies
- Facilitate communication across projects
 - Webinars to seed discussion and collaboration
 - Regular (monthly?) videoconferences
- Develop a “web” presence?
 - Part of a larger effort of coordination, outreach and training for the software ecosystem.



Discussion Topics

Business Models

- ❑ Currently a group of passionate scientists that meet a couple of times a year and coordinate strategically leveraged activities that help the broader community.
- ❑ **Benefits:** enhanced communication, familiarity across BER projects, shared experiences, leveraging ...
- ❑ **Drawbacks:** limited time to volunteer, limited scope, ...
- ❑ **Cornerstone Projects:**
 - ❑ Community driven, community service oriented by design (ESS-DIVE, iLAMB, IDEAS-Watersheds)
 - ❑ Provide critical support/structure so that it's easier and more beneficial for participation.
 - ❑ Create new mechanisms for recognition and participation (e.g., BSSW fellows awards)

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