



U.S. DEPARTMENT OF  
**ENERGY**

Office of  
Science

## **CESD Cyberinfrastructure Working Groups**

### ***Software Engineering and Interoperability***

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# Interests and Scope

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*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

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## ***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)
- ❑ 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
  - ❑ Subsurface Environmental Simulation Benchmarking Workshop V
  - ❑ 2nd Integrated Hydrologic Model Intercomparison Workshop
- ❑ Facilitate communication across projects
  - ❑ Webinars to seed discussion and collaboration, kickoff last week by Ryan Knox about FATES
  - ❑ Regular (monthly?) videoconferences
- ❑ Develop a “web” presence?

# 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, ...
- Do we need a mechanism to manage proposals and funding for working group activities; **Do we need a center?**
- What is working for other centers and working groups?

## ***Develop a “web” presence:***

- Share, communicate, and coordinate
- But what should it really provide to be most useful?

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