ACME Ambitions and Status
Vision, Goals and Reality

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ACME Information

Why ACME? A DOE Science Vision for Climate Simulation and Prediction

The Accelerated Climate Modeling for Energy Project is an ongoing, state-of-the-science Earth system modeling, simulation, and prediction project that optimizes the use of DOE laboratory resources to meet the science needs of the nation and the mission needs of DOE.

“A DOE Model on DOE Machines for the DOE Mission”
Three-Year (2017) Deliverables

1. ACME v1 Model Experiments Completed
   1. Water Cycle – Coupled High Resolution Globally
   2. Cryosphere – Global Coupled Model with Refined Resolution Regions in Atmosphere, Ocean and New Ice Processes
   3. BGC – Global Coupled Model with New Terrestrial BGC and Ecological Processes

2. ACME v1 Model Documented and Released

3. All ACME v1 Experimental Data Available

Model Simulations Must Start by Summer 2016
ACME v1-alpha Completed by January 2016
ACME v1 Components Completed by November 2015
ACME Project Elements

• a series of **prediction and simulation experiments** addressing scientific questions and mission needs;
• a well documented and tested, continuously advancing, evolving, and improving **system of model codes that comprise the ACME Earth system model**; **formal code review process for each component; primary metrics for coupled system**
• the ability to use effectively **leading (and “bleeding”) edge computational facilities** soon after their deployment at DOE national laboratories; and **NESAP, CAAR**
• an **infrastructure** to support code development, hypothesis testing, simulation execution, and analysis of results. Recently **Identified need for versioning of infrastructure, like model. Especially Workflow pieces and integration.**
ACME Roadmap

Major Review-Renewal Proposal

100+ PFLOP Machines

Current Machines

Project Y

0 2 4

v0 v1 v2

Major Simulations
Model Development
Leadership Architectures
CRUNCH TIME!!!!

• Code freeze in November 2015
• Coupled model ready for tuning January 1, 2016
• Experimental Simulation Campaigns start July 1, 2016!!!!
Some Current Workflow Challenges

• Lots of details – standardizing regridders, merging disparate data analysis packages and scripts, obtaining observational data sets, etc.

• Infrastructure at Leadership Centers
  – Implicit assumption that most tasks will be done on their resources, and only small amount of data will be moved.
  – Diverse software stacks are diverse on data and infrastructure computers
  – Hard to get dedicated ACME resources that can be customized for ACME use cases.

• ESGF and data that are cataloged, but physically unavailable – e.g. HPSS