What's new in the CESM2 user interface

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CIME
Common Infrastructure for Modeling Earth

Model infrastructure and control has been separated from model science and is now available in a public/open-source git repository:

https://github.com/ESMCI/cime/

CIME contains

- Model coupling code
- Case generation, control and workflow scripts
- Stub and Dead models for each supported component

Directory Structure changes

CESM1.2.2

- scripts
  - ccsm_utils
    - Machines
    - Tools
- models
  - atm
    - datm
    - cam
    - satm
    - Xatm
  - csm_share
  - utils
    - mct
    - pio

CESM2.0

- cime
  - scripts
    - Tools
  - components
    - data_comps
    - stub_comps
    - Xcpl_comps
  - externals
    - pio
    - mct
  - cime_config
    - cesm
      - machines
- components
  - cam
  - clm

Case Control System

Scripts have been rewritten in python with a coordinated object oriented design

- Faster
- More code reuse
- Improved and expanded testing
- Consistent look and feel

CESM1.2.2: create_newcase -case foo -compset A -res f19_g16 -mach yellowstone -compiler intel

CESM2.0: create_newcase --case foo --compset A --res f19_g16 (--machine yellowstone --compiler intel)

Changes in case foo

cesm1.2.2

- cesm_setup
- foo.build
- foo.clean_build
- foo.submit

CESM2.0

- case.setup
- case.build
- case.build --clean
- case.submit

Ensemble Verification Test

How do you have confidence that your new machine / new compiler / new optimization is correct?

- Results are bit-for-bit exact when compared to run previous to change (RARE)
- Run 200-400 years and compare to a known run of same length (costly and subjective)
- New ensemble verification test: Do three 1 year runs with perturbed initial conditions, compare these runs to an ensemble of previously generated runs. (inexpensive with an objective result)

New model components

- Ocean wave model
- Land ice (glacier) model
- Mosart (improved River runoff model)
- External System Processing (Data Assimilation) model