Review

Questions from day 1?

Setting up different case types

Review of a case directory – Common files and commands

- Case documentation
  - README.case – detailed documentation of the case
  - CaseStatus – history of operations (configuration, builds, runs)
  - CaseDocs – model run-time settings files
- Commands
  - **`xmlquery`** – Find and display case information and settings
  - **`xmlchange`** – Change case settings
  - **`pelayout`** – Display how the model will use the machine processing nodes
  - **`preview_namelist`** – Compute all the runtime model settings files
  - **`preview_run`** – Display details of how the run will be submitted to the machine

Review of a case directory – Configuration file groups

- **Component namelist (run-time) config files** – (***Set runtime options here***)
  - `user_nl_blom user_nl_cam  user_nl_cice user_nl_cism`
  - `user_nl_clm     user_nl_cpl     user_nl_mosart`
  - These files are used to set component-model namelists at runtime.
- **Case configuration files** (*FYI – you should not have to look at these*)
  - env_archive.xml – details of how to run the short-term archiver
  - env_batch.xml – details of how the HPC machine's batch system works
  - env_build.xml – details of how the executable will be built
  - env_case.xml – details of this particular case
  - env_mach_pes.xml – details of how the run will use machine processors
  - env_mach_specific.xml – details of runtime environment settings
  - env_run.xml – details of how the case will be run
  - env_test.xml – used by the CIME testing system to run tests

Setting up different case types

Types of NorESM model run

- **Initial run**
  - Start NorESM with a set of initial-data files for each component
  - Used to begin a new experiment
- **Restart run**
  - Start NorESM with the exact state of the restart files
  - Used to continue a run in a case where the state was last saved
- **Branch run**
  - Similar to a restart run but using a consistent set of restart files from a previous run
- **Hybrid run**
  - Similar to an initial run but using initialization datasets *from a previous case*

NorESM model **initial** run (aka **startup**)

- This is the default run type where the model is started from a set of initial value files or settings.
- Each component will have default initial value files for supported combinations of compset and resolution. In some unsupported settings, you may have to provide an initial value file (expert level).
- You can always find out what type of run you will be doing:

```
./xmlquery RUN_TYPE
```

NorESM model **restart** run

- Restart runs are used to continue a run with minimal changes.
- When submitting a restart run, only changes to history (diagnostic) output fields and frequency are allowed.
- When a case is running and creates a set of restart files, these files can be used to restart the model such that the model state is bit identical with a normal model run.
- To create restart files, use the **`REST_OPTION`** and **`REST_N`** XML variables.
- Make sure **`CONTINUE_RUN`** is **`TRUE`** before submitting (normally automatic after a successful run)

NorESM model **branch** run

- In a branch run, all components are initialized using a consistent set of restart files from a previous run.
- The set of restart files is determined by the **RUN_REFCASE** and **RUN_REFDATE** XML variables
- Several reference cases are provided in /cluster/shared/noresm/inputdata/ccsm4_init but you can change the location with the **RUN_REFDIR** XML variable.
- Set **GET_REFCASE** to **TRUE** so that the reference files are copied into your run directory.
- A branch run is a restart run so only limited changes to the namelists are allowed (see restart run).

NorESM model **hybrid** run

- A hybrid run is initialized like an initial run but it uses initialization data sets from a previous case as in a branch run.
- Because a hybrid run is similar to an initial run, there is a lot more flexibility in the set of initial-data files and namelist settings.
- In a hybrid run, CAM requires an initial value file, not a restart file.
- The ocean component does not start until what would normally by the second ocean coupling interval.

Other (hopefully) useful tidbits

More about xmlchange and xmlquery

- Search for an XML variable
  `./xmlquery --partial <STRING>`
- Find out more about an XML variable
  `./xmlquery --description <VARIABLE>`
- What about duplicate variables in different groups?
  `./xmlquery JOB_WALLCLOCK_TIME`

```
Results in group case.st_archive
    JOB_WALLCLOCK_TIME: 0:59:00

Results in group case.run
    JOB_WALLCLOCK_TIME: 01:00:00
```

- Change just the run wallclock
  `./xmlchange --subgroup case.run JOB_WALLCLOCK_TIME=02:00:00`

Another way to modify a case

- create_newcase has an argument, --user-mods-dir, that allows you to bundle a set of user_nl_xxx files along with xmlchange commands.
- NorESM and several component models provide common case customization sets in their cime_config/usermods_dirs directory.

Really useful case control reference

https://esmci.github.io/cime/versions/master/html/index.html

Questions?