

CESM Tutorial

Intro to Lab: Basics of CESM

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CESM2 Quickstart Workflow

<https://escomp.github.io/CESM/release-cesm2/>

- One-Time Setup Steps
 - Download the CESM code
 - Create an Input Data Root Directory
 - Porting
- Creating & Running a Case
 - Create a New Case
 - Invoke `case.setup`
 - Build the Executable with `case.build`
 - Run the Model with `case.submit`
 - Review Output Data

How to Setup Your CESM Workspace

Paths are the directions to the location of different pieces of your experiment

Roots are saved paths that point to each piece

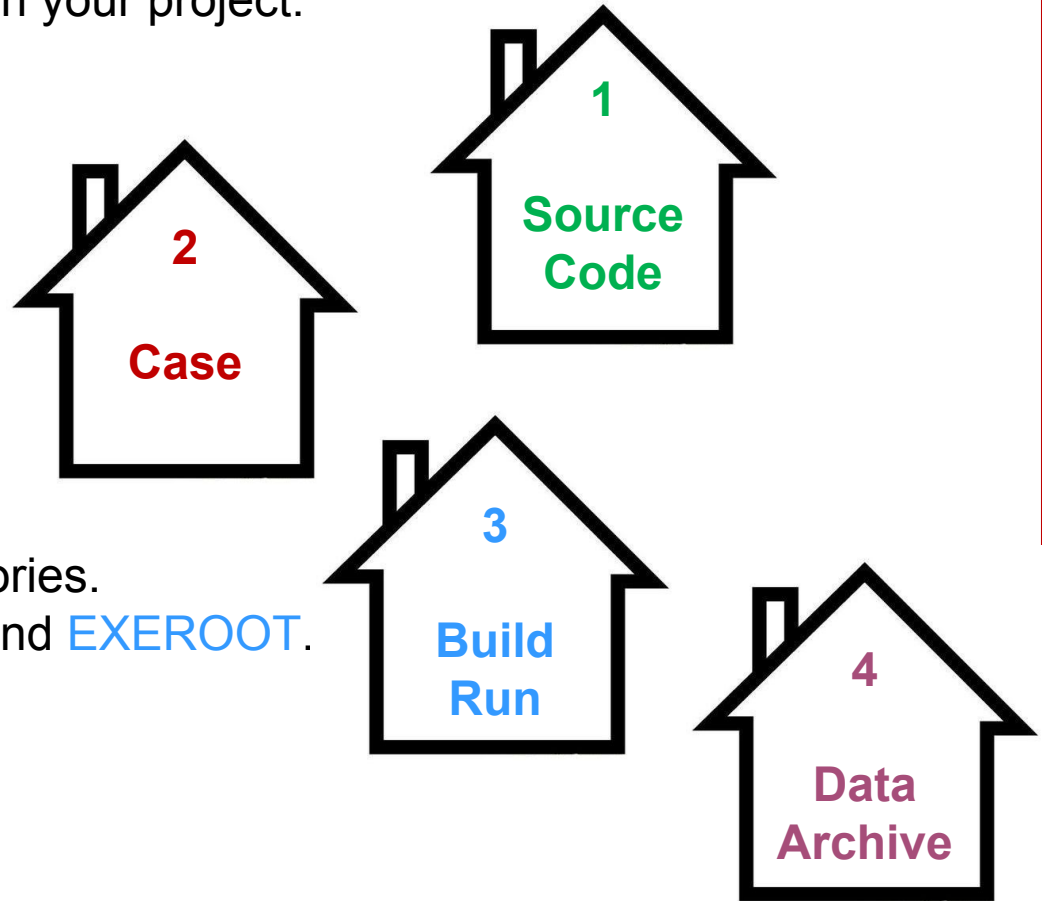
You will need to be aware of 4 paths in your project:

➤ Path to your CESM code.
This is referred to as **SRCROOT**
and contains **CIMEROOT**.

➤ Path to your case directories.
This is your **CASEROOT**.

➤ Path to your build and run directories.
Referred to later as **OBJROOT** and **EXEROOT**.

➤ Path to your Archived data.
Saved as your **DOUT_S_ROOT**.



Download CESM

Note: The tutorial uses a slightly modified version of CESM that has been checked out for you on Cheyenne. You do not need to do the steps below for the practical, but you may for your later work!

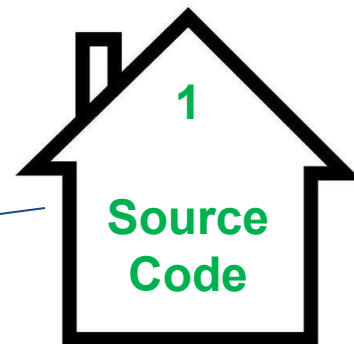
```
work/fischer> git clone -b release-cesm2.1.1 https://github.com/ESCOMP/cesm.git cesm2.1.1
Cloning into 'cesm2.1.1'...
remote: Enumerating objects: 26, done.
remote: Counting objects: 100% (26/26), done.
remote: Compressing objects: 100% (22/22), done.
remote: Total 2424 (delta 11), reused 17 (delta 4), pack-reused 2398
Receiving objects: 100% (2424/2424), 2.01 MiB | 0 bytes/s, done.
Resolving deltas: 100% (1322/1322), done.
Note: checking out '69af836c8a857ccac1b36efc04b0008770e5970d'.
```

You are in 'detached HEAD' state. You can look around, make experimental changes and commit them, and you can discard any commits you make in this state without impacting any branches by performing another checkout.

If you want to create a new branch to retain commits you create, you may do so (now or later) by using `-b` with the checkout command again. Example:

```
git checkout -b <new-branch-name>
```

```
work/fischer> cd cesm2.1.1
Directory: /glade/work/fischer/cesm2.1.1
fischer/cesm2.1.1> ls
ChangeLog          cime_config      doc              LICENSE.txt      README.rst
ChangeLog_template Copyright        Externals.cfg   manage_externals
fischer/cesm2.1.1>
```



`cime_config` contains CESM specific configuration information for CIME
`manage_externals` contains utilities for downloading component models
which are defined in the `Externals.cfg` file

Checkout all the model components

Note: Try this at home!

The tutorial setup has already done this step for you.

```
fischer/cesm2.1.1> pwd
/glade/work/fischer/cesm2.1.1
fischer/cesm2.1.1> ./manage externals/checkout externals
Processing externals description file : Externals.cfg
Checking status of externals: clm, mosart, ww3, cime, cice, pop, cism, rtm, cam,
Checking out externals: clm, mosart, ww3, cime, cice, pop, cism, rtm, cam,
Processing externals description file : Externals_CLM.cfg
Checking out externals: fates, ptclm,
Processing externals description file : Externals_POP.cfg
Checking out externals: cvmix, marbl,
Processing externals description file : Externals_CISM.cfg
Checking out externals: source_cism,

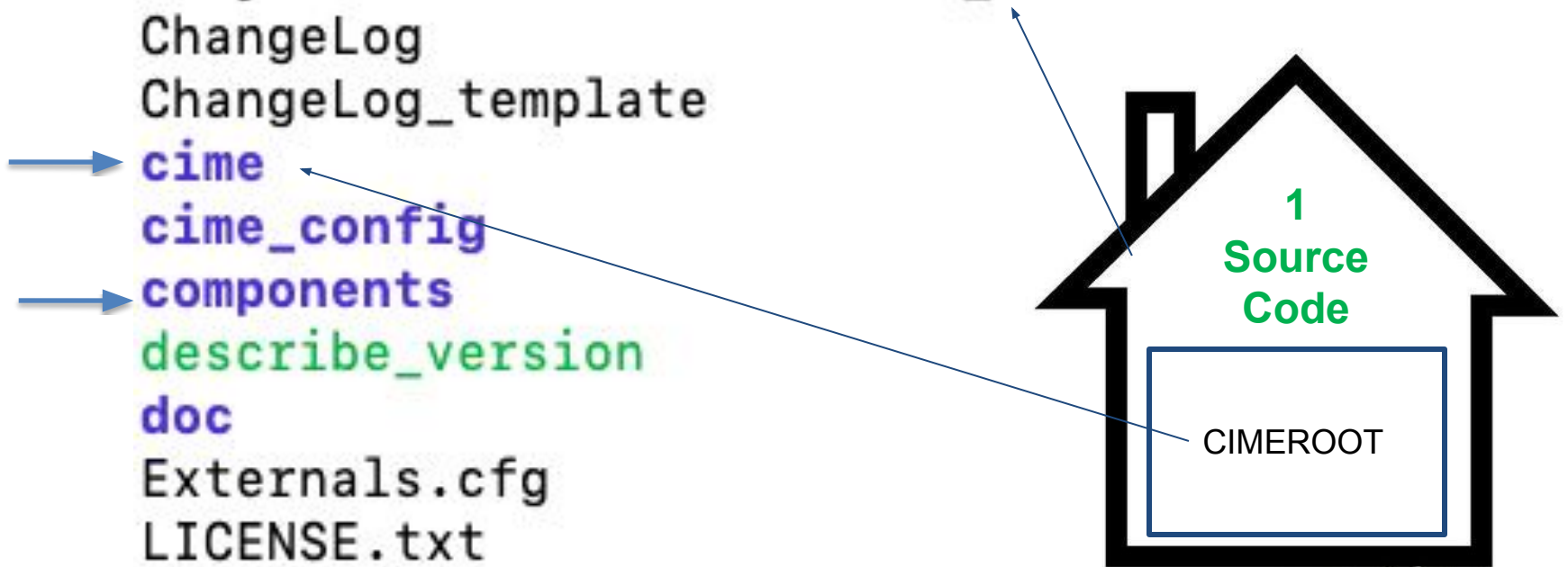
fischer/cesm2.1.1>
```

[manage_externals/checkout_externals](#) is required to fully acquire all of the CESM source code. You should not need access credentials to do this. And, it is not downloading input data. That is a later step.

Download listing of CESM

Note: I've switched paths to the pre-downloaded tutorial version of the model

```
cheyenne6 tutorial/cesm2.1_tutorial2022> pwd
/glade/p/cesm/tutorial/cesm2.1_tutorial2022
cheyenne6 tutorial/cesm2.1_tutorial2022> ls -l
ChangeLog
ChangeLog_template
cime
cime_config
components
describe_version
doc
Externals.cfg
LICENSE.txt
manage_externals
README.rst
cheyenne6 tutorial/cesm2.1_tutorial2022> 
```



Components listing

```
tutorial/cesm2.1.1_tutorial> cd components/  
Directory: /glade/p/cesm/tutorial/cesm2.1.1_tutorial/components  
cesm2.1.1_tutorial/components> ls -l  
cam ←———— Community Atmosphere Model  
cice ←———— Community Sea Ice Model  
cism ←———— Community Ice Sheet Model  
clm ←———— Community Land Model  
mosart ←———— Model for Scale Adaptive River Transport  
pop ←———— Parallel Ocean Program  
rtm ←———— River Transport Model  
ww3 ←———— WaveWatch3  
cesm2.1.1_tutorial/components>
```

```
cesm2.1.1_tutorial/components> cd cam
```

```
Directory: /glade/p/cesm/tutorial/cesm2.1.1_tutorial/components/cam
```

```
components/cam> ls -l
```

```
bld  
chem_proc  
cime_config  
doc  
src  
SVN_EXTERNAL_DIRECTORIES  
test  
tools  
components/cam>
```

```
cesm2.1.1_tutorial/components> cd clm
```

```
Directory: /glade/p/cesm/tutorial/cesm2.1.1_tutorial/components/clm
```

```
components/clm> ls -l
```

```
bld  
cime_config  
CODE_OF_CONDUCT.md  
CONTRIBUTING.md  
Copyright  
CTSMMasterChecklist  
doc  
Externals.cfg  
Externals_CLM.cfg  
LICENSE  
manage_externals  
parse_cime.cs.status  
README  
README_EXTERNALS.rst  
README.rst  
src  
src_clm40  
test  
tools  
components/clm>
```

CIME – Common Infrastructure for Modeling the Earth

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

Take-away points

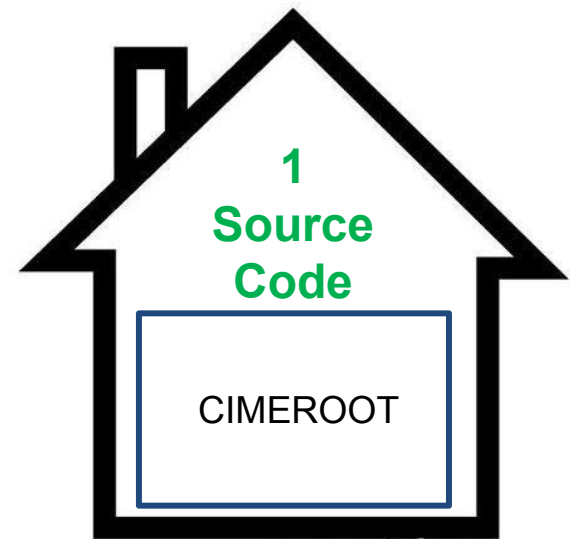
- Coupling infrastructure
- Data and stub models for satisfying driver/mediator requirements
- Testing infrastructure
- Python scripts and XML configuration files for the **Case Control System**

```
tutorial/cesm2.1.1_tutorial> cd cime
Directory: /glade/p/cesm/tutorial/cesm2.1.1_tutorial/cime
cesm2.1.1_tutorial/cime> ls -l
ChangeLog
ChangeLog_template
CMakeLists.txt
config
CONTRIBUTING.md
doc
index.html
LICENSE.TXT
README.md
scripts
src
tools
utils
cesm2.1.1_tutorial/cime>
```


CIME Documentation

<http://esmci.github.io/cime>

```
cesm2.1.1_tutorial/cime> cd scripts/  
Directory: /glade/p/cesm/tutorial/cesm2.1.1_tutorial/cime/scripts  
cime/scripts> ls -l  
create_clone  
create_newcase  
create_test  
data_assimilation  
fortran_unit_testing  
lib  
query_config  
query_testlists  
tests  
Tools  
cime/scripts>
```



Don't be afraid to explore in these directories in the lab session this afternoon!

Work Flow: Super Quick Start

CESM2 can be run with a set of **4 commands**

Set of commands to build and run the model on supported machine cheyenne

one time step – create a directory to store your experiment case roots

```
mkdir ~/cases
```

go into scripts subdirectory of cime

```
cd /glade/p/cesm/tutorial/cesm2.1_tutorial_2021/cime/scripts
```

create a new case in the directory “cases” in your home directory

```
./create_newcase --case ~/cases/b.day1.0 --res f19_g17 --compset B1850
```

go into the case you just created in the last step

```
cd ~/cases/b.day1.0
```

invoke case.setup

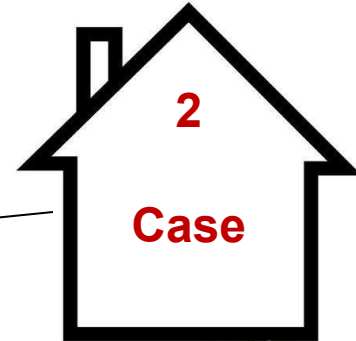
```
./case.setup
```

build the executable (cheyenne specific commands!)

```
qcmd -- ./case.build
```

submit your run to the batch queue

```
./case.submit
```



Create a new case experiment

In the cime/scripts directory, `create_newcase` is the tool that generates a new case.

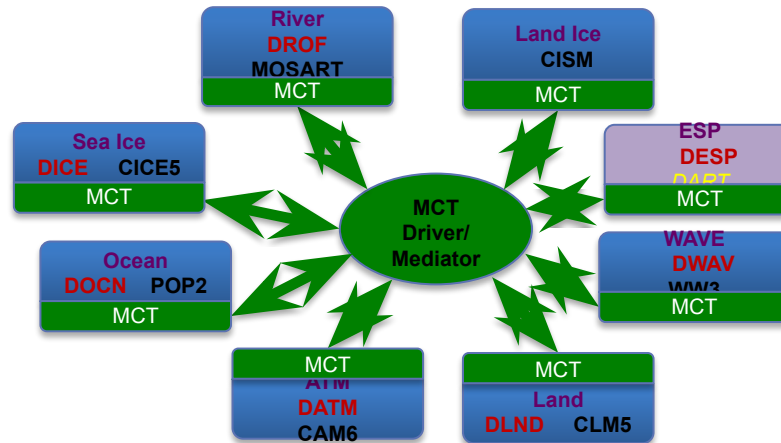
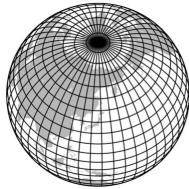
`create_newcase` requires 3 arguments

What is the casename ?

Which resolution?

Which model configuration ?
Which set of components ?

Which machine are you running on?



Sometimes Optional

NOTES:

- for all user scripts, you can run the script name followed by the `--h` or `--help` argument to see help documentation and a list of all command line arguments.
- Double dashes “--” are now required with command line arguments
- `--mach` is not required on CESM supported machines

Result of running create_newcase

CIMEROOT/scripts/create_newcase --case ~/cases/b.day1.0 --res f19_g17 --compset B1850

```
cime/scripts> ./create_newcase --case ~/cases/b.day1.0 --res f19_g17 --compset B1850
Compset longname is 1850_CAM60_CLM50%BGC-CROP_CICE_POP2%ECO%ABIO-DIC_MOSART_CISM2%NOEVOLVE_WW3_BGC%BDRD
Compset specification file is /glade/p/cesm/tutorial/cesm2.1.1_tutorial/cime/./cime_config/config_compsets.xml
Compset forcing is 1850
Com forcing is Biogeochemistry intercomponent with diagnostic CO2
ATM component is CAM cam6 physics:
LND component is cLm5.0:BGC (vert. resol. CN and methane) with prognostic crop:
ICE component is Sea ICE (cice) model version 5
OCN component is POP2 EcosystemAbiotic DIC/DIC14
ROF component is MOSART: MOdel for Scale Adaptive River Transport
GLC component is cism2 (default, higher-order, can run in parallel):cism ice evolution turned off (this is the standard configuration unless you're explicitly interested in ice e
WAV component is Wave Watch
ESP component is
Pes specification file is /glade/p/cesm/tutorial/cesm2.1.1_tutorial/cime/./cime_config/config_pes.xml
Compset specific settings: name is RUN_STARTDATE and value is 0001-01-01
Compset specific settings: name is RUN_REFDATE and value is 0301-01-01
Compset specific settings: name is RUN_TYPE and value is hybrid
Compset specific settings: name is RUN_REFCASE and value is b.e20.B1850.f19_g17.release_cesm2_1_0.020
Compset specific settings: name is CLM_NAMELIST_OPTS and value is use_init_interp=.true.
Machine is cheyenne
Pes setting: grid match is a%1.9x2.5.+l%1.9x2.5.+oi%gx1 grid info
Pes setting: machine match is cheyenne
Pes setting: compset_match is CAM.+CLM.+CICE.+POP.+ PE layouts
Pes setting: grid is a%1.9x2.5_l%1.9x2.5_oi%gx1v7_r%r05_g%gland4_w%ww3a_m%gx1v7
Pes setting: compset is 1850_CAM60_CLM50%BGC-CROP_CICE_POP2%ECO%ABIO-DIC_MOSART_CISM2%NOEVOLVE_WW3_BGC%BDRD
Pes setting: tasks is {'NTASKS_ATM': 288, 'NTASKS_ICE': 108, 'NTASKS_CPL': 288, 'NTASKS_LND': 144, 'NTASKS_WAV': 36, 'NTASKS_ROF': 40, 'NTASKS_OCN': 288, 'NTASKS_GLC': 36}
Pes setting: threads is {'NTHRDS_ICE': 1, 'NTHRDS_ATM': 1, 'NTHRDS_ROF': 1, 'NTHRDS_LND': 1, 'NTHRDS_WAV': 1, 'NTHRDS_OCN': 1, 'NTHRDS_CPL': 1, 'NTHRDS_GLC': 1}
Pes setting: rootpe is {'ROOTPE_OCN': 288, 'ROOTPE_LND': 0, 'ROOTPE_ATM': 0, 'ROOTPE_ICE': 144, 'ROOTPE_WAV': 252, 'ROOTPE_CPL': 0, 'ROOTPE_ROF': 0, 'ROOTPE_GLC': 0}
Pes setting: pstrid is {}
Pes other settings: {}
Pes comments: about 12ypd expected
Compset is: 1850_CAM60_CLM50%BGC-CROP_CICE_POP2%ECO%ABIO-DIC_MOSART_CISM2%NOEVOLVE_WW3_BGC%BDRD compset longname
Grid is: a%1.9x2.5_l%1.9x2.5_oi%gx1v7_r%r05_g%gland4_w%ww3a_m%gx1v7
Components in compset are: ['cam', 'clm', 'cice', 'pop', 'mosart', 'cism', 'ww3', 'sesp', 'drv', 'dart']

*****
This compset and grid combination is not scientifically supported, however it is used in 10 tests.
*****

Using project from .cesm_proj: P93300606
No charge_account info available, using value from PROJECT
Using project from .cime/config: P93300606
cesm model version found: release-cesm2.1.1
Batch system type is pbs
job is case.run USER REQUESTED WALLTIME None USER REQUESTED_QUEUE None
job is case.st_archive USER REQUESTED_WALLTIME None USER REQUESTED_QUEUE None
Creating Case directory /glade/u/home/fischer/cases/b.day1.0
cime/scripts>
```

Machine specific info

Success! This is the CASEROOT directory



CASEROOT directory structure after running

```
cases/b.day1.0> pwd
/glade/u/home/fischer/cases/b.day1.0
cases/b.day1.0> ls -l
archive_metadata
Buildconf
case.build
case.cmpgen_namelists
case.qstatus
case.setup
case.submit
check_case
check_input_data
env_archive.xml
env_batch.xml
env_build.xml
env_case.xml
env_mach_pes.xml
env_mach_specific.xml
env_run.xml
LockedFiles
pelayout
preview_namelists
preview_run
README.case
SourceMods
Tools
xmlchange
xmlquery
cases/b.day1.0>
```

create_newcase



script to check required input data files and download them, if necessary

User Customizable case XML files

User defined source code modifications (advanced!)

script to change XML settings

script to query XML settings

CASEROOT env_*.xml files

env_*.xml contains variables used by scripts -- some can be changed by the user

env_archive.xml	specifies rules for short-term archival script case.st_archive
env_batch.xml	set by create_newcase to define batch specific settings used script case.submit
env_build.xml	specifies build information used by script case.build
env_case.xml	set by create_newcase and cannot be modified
env_mach_pes.xml	specifies PE layout of components used by script case.run
env_mach_specific.xml	specifies machine specific information used by script case.build
env_run.xml	- sets run time information (such as length of run, frequency of restarts, ...) User interacts with this file most frequently

- To query a variable in an xml file use script **xmlquery** (or **xmlquery -p**)
- To modify a variable in an xml file use script **xmlchange**
./xmlchange STOP_N=20

NOTE: You can edit the XML files manually but it is recommended that you use the xmlchange script to prevent XML errors and keep a record of your changes!

Work Flow: Super Quick Start

one time step – create a directory to store your experiment case roots

```
mkdir ~/cases
```

go into scripts subdirectory of cime

```
cd /glade/p/cesm/tutorial/cesm2.1_tutorial_2021/cime/scripts
```

create a new case in the directory “cases” in your home directory

```
./create_newcase --case ~/cases/b.day1.0 --res f19_g17 --compset B1850
```

go into the case you just created in the last step

```
cd ~/cases/b.day1.0
```

```
# invoke case.setup
```

```
./case.setup
```

build the executable (cheyenne specific commands!)

```
qcmd -- ./case.build
```

submit your run to the batch queue

```
./case.submit
```

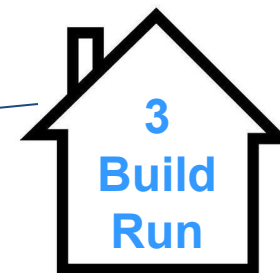
case.setup

Notice the “.” before any command run in the CASEROOT! Run `./case.setup --help` in the lab session.

```
cases/b.day1.0> ./case.setup
Setting resource.RLIMIT_STACK to -1 from (307200000, -1)
/glade/u/home/fischer/cases/b.day1.0/env_mach_specific.xml already exists, delete
job is case.run USER_REQUESTED_WALLTIME None USER_REQUESTED_QUEUE None
Creating batch scripts
Writing case.run script from input template /glade/p/cesm/tutorial/cesm2.1.1_tutor
Creating file .case.run
Writing case.st_archive script from input template /glade/p/cesm/tutorial/cesm2.1.
Creating file case.st_archive
Creating user_nl_xxx files for components and cpl
If an old case build already exists, might want to run 'case.build --clean' before
You can now run './preview_run' to get more info on how your case will be run
cases/b.day1.0>
```

case.setup creates:

- RUNDIR and EXEROOT directories
- user_nl_xxx files – user customizable component namelist files
- scripts `case.run`, `case.st_archive`, and Macros.make file
- hidden files `.case.run` and `.env_mach_specific.*` which can help with debugging
- CaseDocs directory - **NOTE:** these files should not be edited!



Work Flow: Super Quick Start

Set of commands to build and run the model on a supported machine: "cheyenne"

one time step – create a directory to store your experiment case roots

`mkdir ~/cases`

go into scripts subdirectory of cime

`cd /glade/p/cesm/tutorial/cesm2.1_tutorial_2021/cime/scripts`

create a new case in the directory "cases" in your home directory

`./create_newcase --case ~/cases/b.day1.0 --res f19_g17 --compset B1850`

go into the case you just created in the last step

`cd ~/cases/b.day1.0`

invoke case.setup

`./case.setup`

build the executable (cheyenne specific commands!)

`qcmd -- ./case.build`

submit your run to the batch queue

`./case.submit`

The "qcmd --" is for Cheyenne only!

Running the case.build Script

```
cases/b.day1.0> setenv CESM_BLD_TEMPLATE /glade/p/cesm/tutorial/templates/cesm2.1.1_b1850/bld
cases/b.day1.0> qcmd -- ./case.build
Submitting command to PBS using account CESM0005:
./case.build
```

Waiting for job 7394242.chadmin1.ib0.cheyenne.ucar.edu to start ...

```
Building case in directory /glade/u/home/fischer/cases/b.day1.0
sharedlib only is False
model_only is False
```

```
Setting resource,RLIMIT_STACK to -1 from (-1, -1)
```

```
Generating component namelists as part of build
```

```
- Prestaging REFCASE (/glade/p/cesmdata/cseg/inputdata/cesm2_init/b.e20.B1850.f19_g17.release_cesm2_1_0.020/0301-01-01) to /glade/scratch/fischer/b.day1.0/run
Copy rpointer /glade/p/cesmdata/cseg/inputdata/cesm2_init/b.e20.B1850.f19_g17.release_cesm2_1_0.020/0301-01-01/rpointer.ocn.restart
Copy rpointer /glade/p/cesmdata/cseg/inputdata/cesm2_init/b.e20.B1850.f19_g17.release_cesm2_1_0.020/0301-01-01/rpointer.ice
Copy rpointer /glade/p/cesmdata/cseg/inputdata/cesm2_init/b.e20.B1850.f19_g17.release_cesm2_1_0.020/0301-01-01/rpointer.lnd
Copy rpointer /glade/p/cesmdata/cseg/inputdata/cesm2_init/b.e20.B1850.f19_g17.release_cesm2_1_0.020/0301-01-01/rpointer.rof
Copy rpointer /glade/p/cesmdata/cseg/inputdata/cesm2_init/b.e20.B1850.f19_g17.release_cesm2_1_0.020/0301-01-01/rpointer.atm
Copy rpointer /glade/p/cesmdata/cseg/inputdata/cesm2_init/b.e20.B1850.f19_g17.release_cesm2_1_0.020/0301-01-01/rpointer.ocn.tavg.5
Copy rpointer /glade/p/cesmdata/cseg/inputdata/cesm2_init/b.e20.B1850.f19_g17.release_cesm2_1_0.020/0301-01-01/rpointer.glc
Copy rpointer /glade/p/cesmdata/cseg/inputdata/cesm2_init/b.e20.B1850.f19_g17.release_cesm2_1_0.020/0301-01-01/rpointer.ocn.ovf
Copy rpointer /glade/p/cesmdata/cseg/inputdata/cesm2_init/b.e20.B1850.f19_g17.release_cesm2_1_0.020/0301-01-01/rpointer.drv
```

```
Creating component namelists
```

```
Calling /glade/p/cesm/tutorial/cesm2.1.1_tutorial/components/cam//cime_config/buildnml
...calling cam buildcpp to set build time options
CAM namelist copy: file1 /glade/u/home/fischer/cases/b.day1.0/Buildconf/camconf/atm_in file2 /glade/scratch/fischer/b.day1.0/run/atm_in
Calling /glade/p/cesm/tutorial/cesm2.1.1_tutorial/components/clm//cime_config/buildnml
Calling /glade/p/cesm/tutorial/cesm2.1.1_tutorial/components/cice//cime_config/buildnml
...buildnml calling cice buildcpp to set build time options
Calling /glade/p/cesm/tutorial/cesm2.1.1_tutorial/components/pop//cime_config/buildnml
... buildnml: calling pop buildcpp to set build time options
Calling /glade/p/cesm/tutorial/cesm2.1.1_tutorial/components/mosart//cime_config/buildnml
Running /glade/p/cesm/tutorial/cesm2.1.1_tutorial/components/cism//cime_config/buildnml
Calling /glade/p/cesm/tutorial/cesm2.1.1_tutorial/components/ww3//cime_config/buildnml
Calling /glade/p/cesm/tutorial/cesm2.1.1_tutorial/cime/src/components/stub_comps/sesp/cime_config/buildnml
Calling /glade/p/cesm/tutorial/cesm2.1.1_tutorial/cime/src/drivers/mct/cime_config/buildnml
```

Namelist creation

```
Finished creating component namelists
```

```
Building gptl with output to file /glade/scratch/fischer/b.day1.0/bld/gptl.bldlog.190731-152702
```

```
Calling /glade/p/cesm/tutorial/cesm2.1.1_tutorial/cime/src/build_scripts/buildlib.gptl
Building mct with output to file /glade/scratch/fischer/b.day1.0/bld/mct.bldlog.190731-152702
Calling /glade/p/cesm/tutorial/cesm2.1.1_tutorial/cime/src/build_scripts/buildlib.mct
Building pio with output to file /glade/scratch/fischer/b.day1.0/bld/pio.bldlog.190731-152702
Calling /glade/p/cesm/tutorial/cesm2.1.1_tutorial/cime/src/build_scripts/buildlib.pio
Building csm_share with output to file /glade/scratch/fischer/b.day1.0/bld/csm_share.bldlog.190731-152702
Calling /glade/p/cesm/tutorial/cesm2.1.1_tutorial/cime/src/build_scripts/buildlib.csm_share
```

Model Build

```
- Building clm4_5/clm5_0 Library
Building lnd with output to /glade/scratch/fischer/b.day1.0/bld/lnd.bldlog.190731-152702
clm built in 1.693829 seconds
```

```
Building atm with output to /glade/scratch/fischer/b.day1.0/bld/atm.bldlog.190731-152702
Building ice with output to /glade/scratch/fischer/b.day1.0/bld/ice.bldlog.190731-152702
Building ocn with output to /glade/scratch/fischer/b.day1.0/bld/ocn.bldlog.190731-152702
Building rof with output to /glade/scratch/fischer/b.day1.0/bld/rof.bldlog.190731-152702
Building glc with output to /glade/scratch/fischer/b.day1.0/bld/glc.bldlog.190731-152702
Building wav with output to /glade/scratch/fischer/b.day1.0/bld/wav.bldlog.190731-152702
Building esp with output to /glade/scratch/fischer/b.day1.0/bld/esp.bldlog.190731-152702
```

```
mosart built in 1.559792 seconds
```

```
cice built in 1.694304 seconds
```

```
sesp built in 2.395237 seconds
```

```
pop built in 5.087418 seconds
```

```
cam built in 9.661922 seconds
```

```
Component glc build complete with 3 warnings
```

```
cism built in 155.652131 seconds
```

```
ww built in 155.668007 seconds
```

```
Building cesm with output to /glade/scratch/fischer/b.day1.0/bld/cesm.bldlog.190731-152702
```

```
Time spent not building: 7.792995 sec
```

```
Time spent building: 193.260044 sec
```

```
MODEL BUILD HAS FINISHED SUCCESSFULLY
```

```
cases/b.day1.0>
```

Success

Work Flow: Super Quick Start

Set of commands to build and run the model on a supported machine: "cheyenne"

one time step – create a directory to store your experiment case roots

mkdir ~/cases

go into scripts subdirectory of cime

cd /glade/p/cesm/tutorial/cesm2.1_tutorial_2021/cime/scripts

create a new case in the directory "cases" in your home directory

./create_newcase --case ~/cases/b.day1.0 --res f19_g17 --compset B1850

go into the case you just created in the last step

cd ~/cases/b.day1.0

invoke case.setup

./case.setup

build the executable (cheyenne specific commands!)

qcmd -- ./case.build

submit your run to the batch queue

./case.submit

Set Job project number and batch queue if needed...

```
cheyenne5 cases/b.day1.0> ./xmlquery -p PROJECT
```

```
Results in group case.run  
PROJECT: UESM0008  
PROJECT_REQUIRED: TRUE
```

```
Results in group case.st_archive  
PROJECT: UESM0008  
PROJECT_REQUIRED: TRUE
```

```
cheyenne5 cases/b.day1.0> ./xmlchange PROJECT=PROGNUM?  
cheyenne5 cases/b.day1.0> ./xmlquery -p QUEUE
```

```
Results in group case.run  
JOB_QUEUE: regular  
USER_REQUESTED_QUEUE:
```

PROGNUM?

IMPORTANT! DO THIS

Running the Model

```
cases/b.day1.0> ./xmlquery DOUT_S
DOUT_S: TRUE
cases/b.day1.0> ./xmlquery STOP_N,STOP_OPTION

Results in group run_begin_stop_restart
STOP_N: 5
STOP_OPTION: ndays
cases/b.day1.0> ./case.submit
Setting resource.RLIMIT_STACK to -1 from (307200000, -1)
- Prestaging REFCASE (/glade/p/cesmdata/cseg/inputdata/cesm2_init/b.e20.B1850.f19_g17.release_cesm2_1_0.020/0301-01-01) to /glade/scratch/fischer/b.day1.0/run
Copy rpointer /glade/p/cesmdata/cseg/inputdata/cesm2_init/b.e20.B1850.f19_g17.release_cesm2_1_0.020/0301-01-01/rpointer.ocn.restart
...
Creating component namelists
Calling /glade/p/cesm/tutorial/cesm2.1.1 tutorial/components/cam//cime_config/buildnml
CAM namelist copy: file1 /glade/u/home/fischer/cases/b.day1.0/Buildconf/camconf/atm_in file2 /glade/scratch/fischer/b.day1.0/run/atm_in
Calling /glade/p/cesm/tutorial/cesm2.1.1 tutorial/components/clm//cime_config/buildnml
Calling /glade/p/cesm/tutorial/cesm2.1.1 tutorial/components/cice//cime_config/buildnml
Calling /glade/p/cesm/tutorial/cesm2.1.1 tutorial/components/pop//cime_config/buildnml
Calling /glade/p/cesm/tutorial/cesm2.1.1 tutorial/components/mosart//cime_config/buildnml
Running /glade/p/cesm/tutorial/cesm2.1.1 tutorial/components/cism//cime_config/buildnml
Calling /glade/p/cesm/tutorial/cesm2.1.1 tutorial/components/ww3//cime_config/buildnml
Calling /glade/p/cesm/tutorial/cesm2.1.1 tutorial/cime/src/components/stub_comps/sesp/cime_config/buildnml
Calling /glade/p/cesm/tutorial/cesm2.1.1 tutorial/cime/src/drivers/mct/cime_config/buildnml
Finished creating component namelists
Checking that inputdata is available as part of case submission
Setting resource.RLIMIT_STACK to -1 from (-1, -1)
Loading input file list: 'Buildconf/clm.input_data_list'
Loading input file list: 'Buildconf/cpl.input_data_list'
Loading input file list: 'Buildconf/pop.input_data_list'
Loading input file list: 'Buildconf/ww3.input_data_list'
Loading input file list: 'Buildconf/cice.input_data_list'
Loading input file list: 'Buildconf/cism.input_data_list'
Loading input file list: 'Buildconf/mosart.input_data_list'
Loading input file list: 'Buildconf/cam.input_data_list'
- Prestaging REFCASE (/glade/p/cesmdata/cseg/inputdata/cesm2_init/b.e20.B1850.f19_g17.release_cesm2_1_0.020/0301-01-01) to /glade/scratch/fischer/b.day1.0/run
Copy rpointer /glade/p/cesmdata/cseg/inputdata/cesm2_init/b.e20.B1850.f19_g17.release_cesm2_1_0.020/0301-01-01/rpointer.ocn.restart
...
- Prestaging REFCASE (/glade/p/cesmdata/cseg/inputdata/cesm2_init/b.e20.B1850.f19_g17.release_cesm2_1_0.020/0301-01-01) to /glade/scratch/fischer/b.day1.0/run
Copy rpointer /glade/p/cesmdata/cseg/inputdata/cesm2_init/b.e20.B1850.f19_g17.release_cesm2_1_0.020/0301-01-01/rpointer.ocn.restart
...
Creating component namelists
Finished creating component namelists
Check case OK
submit_jobs case.run

Submit job case.run
Submitting job script qsub -q regular -l walltime=12:00:00 -A P93300606 -v ARGS_FOR_SCRIPT='--resubmit' .case.run
Submitted job id is 7394313.chadmin1.ib0.cheyenne.ucar.edu
Submit job case.st_archive
Submitting job script qsub -q share -l walltime=0:20:00 -A P93300606 -W depend=afterok:7394313.chadmin1.ib0.cheyenne.ucar.edu -v ARGS_FOR_SCRIPT='--resubmit' case.st_archive
Submitted job id is 7394314.chadmin1.ib0.cheyenne.ucar.edu
Submitted job case.run with id 7394313.chadmin1.ib0.cheyenne.ucar.edu
Submitted job case.st_archive with id 7394314.chadmin1.ib0.cheyenne.ucar.edu
cases/b.day1.0> qstat
Job id      Name      User      Time Use S Queue
-----
7394314.chadmin1  b.day1.0.st_arc  fischer      0 H shareex
7394313.chadmin1  b.day1.0.run     fischer      0 Q regular
cases/b.day1.0>
```

Check archive and Run options

Check if namelists need to be rebuilt

Check input data

Submit case.run

Submit case.st_archive dependent on the successful completion of case.run

Batch job status qstat -u testusr1

Check the CASEROOT CaseStatus file

```
cases/b.day1.0> cat CaseStatus
2019-07-31 15:14:10: case.setup starting
-----
2019-07-31 15:14:11: case.setup success
-----
2019-07-31 15:20:02: case.build starting
-----
2019-07-31 15:24:30: build.clean starting
-----
2019-07-31 15:24:33: build.clean success
-----
2019-07-31 15:25:26: case.setup starting
-----
2019-07-31 15:26:47: case.setup success
-----
2019-07-31 15:27:02: case.build starting
-----
CESM version is release-cesm2.1.1
Processing externals description file : Externals.cfg
Processing externals description file : Externals_CLM.cfg
Processing externals description file : Externals_POP.cfg
Processing externals description file : Externals_CISM.cfg
Checking status of externals: clm, fates, ptclm, mosart, ww3, cime, cice, pop, cvmix, marbl, cism, source_cism, rtm,
./cime
  clean sandbox, on cime_cesm2_1_1_tutorial
./components/cam
  clean sandbox, on cam1/release_tags/cam_cesm2_1_rel_29/components/cam
./components/cice
  clean sandbox, on cice5_cesm2_1_1_20190321
./components/cism
  clean sandbox, on release-cesm2.0.04
./components/cism/source_cism
  clean sandbox, on release-cism2.1.03
./components/clm
  clean sandbox, on release-clm5.0.25
./components/clm/src/fates
  clean sandbox, on fates_sl.21.0_a7.0.0_br_rev2
./components/clm/tools/PTCLM
  clean sandbox, on PTCLM2_180611
./components/mosart
  clean sandbox, on release-cesm2.0.03
./components/pop
  clean sandbox, on pop2_cesm2_1_rel_n06
./components/pop/externals/CVMix
  clean sandbox, on v0.93-beta
./components/pop/externals/MARBL
  clean sandbox, on cesm2.1-n00
./components/rtm
  clean sandbox, on release-cesm2.0.02
./components/ww3
  clean sandbox, on ww3_181001
2019-07-31 15:30:23: case.build success
-----
2019-07-31 15:34:20: case.submit starting
-----
2019-07-31 15:34:27: case.submit success case.run:7394313.chadmin1.ib0.cheyenne.ucar.edu, case.st_archive:7394314.chadmin1.ib0.cheyenne.ucar.edu
-----
cases/b.day1.0>
```

In the Lab:

- Check the files in the RUNDIR as the model is running and once it is finished
- Check the files in the DOUT_S_ROOT directory after the **case.st_archive** runs and once the simulation is finished



Success

More Information/Getting Help

CESM Bulletin Board: <http://bb.cgd.ucar.edu/>

Home » Forums

FORUMS

View Forums Active topics Unanswered topics

CESM - General
The Community Earth System Model (CESM) is a fully coupled, global climate model that provides state-of-the-art computer simulations of the Earth's past, present, and future climate states.

Forum	Topics	Posts	Last post
Announcements	29	61	Invitation to participate in CESM integrated data search survey by aliceb June 15, 2015 - 6:14pm
Bug reporting Community Bug Reporting	194	625	CCSM3 run error by janezhang8587@... July 21, 2015 - 3:03am
Climate Variability Diagnostics Package inquiries	2	20	Sign of PDO by asphilli June 9, 2014 - 10:40am
General Discussion Includes requests for new features and configuration inquiries	434	1479	CLM4 Irrigation Modification by mdfowler@... July 29, 2015 - 9:11am
GIT Issues This Forum is for the discussion of git issues in the CIME repository	3	16	svn external for a given git tag by andre May 6, 2015 - 4:04pm
Input Data inquiries	207	555	map_fv0.9x1.25_to_T85_aave_110411.nc by aliceb July 30, 2015 - 11:43am
Known Issues Posted and Moderated by CSEG only Subforums: ocean/POP2 (3), atmosphere/CAM (23), atmosphere/WACCM (12), Component Sets (COMPSETS) (5), Coupler (3), Dead and Stub Models (0), Grids (1), ice/CICE (1), land/CLM (13), land-ice/CISM (1), Machines/scripts (27), mapping (0), Utilities (1)	0	0	n/a
Model Intercomparison Project (MIP) inquiries CESM MIP simulations, including CMIP5	14	47	Notice to the Community: ESGF Nodes Going Offline by strandwg June 21, 2015 - 10:36am
New Feature Requests	1	2	user_nl feature request by jeedwards August 14, 2014 - 4:18pm

- **Register** as a forums user by entering your valid information in the registration form
- **Subscribe** to forums of interest - especially the “Announcements” and “Known Problems” – this is one way that we communicate updates to you!
- **Join** the CESM participants email list at:
<http://mailman.cgd.ucar.edu/mailman/listinfo/ccsm-participants>
- **Create** a github account and opt-in to “watch” CESM related repositories

More Information/Getting Help

CESM tutorial: https://ncar.github.io/CESM-Tutorial/notebooks/basics/basics_overview.html



☰ Contents

Goals of This Tutorial

Yearly In-Person Tutorials

CESM Project Funding

Acknowledgements

Welcome to the CESM Tutorial

In 1983 NCAR created the *Community Climate Model* (CCM) as a freely available global atmosphere model for use by the climate research community. The scope of CCM development continued to expand and in 1994 NCAR scientists released the *Climate System Model* (CSM), a global model that included component models for the atmosphere, land surface, ocean, and sea-ice, communicating through a central coupler component. To recognize the broad community of users and sponsors contributing to this effort, the CSM was renamed the *Community Climate System Model* (CCSM). The CCSM model evolved to include ice sheet and biogeochemical modeling and was renamed the *Community Earth System Model* (CESM) in 2013.

This repository includes materials designed to be an introduction to running the CESM. The materials were developed to support the CESM tutorial and serve as reference documentation for all CESM users.

Goals of This Tutorial

Through this online tutorial you will learn how to run the CESM model, modify the model experiments, and use the model output. These tutorial materials are designed for the CESM version 2 (CESM2)

Yearly In-Person Tutorials

The CESM tutorial was started in 2010 and is typically offered as an in-person summer workshop. If you are interested in attending the tutorial, please see the [CESM webpage](#) for the most up to date information about when the tutorial will next be offered in Boulder, Colorado and the timeline for applying.

Thank You!

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To provide facility support to the wider community; and,
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