

▶ RAYLEIGH TUTORIAL

MODULE 4: ENSEMBLE MODE



IN THIS MODULE:

- Ensemble Mode Overview
- I/O Redirection
- Ensemble Mode Exercise

BEFORE WE BEGIN:

- Copy your module3 directory to module4

```
$ cp -r module3 module4
```

- Verify that each run within module4 still works
(Call me over if one does not)

ENSEMBLE MODE OVERVIEW

- Multiple simulations may be run under the umbrella of a single executable
- Why?
 - Parameter space studies
 - Organization (I forgot what I was doing)
 - Queuing policies/Efficiency Issues

ENSEMBLE MODE MECHANICS

- Ensemble mode has two requirements
 - Modified call to Rayleigh `./rayleigh -nruns X`
 - A file containing a list of run directories
- Each run still gets its own directory
- Number of MPI ranks must agree with sum of $\text{nrow} * \text{npcol}$ from all `main_input` files involved.
- CAUTION: Under-Development. GREAT for stable runs.

ENSEMBLE MODE: EXERCISE 1

- Softlink Rayleigh to the module4 directory

```
$ ln -s $RDIR/build/rayleigh module4/.
```

- Create a file within module4 named run_list
- Add these lines:

```
bous  
anelastic  
anelastic_nd  
ALWAYS INCLUDE A BLANK LINE HERE AT END
```

- Directory names should be relative to where rayleigh is run from
(module4, in this case)

ENSEMBLE MODE: EXERCISE 1

- Run Rayleigh from within module4:

```
$ mpiexec -np N ./rayleigh -nruns 3
```

- N should agree with the total number of cores specified within each main_input file (probably 12)
- Not bad, but output is a bit messy...

REDIRECTING I/O

- Output for each run can be redirected via the `io_controls` namelist

```
&io_controls_namelist  
  stdout_flush_interval = 5  
  stdout_file = 'rayleigh.out'  
/
```

- `stdout_file`:
 - tells the code where to write
- `stdout_flush_interval`:
 - Number of lines retained in memory before flushing
- Best practice: keep `stdout_flush_interval` around 1,000
- Flushes occur automatically during important events like birthdays and weddings

EXERCISE

- Modify all three of your ensemble mode runs to read:

```
&io_controls_namelist  
stdout_flush_interval = 5  
stdout_file = 'Rayleigh.out'  
/
```

- Rerun the ensemble run

```
$ mpiexec -np N ./rayleigh -nruns 3
```

- Examine bous/Rayleigh.out etc.

Questions?