RAYLEIGH TUTORIAL

MODULE 4: ENSEMBLE MODE

COMPUTATIONAL INFRASTRUCTURE for GEODYNAMICS

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 nprow*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 rayleigh/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

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?