

Some Parallel R

Timothy H. Kaiser, PH.D
tkaiser2@nrel.gov

Slides

Claims and Disclaimers

- * I am not an expert in R
- * I am considered an expert in Parallel Programming
- * I have developed and published parallel packages in several languages including Python, C++, and Fortran
- * I am not an expert in Earthquake simulation (have done it)
- * Have publications where someone said they wanted to do Parallel R. I convinced him otherwise and he actually finished his Ph.D.
- * The people that developed parallel R are R programmers
- * Not so sure this is a good idea

Paths for Today

- * Rmpi
- * Parallel R library
- * Combine the two

Hope to cover today

- * Briefly Rmpi
 - * Simple examples
 - * Odd example (Don't think you should be doing this)
 - * Three full examples
 - * Bag of Task
 - * California Earthquake Hazard Map
 - * Finite Difference (Stommel) Code (won't get this far)

Hope to cover today

- * Briefly "Normal" Parallel R

- * `library(parallel)`

- * `library(dplyr)`

- * `library(doParallel)`

Hope to cover today

- * Some tricks outside of R
 - * Forcing tasks to cores
 - * Monitoring tasks
 - * Splitting files
 - * Writing files to be read as binary

References

<https://cran.r-project.org/web/packages/foreach/index.html>

<https://cran.r-project.org/web/packages/foreach/foreach.pdf>

<https://cran.r-project.org/web/packages/doParallel/index.html>

<https://cran.r-project.org/web/packages/dplyr/>

<https://cran.r-project.org/web/packages/Rmpi/index.html>

<https://mpi4py.readthedocs.io/en/stable/>

<https://github.com/rstudio/cheatsheets>

MPI - search Message Passing Interface

<https://insights.dice.com/2019/07/29/5-programming-languages-probably-doomed/>

Examples run on:

- * CU/CSU Summit
- * NREL Eagle
- * Mac laptop and desktop
- * and for today...

My Raspberry Pi Cluster

- * Currently two 4 core nodes
 - * clr & blk
- * Ethernet interconnect
- * lmod
- * gcc 10.x
- * OpenMPI & MPICH
- * R 4.0.5
- * Python 3.9.4
- * spack

