**Blue Waters Petascale Semester Curriculum v1.0**

**Unit 3: Using a Cluster**

**Lesson 8: Scaling on a Cluster 3**

**Exercise Instructions for Students**

*Developed by Michael N. Groves for the Shodor Education Foundation, Inc.*

1. Compile the mpi\_pi\_area.c using your system’s MPI compiler. The provided Makefile should be helpful with this process. It should create an exe file.
2. Submit the code to the scheduler selecting a series of cores (2, 4, 6, 8, 10, 12, 14, 16). When finished plot calculation time (provided in the output file) as a function of number of cores. Discuss how speed-up is affected by the number of resources requested.
3. Submit the code to the scheduler selecting a series of wallclock times (2 minutes, 4 minutes, 6 minutes, and 8 minutes). For this exercise select a fixed number of cores. Students should then plot calculation time as a function of wallclock times and discuss how speed-up is affected by wallclock time.



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*Browse and search the full curriculum at*[*http://shodor.org/petascale/materials/semester-curriculum*](http://shodor.org/petascale/materials/semester-curriculum)

*We welcome your improvements! You can submit your proposed changes to this material and the rest of the curriculum in our GitHub repository at*[*https://github.com/shodor-education/petascale-semester-curriculum*](https://github.com/shodor-education/petascale-semester-curriculum)

*We want to hear from you! Please let us know your experiences using this material by sending email to* [*petascale@shodor.org*](mailto:petascale@shodor.org)