

High Performance Computing - A.Y. 2011/12

3rd assignment

This assignment still deals with solving in parallel the Game of Life problem.

Performance evaluation

Study the performance of the various parallel versions of the algorithm, by plotting:

- For different problem size, the speedup as a function of the number of processors exploited. Note that, to avoid strange behaviors, for each parallel test you have to try to use the processors evenly. In other words, even the load imbalance is a source of overhead and thus low efficiency.
- Study the scalability, by plotting the efficiency as a function of the processor/host number, where you increase the problem size along with the number of processor/host number.

OpenMP

The new version of the algorithm has to mix MPI (message passing) with *OpenMP* (shared memory). This means that you have to allocate a single MPI process/task on each multicore host of the cluster, where each process/task is in turn parallelized by using *OpenMP*.

Evaluate the performance in term of execution time for different problem size when using all the six host nodes. More specifically:

- Evaluate the benefits of static allocation of workload to each thread vs. a dynamic one.
- Compare the various OpenMP-MPI versions with a pure MPI one.

An example of OpenMP-MPI program is published on the course website.

Hand in

Create a tar/zip file containing all your solution source code and a Makefile, and a pdf file with a written report about this assignment.

Send the pdf file and the tar/zip file to orlando@unive.it with your tar/zip file solution and the report with the subject “*HPC – assignment 3*”.