ParticleEngine

What is ParticleEngine?

ParticleEngine is a visualization engine dedicated to vector fields, based on particles randomly sampled over the domain of interest and displaced according to the local orientation and intensity of the vectors. The vector fields are read from a Cartesian grid, and are stored in a file written in the GSLIB format (see the example.gslib file in the data/gslib folder for more details). The package features two different modes of particle displacement, one on the CPU and the other on the GPU.

The CPU mode is written in regular C++ code and executed sequentially. It is suitable for a moderate number of particles. The GPU mode is written with the CUDA API and is therefore solely available on CUDA-enabled NVIDIA graphic cards (see the CUDA-enabled GPU page to learn more about compatible graphic cards). It is less efficient than the CPU version for moderate numbers of particles (up to 300,000 particles according to our tests) due to synchronization issues, but becomes more efficient as the number of particles keeps growing as particles are updated in parallel. Developers can customize particle behavior by changing preprocessor variables in the include/Defines.h file (recompilation of the source code is mandatory for each change).
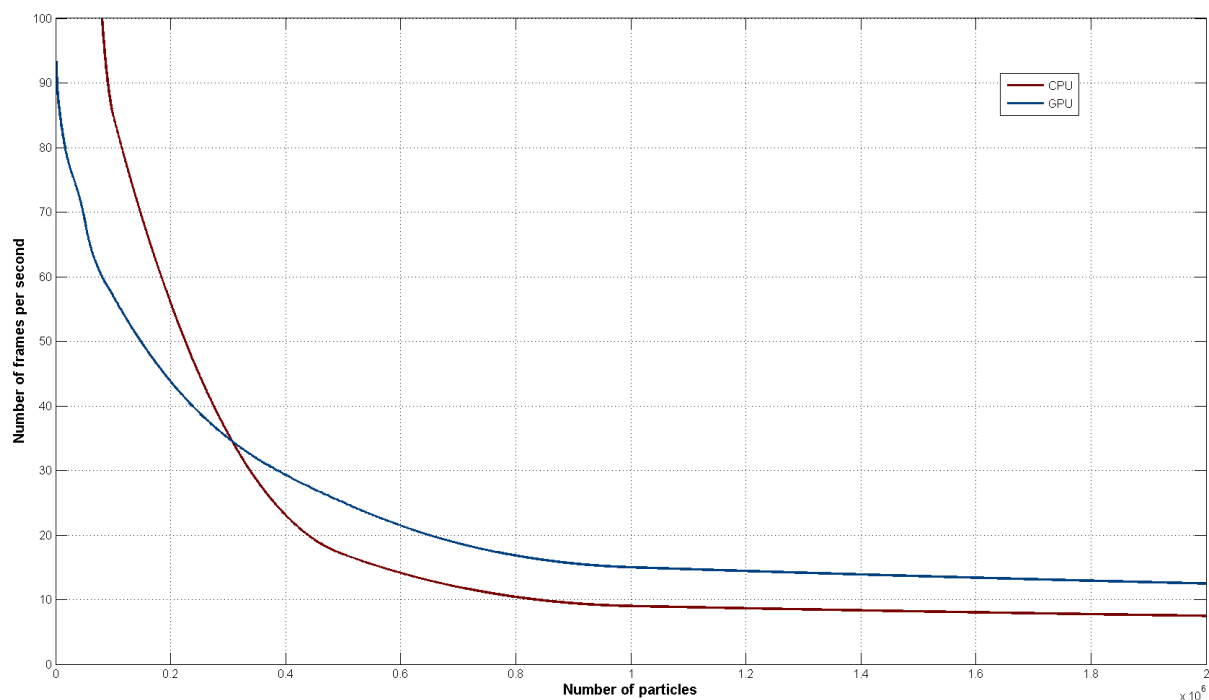

Figure : Evolution of the framerate as the number of particles increases on the CPU and the GPU version of ParticleEngine. The tests were run on a 64-bits XPS computer, with a QuadCore Intel Core i7 920 CPU (6 Go of RAM memory) and a double NVIDIA GTX280 GPU (2*1 Go of RAM memory).

How can you use your own data?

The executable does not currently provide any user interface to load data. However, the executable is setup to use some predefined datasets read from GSLIB files; hence, to test your own files, you can simply replace one of the gslib files with your own data. For more details on the expected file format, please refer to the example.gslib file in the data/gslib folder.

About ParticleEngine...

ParticleEngine is a stand-alone application developed in C++ in the framework of a Master's Thesis project defended by Grégoire Piquet. The initial source code was reworked later by Thomas Viard to provide a ready-to-use executable and source code package. All the materials provided in this package were created at the Gocad Research Group laboratory.

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Changelog

V1.0.1 (June 2010)   Documentation update.

V1.0.0 (May 2010)   First release.