Parallel Computation: Models And Methods

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If we perform the computations only in the mesh nodes, the postprocessing time takes some hundredths of percent of the total simulation time. To provide the compatibility with COMSOI format a parser was developed; it works with m-le representation of COMSOL model and extracts the information for creating the model. In the presented model dynamic focusing method is used to calculate the unknown potential of the middle electrode using the known potentials of the upper and the lower electrodes and potential equality constraint for middle electrodes separated by dielectrics. The parallel simulation is performed with even distribution of parametric variants on cluster nodes. The results are presented in the table 2.
INTRODUCTION

Three parallel methods (OpenMP, MPI, and OpenACC) are evaluated for the computation of a two-dimensional dam-break model using the explicit finite volume method. A dam-break event in the Pangtoupao flood storage area in China is selected as a case study to demonstrate the key technologies for implementing parallel computation. The subsequent acceleration of the methods is also evaluated. The simulation results show that the OpenMP and MPI parallel methods achieve a speedup factor of 9.8×— and 5.1×—, respectively, on a 32-core computer, whereas the OpenACC parallel method achieves a speedup factor Akl, S. G., Parallel Computation: Models and Methods, Prentice-Hall, 1997. Almasi, G. S., and A. Gottlieb, Highly Parallel Computing, Benjamin/Cummings, 2nd ed., 1994. Bertsekas, D. P., and J. N. Tsitsiklis, Parallel and Distributed Computation: Numerical Methods. The field of parallel processing is concerned with architectural and algorithmic methods for enhancing the performance or other attributes (e.g., cost-effectiveness, reliability) of digital computers through various forms of concurrency. Even though concurrent computation has been around since the early days of digital computers, only recently has it been applied in a manner, and on a scale, that leads to better performance, or greater cost-effectiveness, compared with vector supercomputers. Parallel computing is a type of computation in which many calculations or the execution of processes are carried out simultaneously. Large problems can often be divided into smaller ones, which can then be solved at the same time. There are several different forms of parallel computing: bit-level, instruction-level, data, and task parallelism. Parallelism has long been employed in high-performance computing, but it's gaining broader interest due to the physical constraints preventing frequency scaling.