ABSTRACT
We describe how the Chunks and Tasks programming model can be used for efficient parallelization of computations. In the Chunks and Tasks model there is no message passing, instead the application programmer specifies how to divide the work into small pieces (tasks) that can be executed in parallel. Abstractions for data (chunks) are also provided. The application programmer need not worry about the distribution of work or data. At the same time Chunks and Tasks imposes restrictions to make the implementation of efficient parallel backends feasible, allowing Chunks and Tasks programs to run efficiently on modern supercomputers. The Chunks and Tasks model is general and can be applied for any problem that can be expressed as a hierarchy of tasks. As an example we show how the model has been used to achieve scalable parallelization of sparse matrix-matrix multiplication for a priori unknown sparsity patterns. In contrast to previous approaches that were based on static data distribution for the matrices, Chunks and Tasks allows us to dynamically detect and exploit a priori unknown matrix sparsity structures.