A parallel representation of programs

TIDeFlow is a collection of theories and tools that offers an alternative to traditional programming and execution models. This work is based on the observation that HPC programs are mostly composed of loops. The objective is to provide programmers with tools to naturally express the interplay between loops.

A distributed runtime system

Each processor participating in the computation is responsible for obtaining its own work making the intervention of an Operating System Scheduler unnecessary. As a result, finer-grain parallelism is possible.

Results

Four typical HPC kernels were developed and run using TIDeFlow in Cyclops-64. The results show good scalability with little programmer effort. In each case, the programmer had to write (1) the code for each parallel loop in the application and (2) a graph representing their dependencies.