
Task graph execution managed by a runtime: an opportunity for theoreticians

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Abstract

In the field of High-Performance Computing (HPC), expressing parallelism with task graphs is (at last) a trend, we can see various computation libraries being ported to that programming paradigm. The actual execution is then delegated to a runtime, in which we can inject more or less dynamic or static heuristics, to optimize task scheduling and data transfers.

The StarPU runtime aims at providing a test-bed for such heuristics. Various HPC applications have been ported to StarPU and can be used as as many real-world test instances to confront heuristics to a real execution environment. A simulation mode also allows to decide how much of the reality should be exposed (memory constraints, data transfer time, scheduling cost, ...). This is thus an opportunity to incrementally bring theoretical heuristics to the wildness of HPC execution.

Keywords: Task graphs, scheduling, runtime system, simulation

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