Analyzing Dynamic Task-Based Applications on Hybrid Platforms: An Agile Scripting Approach

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Abstract

In this paper, we present visual analysis techniques to evaluate the performance of HPC task-based applications on hybrid architectures. Our approach is based on composing modern data analysis tools (pjdump, R, ggplot2, plotly), enabling an agile and flexible scripting framework with minor development cost. We validate our proposal by analyzing traces from the full- fledged implementation of the Cholesky decomposition available in the MORSE library running on a hybrid (CPU/GPU) platform. The analysis compares two different workloads and three different task schedulers from the StarPU runtime system. Our analysis based on composite views allows to identify allocation mistakes, priority problems in scheduling decisions, GPU tasks anomalies causing bad performance, and critical path issues.