ABSTRACT

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This work proposes a middleware, called DistributedCL, which makes parallel processing on distributed GPUs transparent. With DistributedCL middleware support, an OpenCL enabled application can run in a distributed manner, using remote GPUs, transparently and without alteration to the code or recompilation. The proposed architecture for the DistributedCL middleware is modular, with well-defined layers. A prototype was built according to the architecture, into which were introduced multiple optimization features, including batch data transfer, asynchronous network communication and asynchronous OpenCL API invocation. The prototype was evaluated using available benchmarks and a specific benchmark, the CLBench, was developed to facilitate evaluations according to the amount of processed data. The prototype presented good performance, higher compared to similar proposals. The size of data for transmission over the network showed to be the biggest limiting factor.

Keywords: OpenCL, GPGPU, GPU, middleware, distributed systems.