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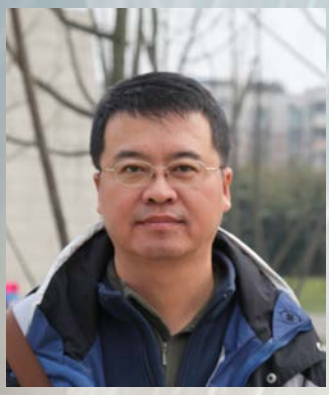

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Introduction to HSA and HSAemu

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Abstract

Heterogeneous System Architecture (HSA) is an open industry standard designed to support a large variety of data-parallel and task-parallel programming models. Currently, most of HSA hardware and software components are still in development. It is helpful to provide various heterogeneous simulation environments for HSA developers in developing HSA software stacks. This talk presents the design of HSAemu, a full system emulator for the HSA platform, and illustrates how those HSA features are implemented in the simulator. HSAemu provides an infrastructure of heterogeneous simulation environments by supporting required HSA features, including hUMA, hQ and HSAIL. Based on the infrastructure, HSAemu has implemented two simulation models: FastSim and DeepSim. FastSim is a functional HSA model for fast simulation of a complete HSA software stack. FastSim takes advantages of parallel simulation techniques to achieve high simulation speed. DeepSim supports a detailed GPU model to simulate a cycle accurate GPU to gather more profiling information for micro-architecture design tradeoffs. In our preliminary experiments, the infrastructure of HSAemu is successfully tested to run a complete HSA software stack. The performance comparison between FastSim and DeepSim shows that FastSim is about 3 to 85 times faster than DeepSim. HSAemu could be used as a useful developing tool for the development of HSA systems.