An Efficient Scheduling Approach for Concurrent Packet Processing Applications on Heterogeneous Systems

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Programming heterogeneous processing units on modern commodity systems

OpenCL

Heterogeneous traffic characteristics

Heterogeneous network packet processing applications

CPU vs GPUs

- CPUs handle branch-intensive and latency-critical workloads.
- GPUs are designed for data-parallel workloads, leveraging the thousands of cores.

Discrete GPUs vs Integrated GPUs

CPUs

GPUs

Performance Characterization

(a) DPI

(b) AES-CBC

Challenges

- TDP limit and thermal constraints.
- Contention for hardware resources.
- Contention for software resources.
- Not a single configuration is the best fit for all the applications.

The goals of our scheduler

- Efficient scheduling of concurrently running network packet processing applications on heterogeneous processors.
- Adaptive and effective network traffic management and distribution.
- Energy efficiency.

Current adaptation capability of scheduler (application: DPI)

Scheduling policies for each application

- High throughput.
- Low energy consumption.
- Low latency.

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