Where are the Joules? Energy Demand Analysis of Heterogeneous Memory Technologies

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Thomas Preisner[1], Dustin Tien Nguyen[1], Manuel Vögele[2], Matthias Szymanski[2], Timo Hönig[2], Rüdiger Kapitza[1], Wolfgang Schröder-Preikschat[1]

[1] Friedrich-Alexander-Universität Erlangen-Nürnberg
[2] Ruhr-Universität Bochum

FAU Friedrich-Alexander-Universität Erlangen-Nürnberg

RUHR UNIVERSITÄT BOCHUM

RUB

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Goal optimize system provisioning with regard to energy consumption using available memory technologies

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→ Measure energy consumption of different memory technologies

Memory Energy Benchmark

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- Degree of parallelism
- Access patterns
- Access granularity
- Duration
- NUMA
- Cache Optimizations
- ...

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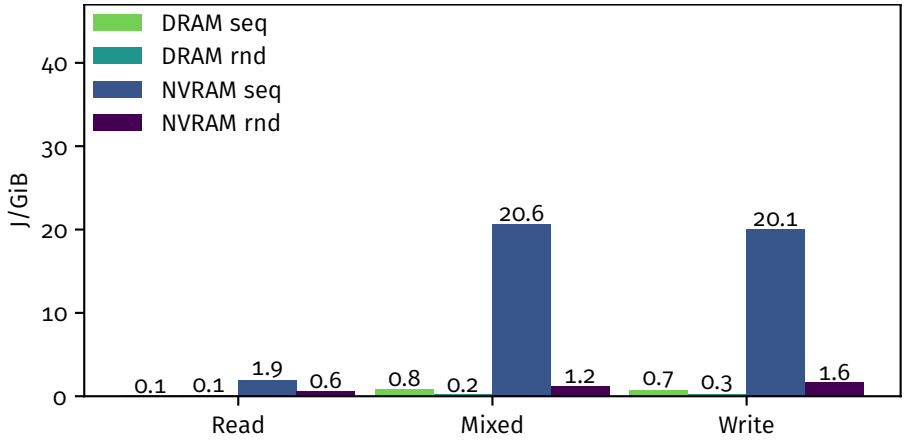
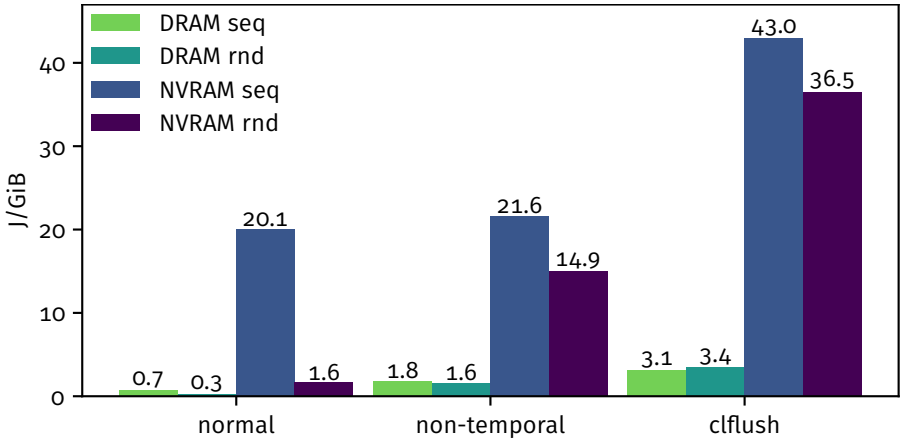
→ Measurement using Intel RAPL/external power meter

DRAM vs. NVRAM – Workloads



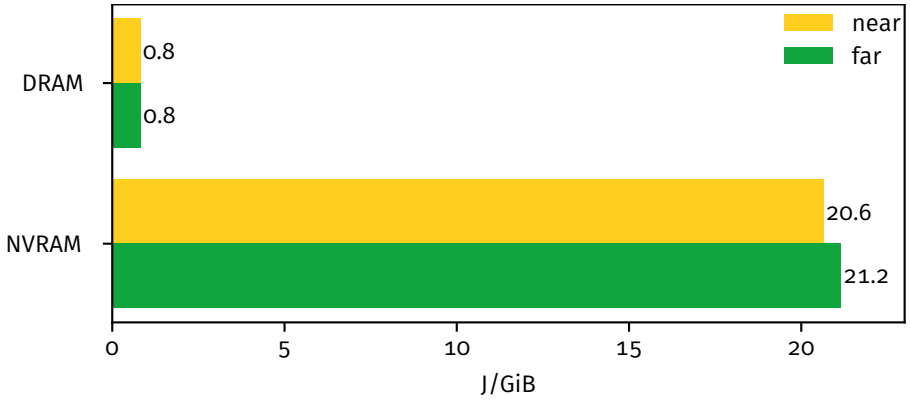
2 cores, 32 threads, near memory, 80 s duration

DRAM vs. NVRAM – Cache Optimizations



2 cores, 32 threads, write-only, near memory, 80 s duration

DRAM vs. NVRAM – NUMA



2 cores, 32 threads, mixed read/write, sequential, 80 s duration

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  - of CXL-equipped systems