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Background

Modern CPUs contain hardware performance counters: architectural registers that allow low-level analysis of running programs.

The Performance API (**PAPI**) library provides portable access to the performance counters found on a wide variety of architectures.

PAPI supports additional sources of performance information via extendable components.

The following components were available in PAPI 4:

- Temperature: coretemp, lmsensors
- GPU: cuda
- Networking: infiniband, myrinet, ethernet
- Filesystems: lustre

The PAPI 5 release has many new features, including support for components reporting metrics related to Power, Energy, and Virtualization.

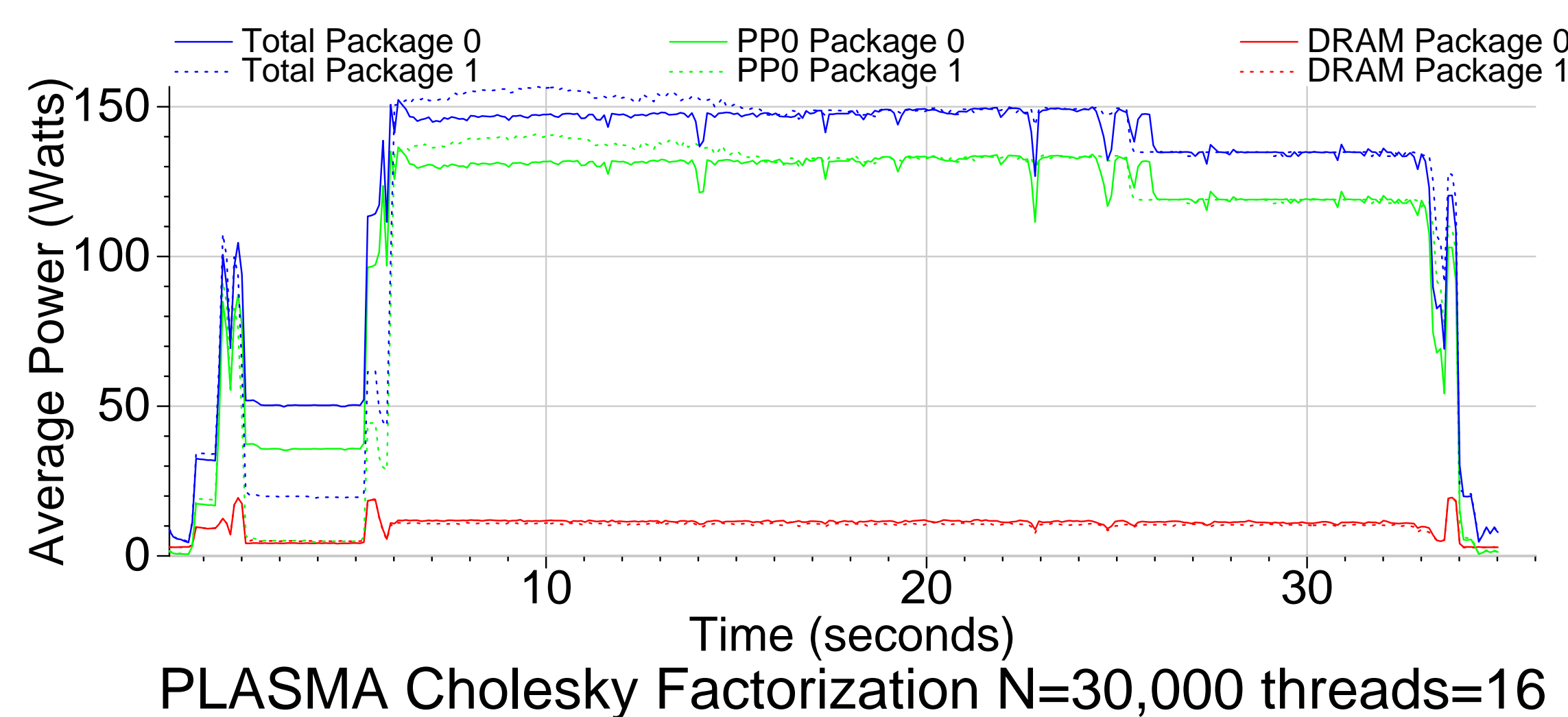
Improved CPU Support

PAPI continues to add support for new architectures:

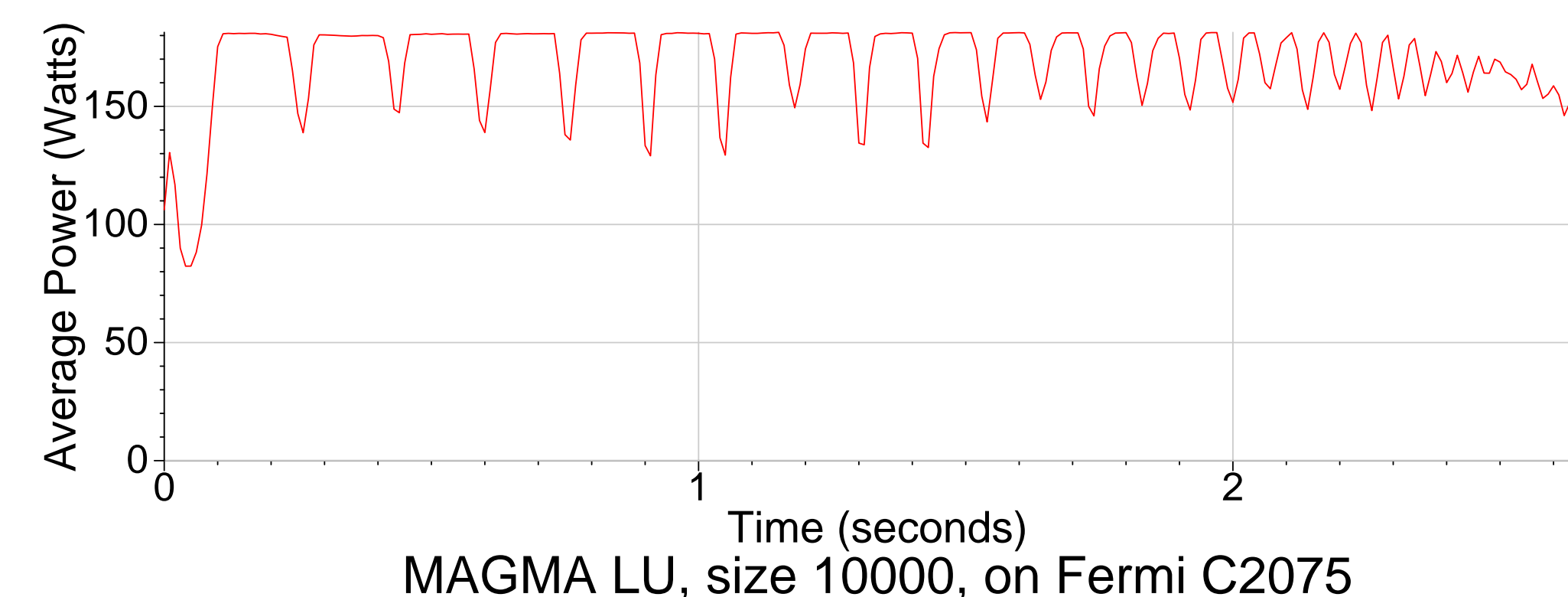
- Blue Gene/Q
Components for CPU, L2, I/O, Torus, and Kernel
- Up-to-date Intel and AMD support:
SandyBridge, Ivy Bridge, Cedarview Atom, etc.
- AMD Northbridge and Intel Offcore/Uncore Events
- Intel Xeon Phi / MIC
- Improved ARM support

Power/Energy

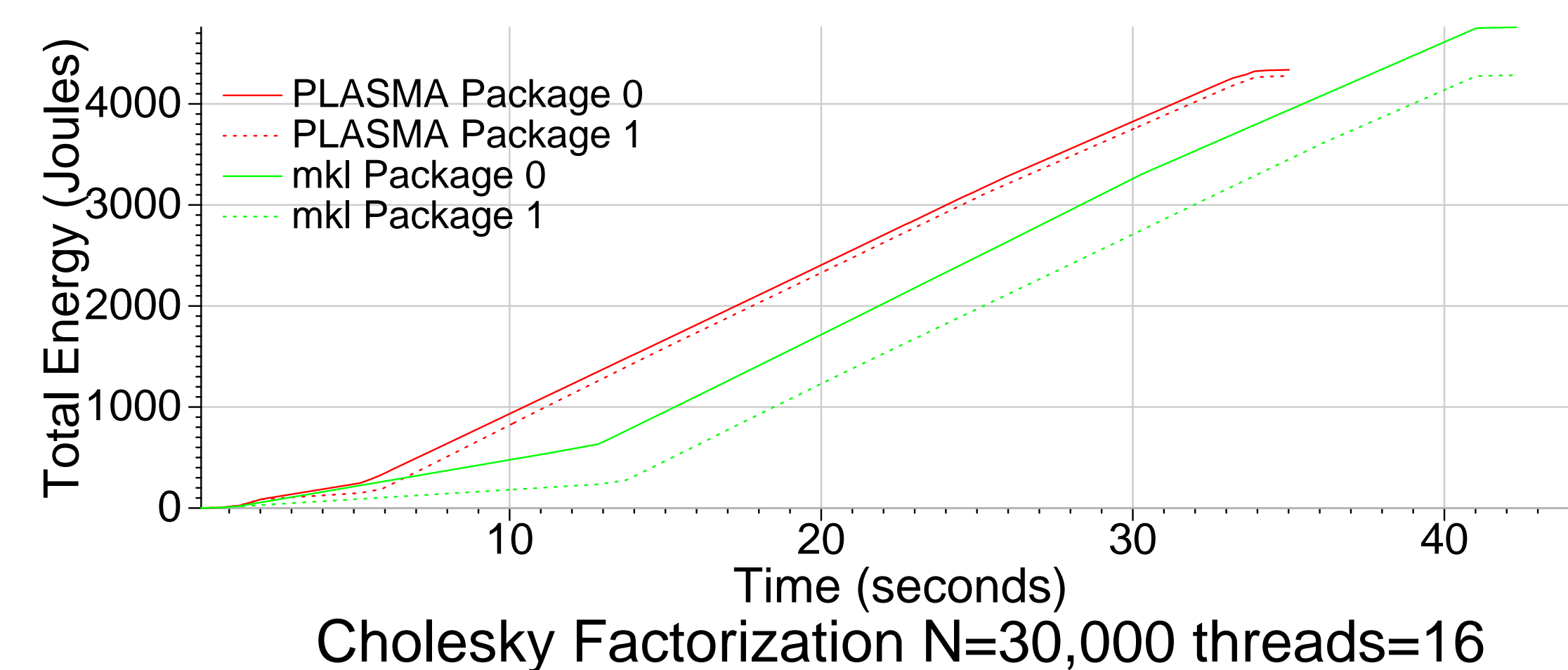
The RAPL component enables access to estimated energy measurements available on recent Intel processors.



The NVIDIA Management Library (NVML) component reports power usage of recent NVIDIA GPUs.



The new PAPI components can be used to compare the relative Energy usage of algorithms.



Support is also available for measuring Voltage and Current (and thus, Energy) on the Intel Xeon Phi.

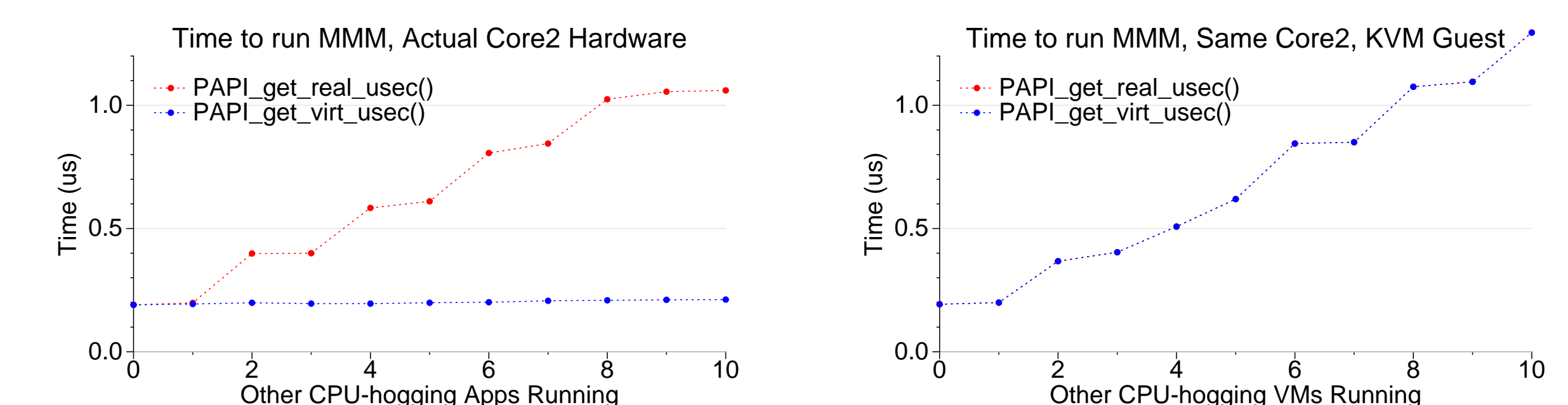
Virtualization and Cloud

Recent versions of KVM support hardware counter virtualization, allowing PAPI to report performance results from inside of a virtualized environment.

PAPI also has components that enable enhanced measurement in virtual environments:

- vmware component: reports VMware statistics
- Appio component: provides advanced I/O statistics

In an over-subscribed virtualized system, time used by other VMs (called “steal time”) can be included in per-process timing results. This can make optimization difficult in a cloud environment. The PAPI stealtime component reports when stealtime is an issue.



Other Improvements

- New event value types, including floating point (previously limited to 64-bit unsigned integers)
- Enhanced event descriptions (including units for events)

Download PAPI Today!

<http://icl.cs.utk.edu/papi/>

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