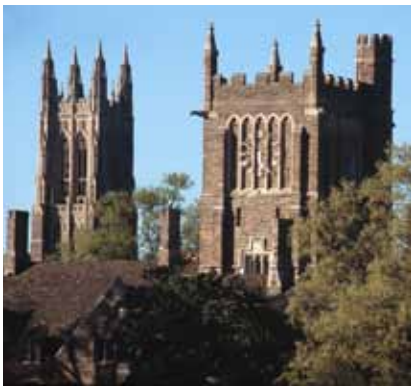
SUCCESS BRIEF
Intel® Xeon® processor E5 family
Education
Technical Computing in the Cloud
High-Performance Computing

Delivering Adaptive Performance

Intel® Turbo Boost Technology 2.0 shows steady addition of up to 0.4 GHz for Intel® Xeon® processor E5-2680 at Duke



Duke UNIVERSITY

"The CPUs were rated at 2.7 GHz, but we almost always saw them operating at 3.0 GHz and up. The CPUs were able to continually stay above their rated clock rate."

– John Pormann, Director, Scalable Computing Support Center, Duke University

INSTITUTION

Duke University has about 13,000 undergraduate and graduate students, a world-class faculty, and a strong commitment to applying knowledge in service to society. Duke's Scalable Computing Support Center (SCSC) provides high-performance computing (HPC) resources for university researchers in bioinformatics and other fields.

CHALLENGE

To support its HPC clusters and its expanding private cloud services, SCSC needs technologies that combine high performance and memory capacity with energy-efficient operations. John Pormann, SCSC director, is eager to take advantage of Intel® Turbo Boost Technology 2.0 in the Intel® Xeon® processor E5 family, but was concerned the family's built-in graphics processing unit (GPU) might reduce computational performance compared to a non-GPU processor.

SOLUTION

Pormann's team tested a dual-socket server with the Intel Xeon processor E5-2680. They reported that with Intel Turbo Boost Technology enabled and the GPU unused, the GPU not only did not lower the CPU's performance, but seemed to enhance it.

BENEFITS

Intel Turbo Boost Technology 2.0, along with the processor family's advances in memory capacity, bus bandwidth, and floating-point performance, can help Duke's research teams tackle more complex challenges and achieve results faster. These capabilities also provide a flexible, energy-efficient foundation for Duke's evolving private cloud, which Pormann says will foster collaboration and enable new ways of conducting science.

"The new Intel Turbo Boost 2.0 allows for long-term performance enhancement," he says. "Our tests showed we could load up the system and it would stay at the higher GHz level continually for an hour or more, and the CPU is able to borrow power continuously from the GPU. That's going to be a significant benefit to our researchers."

The team also saw a reduction in idle power consumption compared to the previous generation. "The power draw was greatly reduced, to almost 76W at idle," says Pormann. "The current blades with the Intel Xeon processor 5650 only drop down to 130-140W at idle, so this is a huge potential savings in power."

The power savings will give Duke added flexibility as it moves toward private cloud services. "In a cloud, we might want to have a couple of extra machines handy that are in idle mode and available for a cloud burst situation, ready to absorb some extra load quickly," Pormann says. "It's much easier to justify doing that when the idle power is that low."

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