



**TAKE A SURVEY**

RESEARCH PURPOSES ONLY



[Back to article](#)

[Print this](#)

## AMD yields more efficiency, Intel more throughput in quad-core CPU showdown

**In a recent gauntlet of tests comparing AMD's quad-core Opteron processor (i.e. Barcelona) to Intel's quad-core Xeon (i.e. Tigerton), the Xeon delivered up to 14 percent more throughput, but the Opteron used up to 41 percent less energy.**

**By Ted Samson**

January 16, 2008



In a recent gauntlet of tests comparing AMD's quad-core Opteron processor ([Barcelona](#)) to Intel's quad-core Xeon (a.k.a. [Tigerton](#)), the Xeon delivered up to 14 percent more throughput, but the Opteron used up to 41 percent less energy.

The series of tests were conducted by Neal Nelson and Associates, an independent consulting firm. If you've been following my blog for a while, that name may sound familiar: Nelson has run similar power and performance tests over the past year, [one in July](#) and one in [August](#).

Nelson conducted this series of tests using similarly configured quad-core Xeon and Opteron servers using 1GB memory modules at 4GB, 8GB, and 16GB main memory sizes. He also used one- and two-socket configurations at speeds of both 2.0GHz and 2.33GHz.

Cutting to the chase, Nelson determined the following in his tests:

- When the sizes of the database working sets were small enough to fit in the servers' kernel disk buffer cache, such that there was virtually no physical disk I/O, the Xeon-based servers delivered up to 14 percent higher throughput than the Opteron-based servers.
- When the sizes of the database working sets were too large to fit in the kernel disk buffer cache, which forced substantial physical disk I/O, the Xeon-based servers delivered up to 3 percent higher throughput than the Opteron-based servers
- When the servers were subjected to various identical levels of transaction arrival rates, the Opteron-based servers consumed up to 32 percent

less power than the Xeon-based servers.

-- When the systems were idle and waiting for transactions to process, the Opteron-based servers consumed up to 41 percent less power than the Xeon-based servers. ("The power consumption at idle is particularly significant since studies have shown that many servers are powered on, but idle, 80 percent of the time," Nelson notes.)

"By themselves, the Intel processor chips may use less power, but all current Intel Xeon servers require the use of fully-buffered memory modules [FB-DIMM]. These FB-memory modules appear to consume more power than the DDR-II memory modules used by the AMD-based servers. The result is that in many cases an Opteron-based server actually uses less total power than a Xeon-based server," says Nelson in a written statement.

#### **A better green benchmark?**

Nelson reached his conclusions by employing what's he's dubbed Neal Nelson's Power Efficiency Benchmark. The benchmark works as follows: Nelson simulates users from 32 separate computers submitting individual transactions to similarly configured servers running Apache2 Web server, the MySQL relational database, and Novell's Suse Linux Enterprise Server O. He measures the throughput and power usage of the systems in increments of 50 users, from 100 to 500, over half-hour sessions. "The benchmark has a complex multi-user load with a large memory footprint, a high volume of context switches, significant network traffic, and substantial amounts of physical disk I/O," according to Nelson.

In addition to sharing his conclusions for his test, Nelson has made an effort to differentiate his power-efficiency benchmark from the one **recently unveiled by SPEC**. "The SPECPower test has a single-client machine feeding batches of 1,000 transactions to a small number of Java-based application programs," says Nelson. "[It also] has a small memory footprint, a low volume of context switches, simple network traffic, and it performs no physical disk I/O. The SPEC test was created by a committee of computer vendor employees, and SPEC offers no guarantee that their numbers will correlate to a customer's real-world experiences."

**Nelson's test results** can be viewed in their entirety on his Web site.

#### **Related articles:**

[AMD launches Barcelona](#)

[Intel releases quad-core Tigerton](#)

[Study: AMD more power-efficient than Intel](#)

[In AMD-Intel square-off, memory proves key](#)

[SPEC seeds future green-server benchmarks](#)

*Ted Samson is a senior analyst at InfoWorld and author of the [Sustainable IT blog](#). Subscribe to his [free weekly Green Tech newsletter](#).*

 [Print this](#)