

## AMD launches the Barcelona quad-core processor

Advanced Micro Devices Inc.(AMD) hopes to seize a larger share of the power server chip market from its rival Intel Corp. on Monday when it launches the Barcelona quad-core processor.

AMD has been shipping the Quad-Core AMD Opteron chip to server vendors throughout August, but will use its news conference in San Francisco to publicly announce those partnerships as well as prices and benchmark test results.

The company plans to launch a 1.9GHz, 68-watt Barcelona chip that focuses on server power efficiency, and a 2.0GHz, 95-watt version that focuses on price/performance, said Randy Allen, AMD's corporate vice president for the server and workstation division. In the fourth quarter, the company will follow that with a 2.3 GHz, 120-watt version for high-performance applications, and higher clock speeds for the first two chips.

There is a lot at stake. After launching the original Opteron chip in 2003, the company enjoyed brisk demand as customers applauded the power-efficient performance of that 130-nanometer design process chip. But Intel soon got back in the fight, as both companies built smaller, faster components, shrinking their chip scales to 90nm and adding a second core.

AMD has endured disappointing results lately, posting losses in the hundreds of millions of dollars for recent quarters and focusing its attention on a merger with graphics chip maker ATI Technology. At the same time, Intel claimed bragging rights to beating AMD to quad-core architecture and 65nm scale chips with its Clovertown server chip. Intel is also preparing to launch an even smaller-featured design in the fourth quarter with its 45nm Penryn chip.

AMD says Barcelona is the answer to the Intel challenge. The chip is designed with all four cores on a single die, as opposed to Intel's design of joining two dual-core Woodcrest Xeon chips, Allen said.

Even more important, AMD upgraded each core from 64-bit floating point performance to 128-bit, and retained its Direct Connect architecture and on-chip memory controller to avoid bottlenecks in data flow, he said.

Thanks to that design, the new chip will provide better performance while using the same amount of power, he said. A customer could upgrade a Hewlett-Packard Co.ProLiant DL 385 server from AMD's dual-core to quad-core Opteron and gain faster operation with the same power and cooling demands.

"Clovertown will look very anemic, especially as we bring out new frequencies. Customers really don't buy nanometers. What they care about is performance and benchmarking," said Allen. "That Direct Connect architecture is very helpful with virtualization, running multiple OSes and other applications pulling more data than can be held in on-chip memory."

Despite those advantages, AMD has missed out on a spike in market demand driven by a need to upgrade to servers capable of performing virtualization, one analyst said.

"A lot of people view this as six months late or more," said Doug Freedman, managing director for research at American Technology Research. "Expectations got ahead of themselves, and some people viewed this as a potential savior for AMD after their server share topped out at the end of last year, going up against Intel's dual-die quad-core. Now the feeling is this launch isn't robust enough in terms of samples shipped, design wins and the complete food chain."

To recover, AMD will have to quickly increase its production and release faster versions of Barcelona to improve the chip's availability for a range of applications, Freedman said.

Intel executives say they are pressing the lead.

"We are very confident, at least on the DP [dual processor] side, that we will have leadership across most of the benchmarks versus Barcelona," said Adesh Gupta, regional platform architecture manager at Intel Asia-Pacific's Server Platforms Group.

"There are a small percentage of benchmarks which are floating-point based where we know that they have an advantage and that's an area which we will see them talk about a lot... If you look at the broader spectrum of applications at the enterprise, we have a significant lead today and we believe we will have that lead with Clovertown, and once we have Harpertown with 45nm we will extend that lead further," Gupta said.

However, some vendors say there is room in the market for both chips. Each processor has its own strengths, said Dell Inc.CEO Michael Dell, in remarks to financial analysts at the Citigroup Technology Conference in New York on Wednesday.

Based on early tests, Dell said, a server using Barcelona chips is faster at running floating-point applications than a

computer with Intel's Clovertown chips, but Clovertown is faster than Barcelona at running integer instructions.

"So depending on the applications you run, or your theories of computer science, one of those servers may be the best for you. It is simply unacceptable for a company of Dell's size to have only one of those choices," Dell said.