AMD's dual-core CPUs come out fighting

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Two weeks ago, AMD released its dual-core Opteron server chips and announced that we'd soon see dual-core technology brought to the desktop in the form of its Athlon 64 X2 processors. We have tested one of the new chips, and today we can share performance figures. The results are dramatic. AMD's new dual-core Athlon 64 X2 4800+ CPU hands the company a decisive victory over rival Intel; a system from AMD using the X2 4800+ beat an Intel-submitted PC with the Pentium Extreme Edition 840 (PEE 840) on every one of our dual-core benchmarks.

With four Athlon 64 X2 chips announced today, AMD gives PC buyers greater dual-core CPU choices than you get with Intel and its lone PEE 840. What's more, the Athlon 64 X2 chips work with existing AMD motherboards, providing DIY consumers flexibility in bringing dual core to their current platform without having to overhaul the entire PC, starting with the motherboard.

AMD's initial shipment will consist of four different CPUs. We received a test system from AMD with the highest-end Athlon 64 X2 4800+ ($1,001) chip. The X2 4600+ ($803), the X2 4400+ ($581) and the X2 4200+ ($537) round out the line. Both the X2 4800+ and the X2 4600+ are clocked at 2.4GHz; the X2 4800+ costs more because it has 1MB of L2 cache on each processing core to the X2 4600+ core's 512KB. The X2 4400+ and the X2 4200+ both have a clock speed of 2.2GHz, with a similar breakdown of L2 cache: 1MB on each X2 4400+ core and 512KB on each X2 4200+ core.

Because AMD's processors use a different chipset than Intel's and the comparison 'white box' units use different memory, hard drives and other hardware, we can't make a perfect direct comparison between the two CPUs. The best we can do is set every component to factory specs and compare those baseline-to-baseline results. Using that methodology, we found AMD's chip the clear winner. Still, it's hard to pinpoint specifically why the Athlon 64 X2 4800+ is faster than the Pentium Extreme Edition 840. AMD claims its chip is lightning-fast because of its built-in memory controller -- and judging from our dual-core tests, we'd have to agree that it plays a part in giving AMD the edge. Intel's PEE 840 must communicate with system memory via a separate memory controller connected via the frontside bus (FSB), a pathway on which data can travel at 1,066MHz at best. With its integrated memory controller, the Athlon 64 X2, AMD's chip removes the FSB bottleneck and can communicate with system memory at the processor's full clock speed.

Link [2] to full story with graphs.

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