

# Time to accept parallel but not without a fight

## ANALYSIS

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Reporting from Monterey

The laws of physics are forcing the semiconductor industry to accept something it knew all along but refused to acknowledge: the most effective way to provide high-performance silicon is to use lots of microprocessors rather than just one.

"The theoretical argument for parallelism is very compelling but has never been realised," said Chris Rowen, CEO of Tensilica, whose technology generates optimised microprocessors.

"You put a vast array of microprocessors down and you get terrific performance," he added. "It is so cheap to build microprocessors nowadays

you can build in redundant microprocessors. But while the theoretical argument for parallelism grows in strength, why has it so often failed in the past?"

The main reason is that it is something different. People like to stick with the familiar, safe way. Now they cannot be safe any longer because heat has provided a ceiling to single processor systems.

"Transistor scaling is limited by power density," said Rowen. "We'll continue to improve density for the next ten years, so transistors will get cheaper and cheaper, but unless we do something else in the design we won't get any performance advantage out of it. We're reaching the limits of power/density."

John Daane, CEO of Altera, agreed: "Power is the critical factor. You can't

help matters by decreasing the voltage any more. Because you're not reducing the power supply any more, increasing the density and the frequency works against you."

So the industry is being forced to accept multiprocessing, where an array of microprocessors, working at frequencies which do not break the power/density ceiling, can deliver the continued increases in performance which single microprocessors cannot.

"Five out of the top ten supercomputers do massively parallel processing," said Dr Bernie Meyerson, CTO of IBM. Intel and AMD have accepted multi-core processing. The IBM/Sony/Toshiba Cell processor has eight synergistic microprocessors around a PowerPC core.

Kicking a bit, and screaming a bit, the industry is going parallel.