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Moore's Law Reconsidered

It's not just cramming more transistors onto a sliver of silicon. It's adding intelligent integration.

By Om Malik, Business 2.0 Magazine columnist
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(Business 2.0 Magazine) -- Apple's unveiling of the iPhone at this year's Macworld trade show quietly signaled the end of Moore's Law as we know it. At the same time, it ushered in a new era of technical innovation, driven by a new understanding of Moore's Law.

Gordon Moore, co-founder of Intel (Charts), noted in 1965 that the power of a chip doubles every 24 months, and the concept has been an industry obsession ever since, especially among PC makers. This fascination with faster processors was understandable. The units sold, often in dowdy beige boxes, at the rate of tens of millions every year and, in their slipstream, lifted everyone from commodity memory-chip and disc-drive makers to companies peddling operating systems.

But at the turn of the 21st century, PC penetration hit a silicon ceiling. The machismo of building powerful chips got a reality check, and it wasn't pretty: Engineers began to run into a limit to how much they could cram into the processors without overheating and running down laptop batteries.

Hamstrung, they began to look for alternatives such as multicore chips, but the bloom was off the rose. At the same time, the excitement in computing, led by Google (Charts), was moving from the PC to the network. The big shift led to a lot of hand-wringing within the chip community.

Many secretly asked the dreaded question: Was this the end of the line for Moore's Law?

Nope, says Drew Lanza, general partner with Morgenthaler Ventures, who points out that while the PC itself might be disappearing, mobile devices such as the iPhone are the new beneficiaries of Moore's Law. Moore's original research paper didn't say anything about processor clock speed. It said you could, with every generation of chips, cram more transistors into the same space.

Until very recently chipmakers have used Moore's Law to pack more processing power into the same chip. But now, at last, they're focusing on putting the same amount of processing power into an ever smaller and cheaper chip, and using those transistors to do more than just crunch numbers.

Nokia (Charts), for instance, is coming out with the N95, a phone that combines a videocamera, an MP3 player, VOIP, and a slew of other features, along with GSM, 3G, Wi-Fi, and Bluetooth. That's the typical range of features in a low-end MacBook. And that's the point, Lanza says: "The future is putting all of those features onto just a handful of inexpensive chips, and adding more and more functionality. That is where Moore's Law has moved."

As phone makers cram more features into cell phones - FM radios, TV tuners, Wi-Max, and ultra-wideband - chip designers will

have to pack them intelligently into ever smaller circuits. Moore's Law in the 21st century is about building these supercombo chips, not the fastest chip for your desktop. With nearly 1 billion mobile phones sold every year, this is an opportunity much larger than the PC market.

The implications for Web businesses are huge.

Go back to the upcoming iPhone: When Steve Jobs showed it to the world, he checked stock prices and bought movie tickets via an industrial-strength Safari browser, not the dumbed-down browser that today's phones use. Just as Moore's Law 1.0 lifted all PC boats, version 2.0 will turbocharge cellphone usage and make smart new startups a fortune.

Once again, give thanks to Gordon Moore.

Om Malik runs the technology blog GigaOm. ■

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