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Intel Details Teraflops-Capable Chip

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By Jordan Robertson, AP Technology Writer

Intel Details Research Chip Capable of More Than a Trillion Calculations Per Second

SAN JOSE, Calif. (AP) -- Intel Corp. has designed a computer chip that promises to perform calculations as quickly an entire data center -- while consuming as much energy as a light bulb.

The world's biggest chipmaker said Sunday it developed a programmable processor that can perform about a trillion calculations per second, or deliver a performance of 1.01 teraflops. It accomplishes this feat while consuming 62 watts of power when the chip is running at a frequency of 3.16 gigahertz.

A similarly powerful supercomputer in 1996 at Sandia National Laboratories took up more than 2,000 square feet, used nearly 10,000 Pentium Pro processors, and consumed more than 500 kilowatts of electricity.

Intel's latest chip is still in the research phase, but it marks an important breakthrough for an industry obsessed with obtaining the highest amount of performance for the lowest energy consumption.

Semiconductor companies used to focus overwhelmingly on generating faster and faster processing cycles, known as clock speed, and engineers didn't worry excessively about overheating chips. Now the balance between performance and efficiency is considered a quintessential part of Moore's Law, the 1965 prediction by Intel co-founder Gordon Moore that the number of transistors on a chip should double about every two years.

Just last month, Intel and International Business Machines Corp. separately announced they had devised ways to replace problematic but vital materials in the transistors of computer chips that have begun leaking too much electric current as the circuitry on those chips gets smaller.

The breakthrough ratcheted up the competition between Intel and rival chipmaker Advanced Micro Devices Inc., which helped IBM develop the technology along with electronics makers Sony Corp. and Toshiba Corp.

Executives at Santa Clara-based Intel, who will provide details of the chip this week, acknowledge that it might never make it to market in its current incarnation. Building the chip would be a manufacturing marvel, and it's unclear whether there's an operating system intelligent enough to control it.

"What we're trying to do is take microprocessor performance to the next level -- that's what's motivating us," said Justin Rattner, Intel's chief technology officer.

Technology experts praised Intel for devising a clever way to get 80 core calculating engines onto a single slice of silicon. The cores used on the research chip are much smaller and simpler than those used in Intel's latest line of chips, which have two or four cores. The research chip has 100 million transistors on it, about one-third the number on Intel's current line of chips.

The first uses for the chips would likely be in corporate data centers, supercomputers, communications infrastructures and for heavy-duty financial and scientific research.

Intel suggested one possible consumer use: a program that intelligently monitors a televised sporting event and automatically identifies and compiles key highlights like a slam dunk or a home run by a favorite player based on the spectator's preferences.

Other uses could be artificial intelligence, realistic 3-D computer modeling and real-time speech recognition.

"This is significant," said Jim McGregor of market research firm In-Stat. "If you can get that much power out of a chip, even if it's not something you use today, it's still a critical proof point. And it's not just for Intel, it's for the entire industry."

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