CIO

by Agam Shah

Intel Ponders Solar-Powered CPU Tech in Graphics, Memory

News

Feb 19, 2012 • 3 mins

Computers and Peripherals   Data Center

Intel is looking to drive down processors' power consumption

Intel's experimental solar-powered processor may have started off as a fun project, but the chip maker is now looking to extend the technology to hardware such as graphics processors, memory and floating point units.

Intel last year showed the low-power processor — charged only by the light from a reading lamp — running Windows and Linux PCs. Intel is expected to share further details about the processor, which is code-named Claremont, at the International Solid-State Circuits Conference in San Francisco next week.

The CPU, which is the size of a postage stamp, is also known as the near-threshold voltage (NTV) CPU for its ability to keep operating at extremely low voltage levels. The CPU's power consumption could go down to as little as 280 millivolts when running at 3MHz, and up to 1.2 volts when running at around 1Ghz when more performance is needed.

The NTV CPU is designed to bring extreme energy efficiency to computing devices, said Justin Rattner, Intel's chief technology officer, in a briefing ahead of the show.

"It's allowing us to make Intel's product more [power efficient] across the compute continuum" while reaching appropriate performance levels, Rattner said.

The CPU can remain at near-threshold voltage levels when not operational, which could keep laptops operational without killing battery life. That is much better than putting a PC into sleep or hibernation mode to save battery.
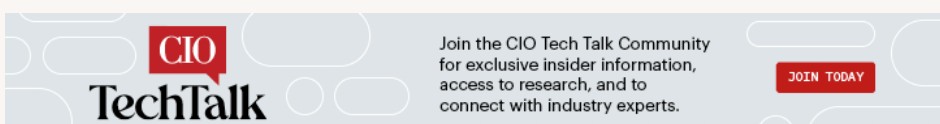
In an on-stage demonstration at last year's Intel Developer Forum, an engineer demonstrated a PC running a small animation when powered by the CPU. After the light source was blocked from the chip, the computer froze. The CPU worked with concept DDR3 memory developed by Micron called Hybrid Memory Cube, which is seven times more power-efficient than current DDR3 memory.

"It was not our intention to build a solar-powered microprocessor," Rattner joked, reminiscing about the experiment.

But the demonstration was an interesting way to show what the company was trying to achieve with NTV technology. The energy gains are about five to 10 times with NTV, Rattner said.

"The design has generated an extraordinary amount of interest," Rattner said.

The next goal is to extend the technology to other key components inside a computer.

"We are continuing to expand the use of these low-voltage techniques … to graphics and memory," Rattner said. The technology can also be deeply embedded inside circuitry to bring more power efficiency to supercomputing.

The solar-powered CPU is based on a Pentium chip design, and the researchers converted the logic circuit to operate at near-threshold voltage. The CPU was made using the 32-nanometer processor, which is the same used to make Intel's latest smartphone chip code-named Medfield. That chip will be appear in smartphones and tablets later this year.

Intel is sharing details about the chip layout and design methodology at ISSCC, which is being held from Feb. 19 to Feb. 23. The chip maker is also presenting separate papers that cover memory, graphics processors and floating-point units based on near-threshold voltage technology.

The research around the solar-powered CPU is being carried out in Intel's research labs. The chip maker has said it does not expect the solar-powered CPU to go commercial, but that elements from the research would be implemented in future Intel products.
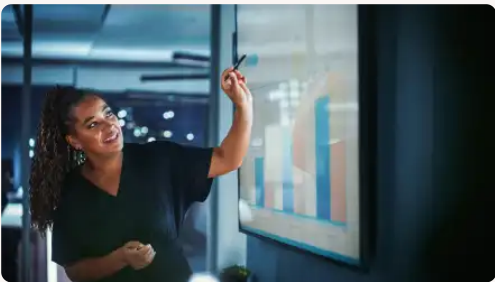
Show me more

POPULAR | ARTICLES | PODCASTS | VIDEOS

01

FEATURE

15 ways to grow as an IT leader in 2024

By Mary Pratt

Jan 15, 2024 • 13 mins

CIO | IT Strategy | Careers

02

PODCAST

CIO Leadership Live Middle East with Anthony Lynsdale, Vice President Information Technology at Atlantis Dubai

Jan 15, 2024 • 15 mins

CIO Leadership Live

CIO Leadership Live

FEATURED GUEST

Anthony Lynsdale
Vice President Information Technology Atlantis Dubai

03

VIDEO

How can IT leaders drive environmental sustainability?

Jan 15, 2024 • 6 mins

CIO Leadership Live

How can IT leaders drive environmental sustainability?

CIO

Sponsored Links

Protect your business from sophisticated threats by accelerating responses and simplifying experiences with data-backed and AI-powered Cisco Breach Protection. Sign up for a free demo.

Don't let budget hold you back. Get more predictive insights from Cisco Full-Stack Observability to resolve issues quicker and optimize user experiences. Schedule a

Take the guess work out of modernizing your workplace and creating the optimal work environment. Register to access our Design Guides.

This IDC report explores how to shift resources from day-to-day tactics over to strategic outcomes

personalized consultation today!

Download this IDC spotlight to learn how to capture new business opportunities more quickly

Cisco's Full-Stack Observability (FSO) solution delivers always-on, secure, and exceptional digital experiences. Book a free, zero-commitment consultation with an expert to learn more about how to make Cisco FSO work for you.

Empower workers with a safer, smarter, and more sustainable workspace with a single cloud platform that marries applications and data. Try Cisco Spaces for 30 Days, On Us.

Streamline security. Talk to a Cisco expert to learn about the benefits of breach protection.

Simplify complexity and make better decisions to secure your enterprise. Speak to a specialist to get the details on Cisco Cloud Protection.

Hybrid work isn't one size fits all. Whatever your workforce model, we have you covered – today, tomorrow, and into the future. Sign up for a 30-minute, zero-commitment demo to get your questions answered, learn how to get started, and explore a range of solutions.