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Ajile shows Java-based processor



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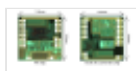
SAN JOSE, Calif. — Ajile Systems Inc. unveiled a new processor Wednesday (June 14) that could accelerate Java-based programs running on automobiles, home appliances, personal digital assistants, and a host of other embedded applications.

The processor, known as the aJ-100, features a power draw of just 100 mA, making it ideal for battery-powered applications. “Others have developed Java-based processors,” said David Hardin, chief technical officer for [Ajile Systems \(San Jose, Calif.\) < http://www.ajile.com/ >](http://www.ajile.com/). “But no one has provided the low power operation that this processor has.”

The few Java-based processors that have been developed up to now have drawn 10 to 20 times as much power as Ajile's new system, the company said. Sun Microsystems' picoJava processor, for example, draws about 1.5 W.

Ajile engineers said they were able to dramatically reduce the power required by the new chip for several reasons: its unusually low gate count; a gated clock; and a design that was specifically geared for embedded applications. “Sun targeted their Java processor at different kinds of applications,” Hardin said. “We're not targeted toward plug-in-the-wall applications. We're aiming specifically at deeply embedded, battery-powered applications.”

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Introducing the new processor at the Embedded Processor Forum here, Hardin said the aJ-100 displays an unusually simple design. It incorporates only about 20,000 gates, and its gated clock innovation enables the clock when it's not in use, thus saving power.

The aJ-100 processor operates at 100 MHz, uses 32-bit direct execution, incorporates five 8-bit general-purpose I/Os, and integrates 48 kbytes of SRAM and a memory controller for ROM, SRAM or flash memory.

Ajile engineers based the aJ-100 design on the company's JEM2 Java-based processor, which was introduced in March. But while the JEM2 was built in 0.50-micron process technology, the aJ-100 uses 0.25-micron technology.

Ajile was incorporated in July 1999 for the purpose of developing a Java-based processor. Its founders began work on a distributed embedded processor for internal use at Rockwell Collins before ultimately deciding to develop a Java processor.

The JEM1 processor was designed for internal use at Rockwell Collins, and was intended as a standardized single processor that would be used across the company's avionics products to reduce the code base supported by engineers. However, getting the JEM adopted proved a slow process, especially among the company's strong contingent of Ada programmers. Ultimately Rockwell Collins engineers received approval and an investment from the company to spin off the JEM design and design team in hopes of finding a commercial market.

"We saw a technological shift from a PC-centric market to a network-based market," said Danh Le Ngoc, vice president of marketing and one of Ajile's founders. "And we knew that C is not designed for a network market, whereas Java deploys to many platforms."

Seeing the potential power of a Java-based processor, Ngoc and six other engineers decided to pool their efforts. "With our own savings and the belief that Java was right for the embedded market, we started our own company," he said.

The company has focused on overcoming the barriers to deploying a Java-based processor, specifically Java's slow execution on resource-constrained CPUs, and on the large memory footprint needed for the Java environment and supporting operating systems.

Ajile engineers believe they are solving those problems. Because the aJ-100 uses unique byte-code instructions and needs no real-time operating system, the processor has achieved relatively fast performance benchmarks — measured in units specifically designed for Java-based processors — and does not need large memory to run, the company said. "We tried to take a minimalist approach to get the best implementation of Java features per square millimeter," Hardin said.

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