New Chip to Challenge Intel Associated Press

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SAN FRANCISCO -- Setting up a battle for the future of computing, engineers from IBM, Sony and Toshiba unveiled details Monday of a microprocessor they claim has the muscle of a supercomputer and can power everything from video-game consoles to business computers.

Devices built with the processor, code-named Cell, will compete directly with the PC chips that have powered most of the world's personal computers for a quarter century.

Cell's designers say their chip, built from the start with the burgeoning world of rich media and broadband networks in mind, can deliver 10 times the performance over today's PC processors.

It also will not carry the same technical baggage that has made most of today's computers compatible with older PCs. That architectural divergence will challenge the current dominant paradigm of computing that Microsoft and Intel have fostered.

The new chip is expected to be used in Sony's next-generation PlayStation game console. Toshiba plans to incorporate it into high-end televisions. And IBM has said it will sell a workstation with the chip.

Beyond that, companies are remaining coy about where it might be used and whether it will be compatible with older technology.

"With this massive computing power, we'll get to the point where we'll get closer to (a) photo-realistic-type effect that will be able to be generated by the computer," said Jim Kahle, an IBM fellow.

Supercomputer claims are nothing new in the high-tech industry, and over the years chip and computer companies have steadily improved microprocessor performance even without altering chips' underlying architecture.

And while its competitors may well match the Cell chip in performance by the time it debuts in 2006, it differs considerably from today's processors in constitution.

Cell is comprised of several computing engines, or cores. A core based on IBM's Power architecture controls eight "synergistic" processing centers. In all, they can simultaneously carry out 10 instruction sequences, compared with two for today's Intel chips.

The new microprocessor also is expected to be able to run multiple operating systems and programs at the same time while ensuring each has enough resources. In the

home, that could allow for a device that's capable of handling a video game, television and general-purpose computer at once.

"It's very flexible," Kahle said. "We support many operating systems with our virtualization technology so we can run multiple operating systems at the same time, doing different jobs on the system."

Later this year, Intel and Advanced Micro Devices plan to release their own "multicore" chips, which also increase the number of instructions that can be executed at once. IBM and Sun Microsystems already sell chips with multiple cores, mainly for business servers.

Cell also appears to have an advantage in the number of transistors -- 234 million compared with 125 million for today's latest Pentium 4 chips. Traditional chipmakers, however, have regularly doubled their number of transistors every 12 to 18 months.

Cell is said to run at clock speeds greater than 4 GHz, which would top the 3.8 GHz of Intel's current top-speed chip.

Cell's designers said they are running a variety of operating systems on the processor at their lab in Austin, Texas. But they would not say whether Microsoft's Windows is one of them. In fact, they only confirmed running Linux.

The PC industry has seen a long line of chips attempt to usurp the x86 architecture pioneered by Intel that dominates today's computers. But all have failed, and Intel remains the world's largest chipmaker.

In the 1990s, IBM, Motorola and Apple Computer pushed the PowerPC architecture. Though it's still used by the Apple Macintosh as well as IBM workstations and servers, it failed to dethrone Intel.

Most recently, Transmeta's Crusoe was supposed to challenge Intel's dominance in notebooks. Launched at the twilight of the tech boom in 2000, it gained only marginal acceptance, and the company is now considering plans to focus on licensing its patents.

Intel has since developed its own mobile chip technology, Centrino.

"Transmeta was also a disruptive influence in the market. And because of Transmeta, we've got Centrino and the advances that have happened in mobile computing," said Steve Kleynhans, a Meta Group analyst. "Unfortunately, we don't really have Transmeta anymore."

For a challenger to succeed in displacing x86, it will have to perform considerably better since it also will break computing's long-standing tradition of backward and forward compatibility, said Justin Rattner, who oversees Intel's Corporate Technology Group.

"They're going to have to show they're able to do things that conventional architectures at least at the moment are incapable of doing," he said. "That's the fundamental question."

The Cell's specifications also suggest the PlayStation 3 will offer realistic graphics and strong performance. But analysts cautioned that not all the features in a product announcement will find their way into all systems built on the device.

"Any new technology like this has two components," Kleynhans said. "It has the vision of what it could be because you need the big vision to sell it. Then there's the reality of how it's really going to be used, which (is) generally several levels down the chain from there."