

IBM

Sony Corporation

Sony Computer Entertainment Inc.

Toshiba Corporation

IBM, Sony, Sony Computer Entertainment Inc. and Toshiba Unveil Cell Processor
Companies Released First Details of Multicore Chip Comprising Power Architecture and Synergistic Processor

ARMONK, NY and TOKYO, November 29, 2004 – IBM, Sony Corporation, Sony Computer Entertainment Inc. (Sony Corporation and Sony Computer Entertainment Inc. collectively referred to as Sony Group) and Toshiba Corporation today unveiled for the first time some of the key concepts of the highly-anticipated advanced microprocessor, code-named Cell, they are jointly developing for next-generation computing applications, as well as digital consumer electronics.

The four companies also announced that they would reveal technical details of Cell at the International Solid State Circuits Conference (ISSCC) to be held from February 6th to 10th, 2005, in San Francisco.

Specifically, the companies confirmed that Cell is a multicore chip comprising a 64-bit Power processor core and multiple synergistic processor cores capable of massive floating point

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processing. Cell is optimized for compute-intensive workloads and broadband rich media applications, including computer entertainment, movies and other forms of digital content.

Other highlights of the Cell processor design include:

- Multi-thread, multicore architecture.
- Supports multiple operating systems at the same time.
- Substantial bus bandwidth to/from main memory, as well as companion chips.
- Flexible on-chip I/O (input/output) interface.
- Real-time resource management system for real-time applications.
- On-chip hardware in support of security system for intellectual property protection.
- Implemented in 90 nanometer (nm) silicon-on-insulator (SOI) technology.

Additionally, Cell uses custom circuit design to increase overall performance, while supporting precise processor clock control to enable power savings.

IBM, Sony Group and Toshiba will disclose more details about Cell in four technical papers scheduled for presentation at the International Solid State Circuits Conference.

“Less than four years ago, we embarked on an ambitious collaborative effort with Sony Group and Toshiba to create a highly-integrated microprocessor designed to overcome imminent transistor scaling, power and performance limitations in conventional technologies,” said Dr. John E. Kelly III, senior vice president, IBM. “Today, we're revealing just a sampling of what we believe makes the innovative Cell processor a premiere open platform for next-generation computing and entertainment products.”

“Massive and rich content, like multi-channel HD broadcasting programs as well as mega-pixel digital still/movie images captured by high-resolution CCD/CMOS imagers, require huge amount of media processing in real-time. In the future, all forms of digital content will be converged and fused onto the broadband network, and will start to explode,” said Ken Kutaragi, executive deputy president and COO, Sony Corporation, and president and Group CEO, Sony Computer Entertainment Inc. “To access and/or browse sea of content freely in real-time, more

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sophisticated GUI within the 3D world will become the 'key' in the future. Current PC architecture is nearing its limits, in both processing power and bus bandwidth, for handling such rich applications.”

“The progressive breakdown of barriers between personal computers and digital consumer electronics requires dramatic enhancements in the capabilities and performance of consumer electronics. The Cell processor meets these requirements with a multi-processor architecture/design and a structure able to support high-level media processing. Development of this unsurpassed, high-performance processor is well under way, carried forward by dedicated teamwork and state-of-the-art expertise from Toshiba, Sony Group and IBM,” said Mr. Masashi Muromachi, Corporate Vice President of Toshiba Corporation and President & CEO of Toshiba's Semiconductor Company. “Today’s announcement shows the substantial progress that has been made in this joint program. Cell will substantially enhance the performance of broadband-empowered consumer applications, raise the user-friendliness of services realized through these applications, and facilitate the use of information-rich media and communications.”

Cell provides a breakthrough solution by adopting flexible parallel and distributed computing architecture consisting of independent, multi-core floating point processors for rich media processing. With the capability to support multiple operating systems, Cell can perform both PC/WS operating systems as well as real-time CE/Game operating systems at the same time. Scalability offered by Cell can be utilized for broader applications, from small digital CE systems within the home to other entertainment applications for rendering movies, and to the big science applications as supercomputers.

A team of engineers from IBM, Sony Group and Toshiba are collaborating on the design and implementation of Cell which is expected to deliver vast floating point capabilities, massive data bandwidth and scalable, supercomputer-like performance. The design work is taking place at a joint development lab the three companies established in Austin, Texas, after the project was announced in 2001.

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IBM plans to begin pilot production of Cell microprocessors at its 300mm wafer fabrication facility in East Fishkill, NY during the first half of 2005. The first computing application IBM plans for Cell is the Cell processor-based workstation it is developing with SCEI.

Sony Corporation expects to launch home servers for broadband content as well as high-definition television (HDTV) systems powered by Cell in 2006.

Sony Computer Entertainment Inc. also expects to launch its next generation computer entertainment system powered by Cell to revolutionize the experience of computer entertainment.

Toshiba Corporation envisions diverse applications for Cell and expects to launch its first Cell-based product, a high-definition television (HDTV), in 2006.

About IBM

IBM is the world's largest information technology company, with 80 years of leadership in helping businesses innovate. IBM is also a recognized innovator in the semiconductor industry, having been first with advances like more power-efficient copper wiring in place of aluminum and faster SOI and silicon germanium transistors. These and other innovations have contributed to IBM's standing as the number one U.S. patent holder for 11 consecutive years. More information about IBM semiconductors can be found at: <http://www.ibm.com/chips>

About Sony Corporation

Sony Corporation is a leading manufacturer of audio, video, game, communications, key device and information technology products for the consumer and professional markets. With its music, pictures, computer entertainment and on-line businesses, Sony is uniquely positioned to be the leading personal broadband entertainment company in the world. Sony recorded consolidated annual sales of approximately \$72 billion for the fiscal year ended March 31, 2004. Sony Global Web Site: <http://www.sony.net/>

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About Sony Computer Entertainment Inc.

Recognized as the global leader and company responsible for the progression of consumer-based computer entertainment, Sony Computer Entertainment Inc. (SCEI) manufactures, distributes and markets the PlayStation® game console and PlayStation®2 computer entertainment system. PlayStation has revolutionized home entertainment by introducing advanced 3D graphic processing, and PlayStation 2 further enhances the PlayStation legacy as the core of home networked entertainment. SCEI, along with its subsidiary divisions Sony Computer Entertainment America Inc., Sony Computer Entertainment Europe Ltd., and Sony Computer Entertainment Korea Inc. develops, publishes, markets and distributes software, and manages the third party licensing programs for these two platforms in the respective markets worldwide. Headquartered in Tokyo, Japan, Sony Computer Entertainment Inc. is an independent business unit of the Sony Group.

About Toshiba

Toshiba Corporation is a leader in the development and manufacture of electronic devices and components, information and communication systems, digital consumer products and power systems. The company's ability to integrate wide-ranging capabilities, from hardware to software and services, assure its position as an innovator in diverse fields and many businesses. In semiconductors, Toshiba continues to promote its leadership in the fast growing system-on-chip market and to build on its world-class position in NAND flash memories, analog devices and discrete devices. Visit Toshiba's website at www.toshiba.co.jp/index.htm

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