



From Intel Inside to Intel Everywhere: Will the Chipmaker's Strategy Work?

Published : July 28, 2004 in [Knowledge@Wharton](#)

Think Intel, and you probably think of the microprocessor chips that serve as the brains of personal computers. But the company over the years quietly has been expanding its horizons well beyond chips for laptop and desktop computers. It's already developed a major business in chips for server computers – powerful machines used by corporations and governments – and also offers to sell nearly complete servers. More recently, the Santa Clara, Calif.-based company has taken steps towards a similar strategy in the arena of data storage equipment. In addition, Intel has set its sights on wireless communications and is angling to play a key role in designing products for the "digital home."



This is a single/personal use copy of Knowledge@Wharton. For multiple copies, custom reprints, e-prints, posters or plaques, please contact PARS International: reprints@parsintl.com P. (212) 221-9595 x407.

Indeed, Intel's Chief Technology Officer, Patrick Gelsinger, outlined a grand ambition for the company in a speech last fall. "Before I retire from Intel, I want a piece of Intel technology touching every human on earth, every minute of every day, in every aspect of their lifestyle," Gelsinger said.

This strategy, which might be dubbed "Intel Everywhere," has its risks. They include the prospect that consumers will chafe against computer-based products in their living rooms, and the possibility that Intel will step on partners' toes along the way. In addition, Intel may face renewed competition from longtime rival Advanced Micro Devices.

On the other hand, observers suggest Intel is wisely pursuing new opportunities. Strong growth rates in the traditional PC arena have slowed down, and the semiconductor industry's recent momentum has peaked, according to a report this week from investment firm Merrill Lynch. Merrill Lynch downgraded Intel and other chip stocks from "buy" to "neutral", and cut its revenue forecast for annual growth in the semiconductor sector in 2005 from 16% to 6%.

[Morris Cohen](#), a Wharton professor of operations and information management, says that heading into new markets could help Intel overcome a notorious problem in the chip industry: the volatile swings of demand that make capacity planning difficult. Cohen, who has consulted with Intel on supply chain strategy, said new arenas that offset the PC business cycle or offer stable demand could make it easier for the company to manage its equipment purchases. "Any expansion into markets that allow them to smooth out the production schedule...might help them," Cohen points out.

Intel, whose revenues grew 13% last year to \$30.1 billion, ranks 65th on the *Fortune* 500 list, employs some 78,000 workers and bills itself as the world's largest chip maker. Its products include microprocessors, which control the central processing of data in computers, as well as chipsets, which are groups of integrated circuits for purposes such as controlling the flow of information between the processor and other devices in a computer.

Last year, Intel snagged a commanding 82.9% of the worldwide market for PC microprocessors, according to tracking firm Mercury Research. Dean McCarron, principal analyst at Mercury Research, estimates that more than 90% of the company's business is related to PCs, including microprocessors and chipsets.

But the company did not start off as a PC specialist. In fact, its launch in 1968 came more than a decade before personal computers became widely popular. Intel initially focused on semiconductor memory products. The company introduced the first microprocessor in 1971, but that chip went into calculators.

It wasn't until the mid-1980s that Intel made a strategic move to concentrate on microprocessors for computers, in particular the growing market of PCs. In the mid- to late 1990s, the company developed specialized microprocessors for the desktop, laptop and server computer markets. Intel now makes "applications processors" to handle email programs in wireless handheld devices, chipsets to allow voice communication in cell phones and products for network routers and switches.

To the general public, though, Intel comes across as a – or perhaps "the" - PC chip maker. That reputation has a lot to do with the company's "Intel Inside" marketing program, which was launched in 1991. Through the program, Intel offered to share advertising costs for PC ads that included the Intel logo. Intel now boasts that it is one of the top-ten known brands in the world, in a class with Coca Cola, Disney and McDonalds.

Chips and More

But Intel is much more than just a PC chip company. McCarron estimates that Intel's processors for server computers rake in multiple billions of dollars a year. And the company hasn't been content to sell just chips for servers. Over the years, Intel has helped generate a market in low-end servers by offering manufacturers chips, chipsets, system blueprints and even servers that contain everything but a few easily integrated components, like memory. In many cases, lesser-known manufacturers use Intel's package of server products to make what are known as "white box" servers.

Now the company is poised to duplicate this strategy in the growing world of data storage, which refers to specialized computers with multiple disk drives for holding digital information. "The server-commoditization wave is being repeated in storage," David Freund, an analyst with research firm Illuminata, wrote in a recent report. "Intel is planting (its) seeds and planning to reap the rewards." Already, Intel makes a number of semiconductor products for storage systems. But it is now weaving its efforts into a more comprehensive whole that would reduce the independent engineering needed to make a system.

Intel is working with partner Emulex to integrate some storage functions with processor chips, which could speed up performance and cut costs. The company produced a blueprint for a low-end storage product and showed such devices at a trade show earlier this year. And it has begun coordinating the work of several divisions that touch on the storage world, says Seth Bobroff, director of marketing programs and communications for Intel's networking and storage group. "It's absolutely a key area and one we see growing," Bobroff said. "We see the opportunity and are working as one."

Another opportunity Intel has in its sights is wireless communications. Here again, the company has done more than just produce chips. Last fall, Intel showed off what it called the Universal Communicator, a

prototype handheld device that switches smoothly between wireless networks. The gizmo incorporated Intel's XScale processor, which is built to consume less power and fit into portable devices.

At a conference at the San Jose McEnery Convention Center, CTO Gelsinger demonstrated some nifty possible uses of the Communicator. Gelsinger employed the device to have a voice conversation with a colleague in the lobby, and when the colleague was near a coffee station, a menu of offerings appeared on Gelsinger's screen -- representing a location-based service possible with wireless technology. Gelsinger said Intel had no plans to bring the Communicator to market. But, he added, "We expect this to spur innovation in real products."

Yet another market Intel is pursuing aggressively is the so-called "digital home," which refers to the growing overlap between computing devices and consumer electronics products like music players and televisions. Paul Otellini, Intel's president, declared the company's intentions in this arena in a speech earlier this year. "Our goal is to eliminate boundaries between electronic devices inside and outside the home, and we're working with the PC and consumer electronics industries to make this a reality," he said. Otellini outlined a vision of consumer electronics where individuals "have access to digital content anytime, anywhere, on any device."

As part of its push, Intel established a \$200 million fund to invest in "companies that complement Intel products and accelerate development of key technologies and content which enhance and simplify the digital home experience." More directly, Intel said it is developing so-called liquid crystal on silicon technology, which is a method for making large-screen displays.

Entertainment PC

In keeping with its habit of building reference designs for devices that could eventually use its silicon products, Intel has worked to develop what it calls the "Entertainment PC." That's a slim PC connected to a television screen and designed to be used to organize and consume digital content such as music, movies and gaming. Intel said Entertainment PCs "will be capable of sharing content wirelessly and operated with a remote control instead of a keyboard."

In June, Intel announced new chip and chipset products designed, among other things, to enable PCs to produce surround sound and better video capabilities. McCarron said Intel's emphasis on digital media features in PCs makes sense because the traditional PC market has slowed down. While hardware companies in the PC arena enjoyed 20% to 30% annual growth rates in the 1990s, they now face growth in the single digits or teens. "If you want to grow, you have to move into new markets, and this is one," McCarron said.

Already consumers are embracing electronic products with connections to the computer world, such as the Apple iPod and other digital music players and liquid crystal display (LCD) televisions, which are now sold by PC makers Dell and Gateway.

The wireless field also appears to be fertile. Earlier this year, the chief research officer of market analysis firm IDC suggested that the proliferation of communicating devices, such as radio frequency ID (RFID) tags and mobile phones, will lead to a vast increase in the amount of data being sent on networks by 2012. Meanwhile, statistics show an increasing hunger for storage equipment, thanks to factors including government regulations for retaining data and the growing digitalization of content such as music. The

amount of disk storage system capacity shipped worldwide in the first quarter of this year hit 247 petabytes, up 39.4% from the first quarter of 2003, according to a report by IDC. (A petabyte is a million gigabytes.)

But Intel's expansion plans may hit hurdles. Illuminata's Freund notes the company's forays into new arenas -- such as the telecommunications market -- haven't always gone smoothly. The digital home market has particular challenges for PC players, McCarron adds. One, he said, is a "communications barrier," where the computer industry must convince consumers used to buying audio equipment for \$100 to \$200 to buy a PC device that may cost hundreds more but comes loaded with more capabilities.

Intel and its allies also are up against an "ease of use" obstacle, McCarron says. "It's hard to compete with something as easy to use as a DVD player, where you just toss in a disk and push play," he explains. Intel is aware of this need to make sure "it just works." Along these lines, the company has developed audio technology designed to change the role of a computer's jack depending on what has been plugged in there -- so if a microphone is plugged into a speaker jack, the computer will recognize the error and can change the jack to function as a microphone jack.

Then there's the question of whether Intel's new efforts threaten long-term partners. IBM, for example, declined to speak on Intel's possible storage white box efforts, saying it doesn't comment "on its competitors' plans."

Microsoft's Kevin Miller, who is in charge of the software giant's alliance with Intel, says the two companies have to work harder at communicating than they used to in order to avoid clashing. With Intel writing Windows applications and Microsoft selling products such as keyboards, it's a less simple era than when Intel focused on hardware and Microsoft on software, Miller suggests. "If we 'go dark' on each other, that creates the potential for collisions," he says. So far, though, the collaboration generally has gone well.

Even so, Intel's old microprocessor rival Advanced Micro Devices has turned up the heat in the server market. Last year AMD introduced its Opteron chips, which can run either 32-bit or 64-bit software -- meaning they can take in data in 32-bit or 64-bit portions. The 64-bit extension allows systems to work with larger amounts of computer memory, which is helpful for applications such as databases. Computer giants Hewlett-Packard, Sun Microsystems and IBM all offer machines with Opteron chips. Intel only recently put out a comparable chip. Opteron "introduced competition into a market in which Intel didn't have competition," McCarron says.

But AMD's challenge doesn't seem to be slowing Intel down as it moves beyond the traditional PC. Company spokeswoman Laura Anderson says Intel intends to guard its existing turf even as it seeks new pastures. "We'll continue to keep our focus on both places," she says.

This is a single/personal use copy of Knowledge@Wharton. For multiple copies, custom reprints, e-prints, posters or plaques, please contact PARS International: reprints@parsintl.com P. (212) 221-9595 x407.