Moving to the Digital Home

Intel delivers innovative Intel® Viiv™ technology, powerful new products and interoperability initiatives to help bring consumers a next-generation entertainment experience

Home, it's often said, is where the heart is. That's probably because home — be it an apartment in Manhattan, a Tudor in London or a penthouse in Hong Kong — is at the heart of people's lives. Home is where people go to rest and nest, to spend time with friends and family, to escape the pinball game of work, and to be entertained by more engaging games, from TV's popular "Survivor" series to best-selling PC-based diversions such as Halo 3*.

Consumer surveys reveal that enjoying music and video, watching TV and using a personal computer are among the top things people like to do in their homes. For example, a recent survey found that about 36 million Americans download music or video files.[1] From a more global perspective, a recent GMI poll that surveyed 20,000 consumers in 20 countries found that in all countries except the United States, the PC has overtaken the TV as the one technology people can't live without. In the poll, 75 percent of consumers ranked the PC as their must-have technology, compared to 67 percent for TV. In the United States, the TV remains at the heart of the home for 89 percent of consumers, while the PC is favored by 87 percent.[2]

Market research also offers insight to a shifting home electronics industry. Soaring sales of digital cameras, MP3 players, CD/DVD players, digital TVs, portable media players, digital set-top boxes and other hot gadgets offer evidence that people are moving in droves from analog to digital devices. Consumers are driven largely by a desire to get the utmost enjoyment out of the current proliferation of rich digital content, but that's not the only reason for the rapid crossover to digital media. People also recognize the appeal of being able to create, edit, manage and store their favorite content, using a PC, and share that content easily by means of a wireless network and a high-speed Internet connection.

The Digital Home: a Next-Generation Entertainment Experience

In focus group studies, today's consumers say they want to enjoy digital content on a variety of devices, from TVs and home stereos to PCs, portable media players and other devices. They like the idea of socializing while viewing digital photos with friends and other household members on a large-screen TV in the family room, or listening to music from playlists on high-fidelity speaker systems throughout the house. More broadly, consumers look forward to the

[1] Pew Internet & American Life Project Survey, conducted between 1/13/05 and 2/9/05.
[2] GMI news release, 3/10/05.

time when they can easily access compelling content any time, on any device, in any room of the home.

That day is fast approaching, fueled by the rapid growth of key enabling technologies such as wireless networking and broadband Internet. Broadband connections worldwide continue to rise, with DSL connections projected to grow from a relatively large base of nearly 100 million installations in 2004 to more than double that by 2009.[3] Within the United States alone, the Consumer Electronics Association forecasted that approximately 43 million homes would have a high-speed Internet connection by the end of 2005.

Consumers' ability to experience entertainment "on their own terms" is embodied in Intel's vision of the digital home, an environment in which household members can enjoy countless hours of digital content, regardless of the source, across various devices and stream it to any location throughout the home. This vision bridges two areas that are traditionally islands in the home: the consumer electronics (CE) island inhabited by TVs, stereo systems, broadcast media and so forth, and the PC island populated by Internet content and broadband connections. The vision integrates these bridges by means of a seamless, interoperable home network based on industry specifications. "Interoperable" is the key word in that sentence. For the digital home to become a reality, consumers need innovative, easy-to-use technologies that give them the choice and flexibility to enjoy an optimal digital entertainment experience.

Getting From Here to There: Intel's Role

Delivering Platforms, Beginning With Intel® Viiv™ Technology

Intel recognizes that bringing about the digital home requires a dedicated effort on several fronts. First and foremost, Intel is committed to delivering core technologies for new computing devices, networking products and consumer electronics to advance the digital home experience for people worldwide. This commitment includes delivering platforms that meet real consumer needs and appetites, and that often predict, based on research, highly desirable new usage models.

At the heart of this effort is Intel® Viiv™ technology**, a platform designed to power a new breed of PCs best described as digital entertainment hubs. Premiering in early 2006 from leading system manufacturers worldwide in a variety of designs, entertainment PCs based on Intel Viiv (rhymes with "five") technology are designed to enhance and help manage how

[3] DELL'ORO Group, 01/05

consumers enjoy, manipulate and share countless hours of on-demand digital entertainment in the home. Using an optional remote-control device, people can consume entertainment or download music, movies and other digital content from about 10 feet away from the PC, while relaxing on the couch or recliner.

Intel Viiv technology-based PCs also feature support for high-definition video and for up to 7.1 surround-sound audio; high-end graphics functionality; "instant on/off" ability after initial boot-up (a TV-like function enabled by new Intel® Quick Resume Technology Drivers, when activated); and the latest online music, movie and gaming services, available at the touch of a button of the optional remote. With features like these, such a device is uniquely positioned to become the centerpiece of the family room or den — precisely the vision that inspired Intel to develop Intel Viiv technology.

Intel Quick Resume Technology Drivers are an excellent example of the company's pledge to develop innovative technologies and product designs for the PC platform that help make devices in the digital home more fun and easy to use. This technology enables an Intel Viiv-based PC to continue running and stay accessible to connected devices when it's in "visual-off" mode, much like a television. In other words, the display is blank and the sound is muted, but a consumer can awaken the system within seconds. The technology feature also supports low power consumption in PCs based on Intel Viiv technology.

On the technical side, Intel Viiv technology integrates a suite of powerful ingredients, including a dual-core processor, a next-generation chipset, platform software and wired networking capabilities — all optimized to work in unison and enable an exceptional digital entertainment experience. Designed to serve as the "engine" of Intel Viiv technology, the dual-core processor delivers outstanding performance to enrich the consumer experience. Intel's dual-core architecture supports the concepts of multitasking and multi-user entertainment by providing the processing power to simultaneously download, stream, display and enjoy multiple forms of digital entertainment, including audio, video and PC gaming.

Intel approached the design of Intel Viiv technology much like it approached the development of Intel® Centrino® mobile technology, a set of integrated computing technologies designed to power wireless laptops and make it simple for people to enjoy mobile computing. Like Centrino mobile technology, Intel Viiv technology is a comprehensive suite of components that work together to bring consumers greater benefit than the sum of the individual parts.

Later in 2006, Intel Viiv technology will add other elements designed to help people adopt new digital entertainment usage models. For example, integrated software will make it easier to set up and manage a home network, whether wired or wireless, so consumers can move digital content around the house. Instead of a barrage of complex concepts and technical jargon, consumers will be able to purchase an Intel Viiv technology verified router, set it up in a few steps with several clicks of the remote control, then be up and running with a secure wireless home network. Similarly, Intel will mask the complexity of connecting DVD players, digital TVs, set-top boxes and other devices to the home network by providing consumers with simple, software-based instructions that are easy to navigate with a remote control.

Besides introducing new technology, Intel is helping to meet CE industry requirements for scalable platform solutions that complement the digital home vision. Intel focuses on developing silicon building blocks, reference designs, development platforms and software for CE devices, including IP digital set-top boxes, digital TVs and digital media recorders. Interoperable Intel-based CE platforms are designed to offer consumers access to a broad range of new IP-based digital media and services, ranging from IPTV and video-on-demand to voice over IP (VoIP) and online gaming, delivered over existing DSL broadband networks.

Aligning the CE and PC Industries

Making the digital home a reality also requires a commitment by PC and CE industry leaders to develop guidelines and specifications for interoperability. Historically, these two industries have followed independent product development paths. Because their two sets of products weren't built on the same technologies, they typically don't work together.

To help remedy this problem, Intel spearheaded the formation of a cross-industry group to collaborate on specifications for accelerating the development of interoperable products. The Digital Living Network Alliance (DLNA) aims to simplify the sharing of digital content among networked CE devices, mobile devices and PCs. Group members, which totaled nearly 250 companies as of December 2005, are working to deliver technical design guidelines for vendors to use in developing digital products (PCs, TVs, set-top boxes, printers, stereos, mobile phones, DVD players and other devices) that can share content through wired or wireless networks in the home.

The group delivered on its goal to create guidelines within a year, unveiling the first version of the Home Networked Device Interoperability Guidelines in June 2004. The next version is scheduled to be released in the first quarter of 2006. Intel Viiv technology, as well as

any devices that are tested and verified to work with it, will comply with industry specifications set forth by the DLNA.

Making Premium Digital Content Available

The digital home is not just about hardware or devices; it also depends on a continuing stream of first-class digital content — movies, music, television, games, sports, photos and videos — that will make powerful new digital devices even more appealing.

A number of compelling online services that enable consumers to enjoy hours upon hours of digital music and movies in new ways have already emerged. For example, Radio@AOL* lets consumers stream live Internet radio from the PC to a TV or stereo by means of a digital media adapter. Napster*, one of several digital music services available today, provides monthly unlimited access to more than 1 million music tracks from all the major music labels and hundreds of independent music artists and labels. Meanwhile, film buffs can take advantage of services such as Movielink*, which delivers movies over the Internet for viewing on a home PC or TV.

Intel is working with these and dozens of other leading entertainment companies worldwide to help bring a medley of novel digital content services and applications to homes by means of Intel Viiv technology and on-demand broadband Internet connectivity. Intel is providing the engineering support, specifications and verification tools to content owners, content distributors, portals, software application developers and device vendors to help them deliver Internet-based content services and software applications that are verified and identified to work with PCs based on Intel Viiv technology.

In November 2005, Intel announced more than 40 services and software applications that would be available in many locations around the world, spanning content categories that include countless hours of movies, video and TV, as well as music, games and photos. Intel expects the number of Intel Viiv technology verified content services and applications to grow throughout 2006. Over the course of the year, the list will also expand to include verified consumer devices such as portable media players, networked media devices and other CE devices.

These alliances build on earlier Intel efforts to align with the entertainment and motion picture industries and make premium content available to consumers. In January 2005, Intel and Revelations Entertainment — a partnership between actor Morgan Freeman and producer Lori McCreary — announced an alliance that will work to educate the motion picture industry about the impact of technology on entertainment, as well as to explore new business opportunities for

secure content distribution. In a related move, Intel joined forces with Revelations in July 2005 to help form a new digital entertainment company called ClickStar Inc., which focuses on enabling new business models for distributing films directly to consumers worldwide over broadband Internet connections. Coupled with Intel's digital entertainment technology platforms, ClickStar's intriguing new online service will give consumers the opportunity to watch first-run movies and premium artist-created content from the comfort of home.

Intel also recognizes that without adequate protection, content creators simply won't make great content widely available over digital networks. Toward this end, Intel turned its attention to technology that enables consumers to enjoy content among digital devices in the home, even when it's protected by diverse content-protection schemes. The result was Digital Transmission Content Protection (DTCP) over IP, a specification that Intel co-developed with consumer electronics giants Hitachi, Matsushita (Panasonic), Sony and Toshiba.

Products designed to support DTCP over IP will allow consumers to, for example, download a movie that's protected by a form of digital rights management technology onto a PC or digital set-top box and transfer it — with the rights management solution integrated by the content owner preserved — to other devices on the home network, such as a digital media adapter or a digital TV, for more entertaining viewing. Intel Viiv technology will support the DTCP-IP specification so that consumers can share digital rights-managed content downloaded to their PCs with other verified devices on a home network.

The PC and CE industries are riding a massive digital media wave, buoyed by the rise in broadband Internet access, escalating consumer interest in all things digital, and cross-industry efforts to satiate that interest. The launch of Intel Viiv technology in early 2006, along with other Intel digital home platforms and technologies, and industry enabling efforts, demonstrate that Intel is working to accelerate the creation of a true digital home where CE and computing devices interact transparently and personalized content can be delivered on any device, anytime and anywhere. To consumers, such an environment is likely to seem not just a digital home, but digital nirvana.

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**Home networking capability and many Intel® Viiv™ technology-based usage models will require additional hardware devices, software or services. Functionality of Intel Viiv technology verified devices will vary; check product details for desired features. System and component performance and functionality will vary depending on your specific hardware and software configurations. Remote control may be sold separately.