

# Notable Notebook Enhancements

Tweaks put notebooks on the cusp of moving ahead of desktops for business use.





Until fairly recently, using a notebook computer meant accepting limited performance and relatively high prices as the trade-off for mobility. But that was then and this is now.

The performance and cost gaps between notebooks and desktop computers have closed. With increased capacity, growing feature sets, ever sleeker designs and lower prices, notebooks are becoming the business standard.

The days of companies parceling out notebooks to key executives and a few employees who absolutely couldn't do their jobs without them are long gone. As their capabilities continue to grow, notebooks are poised to supplant desktops as the default business computing device.

"It's already happened in Japan," says Richard Shim, an analyst with the tech research firm IDC. "For business use, notebooks will pass desktops in Western Europe this year and it will happen in the U.S. before 2010, probably in late 2008."

Because of stronger than expected sales of notebooks in the first quarter of 2007, the market analyst firm iSuppli Corp. increased its estimates of total global PC sales for the year. iSuppli forecasts that purchases of notebooks will jump more than 25 percent this year, while desktop sales will only grow by about 4 percent.

The demand for notebooks has been fueled by rapidly evolving features and technology. In turn, an increasingly mobile workforce stokes development by making it clear that they want more — more effective and efficient business tools.

#### The Wider View

Form factors have always been central considerations for those who design, manufacture and use portable computers. Screen size and shape are at the heart of the most significant current trend, according to Leslie Fiering, research vice president at Gartner.

The migration to widescreen displays on notebooks, which began two or three years ago, is almost complete, says Fiering. The standard notebook display now offers a 14- or 15-inch screen with the 16:9 widescreen aspect ratios, she says.

The previously conventional 4:3 aspect displays are disappearing, spurned first by consumers who wanted widescreens on which to watch movies and now being abandoned by business as well.

"The move is driven by the economics of the panel manufacturers and by consumers," says Fiering. "It will also be driven by compatibility of applications with [Microsoft's Windows] Vista [operating system]."

A related development is the proliferation of small notebooks with 12.1-inch widescreen displays, says Fiering. These compact notebooks offer the advantages of widescreen but still allow the user to work comfortably in an airplane seat. Fiering predicts that most businesses will soon standardize on either 12.1- or 14-inch widescreens.

Business may standardize and widescreen may have become the ascendant display format, but IDC's Shim points to the growing diversity in form factors and configuration options in notebooks, including the variety of screen sizes and shapes available.

"Certainly a growing number of notebooks have 14- and 15-inch displays, but we're beginning to see many more 16- to 20-inch screens, especially for multimedia users," Shim says. "And then there are the minis and even convertible notebooks that turn into tablets."

The multiplying options in display sizes as well as other features and configurations show the continuing influence of the consumer market on vendor notebook offerings, according to Shim. In contrast, desktop ▶

design and feature sets have always been largely dictated by the needs of corporate users.

### Keeping It Light, and Then Lighter Still

Just when it seems that manufacturers can do no more to ease the aching shoulders of road warriors, even lighter notebooks appear on the market. A couple years ago, any notebook in the four-pound range was designated an ultra light.

Now several new notebooks, from vendors like Fujitsu, Lenovo and Sony, tip the scales at not much more than two pounds. What's more, Toshiba's new Portégé R500 line of notebooks, with 12.1-inch widescreen displays, comes in one configuration that weighs 768 grams or only about 1.7 pounds.

Some newer lightweight notebooks may force users to make some compromises. For example, some models don't have built-in optical drives, and ergonomics can become an issue with small keyboards.

However, these feather-light notebooks can deliver serious performance. The Lenovo X61, for example, runs on Intel Core 2 Duo chips with the standard option a 2GHz processor and an available upgrade to a 120GB hard drive.

Most of the leading vendors offer very lightweight models with 80GB hard drives that operate at 4200 rpm (revolutions per minute), with upgrades that take them to 5400 rpm. (The higher the rpm, the faster the data will be accessed.)

Some ultralights have relatively small screens – no surprise. Although several offer the substantial display real estate of the 12.1-in widescreen, including the new Fujitsu LifeBook Q2010 notebook, which tips the scales at just 2.2 pounds.

Fujitsu, Sony and other manufacturers use light emitting diode (LED) backlighting to brighten the reduced displays, as well as to reduce the drain on lightweight batteries.

### Under The Covers: Drives and Chips

Even as various notebooks get lighter and slimmer, the entire category is getting more powerful, says John Rydning, an analyst at IDC.

“A 250GB hard drive for notebooks will ship in the second half of 2008, and that means that they are fast approaching the level of desktops,” Rydning says.

Perhaps more telling than the outer limits of performance is a look at the so-called “sweet spot.” This is the point at which buyers get the optimum balance of capacity and value.

“For some time, we've seen the highest capacity for a desktop sweet spot as 160GB,” says Rydning. “That highest-value capacity is getting closer and closer between desktops and notebooks.”

Rydning also notes a transition taking place to a standard disk spin speed of 5400 rpm, with an increasing number of manufacturers offering upgrades to 7200 rpm, which puts notebooks on a par with desktops.

But the loudest buzz around hard drives relates to those that spin only occasionally or not at all — the hybrid hard drives (HHD) or completely solid-state drives (SSD) that have just reached the market. Hybrid drives use a nonvolatile flash memory buffer that holds a large cache of data, and leaves the magnetic platters of the drive at rest most of the time, saving power and speeding boot time.

SSDs eliminate the platters completely, replacing them entirely with nonvolatile flash memory. Like HHDs, solid state drives boot and run faster than conventional hard drives, and are also quieter and consume less power. Samsung and Sony have been selling notebooks with SSD in the Far East for about a year, and Samsung launched a model for the U.S. in June.

At this point, flash memory is expensive, coming in at over \$15 per gigabyte by most estimates, as compared to about 65 cents per gigabyte for conventional drives. Either an HHD or an SSD can add hundreds of dollars onto the price of a notebook.

Hybrid drives are only compatible with PCs running Microsoft's Vista, and there are some issues to be worked out with the operating system before users can leverage the advantages of the hybrid drives, says Rydning.

Gartner's Fiering predicts, “Solid-state drives are coming — we're always going to see a move to solid-state technology.” She predicts significant adoption of SSDs by 2010.

Beyond hard drives, Intel's new Santa Rosa generation of the Centrino chipset is enabling better notebook performance as well as thinner and lighter designs, says Fiering. Centrino Pro also promises to enable virtualization technologies on notebooks.

Advanced Micro Devices has announced that it will release its first processor developed specifically for notebooks later this year. Most analysts predict that the fierce competition between the chipmakers will drive even more rapid notebook advances.

### 802.11n Air Speed

Wireless networking has become essential to notebook users. Now the emerging 802.11n Wi-Fi standard promises to quintuple the bandwidth and double the range of current wireless networks.

Although the standard won't be ratified until next year, products that support a nearly complete Draft 2.0 of the specification are already on the market from most of the notebook manufacturers.

“It will mean less waiting, more multimedia applications and generally make it easier to do almost everything wirelessly,” says Carlos Aguirre, product marketing engineer for 802.11n at Intel, one of the companies that has pushed hardest for the new standard.

The new standard is fully backward compatible to all the members of the 802.11 Wi-Fi family: a, b and g. That means that a notebook with an 802.11n wireless card should run over current 802.11g networks with no problems.

The foundation of 802.11n is MIMO (Multiple Input, Multiple Output) technology, which uses multiple antennas in both the transmitter and receiver to boost data rates and reduce errors. The new standard also incorporates channel bonding technology, which uses two non-overlapping channels simultaneously to move data. Payload optimization technology allows 802.11n to cram more data into individual packets.

Current 802.11g networks have a theoretical maximum throughput speed of 54Mbps, but real-world measurements put the actual speeds at 22 to 24Mbps. In comparison, the new standard has theoretical speeds approaching 300Mbps, with real-world rates measured at 100 to 140Mbps. In practical terms, this means that streaming video, which has

# Vista on the Move

A CDW Tracking Poll, conducted as Microsoft's Windows Vista was rolled out to the corporate world last November, indicated that 86 percent of organizations planned to adopt the operating system. Despite some early glitches, most notably reports of missing third-party driver support, Vista's steady march into enterprise PCs seems destined to continue unabated.

That's essentially a good thing; although it's still too early to assess all of Vista's capabilities, says Leslie Fiering, research vice president for the tech research firm Gartner.

"Some of the new features are under the covers and we won't see the benefits until more applications are written to take advantage of them," says Fiering. "But the plumbing is solid on the operating system."

Beyond the data pipes, Vista offers an array of features that are particularly promising for notebook users.

Fiering cites improved wireless network security as one of the operating system's strengths, which matches Microsoft's general emphasis on security in Vista as an antidote to years of bad press about vulnerabilities in other Windows OSs. Improved firewalls and enhanced antispyware functions should benefit all Vista users, whether they sit in front of desktops or roam with their notebooks.

The controversial User Account Control (UAC) function, which limits users' account privileges, makes good sense in the more exposed mobile computing environment. Windows Vista Enterprise offers BitLocker Drive Encryption, which stores encryption keys and passwords on a Trusted Password Module chip rather than in vulnerable software files. Thus far, there is no known way to bypass the authentication, which means that a lost or stolen notebook won't result in lost or compromised data.

Vista's Windows Meeting Space is a peer-to-peer application for small group collaboration that operates directly between PCs, never involving server infrastructure even when it's run over a corporate LAN or WLAN. No hot spot is necessary for travelers, who can create an ad hoc wireless network using the application. Meeting Space accommodates file sharing and allows collaborative editing.

Windows Mobility Center, which comes in premium editions of Vista, provides improved and simplified data synchronization with PDAs, smart phones and other mobile devices.

"Among other ways that it recognizes what's going on with the system it's running, Vista provides more awareness of power issues than any operating system has in the past," says Fiering.

been cumbersome using 802.11g technology, will now become more easy for wireless notebook users.

"Wireless users complain about range and throughput — in that order — and 802.11n will address both issues," says IDC's Shim. "Consumers will probably be the first to see the benefits."

Specific business uses, such as large warehouses crowded with stacks of goods, will be the first to adopt 802.11n, says George Cravens, technical marketing manager at D-Link, which manufactures wireless networking equipment. Using 802.11n, business networks will also be able to use advanced security protocols without "taking a performance hit," says Cravens.

The new standard is clearly a significant evolutionary step in wireless networking and notebooks by all the major manufacturers support Draft 2.0 of 802.11n.

## Life Support for Batteries

Wireless technology, bigger screens and graphics-rich applications have intensified efforts to extend battery life, says Shim.

"In the past the emphasis was on improving batteries, trying to boost their capacity," he says. "Now the focus has shifted to finding ways to decrease the power consumed."

Vendors are attacking the problem from many directions: Intel's Core 2 Duo and all its new Santa Rosa processors are designed for low consumption. The new Microsoft Vista operating system provides extensive power management functionality (see above). And strategies like using LED backlighting for displays eases the burden on the battery.

"There is no silver bullet to solve the power management problem — it's a grinding incremental effort," says Gartner's Fiering.

That effort is slowly paying off with some notebooks boasting eight to 10 hours of battery life. ■

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