



Starting Your PC in a Flash

By Eric Hellweg October 21, 2005

http://www.technologyreview.com/articles/05/10/wo/wo_102105hellweg.asp?trk=top

Since the early 1990s, Bill Gates has had a consistent lament: the standard PC or notebook takes far too long to boot up. Of course, Gates' company, Microsoft, is one of the main culprits: Windows grows bigger and more complex with every release, meaning there's more operating-system code for computers to load into main memory before they're ready for other tasks.

Gates wants engineers to help ease this software-related problem by designing faster hardware. And he's not alone -- anyone with a computer that's more than a year old knows that they might as well write a postcard, take a shower, or walk the dog once they've pushed the power button.

And that delay time is more than just a minor annoyance for PC users. Gates and his colleagues would like to push computers into the living room, as hubs for video, audio, and other entertainment. But, say analysts, the current startup lag time will be an impediment to consumer adoption. Who's willing to wait several minutes for the sound system or TV to turn on?

In the world of technology, of course, a general lament is also a golden opportunity. For years, engineers have been trying to reduce the time it takes to turn on a PC. The most recent advance came on October 17, when Intel engineers at the Intel Developer Forum in Taipei, Taiwan, unveiled a prototype technology, codenamed "Robson," that reduces startup time in notebooks from "several seconds" to "almost immediate," according to a report on the demonstration at PCWorld.com.

A notebook using Robson was also able to launch individual software programs much faster. For instance, Quicken started in 2.9 seconds, compared with 8 seconds on a standard notebook. (An Intel spokeswoman declined to offer speed enhancement specifications, but confirmed that "it's a noticeable difference.")

Intel hasn't released details about Robson's inner workings. But the key to the company's research efforts -- as well as those by competitors such as Samsung and MSI -- is a type of Flash memory called NAND (for the Boolean "not and," a way of arranging transistors on a memory chip to perform certain logic functions).

In a typical computer, the startup software and operating system are stored on the hard drive; when the computer is turned on, the hard drive starts spinning and the instructions are transferred into the computer's random-access memory (RAM), where the central processing unit can access them. That hard drive, with its mechanized, moving parts, has long been a roadblock to faster start times. If Flash memory chips had enough capacity to store an entire operating system (or the parts essential to startup), the need to wait for the hard drive to cycle through its startup tasks would be eliminated.

Flash memory technology has been around for years; its main advantage over traditional RAM memory is that it's non-volatile, meaning it holds data when the power supply is turned off. That's why it's used in devices such as USB key drives and digital cameras.

But, until recently, high-capacity Flash chips have been too expensive for computer makers to consider using them to replace traditional RAM. Now, as manufacturing capacity grows, prices are dropping drastically. According to research firm Semico, in 2000, a gigabyte of NAND RAM cost around \$1,900. Five years later, it's a mere \$50. And the firm expects that price to slide to around \$9 by 2009.

Consequently, many companies are experimenting with Flash-based RAM. In April, Samsung, in partnership with Microsoft, announced a prototype of a "hybrid drive" that combines a standard hard drive with a sizeable Flash component. The device, which is expected to find its way into consumer PCs in late-2006 (around the time Microsoft's new Vista operating system is scheduled to debut), uses the Flash component for boot-up and many basic PC storage needs.

Besides speeding up processes, the hybrid drive can add an additional 36 minutes to a standard laptop battery's runtime, since the hard drive is less active. And it can shorten startup time, according to Andy Yang, strategic marketing manager for Samsung's semiconductor division. "A 10-to-20 second reduction doesn't seem like much," Yang says, "but when you're trying to access data, it has a significant impact on your user experience."

Some devices might boot up even faster, according to Yang, especially those that do not require a full operating system. "The lag is a noticeable detraction from the PC entertainment experience...If someone had DVD playback capabilities on a flash device, you could play a DVD right away," he says.

In a year or so, then, common complaints about PC startup delays -- by Bill G. or John Q. -- may be heard less often. And consumers may come a bit closer to experiencing the PC as just another appliance: ready to run as soon as it's switched on.