Windows Is So Slow, but Why?

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Back in 1998, the federal government declared that its landmark antitrust suit against the Microsoft Corporation was not merely a matter of law enforcement, but a defense of innovation. The concern was that the company was wielding its market power and its strategy of bundling more and more features into its dominant Windows desktop operating system to thwart competition and stifle innovation.

Peter DaSilva for The New York Times
Windows 95 had 15 million lines of code.
That grew to 18 million lines by the time Windows 98 launched, above.
Windows XP, released in 2001, has 35 million lines of code.

Illustration by The New York Times
Eight years later, long after Microsoft lost and then settled the antitrust case,
it turns out that Windows is indeed stifling innovation — at Microsoft.

The company's marathon effort to come up with the a new version of its desktop operating system, called Windows Vista, has repeatedly stalled. Last week, in the latest setback, Microsoft conceded that Vista would not be ready for consumers until January, missing the holiday sales season, to the chagrin of personal computer makers and electronics retailers — and those computer users eager to move up from Windows XP, a five-year-old product.

In those five years, Apple Computer has turned out four new versions of its Macintosh operating system, beating Microsoft to market with features that will be in Vista, like desktop search, advanced 3-D graphics and "widgets," an array of small, single-purpose programs like news tickers, traffic reports and weather maps.

So what's wrong with Microsoft? There is, after all, no shortage of smart software engineers working at the corporate campus in Redmond, Wash. The problem, it seems, is largely that Microsoft's past success and its bundling strategy have become a weakness.

Windows runs on 330 million personal computers worldwide. Three hundred PC manufacturers around the world install Windows on their machines; thousands of devices like printers, scanners and music players plug into Windows computers; and tens of thousands of third-party software applications run on Windows. And a crucial reason Microsoft holds more than 90 percent of the PC operating system market is that the company strains to make sure software and hardware that ran on previous versions of Windows will also work on the new one — compatibility, in computing terms.

As a result, each new version of Windows carries the baggage of its past. As Windows has grown, the technical challenge has become increasingly daunting. Several thousand engineers have labored to build and test Windows Vista, a sprawling, complex software construction project with 50 million lines of code, or more than 40 percent larger than Windows XP.

"Windows is now so big and onerous because of the size of its code base, the size of its ecosystem and its insistence on compatibility with the legacy hardware and software, that it just slows everything down," observed David B. Yoffie, a professor at the Harvard Business School. "That's why a company like Apple has such an easier time of innovation."

Microsoft certainly understands the problem, the need to change and the potential long-term threat to its business from rivals like Apple, the free Linux operating system, and from companies like Google that distribute software as a service over the Internet.

In an internal memo last October, Ray Ozzie, chief technical officer, who joined Microsoft last year, wrote, "Complexity kills. It sucks the life out of developers, it makes products difficult to plan, build and test, it introduces security challenges and it causes end-user and administrator frustration."

Last Monday afternoon, James Allchin, the longtime engineering executive who leads the Vista team, held a meeting with 75 Windows managers and senior engineers to discuss the status of Vista. On Tuesday morning, Mr. Allchin met with a handful of his lieutenants and told them of the decision to push back the consumer introduction, a move that was announced publicly later that day, after the close of the stock market.

Brad Goldberg, a general manager of Windows program management, who attended the Tuesday morning meeting, said he was not surprised, because he had been involved in

the decision. "But it's a different place than Microsoft a few years ago would have wound up," he said.

Like other Microsoft executives, Mr. Goldberg bristles at the notion that little innovative work has come out of the Windows group since XP. In the last five years, he said, Microsoft has released two versions of the Windows Tablet PC software intended for pen-based notebook computers, and four versions of Windows Media Center. To combat viruses plaguing Windows, much of the engineering team focused for 18 months on fixing security flaws for a downloadable "service pack" in 2004.

"The perception that nothing new has come out of the Windows group since XP is just so far from the truth," Mr. Goldberg said.

But last Thursday, Microsoft reorganized the management of its Windows division. Steven Sinofsky, 40, a senior vice president, was placed in charge of product planning and engineering for Windows and Windows Live, a new Web service that lets consumers manage their e-mail accounts, instant messaging, blogs, photos and podcasts in one site.
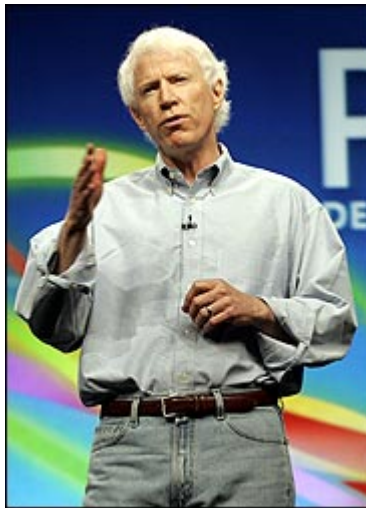
Fred Prouser/Reuters
James Allchin said the Vista delay was the "right thing" to do.

Mr. Sinofsky, a former technical assistant to Bill Gates, the Microsoft chairman, was one of the early people in the company to recognize the importance of the Internet in the 1990's. He comes to the Windows job from heading Microsoft's big Office division, where he was known for bringing out new versions of the Office suite — Word, Excel, PowerPoint, Outlook and other offerings — on schedule every two or three years.

The move is seen as an effort to bring greater discipline to the Windows group. "But this doesn't seem to do anything to address the core Windows problem; Windows is too big and too complex," said Michael A. Cusumano, a professor at the Sloan School of Management at the Massachusetts Institute of Technology.

The Vista delay, Microsoft executives said, was only a matter of a few more weeks to improve quality further, not attributable to any single flaw and done to make sure all its industry partners were ready when the product was introduced. Vista will be ready for large corporate customers in November, while the consumer rollout is being pushed back to January 2007.

Mr. Allchin conceded in an interview that the decision was "a bit painful," but he insisted it was the "right thing." Mr. Allchin, 54, will continue to work on Vista until it ships and then retire, as he said he would last year.

Microsoft will not say so, but antitrust considerations may have played a role in the decision that Mr. Allchin called the right thing to do. As part of its antitrust settlement, Microsoft vowed to treat PC makers even-handedly, after evidence in the trial that Microsoft had rewarded some PC makers with better pricing or more marketing help in exchange for giving Microsoft products an edge over competing software.

In the last few weeks, Microsoft met with major PC makers and retailers to discuss Vista. Hewlett-Packard, the second-largest PC maker after Dell, is a leader in the consumer market. Yet unlike Dell, Hewlett-Packard sells extensively through retailers, whose orders must be taken and shelves stocked. That takes time.

Hewlett-Packard, according to a person close to the company who asked not to be identified because he was told the information confidentially, informed Microsoft that unless Vista was locked down and ready by August, Hewlett-Packard would be at a disadvantage in the year-end sales season.

Vista was also held up because the project was restarted in the summer of 2004. By then, it became clear to Mr. Allchin and others inside Microsoft that the way they were trying to build the new version of Windows, then called Longhorn, would not work. Two years' worth of work was scrapped, and some planned features were dropped, like an intelligent data storage system called WinFS.

The new work, Microsoft decided, would take a new approach. Vista was built more in small modules that then fit together like Lego blocks, making development and testing easier to manage.

"They did the right thing in deciding that the Longhorn code was a tangled, hopeless mess, and starting over," said Mr. Cusumano of M.I.T. "But Vista is still an enormous, complex structure."

Skeptics like Mr. Cusumano say that fixing the Windows problem will take a more radical approach, a willingness to walk away from its legacy. One instructive example, they say, is what happened at Apple.

Remember that Steven P. Jobs came back to Apple because the company's effort to develop an ambitious new operating system, codenamed Copland, had failed. Mr. Jobs convinced Apple to buy his company Next Inc. for $400 million in December 1996 for its operating system.

It took Mr. Jobs and his team years to retool and tailor the Next operating system into what became Macintosh OS X. When it arrived in 2001, the new system essentially walked away from Apple's previous operating system, OS 9. Software applications written for OS 9 would run on an OS X machine, but only by firing up the old operating system separately.

The approach was somewhat ungainly, but it allowed Apple to move to a new technology, a more stable, elegantly designed operating system. The one sacrifice was that OS X

would not be compatible with old Macintosh programs, a step Microsoft has always re-fused to take with Windows.

"Microsoft feels it can't get away with breaking compatibility," said Mendel Rosenblum, a Stanford University computer scientist. "All of their applications must continue to run, and from an architectural point of view that's a very painful thing."

It is also costly in terms of time, money and manpower. Where Microsoft has thousands of engineers on its Windows team, Apple has a lean development group of roughly 350 pro-grammers and fewer than 100 software testers, according to two Apple employees who spoke on the condition that they not be identified.

And Apple had the advantage of building on software from university laboratories, an ex-perimental version of the Unix operating system developed at Carnegie Mellon University and a free variant of Unix from the University of California, Berkeley. That helps explain why a small team at Apple has been able to build an operating system rich in features with nearly as many lines of code as Microsoft's Windows.

And Apple, which makes operating systems that run only on its own computers, does not have to work with the massive business ecosystem of Microsoft, with its hundreds of PC makers and thousands of third-party software companies.

That ballast is also Microsoft's great strength, and a reason industry partners and com-puter users stick with Windows, even if its size and strategy slow innovation. Unless Mi-crosoft can pick up the pace, "consumers may simply end up with a more and more inferior operating system over time, which is sad," said Mr. Yoffie of the Harvard Business School.