

COMPUTING



The PC Is Dead

Well, not quite yet. But among corporate customers, the future is beginning to look very uncertain.

By Lee Gomes and Taylor Buley

THROUGHOUT THE COMPUTER industry companies of all sizes, from garage startups to Microsoft, are bracing for the possibility that their future will be in the hands of people like Sean Whetstone.

The head of computer operations for Reed Specialist Recruitment, an employment service with operations on three continents, Whetstone recently upgraded his company's 6,000 desktop computers. Chief information officers order new Dells or HPs all the time. But the computers Whetstone brought in for his employees aren't the traditional metal boxes that sit next to desks or under monitors. They are "virtual" computers. Each employee has a keyboard and a screen, but the processors making the calculations and

deciding what color goes in each pixel are far away, inside a big computer at Reed's main data center in London.

In the science fiction staple of virtual reality, people live not in the real world but as ciphers inside a computer somewhere. That's analogous to what happens with the virtual desktops at Reed. To the user, Microsoft Windows looks just as it does coming from a PC. But the electronic desktop doesn't exactly reside on the desk.

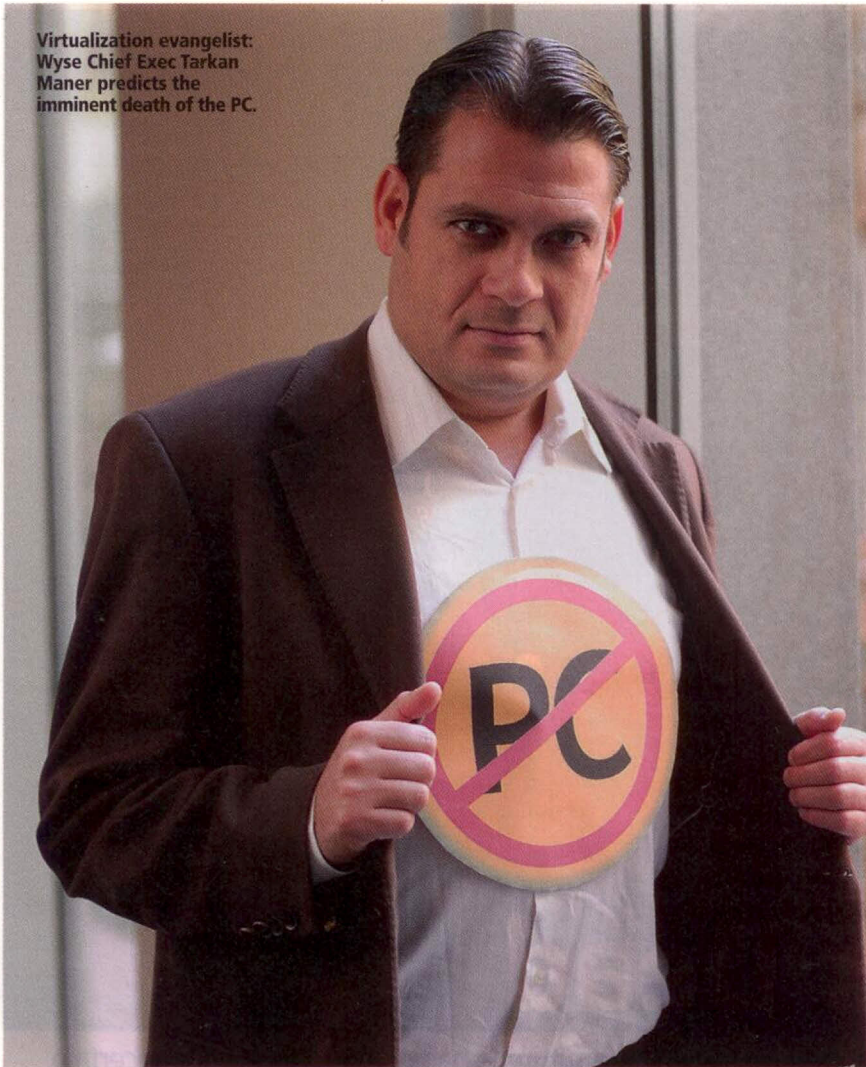
Switching to virtualized desktops is often expensive at the outset because the networking software is complicated. But the maintenance costs are a lot lower. When something goes wrong—say, a computer has a software error—Whetstone doesn't need to send someone from tech support out to the employee's desk.

Instead, a technician simply logs on to the main computer and tinkers with the program running there. Whetstone expects to save 20%, or \$2.4 million a year, off his technology expenses.

Next year will likely be the start of a large upgrade for PCs as big companies switch to Windows 7, Microsoft's latest operating system. With an estimated half-billion workplace computers around the world and \$3 trillion spent each year on corporate computing, that ordinarily would mean a lot of purchase orders for big, brawny new hardware.

Desktop virtualization, however, threatens to break that pattern. Instead of spending \$1,000 for a system with the latest Intel chip and a fast hard drive, a company might get by with a virtualized PC

Virtualization evangelist: Wyse Chief Exec Tarkan Maner predicts the imminent death of the PC.



running on a screen, keyboard and network connector costing in all only \$150. The corporate customer gets the promise of lower support costs plus the security and simplicity that come from having data in one carefully guarded place.

A burgeoning virtualization industry is pushing the technology as the next big thing in computing. Large tech companies like Microsoft and Cisco are bracing themselves in case it turns out to be just that. "In the entire computer industry, no topic is of greater interest right now than desktop virtualization," says Mark Margevicius, analyst at research firm Gartner. "Everyone, everywhere is asking about it."

Desktop virtualization is Act II of a tech shift that began earlier in the decade involving the servers that labor behind the scenes, running databases and hosting

Web sites. While crucial to a company's operations, servers tend to be busy only in spurts, spending much of their time sitting idle. At the start of the decade, when a new breed of software made it possible to make one piece of hardware act as if it were several servers, companies embarked on a wave of server consolidation. By next year, estimates Gartner, half of all server-based computing will be on virtual machines.

If virtualization can work for servers, why not for desktop computers, which outnumber servers by a factor of a hundred? That's the prospect exciting so many companies. Wyse Technology in San Jose, Calif. made computer terminals for places like call centers for 15 years. Four years ago the company switched its emphasis to virtualization—meaning that it is ready to replace a sea of PCs at a company like Reed Specialist

Recruitment with stripped-down keyboard/screen pairs (called "thin clients"). Sales are on pace to grow 40% this year to an expected \$250 million.

Tarkan Maner, Wyse's voluble, Turkish-born chief executive, tells visitors that because of virtualization "the PC is dead, and PC makers are going to have to adjust their business models to deal with that fact." Maner puts his logos where his mouth is: Wyse company cars have a "No PC" sign emblazoned on their doors.

Wyse thin clients cost from \$50 to \$200. Maner says they might be free one day, given away as part of package deals for service or software, as happens with mobile phones. He's on to something, because the real action in virtualization right now involves software. Two companies are fighting each other to become the Microsoft of desktop virtualization: 11-year-old VMware, which pioneered the market, and Citrix Systems, which is expanding rapidly to take advantage of it.

VMware in Palo Alto, Calif. grew out of the Stanford University engineering environs that also gave the world Google, Sun and Silicon Graphics. Its market capitalization of \$17 billion alongside revenues of only \$1.9 billion says something about Wall Street's expectations for its growth and profit margin. Citrix Systems in Fort Lauderdale, Fla. had its origins in the world of clerical computing. The company was founded in 1989 by an IBM software veteran and has revenues of \$1.6 billion and a \$7.2 billion market cap. The VMware-Citrix contest hasn't gone on long enough to handicap, though observers note that Citrix has the advantage of a close association with Microsoft, which watched with alarm as VMware grew to prominence in the data centers it wanted to own for itself.

A shift to virtualized desktops would affect everyone in the industry, not just the companies making the software that directly allows it. Every large tech company stands ready with new products, new services, new technology directions, in case it takes off. At Hewlett-Packard virtualization products were once considered niche offerings handled by a small, dedicated sales crew. Now, says Roberto Moctezuma, head of

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desktop solutions, all HP sales people have them on their rate cards. Dell says it takes a slightly different approach, preferring to talk about “flexible computing” for the benefit of customers unwilling to go the full virtualization route. Cisco sees the interest in desktop virtualization as validation of the emphasis it has been putting on networking. “We don’t think everyone will virtualize every desktop on the planet,” says David Lawler, vice president of the company’s virtualization group. “But very clearly, a significant number of them will.”

Right now, while they promise to reduce administrative costs, virtual PCs cost 50% more than regular ones because of the extra software companies need to license in addition to Windows. Gartner estimates that premium will need to be cut in half before virtualization becomes a widespread phenomenon. There is also the issue of performance. It turns out that some of the most trivial uses of computers—watching YouTube videos, for example—are among the hardest to

VIRTUALIZATION VERSUS THE CLOUD

It used to be that something virtual wasn’t real. And that clouds were just that—those puffy things in the sky. Today we have the tech industry terms “virtual computing” and “cloud computing,” which often get mixed up. Fortunately, there’s an easy way to tell them apart, and it involves hearkening back to the age-old distinction between hardware and software. When you’re talking about virtual computing, you’re invariably talking about hardware; specifically, making PC-style hardware available to users in a new way. A new layer of software, typically running in a far-off data center, tricks users into thinking they are using a desktop PC like before.

Cloud computing, by contrast, usually refers to the sorts of software that run once a computer gets turned on. The “cloud” indicates that the software is hosted in a data center, not sitting on your desktop. If you use Google Docs instead of Microsoft Office for your word processing or spreadsheets, that’s cloud computing. You can mix and match these two approaches, undertaking cloud computing on a nonvirtual, traditional PC. And the opposite: You can use traditional, Office-style programs on a virtual PC. —L.G.

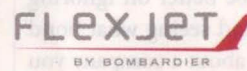
replicate on a virtual computer, since intense graphics need to be transmitted instantly over the network. The big virtualization software makers, not to mention an ever growing roster of virtualization startups, are busy trying to close the gap.

Whetstone says he gives up nothing

in moving his computer processing to London. He challenged his skeptical information technology crew to come up with something a real computer could do that a virtual machine couldn’t. “It has to be for business, obviously,” he says, “but nobody has come up with a challenge that hasn’t been met.” **F**

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