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PC History: The PC at 20

The road from 1981's IBM PC to today's systems--and all the revolutions, evolutions, and fumbles in between.

Lincoln Spector

Q: How do you crash Microsoft Windows?
A: Start Microsoft Windows.

The joke has been around for years. There are plenty of reasons why Windows PCs are so unstable. And one of the biggest is history--20 years of it, now. Today's Wintel (shorthand for Windows on an Intel processor) systems descend directly from the original IBM PC. Announced in August 1981, it was a product that IBM rushed to market with no inkling that it was setting a worldwide standard that would prevail for decades to come.

Of course, all that history has its good side. IBM's machine was extremely versatile, infinitely upgradable, and well documented--strengths that led to the PC's initial success and enduring ubiquity. But those same virtues led to a haphazard evolution that piled one problem on top of another.

With their beautiful graphics, multitasking applications, and networking talents, today's gigahertz-plus systems seem a far cry from the PCs of two decades ago. Still, at the heart of every 21st century Windows-based computer lies an IBM PC.

"What's amazing," says Dan Bricklin, whose Visicalc was the first PC spreadsheet, "is that you can take software for the original PC and run it on today's Windows [systems]."

Since 1981, PC technology has seen remarkable advances--and more than a few false starts and outright blunders. So let's look back and see how today's systems got the way they are. Return with us now to the dawn of PC history....

Before Big Blue

If you were in the market for a personal computer back in 1980, you had plenty of choices. Many popular models of the day ran an operating system from Digital Research called CP/M. Commodore's PET and Tandy/Radio Shack's TRS-80 were also established players. And two guys named Steve had a big business selling the Apple II.

Those systems were aimed at hobbyists who liked to write programs in the BASIC programming language. The major supplier of BASIC was Microsoft, a little company in Bellevue, Washington, headed by a Harvard dropout named Bill Gates.

IBM, the biggest name in serious--that is to say, large and business-oriented--computers, took notice of the nascent personal computer industry in 1980 and assigned a veteran manager/engineer named Don Estridge to get an IBM PC to market. Under strict deadline pressure, IBM engineers in Boca Raton, Florida, made decisions that are still with us today.

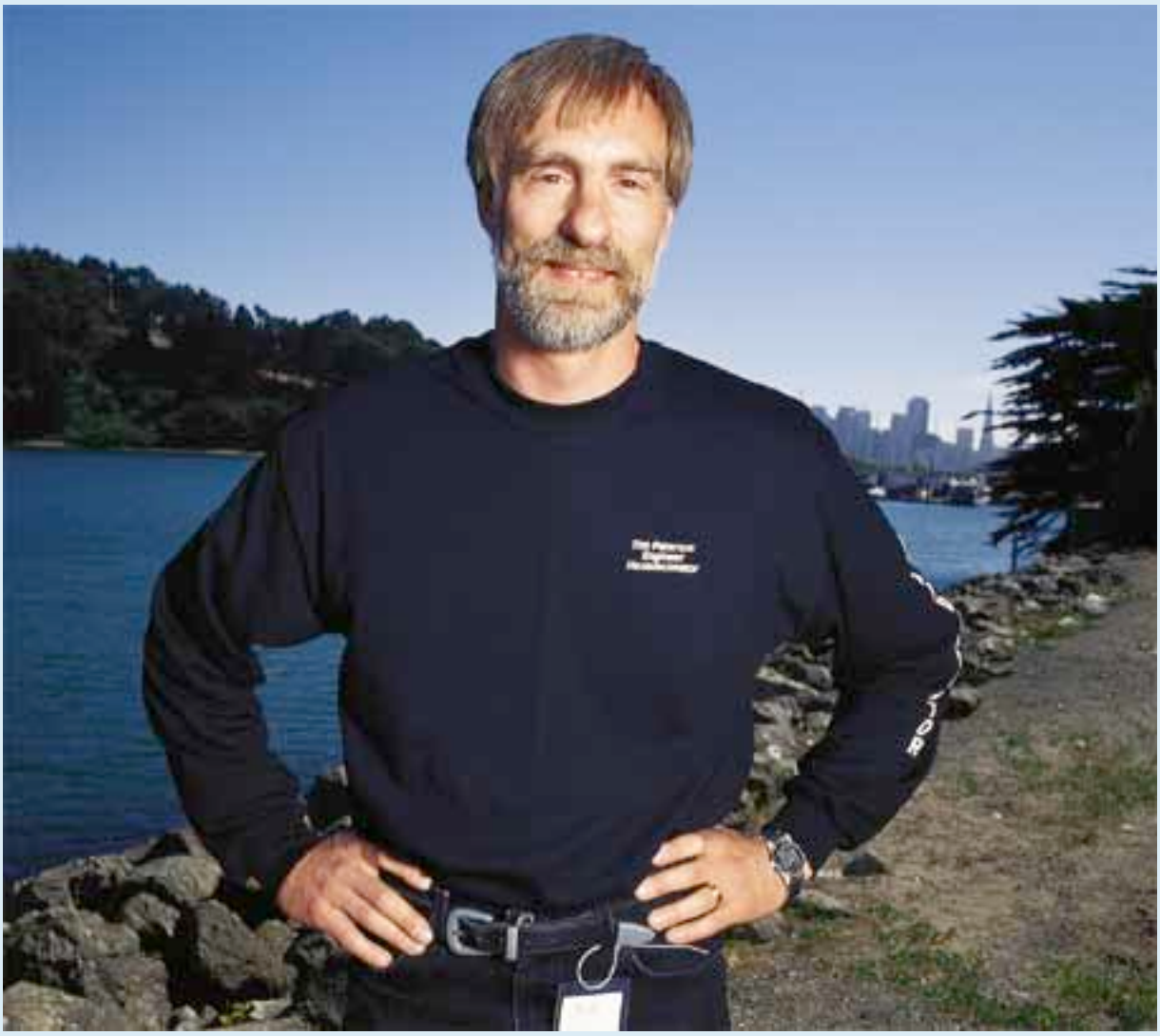
For instance, David Bradley, who was a member of Estridge's engineering team, recalls, "The system would hang, and the only way you could fix it was to turn it off. So I built a warm reboot into the keyboard code. I invented *Ctrl-Alt-Delete*, but Bill Gates made it famous."

The tight deadline meant that the system had to be built with existing technology. Its central processing unit was Intel's 8088. The 8088 was a 16-bit chip--a zippier, more powerful CPU than the 8-bit CPUs used by most early microcomputers. But to keep costs down, the 8088 talked to other components via an 8-bit bus.

Why didn't IBM stick with the popular CP/M operating system? Legend has it that Digital Research president Gary Kildall skipped a meeting with IBM execs to go flying or hang gliding. A more likely story is that Digital Research refused to sign IBM's nondisclosure agreement.

Microsoft's Big Deal

One fact is undeniable: Digital Research had yet to deliver a version of CP/M for Intel's 16-bit CPUs. So Tim Paterson, an employee of a small hardware vendor called Seattle Computer, wrote a CP/M-like operating system for that company's computer, which used Intel's 8086 processor (basically an 8088 with a 16-bit bus).



"I didn't have time to do it right," he recalls, "so I did it quick and dirty." In fact, his creation, officially called 86-DOS, was nicknamed QDOS--Quick and Dirty Operating System.

When IBM told Bill Gates about its problems with Digital Research, Gates had a solution. Microsoft acquired a license for, and later bought, QDOS from Seattle Computer, then licensed it to IBM. It was renamed IBM Personal Computer DOS (or PC-DOS) when sold by IBM, and MS-DOS if sold by anybody else.

But when the PC hit the market, PC-DOS was one of *three* operating systems that IBM offered. The others were existing ones with lots of apps: CP/M (Digital Research had come up with an 8088-compatible version) and Softech's UCSD p-System. How did an upstart like PC-DOS get any traction? Price played a big part: PC-DOS cost $40, while CP/M was $450 and UCSD p-System was $550.

Nobody was prepared for the IBM PC's instant, explosive success. And that clamor was for a machine whose $1265 base model didn't include a monitor, a video card, a parallel or serial port, an operating system, or a floppy drive. According to Bradley, IBM hoped to sell 241,683 PCs over five years. Before those five years were up, the company was selling nearly that many units a month.

And certainly no one expected the standard to last for decades. The PC industry "wasn't seen as having a present, much less a future," remembers Mitch Kapor, creator of Lotus's 1-2-3 spreadsheet.

Why was the PC a hit? For starters, it was a well-designed, well-built machine from a name that businesses knew. Clever ads, with an actor imitating comedy legend Charlie Chaplin, also helped.

And the PC was quickly supported by a raft of third-party applications, such as word pro-cessors (MicroPro's WordStar, SSI's WordPerfect, and others) and Ashton-Tate's DBase database manager.

Peter Norton developed the first version of Norton Utilities to restore a file that he'd accidentally deleted on his own system. And Andrew Fluegelman invented shareware with PC-Talk, a program that made it relatively easy for modem users to dial in to services such as CompuServe and the Source. (Later, Fluegelman helped start a magazine you may know: *PC World*.)

But it was Kapor's 1-2-3 that cemented the IBM PC's reputation as a business machine when the program debuted in early 1983. By taking advantage of the personal computer's 16-bit CPU, 1-2-3 could offer revolutionary features such as on-screen menus.

Send in the Clones

IBM's Estridge--who was to die in a plane crash in 1985--and his team wanted other companies to supply a broad selection of peripherals, so they designed the PC as an open, well-documented system. They got the peripherals, but they also got something else: clones.

In 1982, a start-up called Compaq released a "portable," sewing machine-size computer that worked with software and add-in cards that were designed for IBM's PC. This was possible not only because the PC was an open system, but also because IBM had used off-the-shelf parts. Any company could buy an Intel CPU and a Microsoft operating system.

By 1984, numerous companies were competing in the IBM-compatible market, including Compaq-like start-ups (Columbia, Eagle, Leading Edge) and established manufacturers (ITT, Tandy). But IBM still led the pack. In 1983, Big Blue released the PC/XT, introducing the hard drive as basic equipment (a configuration with a mammoth 10MB disk went for a cool $4995). And in 1984, it upped the ante with the PC AT, the first PC built around Intel's 80286 processor, running at a blazing 6 MHz.

IBM's lead slipped in 1986, when Compaq shipped the first PC based on Intel's 32-bit 80386 (or 386 for short). As a chip, the 386 was a landmark that

made today's windowing, multitasking environments possible. Overall, though, Compaq's system was little more than an AT clone with a better CPU and faster RAM access. Still, it was the latest, greatest PC of the time--and it wasn't from IBM.

Big Blue's dominance faded further in 1987, when the market failed to accept its much-hyped PS/2, the machine designed to replace the AT. Suddenly, the term *IBM compatible* no longer seemed appropriate. From then on, they were just PCs.

DOS Capital

And they still ran MS-DOS. In fact, most of them are *still* running MS-DOS; it's just not visible. And that's one reason for Windows' notorious instability: Windows 95, 98, and Me are complex, multitasking, 32-bit operating systems whose underpinnings descend from the little OS Tim Paterson knocked together in 1980. It's as if someone replaced an old shack with a grand mansion--built upon the shack's foundation.

Not that anyone would have compared Windows 1.0--which was announced in 1983 and shipped in 1985--to a mansion. In fact, this rudimentary graphical front end for DOS was widely derided as clunky. Besides, Microsoft and IBM were soon drumming up enthusiasm for a would-be DOS successor known as OS/2. But when OS/2 finally shipped in 1987, it was tough to configure and slow, and it attracted only a cult following.

In 1990, IBM and Microsoft went their separate ways. IBM continued to improve and sell OS/2, and Microsoft bet the farm on Windows. And that same year, Windows 3.0 changed everything. A huge advance over earlier Windows versions, it became the first environment other than DOS to come preinstalled on most PCs.

Like the original IBM PC, Windows benefited from a wide range of apps. According to Jeff Tarter, editor and publisher of the industry newsletter *Softletter*, "Gates was willing to stand up in front of an audience and say 'I'm

betting my company on this.' No one at IBM was willing to say he was betting his career on OS/2."

No company entered the Windows application market as aggressively as Microsoft itself. As the folks in Redmond (Microsoft's home since 1986) introduced one product after another, they seemed to leave less and less room for others. It didn't help matters that 1-2-3, WordPerfect, Harvard Graphics, and other key DOS programs moved to Windows only after counterparts from Microsoft had gained a toehold.

"In the mid-1990s, it was very difficult to compete with Microsoft," contends Philippe Kahn, whose Borland International was a major force in software in the 1980s and early 1990s. "As a consequence, competitors have disappeared and products haven't evolved as much as they did in the 1980s."

Windows Marches On

In 1993, Microsoft released Windows NT, a 32-bit version that was truly an operating system of its own--it didn't require DOS at all. Meant for networks and high-end users, NT traded ease of use for administrator controls and security. Stiff hardware requirements and compatibility issues kept it out of the mainstream.

Two years later, Windows 95 shipped to far greater fanfare. It too was a 32-bit environment that made full use of the latest processors. But DOS was still there, loading before Windows. Microsoft has kept that same basic setup for Windows 98 and Me; when Windows XP arrives, probably this year, home users will get their first DOS-free version of Windows.

With or without DOS, Windows may simply be too complex to be perfectly reliable, with too much old code on top of new code. "Twice as many lines of code probably means four times as many bugs," warns Kahn.

The sheer versatility of the PC and Windows is another source of trouble: The huge number of apps, peripherals, add-ins, and configurations makes

thorough debugging impossible. Other platforms such as Linux and the Macintosh, which are often praised for superior stability, don't offer anywhere near the flexibility of a Windows PC. And they have not had anywhere near its success. According to Bricklin, "People voted with their pocketbooks"--and the PC won because it was capable of doing so many things.

So will Windows and PCs be around forever? Already, it's almost a cliché to say that the standard will dwindle as the Internet comes to dominate our computing experience. Low-cost devices like PDAs and Internet appliances could indeed eventually edge out the PC for taking care of simple tasks such as Web browsing and e-mail.

For the foreseeable future, though, if you want one device that can handle everything from managing a business to playing the latest games, you'll probably still need the flexibility of a personal computer. And even as PCs continue to morph, the basic value of backward compatibility should ensure that IBM's 20-year-old standard will live on. The soul of the new machine, it appears, will remain the brains of an old one.

Lincoln Spector is a contributing editor for *PC World*.

25 Moments That Mattered

Major events that have shaped the PC platform--plus some famous flops.

1981

1. Enter the PC: Okay, it isn't the first personal computer by a long shot. But the IBM PC is the first from a company that's respected by corporate America.

1983

2. Numbers Easy as 1-2-3: Lotus 1-2-3 becomes the PC's first killer app. What makes it a big success? Revolutionary concepts like menus and on-

screen help.

3. Clone Wars: Compaq's luggable PC work-alike makes the PC a standard independent of IBM.

4. Freedom From the Floppy Shuffle: IBM releases the PC/XT. For the first time, a personal computer comes with a hard drive as standard equipment.

5. Jinxed Junior: Big Blue tries to enter the home market with the PCjr. With a high price, minimal expandability, and a famously lousy keyboard, the system flops.

1984

6. The Mac Leads the Pack: Apple's Macintosh arrives. PC loyalists sneer at its mouse and graphical interface, but future PCs will grow increasingly Mac-like.

7. Architecture Overhaul: The IBM PC gets redone as the PC AT. The first PC to use Intel's 286 chip, the AT also sports a 16-bit bus and a built-in clock.

1985

8. If at First You Don't Succeed: Windows 1.0 appears--and is widely pronounced a dud. The first version of the operating system is ugly, it can't multitask properly, and it moves like a Jello-encased snail.

1986

9. Two Revolutions in One: IBM's control of the PC market falters as Compaq beats Big Blue to market with a PC based on Intel's cutting-edge 386 chip.

1987

10. The DOS Replacements That Weren't: IBM introduces would-be DOS replacement OS/2 and the PS/2, a PC based on a new architecture called

MicroChannel. Neither product makes much of a long-term impact.

1990

11. IBM and Microsoft Divorce: The two giants go their separate ways. IBM sticks with OS/2, and Microsoft puts everything behind Windows.

12. Third Time's a Charm: Windows finally catches on, thanks to version 3.0's improved look and better multitasking. Windows 3.1 (1991) and Windows for Workgroups 3.11 (1993) continue the trend.

13. Office in a Box: Microsoft's bundle of Word, Excel, and PowerPoint changes the way apps are sold, and slowly reduces rivals such as 1-2-3 to irrelevancy.

1991

14. America Goes Online: An obscure online service called AOL arrives for the PC, and you no longer need technical expertise to read your e-mail.

15. College Kid Makes Good: Helsinki student Linus Torvalds develops a Unix-like OS, names it after himself, and gives it away. Geeky types worldwide embrace Linux as their own.

1992

16. Breaking the Sound Barrier: With Creative's Sound Blaster 16, PC sound no longer means a tinny 2-inch speaker. Add the increasingly popular CD-ROM drive, and multimedia is born.

1993

17. A 586 by any Other Name: Stung by a judicial decision that competitors can call their chips 386s, Intel names its powerful new CPU the Pentium.

18. New Technology or Nice Try? Windows NT, the first DOS-free Windows, ships. But it's big and won't run many Windows applications, and

Microsoft recommends the OS only for networks and professionals.

1994

19. Point, Click, Surf: The Internet gains mass appeal when Netscape releases its Navigator browser as a free beta.

20. Fuzzy Math: The Pentium gives wrong answers in rare instances; Intel gives free replacements only to folks who prove they need them. Later, it extends the offer to all comers.

1995

21. Like a Rolling Stone: Windows 95's big rollout uses the Rolling Stones song *Start Me Up*, although it avoids the line, "She makes a grown man cry." Hype aside, Win 95 pushes the platform forward.

1998

22. Built-In Browser: With Windows 98, Internet Explorer becomes part of the operating system. In fact, Microsoft says that it's impossible to remove the browser.

1999

23. Full-Court Press: Presiding over a federal antitrust lawsuit, Judge Thomas Penfield Jackson says that Microsoft "has demonstrated that it will use its prodigious market power and immense profits" to damage competitors. Jackson decides against Microsoft in 2000; at press time, the case is being appealed.

24. Brass Ring at Last: AMD, known for slower, cheaper clones of Intel CPUs, ships its Athlon chip, which outpaces the Pentium III at the same clock speed.

2000

25. Torn Between Two Windows: After years of promising consumers an

NT-based version of Windows, Microsoft releases two programs that aren't it. Windows 2000 is still a business OS. And Windows Me is still Windows 95 at heart.

The PC Gets Cheaper, Faster... and Slower? (chart)

Vital statistic	1981 IBM personal computer	2001 Dell OptiPlex GX150
Price[1]	$3045	$1447
CPU	4.77-MHz 8088	933-MHz Pentium III
RAM	64KB[2] (.0625MB)	128MB[3]
Storage	160KB floppy drive	20GB hard drive, CD-RW and 1.44MB floppy drives
Display	11.5-inch monochrome text monitor	17-inch, 16.7 million color graphics monitor[4]
Other features	Parallel port, tape cassette port, 2-inch internal speaker	Parallel port, 2 serial ports, 4 USB ports, ethernet, wavetable sound and speakers, microphone jack
Operating system	IBM PC-DOS 1.0	Windows 2000
OS RAM requirements	16KB (.0156MB)	32MB[5]

Boot-up time6	16 seconds	51 seconds

For two decades, the PC has grown ever more capable--and prices have tumbled. Yet a typical PC of today takes three times as long to boot as a 1981 model. Why? Blame it on the behemoth of an operating system that Windows has become.1Price dependent on configuration; not adjusted for inflation; IBM PC 1981 price in current dollars would be approximately $6125. Dell OptiPlex GX150 price is as of 5/4/01.2Base configuration was 16KB; maximum on motherboard was 64KB. 3Maximum on motherboard is 512MB.424-bit color. 564MB recommended.6IBM PC tested by vintage PC collector Fred Cisin; Dell tested by PC World Test Center.