What Makes a PC?

Thoughts on Computing Platforms, Standards, and Compatibility

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In May 2006, Apple Computer launched yet another memorable advertising campaign. Humorous personifications of ''a Mac'' (home-loving, casual, straightforward) and ''a PC'' (deskbound, formal, rather unreliable) reflect a perceived division in technical quality and underlying ethos. While this may seem to resemble other consumer duopoly cases—Sony versus Nintendo, Pepsi versus Coke—the ''PC'' represents no one product, corporation, or interest group. The commercials' comical concrete examples support a surprisingly abstract argument.

Until recently, Apple positioned itself as a necessary alternative to IBM, the commercial computing behemoth which released the modern PC's technical ancestor in 1981, so appropriating the name ''personal computer'' to itself.[1] IBM has lost this defining role, and the rising generation of users is unaware of any ''IBM-compatible'' heritage. A proposed successor term is ''Wintel,'' highlighting the surviving tangible identifiers, Intel-originated microprocessors, and Microsoft Windows operating systems. Yet this is no basis for distinction. Apple's ''Get a Mac'' campaign stresses that all its machines feature Intel processors and will run Windows XP or Vista beside Apple's OS X.

This apparently paradoxical strategy—simultaneous dismissal and assimilation of PC norms—is nothing new. Taking the long view provides us with some valuable insights into the role of systems and standards in computer technology, and offers direction for future research.

''Mac'' and ''PC'' have never been standards. They are best understood as platforms: constellations of standards, conventions, and expectations that influence the nature and behavior of hardware, software, producers, users, and mediators. Standards may invite stark choices between acceptance or rejection, as in the iconic case of the 4 ft. × 8.5 in. railway gauge. Computer technologies' ''universal machine'' characteristics, by contrast, offer paths of partial assimilation, emulation, and translation. Platforms, moreover, are partially rhetorical constructs whose boundaries may be contested and redefined.

Apple built its tremendous early growth on the Apple II microcomputer platform, which appeared seemingly from nowhere in 1977. Mass-produced computer systems, of course, do not appear from nowhere. They rely on pre-existing capital, parts, code concepts, production capacity, and distribution networks. The remarkable achievement of Apple's tiny staff was to co-ordinate all these into a viable product; to establish that product (''the computer,'' but in fact the platform) as deserving of attention; and to identify Apple as its only begetter, arbiter of its development and guarantor of its future validity.

IBM's original Personal Computer, released into a well-developed market in 1981, was likewise a constellation of existing entities. The hardware was assembled mostly from non-IBM standard parts, while an operating system, famously, was sought from the fledgling Microsoft, which licensed and adapted an existing system, which in turn was heavily informed by the well-established CP/M. Unlike Apple, however, IBM swiftly lost gatekeeper status over its emerging platform, as a legion of PC ''clone'' producers emerged.[2]

Early microcomputing culture was characterized by a proliferation of other machine-oriented platforms, often aimed at home users. Contemporaneously with Apple, the established electronics firms Commodore and Tandy Radio Shack introduced formulations of the personal computer that long endured, sustained by enthusiastic user communities and vigorous software development cultures. In the UK, my particular field of study, American producers competed with numerous small manufacturers' independent specifications.

This culture is often characterized as a Babel of incompatible platforms that the IBM PC, offering all the advantages of a consensus standard, rapidly swept out of existence.[3] Certainly, however, that 1981 machine did not represent a concerted push to overrun other personal-computer makers' markets—these were, after all, high-turnover, retail-oriented markets, far from IBM's core concerns. The platform was intended, probably, as a kite in the wind. It grew beyond expectation not because microcomputer buyers wanted IBM, but because traditional IBM buyers increasingly wanted microcomputers; thus it was never truly IBM's to control.

In the large-computing era, when IBM consistently held over 70 percent of the US market, its competitors typically depended on niche adaptation, serving markets too small or esoteric for the giant's attention. This strategy might as easily be social or geopolitical as technical: whereas Control Data Corp. specialized in fast-processing machines,[4] European producers such as ICL, Philips, and Olivetti capitalized on local knowledge and national flagship status. Similarly, following the release of the IBM PC, many manufacturers sought to respond with a compatible but crucially different machine. This only becomes obvious when we consider a computer as part of a user system, rather than the sum of its processor and software specifications. The first conspicuously successful ''clone,'' specified by Compaq (1983), was no clone in physical form, but a portable device inspired by pre-PC machines such as the Osborne-1.

''Platforms'' need not be specified at the machine level, and may cut across each other. Digital Research's CP/M operating system provided a common software and information interchange platform for a variety of business-oriented hardware, enduring well into the 1980s. The Web, today, provides a common basis for development in online communication across many applications. Moreover, compatibility need not

operate rigorously at a technical level. Microsoft's Basic dialect, its principal product before the IBM deal, was licensed for each major platform (Commodore's, Apple's, and Radio Shack's). The machines' specifics usually made the direct transfer of code impossible; yet the commonalities were close enough for amateur users to make the appropriate translations themselves.

A further lesson is the need to look beyond the US. In the European markets that responded first to the microprocessor-driven computer—homes, small business, pre-university education—the IBM-compatibles were long understood as one among several possibilities at the high-cost end of a broad market;[5] "standardization" most often suggested CP/M, not IBM, into the mid-1980s. Certainly, historians should pay due attention to the defining role of Commodore, subject of a recent popular account that forcefully decries the Apple-centric nature of much existing literature.[6] Though US-based, Commodore sold heavily into Europe, dominating in particular the extensive German home market at a time when Apple's machines were beyond most purchasers' means. Commodore's opening of a home-user market through price-cutting, it seems, was inspired by the British firm Sinclair's success in promoting limited machines on a price-point design philosophy.[7] The unique result for Britain was a home market carved largely between Commodore and Sinclair, with some smaller niche suppliers remaining viable over a decade or more.

Putting these insights together allows us to understand the rationale behind a variety of heterogeneous developments. In Britain, for instance, the Grundy NewBrain (1983) was a tiny handheld device, yet ran CP/M with memory expandable to the strictly "business" value of two megabytes. Acorn's BBC Microcomputer (1981), endorsed by the national public broadcaster's computer literacy initiative, used the same 6502 processor as the early Commodores and Apples, but was designed to interface with a second processor to run CP/M, Unix-like systems, or systems not yet designed. Acorn's success in defining an education-based niche inspired another British producer, Research Machines (RM), to introduce the Nimbus PC (1985): loosely following IBM-inspired architecture and running a customized version of MS-DOS, the device featured BBC Micro emulation and could interface with various educational peripherals. Such machines could be eccentric in terms of formal hardware specification—Nimbus was one of very few microcomputers ever built around Intel's 80186 processor—and might seem uncompetitively priced. Their validity and (sometimes transient) viability were established at the level of user community orientation and support.

The actual eclipse of these platforms in international context awaits serious investigation. In Britain, affordable PC-compatibles arrived in offices (principally via the indigenous volume electronics manufacturer Amstrad) from 1986. Yet first-generation users around this time generally upgraded not to PCs but to new platforms from Commodore and Atari. My subjective recollection is that the convention of diverse competing hardware platforms did not wilt, in the UK, until the arrival of cheap machines based on the 486 processor around 1993.

What pushed the PC into the traditional niche areas was not standardization but economics: the logic of mass production drove retail prices to a level at which buying a PC made sense. Generic and nicheless, PCs are increasingly underdetermined in style and function, and sometimes even in form (hence the plaintive comment of the Apple campaign's PC figure: "The rest of me's in some other boxes…"). At the same time, white-collar norms continue to inform, for instance, Microsoft Office, and the mismatch with home users' priorities creates a nagging tension. "Get a Mac" is merely the latest campaign to exploit the principle of compatible design, marrying the technicalities of the PC to the Mac's established social and cultural base.

References and notes

1. Most notably through the thinly veiled totalitarian references in the iconic Macintosh launch advertisement (1984). More subtly, "Think Different" (1997–2002) plays on IBM's venerable corporate motto "THINK!"

2. The legal/technical acrobatics of the reverse-engineering process involved are elegantly summarized in P. Ceruzzi, *A History of Modern Computing*, MIT Press, 2003, pp. 277-280.

3. For instance: G. Laing, *Digital Retro*, Ilex, 2004, pp. 6-7, 186.

4. M. Campbell-Kelly and W. Aspray, *Computer: A History of the Information Machine*, Westview, 2004, pp. 121-122.

5. See for instance the threefold division of "Low cost," "Medium-priced," and "Business" in H. Varley and I. Graham, *The Personal Computer Handbook*, Pan, 1983, pp. 182-187.

6. B. Bagnall, *On the Edge: The Spectacular Rise and Fall of Commodore*, Variant, 2005.

7. Ibid., p. 152; L. Haddon, "The Home Computer: The Making of a Consumer Electronic," *Science as Culture*, vol. 2, 1988, pp. 7-51.

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