

The End of Personal Computers

[Nathaniel Borenstein](#)

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Lately, we've been hearing a lot about the idea that we are witnessing "the end of personal computers," the "post-PC era," or, as Microsoft would have it, the "PC-plus era." The difference in terminology is telling, revealing the intense commercial competition and staggering financial stakes that underlie this transition.

For those who have been in the computing industry for decades, it's natural to guess that the transition has been overblown. It's also tempting to predict continuing swings between centralization (in the form of cloud computing) and decentralization (in the form of more powerful PCs). After all, that's what we've seen in the past. But I don't think that's what will happen. My guess is that we finally have enough power and

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the right architectures, on both tiny devices and massive servers, to ensure that the swinging is mostly finished, with future evolution tending to increase power both at the user's location and at the centralized servers.

That very power, however, is what is bringing the PC era as we know it to an end. A PC, irrespective of which operating system it runs, is fundamentally a huge compromise—powerful enough to do necessary tasks, but small enough to fit next to a desk in an office. First the PC shrank to fit under a desk, then to fit on top of a desk, then to fit on your lap, all without requiring any fundamental change to the PC paradigm in which workers were assumed to be more or less chained to their desks and the corporate network.

Now, the technology has gotten small enough to be used in ways never envisioned for PCs. Smartphones are the most obvious example, but there are also wearable computers like Google Glass or even the Samsung Galaxy Gear, distributed sensors, powerful computers embedded in mobile robots, and, ultimately, body-implantable computers and “smart dust.” None of these are scenarios conducive to the interface of a traditional PC and all of them may be even harder for an enterprise to manage than PCs.

Worse still for the PC paradigm, these new devices are slowly undercutting the most basic assumptions of the PC world. As smartphones become better and better at recognizing speech and handwriting, it won't be long until a new generation expects similar functionality on a PC. Although, once you have voice controls on a PC, do you really need a keyboard? If you remove the keyboard, doesn't that make it a tablet now? As Microsoft has inadvertently demonstrated, the user interface of a keyboard device like the PC and any touch screen device are radically and incompatibly different. No one thinks of their smartphone or tablet as a PC.



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Increasingly, computing devices will have a variety of shapes and forms, sharing only a common tendency to store and interact with long-term information on centralized cloud services. This is why cloud computing isn't a fad, or even another pendulum swing. It makes this future possible.

Advancement in user interaction will take place on the devices, while applications will rely on increasingly sophisticated cloud-based services to perform virtually all non-interactive functions. In short, all the services that require "hands on" maintenance today are moving to the cloud, while individuals are moving away from PCs to more specialized interaction devices.

Twenty years from now, when a child sees a PC in a computer museum, he will be flummoxed by the lack of a touch screen, the bulky keyboard and mouse, and the lack of speech or handwriting interaction. This, he will be told, is what they called a PC, and if he's taking notes, he'll do it by whispering into his phone, or sub-audibly verbalizing to his wearable computer (or perhaps by wiggling his fingers to manipulate a virtual keyboard only he can see).

He'll be interacting with a computing unit built into his clothing or implanted on his body, person connected to the cloud—a far more "personal" computer than any we've known to date. Ultimately, what we've known as the personal computer for the last 30 years will be viewed as the first historical example of a *type* of personal computer—and a long-outdated type that is considered anything but personal to children in 2033.

Nathaniel Borenstein is chief scientist at e-mail management firm Mimecast. Based in Michigan, he is the co-creator of the MIME e-mail standard and previously co-founded First Virtual Holdings and NetPOS.

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Then, where does this scenario leave website/homepage design and functionality? Will 'responsive' design be enough or will it become mute?

Or, does the website/homepage we know today disappear only to be replaced by something else? And when? Any time frame other than the 2033 endgame?

Thanks, Nathaniel. Enjoyed this.

- *peterk*

The same applies with a lot of engineering and scientific applications...

How do you write code in FORTRAN or C++ using speech recognition? Or with a touchscreen?