

White Paper draft 11/29/99
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The era of the Personal Computer is over.

Not because PCs are about to disappear, but because PC software and hardware will not define the direction of high-growth technology markets in the 21st century.

For those who remember the 1970s and 1980s, the arrival of PCs in 1979-1981 pushed aside the Minicomputer as the defining force for high-growth markets from then on. The minicomputer market did not disappear. It simply became a stable, 15%-per-year growth industry. As a result, the most creative programmers, engineers and business school graduates started going into PC-related businesses.

What has pushed aside the PC?

The answer is the World Wide Web – sometimes known as the Internet. But this is a flawed answer if you conceive of the Web as something accessed through a PC.

There are two reasons PCs are already obsolete as Web-access devices.

One reason is that only half of U.S. homes have a PC. And the people who do have home PCs are not satisfied with **the type of service they receive** or **the kind of interaction they must do** to successfully access and navigate the Web.

Windows unreliability: *Microsoft's flagship operating system has extremely wide acceptance, but everyone expects to have to re-boot their system at least once per day if they are using Windows on their PCs. [ref: Walter Mossberg, Wall Street Journal, 1999]*

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Complexity of Windows and Macintosh OS: A general-purpose operating system, such as Windows or MacOS, is designed to allow the computer user to run any application program on the computer. This general-purpose design requires the OS to be complex, have many settings and controls, and the allow for recovery from a wide variety of errors that may occur both in the applications programs and in the OS itself. The average person does not need or want this generality.

An OS is inherently unstable: In the academic halls of Computer Science, I used to joke that Operating Systems “consist of those functions that we don’t understand well enough to commit to hardware.” In other words, we may need to change the functions and interfaces as we learn more about the application software environments, the file and database systems, the communications channels, and so on. If we really understood the requirements well, we would have put the programs in a ROM, rather than loading them at “boot” time.

The second reason is that miniaturization of electronics – and the continued increase in compute power per chip – have enabled portable, personal devices, such as the cellular telephone and the personal digital assistant typified by the 3Com Palm III and successor devices.

Both of these devices have wide acceptance among people who are not regular PC users. Why? Because they do **one thing well** (telephone), or do **a small number of things well** (Palm III). The computer industry call these devices *dedicated application computers*. The software is loaded in once and runs many, many times without being modified. The person using them does not see a desktop and “launch” an application program. A single button causes a function to work. And it works well.

You didn’t know your cell phone was a computer? But it is! And so is your thermostat, your pool control, your home security system, your automobile engine carburetor controller, and so on.

Who are the people who will use the Web but not PCs? Here are a few clues:

- ☞ They watch movies at home and in theaters.
- ☞ They talk on the telephone.
- ☞ They buy things in stores, and also from catalogs.

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- ☞ They buy music recordings and listen to them at home, in their cars and while walking or running.
- ☞ They read magazines and newspapers and watch broadcast television.
- ☞ They participate in community activities, attend meetings, go to schools and churches, and raise children.
- ☞ They are interested in who their neighbors are and what stores are in their neighborhoods.
- ☞ They do not program their VCRs.

In other words, they are people like you and me, living their lives in North America at the beginning of the 21st century.