

THE PUBLISHER'S VIEW

Web Terminals—The Next Paradigm Shift?

Web Devices Will Reach New Consumers But Won't Threaten the PC

The spectacular rise of the Internet—driven by the World Wide Web—has been called the biggest paradigm shift in computing since the emergence of the graphical user interface. From publishers to computer makers, companies are revisiting their strategies in the face of this explosion in wide-area-network computing.

In the most extreme view, the rise of the Web will make it the dominant computing platform, leading to the end of the Intel/Microsoft hegemony. As accessing the Web becomes a predominant activity, in this view, the operating environment becomes the browser rather than the underlying operating system. With a Java-enabled browser, programs as well as data can be loaded via the Web, allowing the browser to take on other application functions as needed.

Browsers are available for nearly all processors and operating systems, while Java is interpreted and therefore easily ported to any processor. As a result, the rise of the Web could reduce the value of the x86 architecture and Windows operating system. Although this scenario has a certain appeal, especially for those (such as vendors of RISC processors) forever on the lookout for the next big power shift, it is implausible.

A key part of the appeal of proposed Internet terminals is their low hardware cost: target prices are \$300 to \$600. This price is achieved by eliminating the disk drives, using a television for the display, and cutting back on the amount of DRAM.

Unfortunately, these hardware compromises will seriously cripple the machine. Television displays are far inferior to computer monitors—and with no local mass storage, the system depends on storage located in a network-based server. This may be feasible if a high-bandwidth communication channel is available. But today's ISDN interfaces and cable modems cost substantially more than a modest hard disk; reaching the \$500 price range today dictates a conventional modem, which is far too slow for effective access to remote storage.

Another flaw in this scenario is the assumption that computing needs and wants, beyond Web browsing, can be met with Java applets. Although Java is a full-featured programming language, it will be a long time, if ever, before a wide array of full-featured applications will be implemented in it; the industry isn't creating Java-based applications today, and there don't appear to be many business models to support their creation.

But, counter the Java advocates, most people don't need full-featured applications. Computers will be useful

to most people primarily as communication tools, with perhaps some simple, occasional word processing or spreadsheets or personal information management applications. This argument has some merit, especially given the gross feature overkill that infects most of today's application software. But for many home users, the ability to take work home from the office is an essential part of the machine's justification, and a Web-based machine isn't likely to meet this need. For others, games are a primary driver of home use; good interactive games are going to require lots of local storage unless the communications link is very fast.

Indeed, game machines are likely to be key competitors for Web terminals. By providing a communications cartridge (and possibly a keyboard), game machines could become Web-surfing machines. A combination game/Web machine is likely to have much better games available than a Web terminal that doesn't conform to an existing game platform design.

There are, however, some bright spots in the prospects for Web terminals. First is the opportunity to provide a computing device that is not only less expensive than a PC but much easier to use. A low-cost Web terminal could reach people who just won't buy PCs. It could therefore play a major role in making e-mail pervasive and replacing paper telephone directories, much like France's Minitel system. Such a device might be integrated into a telephone and would be accessible—both in terms of cost and intimidation—to many more people than PCs will reach. Following the cellular-phone model, its cost might also be subsidized by the service provider, making it very inexpensive to purchase.

Another big opportunity for Web-oriented, low-cost computers is in handheld devices—the much-maligned PDAs. The Web is just what PDAs have needed to justify their existence to more users: easy access to a vast array of information. As PDAs move to color displays and wireless data networks become pervasive, handheld Web browsers could become hot items.

The Web does represent a major paradigm shift in computing, and it will enable new classes of devices that may create significant industries. But it does not represent much of a threat to Intel or Microsoft. In fact, both will benefit as Web access makes owning a home PC more compelling than ever. ♦

