

Microsoft Updates Windows Roadmap

WinHEC Conference Showcases New Initiatives—and Conflicts

by Peter N. Glaskowsky

Over the years, Microsoft has made several attempts to make the PC more sophisticated yet easier to use and more reliable. Some of these efforts have seen partial success (such as Windows itself), while others have fallen far short of their original goals (such as Plug and Play). At Microsoft's Windows Hardware Engineering Conference (WinHEC) last month, the company described its latest steps in this direction. Some of these efforts will improve the experiences of Windows users, but others are likely to cause more problems than they solve.

WinHEC also gives Microsoft an opportunity to explain its requirements and recommendations for hardware support of the Windows operating systems. These guidelines, embodied in periodic releases of the *PCXX Hardware Design Guide*, coauthored by Microsoft and Intel, form the basis of Microsoft's Windows logo certification program—the bible of PC design. (The next edition of this guide is due in early 2000 and will apply to PCs made in 2001. More information is available at www.pcdesguide.org.)

DOS Is Not Dead Yet

In an about-face from previously announced plans (see MPR 3/9/98, p. 14), Microsoft said it will develop the next version of Windows for consumer-desktop systems from the existing Windows 98 code base, not from Windows 2000 (formerly Windows NT), which is still expected to ship later this year. The original plan was to leverage the more sophisticated Windows NT architecture to make consumer PCs more stable and easier to maintain and upgrade.

Microsoft said it has identified two primary problems with that plan. Windows 2000 requires substantially more resources for efficient operation, including more memory, more disk space, and a faster processor. We estimate the hardware cost penalty for Windows 2000 support at about \$100, unacceptably high for most home PC users today. Microsoft is not confident of its ability to reduce this cost penalty to a level acceptable to the user community.

Second, Windows 2000 remains incompatible with a wide variety of applications and peripherals designed for the Windows 3.1, 95, and 98 operating systems. Most of these problems are related to the 16-bit DOS-based core of these older operating systems. Although Microsoft would like users to discard these "legacy" products, users themselves are not ready to do so. Microsoft believes it would be prohibitively difficult to make the NT core compatible with these products, so it is prepared to wait a few more years before forcing the transition to NT.

Microsoft, Intel Establish Easy PC Initiative

In parallel with the consumer Windows program, Microsoft continues its efforts to make PCs easier to use. The latest in a long series of such efforts is the Easy PC Initiative, a cooperative venture between Intel and Microsoft. The two companies have clearly defined responsibilities in this initiative—Microsoft handles the software side of things while Intel works on hardware—but there are already signs of stress on the structure of this cooperative effort.

Despite Intel's recent dismissal of the IEEE-1394 serial bus as a mainstream PC interface (see MPR 3/29/99, p. 14), Microsoft continues to insist that 1394 is an essential ingredient for ease of use of future PCs. Microsoft featured 1394 heavily in many WinHEC presentations, including several keynote speeches. Microsoft showed demonstrations of various 1394-connected peripherals, including several DeviceBay modules.

DeviceBay (see MPR 5/12/97, p. 10) uses 1394 and USB to connect modular peripherals to the PC. Microsoft believes 1394 is needed to implement removable mass-storage devices and high-bandwidth PC multimedia peripherals. Intel says that its new USB 2.0 interface should suffice for most, but not all, of these devices and has suggested that DeviceBay could be redesigned to omit the 1394 interface. The DeviceBay standard was recently transferred to the 1394 Trade Association (www.1394ta.org), however, making such a redesign highly unlikely.

In this area, Microsoft is doing essentially all that it can to promote the adoption of 1394. In particular, the driver model found in Windows 98 and Windows 2000 should make it relatively easy to support new kinds of 1394-based devices. Unfortunately, without support from Intel in the form of 1394-equipped core logic, 1394 will remain a niche solution for video-editing systems, too expensive for most PC makers to consider.

Recognizing that it may ultimately be impossible to eliminate problems with device installation and configuration, Microsoft announced plans for a new operating-system service called PC Health. Instead of merely notifying the user of a problem, PC Health will actually try to fix it. The service will use a type of expert system to evaluate software or hardware failures, identify a solution if one is defined in its database, and make the fix if the user desires. Over time, Microsoft will add new solutions to the database, using the Web-based Windows Update mechanism already present in Windows 98.

A WinHEC demonstration of PC Health automatically repaired a deliberately corrupted modem configuration file, restoring a known-good copy of the file from an archive. PC

Health will also be able to roll back recent changes to the system configuration to the earlier known-good state. These capabilities, if intelligently implemented, will certainly be well received by novice and expert users alike.

Microsoft also described some ease-of-use enhancements in Windows 2000. In an early implementation of a PC Health-like feature, many of the dynamically linked libraries (DLLs) in Windows 2000 can be automatically re-installed if the DLL disk file is damaged or missing. To improve the OS's run-time stability, more DLLs will be loaded as write-protected pages than in today's Windows NT 4.0.

The new operating system will be able to record more information about problems with device drivers. It can also be configured to prevent installation of device drivers that have not been certified by Microsoft's Windows Hardware Quality Lab (WHQL).

Microsoft described a new approach to OS updates that should make system administrators very happy—future updates will no longer combine bug fixes with new features. Administrators will be able to apply bug fixes without adding new features that might cause problems with existing applications or require additional user training. With all of these improvements, Windows 2000 should be a popular upgrade.

PC Appliances Aimed at New Markets

For applications such as intelligent televisions and file or print servers, where PC-class power is required but the complexity of the Windows interface is not, Microsoft offered its vision of single-function or appliance PCs. Microsoft said these systems represent the reinventing of the PC. I, however, see this as the de inventing of the PC, which has always been a multifunction device at heart.

Microsoft and Intel demonstrated a prototype server appliance with no monitor. The only physical user interface was a small graphical LCD attached to the front of the system enclosure. The server provided basic file, print, and remote-access sharing services to Windows systems on the local network. The server could also serve Web pages to any attached client system to provide a virtual user interface for configuration and maintenance.

Such servers will run a stripped-down version of the Windows 2000 operating system, equipped with just the essential code modules to implement the desired services. This reduces the size of the operating system and eliminates the need for a fully featured user interface. Microsoft also said that these servers will not follow the current Windows NT licensing model, which requires users to purchase a client license for each system connected to the NT servers within an enterprise. Instead, the server appliance will not require client licenses, reducing their effective cost.

Microsoft says server appliances will become available from multiple vendors by the end of the year. These systems are meant to compete with products from Cobalt Networks (www.cobaltmicro.com) and others. Cobalt's Qube, for example, provides features similar to those of the Microsoft

server appliance, yet it runs on a MIPS-architecture micro-processor and is available for less than \$1,000.

We are forced to wonder how committed Microsoft and its PC OEM partners are to the server-appliance concept. Because they must use PC-compatible processors and core logic, it will be difficult for vendors to make much money on PC servers while matching the low prices of purpose-built server appliances from companies like Cobalt. Also, Microsoft is likely to impose restrictive limitations on the features of its server-appliance software. The company will earn high profits on sales of the full Windows 2000 server software and client licenses; it cannot afford to let server appliances cannibalize these sales.

Universal Plug & Play Extends PC Networks

Microsoft also has designs on appliances of the ordinary kind—home heating and air-conditioning systems, refrigerators, VCRs, and other devices that don't need PC-class intelligence when operated independently. Microsoft believes such appliances should be networked and function cooperatively, ideally under the control of a Windows PC.

Several elements of this proposal are bundled under the umbrella of Universal Plug and Play (UPnP), a Redmondian response to Sun's Jini, which uses similar but incompatible protocols to achieve similar results (see [MPR 3/29/99, p. 10](#)). At WinHEC, Microsoft announced the formation of the UPnP Forum (www.upnp.org), which now has 56 members, including several major consumer-electronics firms.

A WinHEC demonstration of a UPnP-enabled home audio system showed the UPnP protocols running on common PC hardware. First, a networked CD-ROM changer was used to send CD audio data to a box simulating a home stereo. With no intelligent controller in the network, the user interface was limited to selecting disc and track numbers. Adding a PC to the network allowed the user to select audio tracks by artist, title, or theme. Though UPnP does not require a PC, Microsoft clearly wants users to think of home networks as an extension of the PC.

New Interface Extends Graphical Capabilities

Work also continues at Microsoft on GDI+, the company's next-generation graphic device interface. This new interface is likely to have a substantial impact on the design of future graphics chips and software. Although today's DirectX graphics APIs (and all shipping Microsoft user interfaces) are based on 2D windows, GDI+ is based on 3D objects. Most 2D operations are implemented as special cases of 3D functions. Microsoft believes this approach will make it easier to implement future 3D user interfaces and applications.

Microsoft demonstrated its latest 3D user-interface idea, a sort of virtual art gallery where each wall was devoted to a class of applications, such as personal finance, Web browsing, and word processing. Simple mouse gestures were used to move the applications of interest to an end wall that served as the active region. Applications and documents

could be brought to the foreground or stacked in a virtual document sorter, using other mouse gestures.

Although the demonstration fell well short of a complete product, it showed features that we expect to see in future Windows operating systems. These features will have a direct effect on the development of PC hardware, especially graphics chips. For example, to keep text legible in windows at an oblique angle to the user's viewpoint, 3D chips must provide much better texture filtering. New 3D user interfaces will also keep many windows entirely visible, though at reduced sizes; graphics cards will need much more memory to store all these windows.

As 3D becomes more important to everyday PC use and gamers demand better 3D performance, Microsoft sees a trend toward dedicated hardware to accelerate 3D transform and lighting operations. Such hardware will be supported by version 7 of DirectX, due this summer. We believe most 3D-chip companies are already working on geometry acceleration. (At the conference, Nvidia announced its plan to ship such a product next year.) Microsoft believes that the need to adapt geometry processing to the needs of multiple applications makes programmable engines the best solution. Although host-based geometry processing provides the best value for most users today, geometry acceleration should be an easy sale to avid gamers in 2000, and we expect it to migrate into most graphics chips by 2002.

Digital flat-panel display technology took an important step forward at WinHEC with the final release of the Digital Visual Interface (DVI) specification from the Digital Display Working Group (www.ddwg.org), which counts among its members most of the key players in the PC and monitor industries. DVI 1.0 supports digital displays up to 2,048 × 1,536 pixels in size. Because it uses Silicon Image's transition-minimized differential signaling (TMDS) technology, DVI is compatible with most of the digital-interface cards and monitors that have shipped to date, though it defines a new connector type that will require adapter cables for use with these existing products.

Imaging Gets a Close Look

The growing popularity of digital scanners, cameras, and camcorders has given Microsoft an obvious opportunity to add features to the Windows platform. The new Windows Imaging Architecture (WIA), described and demonstrated in prototype form at WinHEC, extends the Windows file system with specific support for photographs and video clips.

WIA gives Windows a new driver model for imaging devices and new operating-system services for imaging software. Microsoft will also improve the ability of its operating systems to handle streaming video (such as the bitstreams that come from digital-video camcorders) in hopes of solving a key problem that has interfered with the broader use of such devices with today's PCs.

The Windows file explorer and Internet Explorer will also be extended to make it easier to store, catalog, and search

images stored on disk. The demonstration of these capabilities showed how a user can search for images that are visually similar to a reference image, making it easier to collect and compare pictures of family members, pets, or other recognizable subjects. This type of image recognition is inherently very difficult, and Microsoft did not explain how well—or how—it will work.

One element of WIA is already causing some controversy among professional imaging experts. Microsoft has defined a new red-green-blue color space called sRGB that encompasses a smaller gamut, or range of allowable colors, than previous RGB color spaces such as the commonly used standard from the Commission Internationale d'Eclairage (CIE), a French organization responsible for much of the early work in color science.

The purpose of sRGB, Microsoft says, is to provide a color space that can be accurately reproduced on the widest possible range of computer monitors, printers, and other output devices. The sRGB gamut provides a lowest common denominator for all of the devices Microsoft expects to be used for imaging under Windows. Because the sRGB gamut is relatively small, color information can be lost when an image is brought in from a high-quality scanner, camera, or other input device with a larger gamut. Once lost, this information can never be reconstructed. For this reason, Microsoft's use of sRGB is likely to limit acceptance of WIA among more demanding professional users.

Microsoft Remains Influential on PC Hardware

Even if Microsoft weren't directly involved in hardware design—for products ranging from steering wheels for PC games to remote controls for home-theater systems—it would still be one of the most influential companies in the hardware business. Its decisions to support particular hardware technologies or devices can make or break hardware companies. Its opinions and predictions of technology trends are treated like gospel.

WinHEC is Microsoft's annual opportunity to inform and advise the hardware industry. This year the message was clear: Microsoft is extending its influence well outside the mainstream PC industry. In part, it will accomplish this goal by making the PC capable of working with products from other industries, such as consumer electronics and home appliances. Microsoft is also working to make the PC *less* capable, in an effort to address needs that are incompatible with the PC as it presently exists.

These efforts are moving Microsoft into markets already occupied by large, powerful companies. Microsoft achieved its present position in the PC industry by a simple three-step process: embracing existing technology, extending it in Microsoft-specific ways, then extinguishing competitors that don't move fast enough to keep up. Whether this strategy will succeed in the consumer-electronics or appliance industries is still uncertain, but if anyone can make it succeed, Microsoft can. 