Microsoft's Multimedia Roadmap

Windows NT to Displace Windows 98 as Consumer OS of Choice

by Peter N. Glaskowsky

Even before shipping Windows 98, Microsoft has begun to play down the new operating system's role in the future of the PC industry. At the February "Meltdown" conference for DirectX developers, Microsoft Sr. VP Jim Allchin described how his company will manage the transition from today's hybrid 16- and 32-bit Windows 98 operating system to a new consumer OS based on the Windows NT microkernel.

In support of this strategy, the first release of version 6.0 of Microsoft's DirectX application programming interface (API) will arrive in April with the Beta 2 release of Windows NT 5.0—not Windows 98. This will give independent software vendors (ISVs) a strong incentive to develop new multimedia titles first on Windows NT, then port them to Win98.

Microsoft's OS roadmap, shown in Figure 1, makes it clear that Windows 98 is the end of the road for the old DOS core. No longer will system vendors and software developers be compelled to deal with 16-bit addressing modes, "low" and "high" memory, VGA hardware compatibility, and the other baggage of 17 years of evolution. Even x86 compatibility is no longer needed, enabling consumer-oriented Alpha and Merced systems. It may take another few years to exorcise all these demons, but the result will be simpler and more manageable systems.

New 3D API Boosts Performance, Quality

The most significant enhancements to DirectX will appear in the portion that has received the most attention: Direct3D. Direct3D 6.0 will include several significant enhancements over the current D3D 5.2. Higher performance will be provided through optimized software as well as greater opportunities for hardware acceleration, and several new quality features have been added.
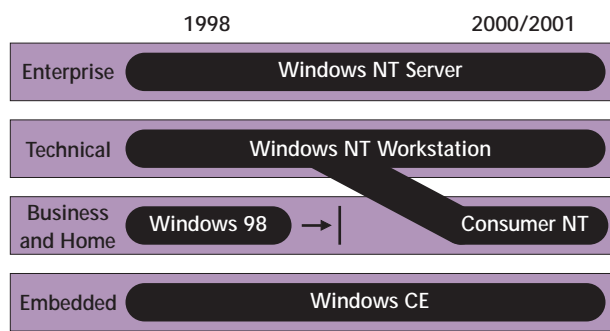

Figure 1. Windows 98 will be the last release of the Windows operating system. Its role will be filled by an as-yet-unnamed consumer-oriented version of Windows NT.

Microsoft has responded in two ways to ISV dissatisfaction with the D3D geometry and lighting code. First, the company has significantly increased the basic speed of the software implementation of these functions. Second, forthcoming 3D-enhanced processors from AMD, Cyrix, and IDT may achieve a 2× performance boost due to use of AMD's 3D extensions.

Microsoft hopes the improved code will be used by more ISVs, who currently develop proprietary software geometry engines to achieve better performance with each new generation of 3D game. Unfortunately, DX6 will not support external geometry accelerators such as 3Dlabs' Glint Gamma and TriTech's Pyramid3D. Microsoft's survey of the 3D industry found few other vendors were prepared to develop such chips within the DX6 timeframe.

Microsoft is working to improve the quality of 3D images by adding features to D3D and releasing a "gold standard" software reference implementation that 3D-chip makers can use as a basis for future designs. The new features include a 3D-oriented texture-compression algorithm licensed from S3, said to reduce the storage and bandwidth required for 3D textures by a factor of 4×–6×, and a bump-mapping algorithm licensed from TriTech. These features, as well as increased flexibility in the way 3D-vertex coordinates are stored and processed, promise to increase the effective performance of 3D rendering for equivalent scene quality.

D3D 6.0 will also include support for stencil buffers, used to facilitate special effects like shadows and 2D overlays, as well as the use of multiple textures for each polygon in a single rendering pass. Some current 3D games simulate these effects at the expense of increased code complexity; native API support will be welcomed by game developers.

Hardware developers will benefit from the reference rasterizer, essentially a software simulation of an ideal Direct3D accelerator. This code takes the form of a D3D device driver, but without the physical device; it includes the same code as the D3D hardware emulation layer. By examining the code, written in C and C++, a hardware developer can verify elements of a 3D accelerator design against Microsoft's expectations.

The rasterizer will also form the basis of future 3D-chip validation tests by the Windows Hardware Quality Lab (WHQL). These tests will allow WHQL to enforce much-needed quality standards for graphics adapters.

Timing Isn't Everything

Microsoft's rapid migration to NT-based DirectX development and deployment comes at a significant price. Some software-development tools run only on Windows 95/98,

and few hardware vendors support their products equally well on Windows 95 and Windows NT. Development may be delayed while ISVs wait for these components to be ported to the NT platform.

Microsoft is not promising that DirectX 6.0 will be ready in time to enable Christmas '98 shipments of DX6-specific titles, and some ISVs are now planning to omit new DX6 features from applications currently under development. This is likely to diminish the value of the non-Intel 3D-enhanced processors, though there should still be several titles that take advantage of these new CPUs. Despite the delay, DirectX is still expected to account for almost all new software development this year; even last year, eight of the top ten PC games were written to the DirectX API.

Windows 98 itself will ship with DirectX 5.2, giving software developers still another reason to delay support for DirectX 6.0. Just as DX5 games must today include a DX5 installer to support Win95 systems without DX5 preinstalled, DX6 games won't be able to depend on finding this version of the API on Win98 systems. DX6 support for Windows 98 will appear later this year in a service-pack release.

DirectMusic Enhances Audio Capabilities

Microsoft also demonstrated at Meltdown a new audio API for DirectX 6.0 that will allow ISVs to provide more interesting soundtracks for entertainment software. The new Direct-Music API provides a more abstract model for music synthesis, using concepts like motif, mood, and personality to synthesize high-quality music in real time. These parameters will generally be developed by professional musicians working together with game developers to produce the desired results.

Instead of today's repetitive, noninteractive sound synthesis techniques such as MIDI and CD-audio playback, DirectMusic allows audio tracks to be different each time a game is played. A DirectMusic game, for example, can provide a musical theme for each level that changes in tempo and intensity according to the challenges the player is facing.

This intelligence will allow games to generate hours of CD-quality music from just a few megabytes of audio samples and control code, making software easier to distribute and more convenient—and entertaining—to use.

NT Provides Superior Platform for Entertainment

Increasingly sophisticated programs using multimedia APIs like Direct3D and DirectMusic, as well as the latest high-performance graphics and audio accelerator chips, are putting a great deal of strain on the Windows 9x platform, which has limited support for such real-time operations.

Software developers are more eager than end users to make the transition to Windows NT, being more aware of NT's power as well as more sensitive to frequent crashes. Users may initially resist switching to an operating system that is currently marketed as an all-work, no-play product, but the switch will ultimately yield benefits for developers and users alike. Ⓜ