



Direct action

Benjamin Woolley assesses Direct3D, Microsoft's promising API for adding 3D functions to applications. He also finds himself in the thrall of power mania: which hardware is big enough?

The internet is not the only area of the information revolution that Microsoft once neglected and is now determined to dominate. 3D graphics are also now firmly in the company's laser-guided sights. Its strategy has been to buy up existing technologies and Microsoften them up for global exploitation. One of these is Reality Lab, a set of programming tools originally developed by the British company, RenderMorphics, for rendering simple textured shapes in real time.

Microsoft has renamed it Direct3D and developed it as the 3D component of its burgeoning multimedia application programming interface, DirectX, version 3 of which had just been launched at the time of writing this. The DirectX "evangelists" (a troop of which are bound for Europe, I am told) are promising that their technology will enable PCs to equal the current performance of consoles and arcades once hardware developments like Intel's MMX and Microsoft's own Talisman (see the November column) are commonly available.

Direct3D is an API, which means it acts as a sort of programming language (used in combination with an existing one, such as C++) for adding 3D functions to applications. Those applications may be games, they may be programs for authoring games and other 3D content, they may be molecular modelling packages, even databases or spreadsheets.

Microsoft has put a lot of work into Direct3D, and the demonstrations I have seen on the developer CD-ROM are promising. A simple textured sphere or teapot (the standard artefact for graphics demos), for example, will render smoothly in real time in a 320x240 window on a standard



An image entitled "Screw the Mold" by Sandford Beml Faisonat, which features in the Apple QuickDraw 3D Gallery (quickdraw3d.apple.com). The image was rendered using QuickDraw 3D, although obviously not in real time

Pentium system. Direct3D (and, indeed, DirectX as a whole) also has the important feature of being able to take advantage of whatever hardware resources are available. If it finds a 3D graphics accelerator, it will be used, so long as there is a driver, which is likely, as most of the major 3D graphics chips are designed to support Direct3D. But equally important, if no acceleration is available, Direct3D objects, and any sounds or 2D images with which they are combined, will still be displayed, generated by a "Hardware Emulation Layer" that reproduces in software any functions that are unavailable in hardware.

Direct3D is not the only 3D API on the market. There is OpenGL too, which is aimed at the higher-end market and is already well-established. More significantly from a PC point of view, there is QuickDraw 3D from Microsoft's old rival, Apple. In at least one head-to-head comparison (published in the American magazine, *Byte*) QuickDraw 3D came out ahead of Direct3D for offering a greater range of object

primitives and for its support of both the Mac and Windows platforms. Some of the Microsoft literature claims that DirectX, too, will be cross-platform. There are some doubts about this. According to at least one source within the company, the main purpose of the technology is to give 32-bit Windows operating environments a competitive edge over rivals, which obviously include Macintosh.

So which API will prevail, and does it matter? It certainly matters, because either Direct3D or QuickDraw 3D are likely to provide the basis for 3D becoming a standard part of the PC environment, as commonplace as sound and 2D graphics are now. You will need to consider this when choosing both software tools and hardware, trying wherever possible to keep your options open by getting support for both (which most third-party developers are, so far, promising to provide).

The question as to which API is likely to prevail is a trickier proposition. We all know who has the marketing muscle. We all know

Infobyte

An Italian company called Infobyte specialises in creating VR tours of historical sites that are truly spectacular. They include the stunning Giotto frescoes in the Basilica of St Francis in Assisi (pictured here), St Peter's Basilica, the Coliseum and, most recently, the restored tomb of the Egyptian queen Nefertari, a VRML version of which can be explored by pointing your browser (running on an extremely powerful workstation) at the company's excellent web site, www.infobyte.it. Once this sort of thing runs in real time on an ordinary PC over a standard internet link, I think 3D's day will truly have arrived.



who controls the operating system (or at least, the one used by the vast majority). But 3D is a relatively new field in PC terms, QuickDraw is already well supported, and you only have to visit Apple's QuickDraw server (quickdraw3d.apple.com) to see that the company means business.

Power mad

Last month, my Compaq Deskpro's hard disk drive decided to experience a strange, slow-motion crash, deteriorating from full working order to complete cabbage-like coma in the space of an hour. I packed it off to my supplier, where it gathered dust for three weeks awaiting Compaq's delivery of a replacement.

During its absence I had to resort to my backup system, an old 486 Viglen Genie, which, unlike the Compaq, has chuntered away reliably in the background without a squeak of protest since I bought it some time in the last century. Being modestly specified in all departments except RAM (it has 16Mb), the Viglen, I thought, would prove to be unusable. In fact, I found it capable of doing just about the same amount of work. For 3D, I returned to Autodesk's 3D Studio running under DOS; for writing, Microsoft Word running under Windows 3.11; for the internet, good old Pegasus and WinFTP (I decided to forgo the delights of the web for a while). It was not tidy, it was not integrated, but it did work.

Those of us who are working with 3D graphics are currently in the thrall of power mania. We are constantly told that more means more: more processing power, more RAM, and yet more sophisticated software means more creativity, more spectacular effects and yet more moolah.

Dear Santa...



In its opening months, 1996 seemed it might turn out to be the moment when 3D finally fulfilled its promise. Creative Labs was selling the 3DBlaster board, VRML was becoming better known. However, the 3DBlaster did not turn out to be the graphics equivalent of the SoundBlaster because only individual programs (games) could take advantage of it. VRML, too, was a bit of a damp squib; few had the hardware to do anything with it, fewer the desire to spend their online hours wandering terrains that look like they were designed by the Early Learning Centre.

Now, as the New Year arrives, one gets the distinct impression that things are starting to move. With the Millennium board and now the Mystique, Matrox has started to establish 3D acceleration as a standard part of the PC graphics subsystem. With the plummeting price of memory, systems are coming equipped with the 16Mb of RAM that is the absolute minimum for handling textured 3D data. With the emergence of mainstream APIs (see main story), we at last have a mechanism for bringing the benefits of the third dimension not just to games, but to a whole welter of applications.

But I do not expect 1997 to be year zero: we have some way to go yet. Santa keeps forgetting to pack his sleigh with such essentials as modular, easy-to-use 3D authoring tools (the current crop are overweight and monolithic), a standard for plug-ins, and the imagination booster all of us involved in the graphics business need if we are to start to come up with content that is both wonderful and practical.

For me, what 1996 lacked most was a Myst, some game or virtual artefact that aroused one's excitement in the possibilities of 3D. So, Santa, please could you give us another of those in 1997? Not Myst 2, but something that demonstrates what wonderful, colourful, inspirational landscapes that even a humble PC can help create.

So when I sat down in front of what to many must still represent the pinnacle of desktop computing power, a Silicon Graphics workstation, it was in a mood of extreme scepticism. The machine in question was SGI's new "personal" workstation, the O2*. SGI's definition of personal is somewhat different to, say, Viglen's. The cheapest O2 costs just over £5,000, for which you get a 32Mb system armed with a MIPS R5000 RISC processor running at 180MHz. It offers blistering graphics performance through a "unified memory architecture" (i.e. no special-texture RAM) combined with built-in hardware acceleration and a system bus that can shove data around at a rate of 2.1 gigabytes per second.

I spent about an hour on the O2, and found it (temporarily at least) restored my confidence in technology. It was the first time I had used VRML that was both nice to look at and explore, smoother than anything I have so far experienced on an NT box or, for that matter, a Unix one. That, of course, was partly because it used the latest version of SGI's WebSpace VRML 2.0 browser. But it also seemed to indicate that SGI might still retain the edge when it comes to optimising hardware for graphics.

However, do 3D artists have to start contemplating spending more than £5,000 in order to do decent work? Do we really need all that extra power? And if we do, should we pay the premium that is inevitable if you leave the general-purpose PC architecture behind and choose something from SGI? Or should we start thinking about going back to basics: stepping off the technology roller coaster, settling back with the old products that we know and like, and leaving it at that?

For me, for the moment, not even the allure of an O2 can completely discredit the latter strategy. But then, my Deskpro is now back and apparently working well, I have started to use the Workstation edition of Windows NT 4.0, and I have been eyeing a rather nice accelerator board. It can only be a matter of time before power madness once again prevails.

* See *PCW December 96* for a full review of the *Silicon Graphics O2*.

PCW Contacts

Benjamin Woolley, writer and broadcaster, can be contacted at woolley@illum.co.uk. His home page is www.illum.co.uk/woolley