

# Windows of change

WINDOWS 2000  
PROMISES THE  
WORLD **BUT**  
**DOES IT**  
**DELIVER?**

TERENCE GREEN  
GIVES YOU THE  
DEFINITIVE  
GUIDE TO THE  
NEW OS

**W**INDOWS 2000 WAS TO HAVE marked the spot where Windows 98 and NT converged, but that changed a year ago when

Microsoft decided to extend the lifespan of Windows 98. The change, of course, seems to be more a consequence of Microsoft restructuring its business divisions than a sign that Windows 2000 Professional isn't a worthy upgrade for Windows 98. Windows 2000 is late so Windows 98 had to hang in there anyway, but Microsoft has also created a Consumer Division which recently released an early beta of a home-user Windows called Millennium. If the anti-trust case results in Microsoft being broken into Baby Bills, it's likely that Consumer Bill and Business Bill will each have a Windows, leaving Windows 98 to fall between stools.

Windows 2000 encompasses a server family and Windows 2000 Professional, the desktop client which takes over from NT4 Workstation. The Server family extends to Windows 2000 Server, Advanced Server and DataCenter Server. Each step supports more processors by default, four, eight, and lots respectively. Other version differences are mainly of interest to large organisations with humungous applications and networks.

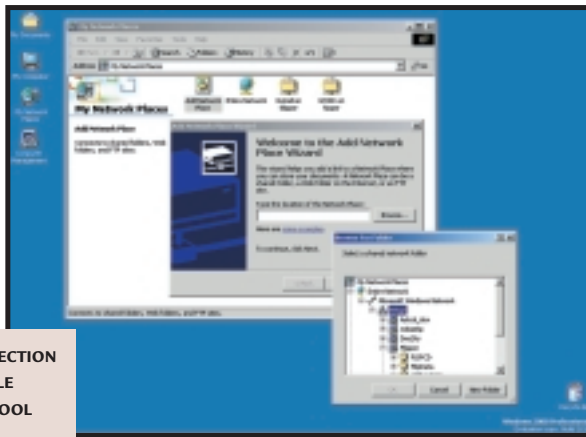
Much has been said about Windows 2000 since the first public beta appeared in late 1997. Now it's coming to the crunch. The big questions are: Will it run games and is it the best business desktop? Strangely enough the answer to both is a qualified yes. Ironically, given the recent flood of cheap, powerful Pentium II systems, the hardware Windows 2000 Professional needs is more likely to be found in the home than in business. Next question.

Should you rush in? If you have the hardware, yes. If not, best watch and wait while the pioneers take the arrows.

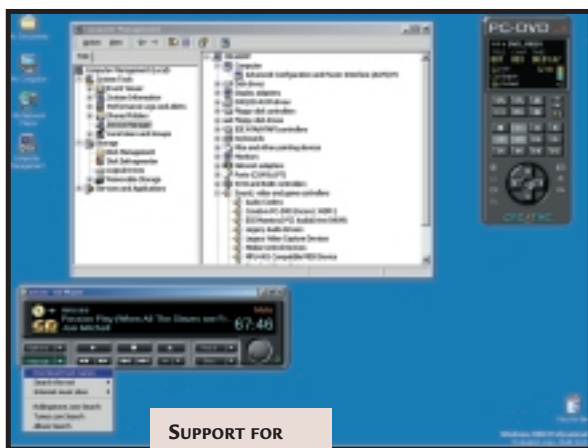
## Consumer

Windows 2000 Professional looks and feels like Windows 98, but has an enhanced user interface which customises itself as you use it. Menus and dialog boxes adapt to show only the most recently used choices, lists are presented in most-recently used order, and on-screen folder clutter is reduced to simple My Documents and My Network Places folders. The aim is to avoid confusion by presenting similar information in a single location, keeping it simple so you aren't shown the entire network unless you actually ask to see it, and providing good search options when you need to track down a computer or resource.

There are also more Wizards which help to configure network and Internet connections, hardware, and software. The Network Connection Wizard (see screenshot overleaf) brings all the disparate tools for connecting to other computers over LANs, dial-up connections, and wired and wireless connections under one heading. Other new wizards hold your hand as you add new hardware and software. Configuring Windows, even Windows 98, has never been this well co-ordinated. Experienced Windows NT Workstation users will find some of the new features irritating and intrusive because there are now more clicks between you and where you want to go. But newcomers are better served by the new user interface and on that measure it meets Microsoft's design goal to make Windows 2000 accessible to a wider audience. Old hands may grumble, but can always reset the UI to work in the old familiar way.



**NETWORK CONNECTION WIZARD: A SINGLE CO-ORDINATED TOOL FOR MAKING ALL EXTERNAL CONNECTIONS**



**SUPPORT FOR ALL THE LATEST MULTIMEDIA HARDWARE**

Windows NT Workstation has always been criticised for lack of hardware support. Windows 2000 supports a vast array of peripherals and has integrated support for Plug and Play, power management, and new technologies such as USB and DVD. But to be a more stable and reliable platform than Windows 98, Windows 2000 is less forgiving of hardware and driver foibles. Stuff which 'sort of works' in Windows 98 won't suit Windows 2000.

Although many older computers and legacy ISA peripherals are supported, the best hardware for Windows 2000 is recent hardware. Plug and Play PCI cards and a BIOS which supports the Advanced Configuration and Power Interface BIOS are good to have. ACPI, unlike Advanced Power Management (APM) which is controlled by the PC BIOS settings, allows Windows 2000 to control card and peripheral configuration and power management automatically. But ACPI can only work if all hardware devices and their drivers support ACPI. Any non-Plug and Play ISA cards or peripherals with unsuitable drivers will defeat ACPI.

When Windows 2000 installs it makes a careful and extremely time-consuming check to see if ACPI can be supported. Simple issues, perhaps a single peripheral in an otherwise all-ACPI system, can tip the balance against support. In that case you get standard PC support which may include some APM features depending on the PC BIOS settings.

Ideally, a Windows 2000 desktop should have an ACPI-compatible BIOS and no ISA cards. A complete list of hardware that Microsoft has tested can be found in the hardware compatibility list (HCL) on the Microsoft website ([www.microsoft.com](http://www.microsoft.com)).

To widen its user appeal Windows 2000 had to provide better support for games than the rather weak DirectX 3.0 emulation in Windows NT. This has been achieved through the DirectX 7.0 layer in Windows 2000 which allows it to offer the same level of support for multimedia applications as Windows 98, provided video, audio, and games peripheral vendors come up with the drivers. At the time Release Candidate 2 became available most of DirectX 7.0 was working well, but drivers for most of the current hot 3D video cards hadn't been finalised.

### Power user client

Business users may scoff at games, but Windows 2000 brings multimedia into the business arena with reliable support for audio, video, and new technologies such as DVD and IEEE1394 (FireWire). Streaming video over the network for education and training is an obvious use; more business multimedia applications will follow once the platform is there.

Power users running multimedia need high-performance hardware. Unlike Windows 98, Windows 2000 supports up to two processors and can make full use of them. Simply moving an application from Windows 98 to a Windows 2000 dual-CPU system has a dramatic effect on performance. No changes to the application are required and dual-CPU systems are cheap these days. The cheapest option, although unsupported by Intel, is to match a pair of Celerons with the Abit BP6 board which has twin Socket-370s, or with a dual-processor PII/III motherboard by means of a Slot 1-Socket-370 converter. But, with 450MHz PIIs costing a little over £100, why not go for the real thing instead?

High-performance applications need a solid platform. Windows NT suffered through not supporting new technologies which Windows 98 does, and because it can fall victim to the same driver quality problems that bug Windows 98. Windows 2000 fixes this with digitally-signed, quality-approved device drivers, and with the Windows Driver Model which enables peripheral manufacturers to create a single driver for both Windows 2000 and Windows 98. WDM means Windows 2000 gets drivers when Windows 98 does (see screenshot on following page).

Digital signing tells users a driver has been approved by Microsoft. You may install an unsigned driver, but if problems ensue the culprit will be easier to identify. These features save time and hassle. When we installed Windows 2000 onto a system fitted with a Creative DVD drive/decoder, the MPEG2 card was not recognised; it sported a yellow exclamation mark in Device Manager. The Creative website revealed a Windows 98 WDM driver which we downloaded knowing it would also support Windows 2000.

The driver installed without a hitch, pausing only to display its digital signature, and thereafter the MPEG2 decoder was fully functional.

In addition to driver signing, Windows 2000 tightens up reliability by introducing system file protection to prevent vital system files from being replaced, the so-called 'DLL Hell' when new software or drivers are installed. SFP checks file signatures and allows the installer to think it has completed the install successfully but won't allow system files to be overwritten.

### Power user network

The reliability provided by driver signing, the Windows Driver Model, and the System File Checker help to protect your data by ensuring that it isn't lost through system failure. The other side to reliability is keeping your data secure from unauthorised exposure or alteration. Microsoft has been active in this area because Windows NT lacked some security mechanisms that are becoming important in the connected world. Windows 98 also lacks these protections, but Microsoft wants Windows 2000, not Windows 98, as the preferred business client.

Accordingly, Windows 2000 is very security-conscious. Support for Kerberos and the Public Key Infrastructure (PKI) provides standards-based ways for Windows 2000 users to authenticate themselves on external networks, of business partners for example, and over public networks such as the Internet. Integrated support for Smart Cards can be used to back up the authentication by enabling a more secure login than simple user name and password.

Transmissions over networks can also be made more secure through use of Windows 2000 integrated VPN (Virtual Private Network) security. VPNs create private communications channels (referred to as tunnelling) over public networks such as the Internet. Microsoft has added two standards-based protocols, L2TP and IPSEC, to Windows 2000 to support enhanced encryption for authentication and data transmissions. Encryption at the desktop is also provided for. The Encrypting File System encrypts files, folders, and drives. It requires the new version of NTFS (NT File System) that comes with Windows 2000.

NTFS for Windows 2000 can only be used on drives holding Windows NT and Windows 2000. It doesn't support other versions of Windows or non-Microsoft operating systems. The old NTFS system is still available if you need to dual boot with Windows 98 or another operating system and Windows 2000 can now see FAT32 drives which is good. You are given a choice to use the new NTFS and in most cases should go for it, not only for encryption, but for content indexing and file tracking, which solves the missing shortcut

problem caused when a file referenced by a shortcut is moved.

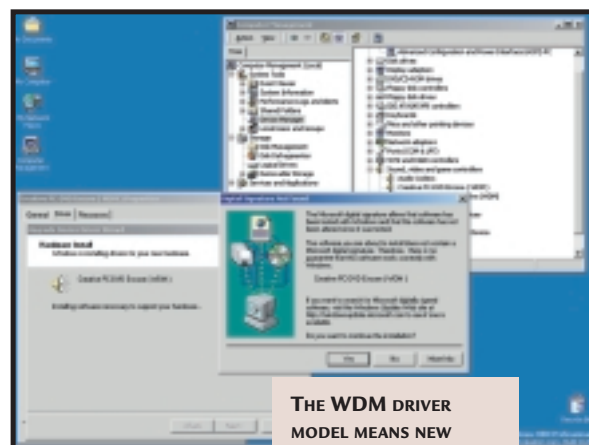
Windows 2000 also supports a host of new storage features to make life easier for network administrators. These include a disk defragmenter at last, disk quotas to prevent file servers from running out of space, and volumes which can be extended without rebooting in order to grow storage dynamically (see screenshot bottom)

### SME user

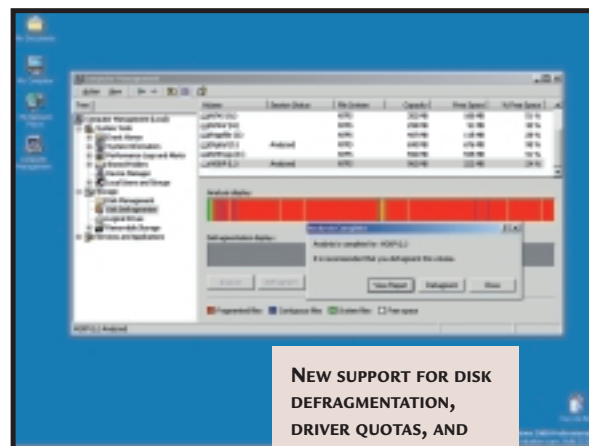
Making life easier for the network administrator is a core design point for Windows 2000. Microsoft wants it to be the best network client and, when used with Windows 2000 Server, to reduce the cost of implementing and maintaining network clients – referred to as Total Cost of Ownership (TCO). This will be on your mind if you're running a Windows NT file and print server for Windows 9x desktops, so how do you reduce TCO with Windows 2000? Like porcupines making love – very carefully.

First you need hardware fully supported by Windows 2000 Professional, preferably ACPI-compliant with no legacy cards. Mostly that means kit purchased in the past year. ACPI PCs don't just save money through power management, but through automatic configuration. But it's not a given. If you're buying peripherals and adding them yourself rather than buying a ready-to-run package be prepared for some messing around.

We took a basic system with an ACPI-compliant BIOS, added four PCI cards (network, SCSI, audio, and MPEG2) and an AGP video card, and installed Windows 2000 Professional. It took time to distribute the PCI cards in the PC in a way which did not cause Windows 2000 undue misery. Certain cards need busmaster slots. Others won't tolerate shared IRQs (a PCI fact of life). The moral of the story? ACPI works, but it's easier and probably cheaper to buy hardware where the



**THE WDM DRIVER MODEL MEANS NEW DRIVES HAVE TO PASS MICROSOFT'S CERTIFICATION TESTS**



**NEW SUPPORT FOR DISK DEFRAGMENTATION, DRIVER QUOTAS, AND DYNAMIC VOLUME GROWTH**

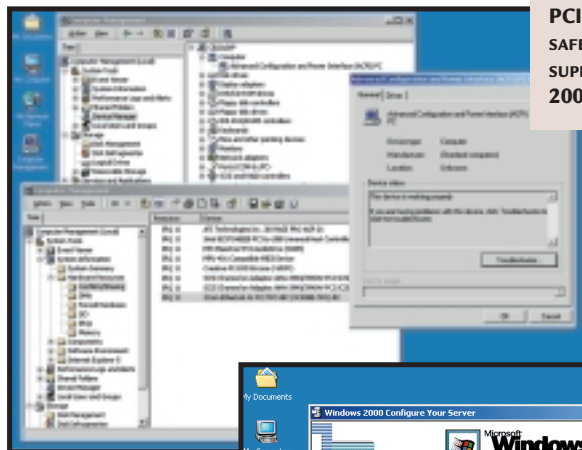


vendor/manufacturer does the testing and verification.

Windows 2000 Professional clients need at least 64MB of RAM, preferably 128MB, and a couple of gigabytes of free hard disk space. If it's not the right time in your hardware cycle to upgrade, you should ensure that all hardware purchases from now on are supported by Windows 2000. Let the early adopters plough through the problems while you prepare to move to Windows 2000 in a year to 18 months once the bugs have been shaken out.

If you and your hardware are ready the next step is to look at your applications. Make sure they're supported, especially if they're custom applications rather than off-the-shelf packages. Windows 2000 is not NT. As a result of the security enhancements in Windows 2000 some NT applications will run on Windows 2000, some won't. Some will run on both but won't exploit all of the Windows 2000 features. Applications that don't support Windows Installer, for example, won't be able to exploit the just-in-time installation which pushes software out to desktops so roaming users can log in and access their applications from any desktop.

So, hardware ready, software ready, you install Windows 2000. You've installed it on new hardware so it looks better than Windows NT or Windows 9x, it runs better, feels better, and is easier to manage. It's a more organised interface, but Windows NT for Dummies it isn't. Windows NT administrators faced with Windows 2000 can spend time looking for familiar administrator tools. Mostly they can't be found or have been hidden in unexpected places. The interface has more to offer, but a studious newcomer can find their way around as quickly as an experienced administrator who doesn't read the manuals. A



training course is recommended, but there is a wealth of information on the Microsoft website.

At this point you have only begun to scratch the surface of Windows 2000. To make real TCO savings you want to implement

IntelliMirror to manage user settings, user data, and applications. IntelliMirror policy-based management controls how and where user data is stored, how their desktop is customised, and how roaming users can access their desktop and applications set from any computer. You can implement IntelliMirror through local policies established on each computer or install Active Directory and implement group policies to give yourself fine-grained, centralised control over network clients and users, remote installation of new operating systems and upgrades, and remote

**ACPI SUPPORT AND PCI DEVICES ARE THE SAFEST OPTION FOR A SUPERIOR WINDOWS 2000 EXPERIENCE**

**ACTIVE DIRECTORY AND WINDOWS 2000 CLIENTS ARE PREREQUISITES FOR FULL TCO BENEFITS FROM WINDOWS 2000 SERVER**

## Before installing Windows 2000

If you're satisfied with your current operating system you don't need Windows 2000. But if you decide to take the jump there are things to check so your upgrade won't be a leap of faith.

Check the hardware and software compatibility lists on the Microsoft website before installing Windows 2000. There are workarounds for most problems except inadequate hardware. It isn't worth the hassle of upgrading if you have ancient laptops,

desktops with all four SIMMs filled but 16MB of RAM, and esoteric ISA peripheral cards whose drivers never passed the Windows 3.1 stage.

Incompatible software can be worked around. An upgrade installation checks software and hardware and lets you cancel installation. You could opt for a dual-boot system. Install Windows 2000 in a separate disk partition, reinstall compatible software on Windows 2000, and preserve

existing Windows for the incompatible software.

Before installing Windows 2000, look in the PC BIOS setup and ensure ACPI, if available, is enabled. 'Plug and Play OS' should also be enabled. If you have an ACPI BIOS and don't enable it before installing Windows 2000, you can try to recover by upgrading, but will need to reinstall to recover ACPI functions. The absence of an ACPI BIOS isn't a show stopper, APM will do and

Windows 2000 will detect and install the most appropriate drivers.

Windows 2000 sets itself up with minimal intervention and delivers improved networking performance, and easier administration. If it goes pear-shaped the recovery options are better than those in Windows NT. A Safe Mode boot menu offers ways to recover and if disaster occurs, the Recovery Console will boot into a command prompt from the release CD.

# Laptops: The power to manage power

If there's anyone who can benefit by upgrading to Windows 2000 now it's the mobile user. If you're lugging a name-brand laptop built in the past 12 months chances are you'll get complete support for Plug and Play, power management, and PC Cards. Windows 98 can give you this too, but it can't give you the added security and stability of Windows 2000.

In Windows 2000 as in Windows 98, power management and Plug and Play configuration are implemented through the Windows Driver Model (WDM), a new driver architecture designed to enable the operating system to manage power and configuration events through ACPI. This allows for sophisticated power management as devices that aren't being used can be powered down automatically and systems left in standby can be powered up as a result of a hardware request to a component, for example an incoming call to the modem.

For Windows 2000 users the immediate benefits of WDM are twofold. Windows 2000 users get new drivers at the same time they become available for Windows 98, because hardware

manufacturers only need to produce one device driver to support their hardware on both Windows platforms. That's a big benefit but even though Windows 2000 users may have the same driver, they also get better stability. This follows from the Windows 2000 system design which isolates the hardware so software problems can't cripple the system.

Windows 98 Plug and Play can misbehave to the point where things stop working or seize up. It can happen because of a poor driver or poor configuration decisions, either by the system or by the user. WDM drivers, because they are tested by Microsoft, are less likely to mess up Windows 98 but Windows 2000 provides even more protection.

Windows 2000 Plug and Play is a layered interface in which the OEM device driver sits at the upper level, isolated from lower-level drivers produced by Microsoft, and isolated from the hardware. Microsoft checks and validates every level and digitally signs OEM drivers. It doesn't guarantee stability, but makes it less likely that Windows 2000 will suffer driver problems than Windows 98.

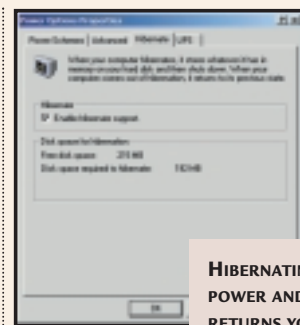
Eventually WDM drivers

and ACPI will enable the OnNow PC which comes to life where you left it, but at present the best Windows 2000 has to offer is a pretty good hibernate option.

Under certain conditions it works for APM BIOSs. When you tell the system to hibernate it stores an image of the system's current state on disk, (it needs as much memory as system memory), and switches the power off.

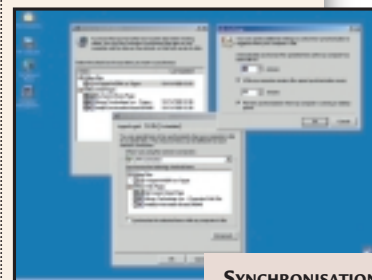
Next time you power up, the system boots and restores itself from the stored image. It's quicker than recovering from Standby, taking less than a minute, and is less fragile than standby or the Windows 98 equivalents. Hibernate isn't new, but it's a generic option in Windows 2000 rather than a vendor add-on which needs special procedures and operates differently on different laptops.

In addition to the hardware benefits Windows 2000 makes it easier and safer to work offline. File encryption and smart-card security protect data, connection wizards help set up connection to networks and the Internet, and network-based documents and folders can be tagged for



**hibernating saves power and returns you to your desktop in double-quick time**

offline working. This copies files and folders, including web pages, to the laptop drive and keeps them consistent with source documents through the Synchronisation Manager. When you right-click on a file or folder and select 'Make Available Offline' or select the same option for web pages in Internet Explorer the choices you make are stored in Synchronisation Manager which has a wealth of options for timed automatic or manual synchronisation (see screenshot below).



**Synchronisation Manager keeps offline documents in order**

diagnostics and troubleshooting. Without Active Directory, Windows 2000 is better than NT and 98 but you'll need Active Directory to make the most of Windows 2000 Server.

Active Directory is the central database in which all machine, user, and network resource data is stored and from which it is all managed, but isn't installed by default when you install Windows 2000 Server. Before you install it you need an in-depth understanding of the implications. There's too much to cover here, but Active Directory will require you to review your network protocols before you install it, and revise key elements of your network. After you have

installed it you will need to cherish it as your network function will depend on it.

At the end of the day there is no doubt that Windows 2000 offers significant improvements over Windows 98 and NT, and so it should after such a prolonged period of development. Good reasons to upgrade include hassles with proprietary laptop power management, Windows NT's lack of Plug and Play support, Windows 9x's lack of security, and the need for specific new features in Windows 2000. But small businesses need to take a cautious approach to active directory, as once it is installed your network will be inextricably linked to it.