hands on

contents

October's *Hands On* kicks off with some advice for those worried about whether or not their important information will still be accessible at the turn of the century. Mark Whitehorn's tips will help you work out the millennium issues in your **database**, as – with just three months left to run – the countdown to 2000 reaches boiling point [p216].

With 2000 in the air, it's also time for developers to start thinking about how the **next version of Windows** will affect their work [p256], and Tim Anderson has the low-down for you.

Away from the desktop, Mark Whitehorn watches as two **PDA operating systems** slug it out and declares one of them the winner. Find out if it's WinCE or Symbian [p230].

There's also the usual crop of expert advice, tips and tricks, from **making more space** on your PC [p220] to learning the latest in **web languages** [p224].

As ever, if you have any comments, questions or suggestions, feel free to send them direct to the writers, or address them to myself.

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Colour co-ordinated

Ken McMahon takes you through the dos and don'ts for getting the best from your colour printer.

Printing can be a frustrating business. Getting any kind of result from some printers, colour or mono, is often such a stressful experience that it's tempting to live with less than perfect results. Unintentionally cropped pictures, landscape pictures printed on portrait paper, poor-quality pictures suffering from bad pixelation, washed out colour, no colour at all – the list of potential cock-ups is lengthy.

But it doesn't have to be this way. An understanding of the way your computer and printer deal with images, careful set-up of output options and printer driver settings, and a bit of occasional maintenance will see your colour output improve beyond measure.

Resolution

Even if you bought your colour inkjet for serious business use, the chances are it won't be long before you get around to printing out a selection of your favourite holiday snaps, or invites to your local Lodge's apron-embroidery evening.

The first step to producing crisp, sharp photos on your inkjet, without having to wait all day for them, is understanding resolution. All digital images are made up of thousands of dots called pixels. Resolution is a measure of the number of pixels in an image, usually expressed as dots per inch (dpi) or pixels per inch (ppi).

If you double the size of an image its resolution will halve, and vice versa – because you are spreading the same number of pixels over a larger area. By increasing the image size and reducing the resolution, the picture quality gets worse and worse – to the point where you can see the individual pixels that make up the image.

▲Fig1 72ppi images optimised for screen use can have their resolution doubled to 150ppi – check the 'constrain file size box' and their size will halve

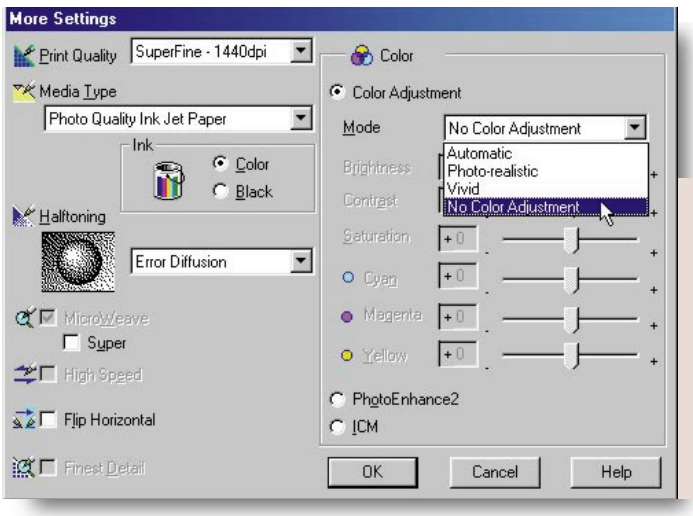
Your photo-editing package will have a feature that allows you to alter the resolution and will look something like this [Fig1] in Adobe Photodeluxe. Whether your photos were taken on a digital camera, supplied on disc by a processing lab, or scanned by your own fair hand this panel will tell you the overall image size and the resolution in pixels per inch.

To make the most of the capabilities of an inkjet your pictures need to have a resolution of around 150ppi at the size you are going to print them. Often, you'll find that your pictures have a much larger overall physical size than you need, but the resolution is only 72ppi because they are optimised for screen display.

Usually, doubling the resolution to 150ppi (and, therefore, halving the image size) is all you need to do. You must make sure to check the 'maintain file size' box as otherwise the program will add pixels by interpolation (making a guess based on the colour values of adjacent pixels and sticking new pixels in the middle of existing ones).

Once this is done, if the image is still too big (at about 18cm x 6cm you can fit two on an A4 page with plenty of margin) you'll need to make it smaller. Open the size dialog box again and, this time with the maintain file size box unchecked, type in the required finished size and click OK. This time you've actually removed some pixels from the image to make it smaller and your picture is now the required size and resolution for printing.

Remember, the optimum size is around 18cm x 6cm at 150ppi. Anything less than this and picture quality will begin to suffer. Higher resolutions will not noticeably improve picture quality, but images will take up more space on your hard drive, take longer to display on screen and much longer to print out.



◄Fig 2 Turning off so-called print enhancements in the printer control panel may actually improve image quality

Output settings

Failure to make sure all your output settings are correct is possibly the most

irritating printing foul-up of all. First check the paper size and orientation are correct. If your application warns that the image will not fit on the paper it's a fair bet that this is the problem. Also, if you have more than one printer connected, say a mono laser as well as a colour inkjet make sure you have the correct printer driver selected.

Next make sure you have the correct settings for the paper you are using. Some printer drivers, Epson, for example, automatically configure the driver for the type of paper you have chosen, but you still need to make sure that if you are using plain paper the driver isn't set for photo quality glossy film.

In any case, you may want to override some of the default settings. It pays to do some experimentation and compare the result of different halftone and colour adjustment modes. In my experience, in the absence of a colour management system, the best results are achieved with any so-called 'enhancement' options (photo-realistic, more vivid colours etc) turned off [Fig2].

Lastly, it's always worth looking at the print preview.

▼SAME PICTURE, DIFFERENT RESOLUTIONS. CLOCKWISE FROM TOP LEFT 200, 150, 100 AND 50PPI. PRINTED ON AN EPSON STYLUS PHOTO EX. (IMAGE FROM PHOTODISC: WORLD LANDMARKS AND TRAVEL)

SPRUCE UP YOUR DOCUMENTS

It's not all about pictures, What about reports, stationery, flyers or anything that involves text, charts, diagrams and the like? Here are some design pointers to help you achieve maximum impact.

- Avoid large areas of dark solid colours – use a percentage tint instead.
- Create richer looking blacks by mixing in 30 per cent cyan.
- To avoid banding, don't use graduate fills over small areas.
- Don't colour type that is smaller than 10 point
- If you do use coloured text, use dark coloured text (say, dark blue, or burgundy) on a light coloured tint panel (say, 20 per cent yellow).
- To make panels or pictures abut the edge of the page, use a smaller than A4 page size and overhang or 'bleed' the object over the edge of the page, then trim to the finished size.
- If your document has a fold (say, A4, folded to A5), avoid printing anything (especially solid colours) in the fold area.
- If printing over a photograph, choose an area of consistent highlight or shadow and choose a contrasting type colour. Alternatively 'knock back' the picture to a tint (using your photo editor's brightness and contrast, or levels).

Paper and cartridges

There are two important questions to be answered here. Why is special paper for inkjet printers so expensive and why are inkjet cartridges so expensive? The answer to both questions is they needn't be. I've had no trouble whatever using non-branded paper and cartridges in a range of Epson and Canon inkjet printers and feedback from other users backs this up.

Paper, however, is less straightforward. While using non-branded paper certainly won't do any damage, finding paper that produces good results is another matter. Ordinary photocopy paper (used on the plain-paper setting) produces fair results, but won't do your photos justice because the printer can't print at it's full resolution.

I've tried various types of coated paper supplied by commercial printers (the smooth surface is achieved by adding china clay), and none worked satisfactorily. I have, however, had perfect results using specially-coated inkjet paper from suppliers who advertise in PCW and elsewhere. It's available double-sided (most branded photo-paper is single sided) and typically costs less than a quarter of the branded papers.

Cleaning

If, despite everything else, print quality is still markedly less than you'd expect, the trouble could be one or more blocked nozzles on the printer. This often manifests itself as vertical ink trails, patchy solid colours or weird colour casts. It can usually be cured by a button on the printer itself or via a utility application, accessed by selecting the printer's control panel from the Start menu, then right clicking the printer icon and selecting properties.

Some manufacturers also provide a test pattern that you can print to check if all the nozzles are unblocked. It's worth printing this after you've performed the cleaning operation, as nozzles that were blocked can remain so.

PCW CONTACTS

Ken McMahon welcomes your feedback. Contact him via the PCW editorial office, or email graphics@pcw.co.uk

Database dilemmas

MONTHS TO GO!

Mark Whitehorn opens up Pandora's box while checking on database compliancy.

While it may not always be obvious, databases are often one of the most crucial tools in business. Assuring that millennium compliance has been achieved is therefore essential, as there are several ways in which the Y2K problem can threaten your database.

The 'bug' can strike at:

- The hardware.
- The OS.
- The RDBMS.
- The application.

The first two have been covered already in this series. However, it is worth remembering that many database applications use the current date as a default value in one or more fields. This value is typically picked up from the local machine, so in client-server systems make sure that both the server and all the clients are Y2K-compliant.

The RDBMS

By now, the current versions of all mainstream RDBMSs should be Y2K-compliant, so all you have to do is to upgrade to the most recent version. Yeah, right! Back in the real world, upgrading an RDBMS is often a complex and expensive step, so many sites run several versions behind and leapfrog occasionally up the version numbers. Even worse, some products allow multiple RDBMS engines to use shared data, so it is conceivable that you may be running several versions concurrently. Given that you may not be able to upgrade in time, check your supplier's website and you should find information about the compliance of earlier versions, for example: *www.microsoft.com/technet/year2k/product/product.asp*

Some companies may supply patches to pull older versions into compliance without the need for a full upgrade.

Date windows

We'll use Access as an example because it is so popular. However, the principles covered here apply to other RDBMSs, both stand-alone and client-server.

▲ MICROSOFT LISTS THE YEAR 2000 READINESS OF ITS APPLICATIONS ON ITS WEBSITE

Access has always stored dates as date values – as numerical values rather than strings. For example, the value 34,001 stored in a date field equates to one and only one date – 1/2/1993 – so in that sense, Access has always been Y2K compliant. But it isn't quite as simple as that (it never is) because the way in which Access interprets any two-digit date varies with the version of the product you are using.

Access 2000 and Access 97 use a date window to interpret dates entered in two-digit format. This assumes that dates between 1/1/00 and 31/12/29 are in the years 2000 to 2029, whereas those between 1/1/30 and 31/12/99 are in the twentieth century (ie from 1930 to 1999).

Access 1.0, 1.0a and 2.0 don't use a date window at all: every two-digit date is assumed to be in the twentieth century. And as for Access 95... well, it depends on the version number of a .dll file called OLEAUT32.DLL. If it is 2.20.4054 or greater, then Access 95 displays one behaviour, if it is lower than 2.20.4054 it displays another.

Both Office97 and Windows NT may have installed updates of OLEAUT32.DLL onto the system. There isn't space here to detail all the variations, but basically it is a mess (and there is nothing to suggest that Access is any worse than any other RDBMS). Different products handle this differently, even those from the same company. You will be delighted to know, for example, that SQL Server 6.5 assumes that values less than 50 are dates in the 21st century, and those greater than or equal to 50 are in the 20th. SQL Server 7.0, however, has an administrator-configurable option for the date window.

Clearly, one way around this problem, despite the very human desire to use two-digit dates, is to force users to enter dates in four-digit mode. Every version of Access interprets these in the same way.

The application

Each database engine will have its own default way of handling dates, but there is usually a database application that sits between the user and the engine, developed with some kind of tool (perhaps C++, VB or the interface part of Access). That application is capable of manipulating the user input data before it is sent to the database engine. One option is therefore to modify the program so it deals only in four-digit dates.

Stuck in the nineties

In the early nineties there were at least 20 RDBMS engines, many of which are no longer with us. But what if you have a database application that was developed using one of these?

- You can apply to a user group (if in existence) to see if it has been checked or if patches are available.
- You can test it yourself.
- You can upgrade to a newer product.

Databases are one of the more problematic areas for Y2K – and the most complex ones will need a lot of work.

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The worm turns

Your email armour will always have chinks, says Nigel Whitfield, but you can boost its protection.

Email is a critical part of the internet, but it's also becoming apparent to many people that it can be a tremendous problem. The last few months have seen email move from a means by which viruses can be spread – and it's never been a good idea to run strange executables, or anonymous Word files – to a core part of the virus writer's strategy. Melissa and Worm.ExploreZip were programmed to hook right into the mail interface of your computer and send themselves on.

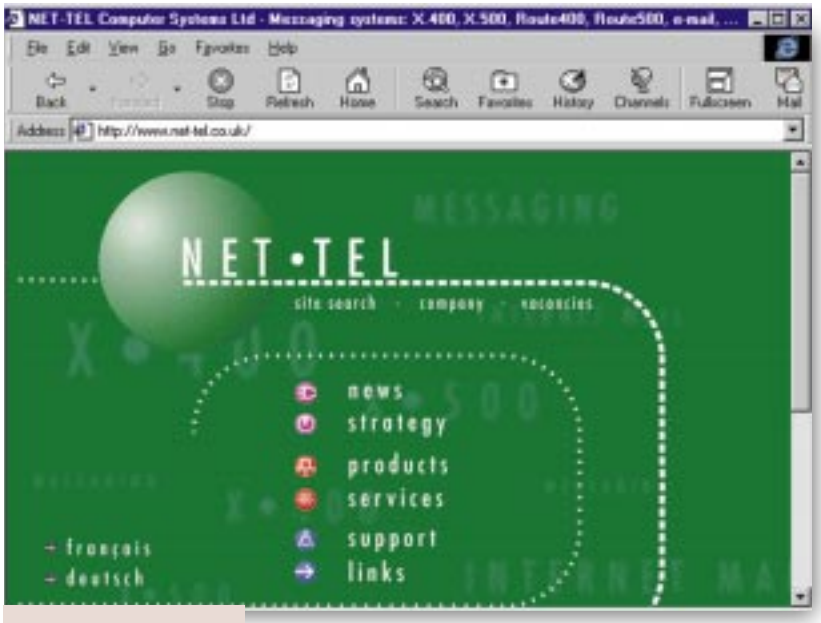
Viruses aren't the only problem for email users, though. It takes surprisingly little effort to forge email on the internet – a fact that's not lost on spammers, and an alarming number of ISPs and companies still have mail servers that can be used by anyone. One major UK ISP suffered tremendous problems recently as a result of a spam attack on its servers, causing a raft of complaints from its users.

Even when a mail server's been secured against random spam, it's still very often a trivial task to forge email and make it look like it's come from another user of the same service. And that means there's considerable potential for creating havoc, from simple malicious comments to someone trying to pass themselves off as you.

What can you do about this? Well there's no single answer, but there are lots of different solutions, depending on your situation.

For personal users, who want to make sure that they're immune from the worst of the email worms and viruses, there are a number of things you should do.

The facetious answer would be 'use Unix or a Mac,' since many attacks use the Windows MAPI system to send copies of themselves, or of other documents, to people in your address book. Of course, that's not a reasonable solution for some people, but you can take steps to protect yourself.



▲ NET-TEL'S TRUSTEDPATH CAN HELP STOP THE SPREAD OF SELF-EMAILING WORMS AND VIRUSES

Firstly, install and keep up-to-date anti-virus software. But don't believe it'll always spot problems. It won't – as many people have recently found to their cost. Always be careful about file attachments, no matter whom they appear to have been sent by. And 'say no to Word files or executables' is a good rule of thumb.

There are formats like RTF and SYLK that can be used to exchange data between systems, without running the same risk that macro-carrying formats such as MS Word involve.

An alarming number of ISPs and companies have servers that can be used by anyone

You could also do worse than download Mail Guard TrustedPath; it's a plug-in for the Windows messaging system that's free for personal use, and can be configured to prompt you before any mail is sent from your system – so a worm or virus can't mail things out without you being aware that it's happening, and having the option of stopping it. You'll find more information at www.net-tel.co.uk.

If you're running a company mail server, then there are more steps you can take. Make sure you don't have an open SMTP relay, so that people can't send spam via your service. There are many solutions depending on your mail software; you'll find some clues at maps.vix.com/tsi/ar-fix.html, which covers a range of mail systems.

And if you run a mail system that allows it, then you should really be scanning all incoming attachments, and making sure they don't contain anything nasty. Educating your users about what types of attachment they should use is important too.

When it comes to the other problem – authentication – there's little chance of all the internet's servers changing swiftly to a standard that allows proper verification of who's sending a message.

That means that if you do want to be absolutely sure of the identity of people, you need to use something that works

Questions & answers

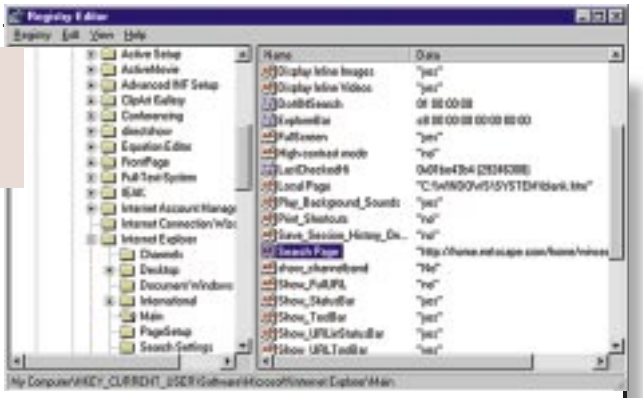
Q In my email program, I have the option of using IMAP or POP3 to retrieve messages. What is the difference, and which one should I be asking my ISP for?

A ***The simple answer is that your ISP probably won't give you a choice – it's likely to be POP3 or nothing, unless you have a very specialised service. POP3 is designed for retrieving messages and transferring them to a different computer. There are some options that some servers offer for sending mail via POP too, but you don't find them very often. IMAP, by contrast, can do an awful lot more. You can use it in much the same way as POP3, retrieving your email from a remote server, but it will also support lots of other features. For example, IMAP allows you to have folders of messages on the server, and it gives you much more flexibility over handling attachments. There are even options for synchronising messages between a remote mailbox and one on the server. All that, however, is more than most ISPs offer – in fact, I can't think of any that do offer IMAP as standard. So while your mail program gives you a choice, it's unlikely that, outside of a corporate network, you'll get the opportunity to choose anything other than POP3.***

Q Is there a way to customise the search button in Internet Explorer version 4 & 5? I work mainly on the lab intranet and need to set it up so that the search button accesses our intranet webserver's search page rather than Microsoft's search page. This was simple in version 3, but I am unable to locate the setting since version 4.

A ***Yes, it's a fairly simple thing to do, though not as straightforward as in other versions. You'll need to edit the Registry, using Regedit, and change the Search Page entry, which you'll find under HKEY_CURRENT_USER\Software\Microsoft\Internet Explorer\Main. Set it to the URL of the page you want to use to search. As ever, be careful when editing the registry and don't do it if you're at all unsure. Presumably burying a useful option like this in an inaccessible place is simply a part of the 'usability' improvements brought to us by the latest versions of the web browsers.***

▸ BY USING REGEDIT TO POINT TO THE URL OF YOUR CHOICE YOU CAN PICK THE SEARCH PAGE YOU WANT TO GO TO



Q When we use our email system at work, most people use the full address which, as you can see ends up being quite long! I use just the user name and host name which seems to work fine, for example boss@mri1 or network@central. How far does this go? Could I email other NHS Trusts using john@accounts.CBHT rather than john@accounts.CBHT.nhs.uk

A ***I'm afraid you probably can't go any further than your local organisation – though it will depend to some extent on how your mail and domain lookup systems are configured. But as a general rule of thumb, when the system looks up an address, if there's no fullstop in the hostname, it will be assumed to be a local one, and the local domain will be added to the end. If there is a full stop, it will be assumed to be a Fully Qualified Domain Name (or FQDN), and verified against the main internet database as such.***

with ordinary email. At the moment, the best solution to this problem is probably PGP – Pretty Good Privacy – which allows you to digitally sign messages so that recipients, if they're using the same software, can verify that it's you. You can download a shareware version of PGP for a variety of systems at www.pgpi.com.

There are also other ways of verifying who you are, using digital certificates, such as the ones issued by BT Trustwise at www.trustwise.com.

To use all this technology, you'll need a decent email program – one that's capable of accepting attachments easily. And if you download PGP, you'll find that there are plug-ins for popular programs like Eudora, so that you can sign a message just with a couple of mouse clicks.

You might balk at the idea of moving to a different email program, especially if, like me, you have thousands of old messages archived. But, as the recent problems with Melissa et al have shown, while email may be the bread and butter of the Internet for many people, it's really not something you can take for granted.

Make sure the program you use is secure and reliable. Update your virus programs, and start to use digital signatures. And encourage other people to do the same.

The latest worm pretended to be a reply to a recent message that email correspondents had sent to you. You can never be 100 per cent safe, but if you're cautious about attachments, keep virus programs up to date, and only accept files from people who've signed their messages, you stand a much better chance of staying safe. Don't just rely on being lucky.

PCW CONTACTS

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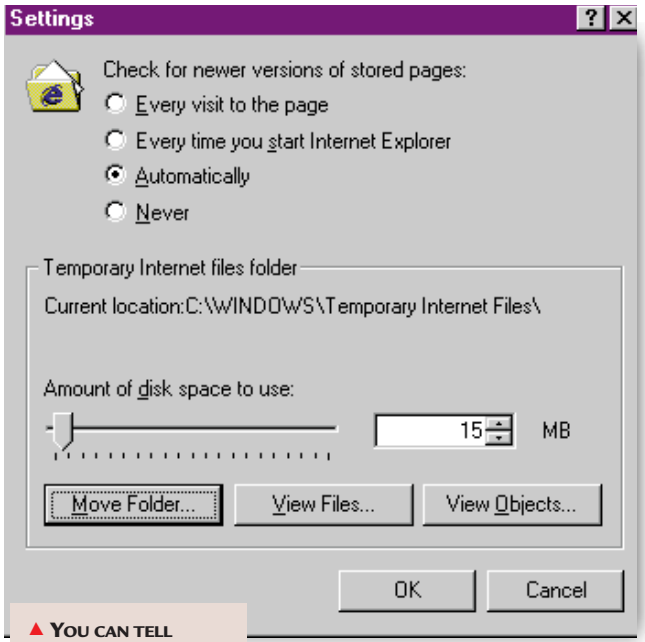
Spaced out

Tim Nott says partitioning may keep volatile files away from the others but it also saves space on the C: drive.

Last month we looked at partitioning, with a view to segregating various types of static and volatile data on your hard disk – in particular changing the location of the swapfile and temp folder. There's much more you can move, which may also help you free up space on drive C:, should this be an issue. A prime candidate for relocation is the Temporary Internet Files folder, which is the Internet Explorer's cache for web pages. Moving this in IE5 is easy – right-click on the IE desktop icon (or go to Tools, Options on the IE menu). On the General tab you'll find a Settings button: this leads to another dialog, which has what we are looking for – a button labelled 'Move Folder'.

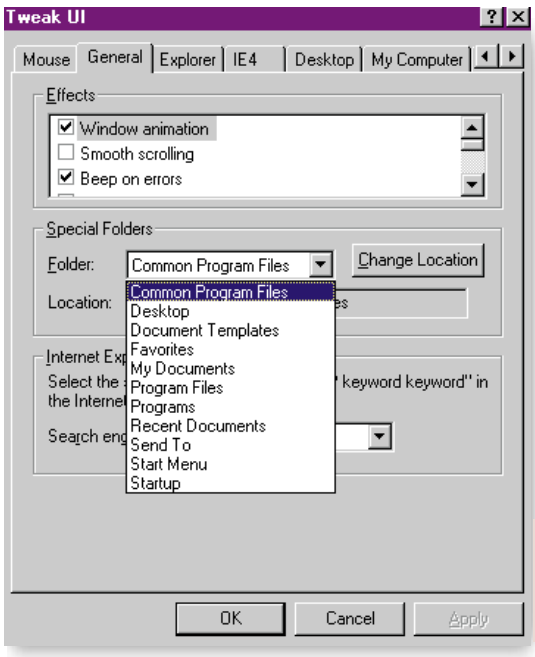


▲ YOU CAN TELL WINDOWS WHERE TO STICK ITS TEMPORARY INTERNET FILES

There are other special folders you can move with the aid of TweakUI. With the Windows 95 version, you can move the Desktop, My Documents, Document Templates, Favorites, and Send To folders. You can also relocate the Start Menu, and independently move components of the latter such as Programs, Recent Documents and StartUp. The Windows 98 version adds Program Files and Common Program Files. These locations – and others such as History – are stored in the Registry, under HKCU \Software \Microsoft \Windows \Current Version \Explorer \Shell Folders, but please note I have not experimented with editing these directly. I suspect that there may be good reasons for not tampering with the locations omitted from TweakUI. If you want to try doing so, then on your own head be it: the usual backup caveats apply.

Some badly-designed installations insist on being located in C:\Program Files

Although moving components off the Start Menu or Send To folder may seem rather trivial, the ability to move the Program Files and Common Program Files folders is extremely useful. As I mentioned last month, my preference is to keep applications on a separate partition, and as space on C: always seems to be tight I resist any attempts by installation routines to place programs here. I have come across some badly-designed installations that insist on being located in C:\Program Files. I've come across games that try to re-install every time you insert the CD as the Autorun routine looks in Program Files and 'thinks' it hasn't been installed. Suffice it to say none of these stay on my hard disk for long, but I think if I were setting up again from scratch, I'd move the Program Files folder to my Applications partition and save myself the grief.



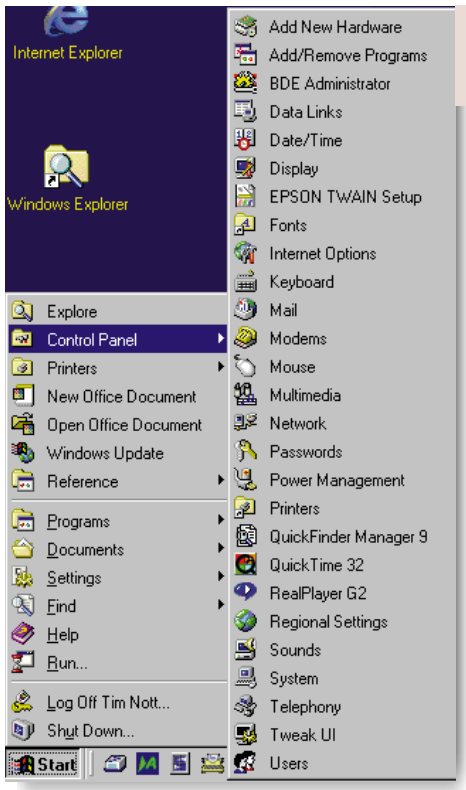
◄ SPECIFY FOLDER LOCATIONS WITH WIN 98 TWEAKUI

One excellent feature is the 'My Documents' folder, which made its debut with Office 95 but is now part of Windows 98. It can serve as a top-level container for all your type-two files – i.e. those you create in applications – as well as templates, user-defined dictionaries and other data you may want to back up on a regular basis. Note that under Windows 98 you can not only rename the desktop icon itself, but can also point it at any folder on your system, by right-clicking and selecting Properties. However, you should think very carefully before doing this – should you decide to change or rename the target folder you may also have to spend a lot of time changing application settings, template references in documents and so on. I've

long kept my data files in a folder (or directory as we used to say back then) called 'Words', as this is what it mostly consists of, and for the sake of consistency, I've renamed the 'My Documents' icon to 'Words' as well. The renaming affects both the desktop and Explorer icon, but you will still see the odd reference to 'My Documents' cropping up in Windows – usually these can't be changed as they are part of hard-coded system messages.

The Windows applets (and MS Office) automatically start a File Save/Open in the My Documents folder, and any applications you subsequently install should be set up to load/save files in an appropriate subfolder. Most recent applications do this without protest – older ones might still want to default to a sub-folder of their own installation. How you organise the data below is up to you. You may prefer to classify first by application – with second level folders for WP, spreadsheets, drawings, bitmaps, DTP and so on. Or you may prefer to classify by purpose or project. I tend to do a bit of both. If I'm doing a project, such as a group test for PCW, for example, I'll create a new folder for it in 'Words\PCW', which will have the text as a Word document, a comparison table in Excel, screenshots in TIFF or GIF and maybe a text file or two. I'll also put a shortcut to this folder in the QuickLaunch toolbar, or on the Desktop. Other things, such as Corel Draw artwork and CAD technical drawings I store by application, but again under a subfolder of 'Words'. By diligent struggling with Microsoft Word, I can get it to store my templates and user dictionaries in another subfolder, which is another step towards one-stop back-up.

Finally, it makes good sense (where possible) to avoid having lots of subfolders and files in the same folder. If you have, say, many subfolders under 'Documents\Letters', it makes sense to create a 'Misc' subfolder to contain those that don't fit into any particular category, rather than stick them straight into 'Letters' – you won't then have to scroll down past a heap of folders to open them.



◀ MENU OF THE DAY – ADDING CONTROL PANEL

Damn – missed!

What goes around comes around, and recently I've had a lot of mail either suggesting tips that have already appeared in this column or requesting repeats. So, I thought we could celebrate the 50th *Hands On Windows* 95/98 column with a top ten of golden oldies. Unfortunately I missed the boat – as this is the 52nd. But here they are anyway: thank you all for your suggestions and requests.

1 Clicking on column headings in Explorer's details view (e.g. date, size), sorts the files by that column. A second click reverses the order.

2 You can drag files into DOS windows, rather than type their names. Note that you must also click in the box afterwards to get the 'focus' for typing commands.

3 The Send To folder – an essential. Create shortcuts to folders and programs in here (C:\Windows\Send To...) and you'll save lots of time copying files to frequently used folders or opening them in a non-associated application.

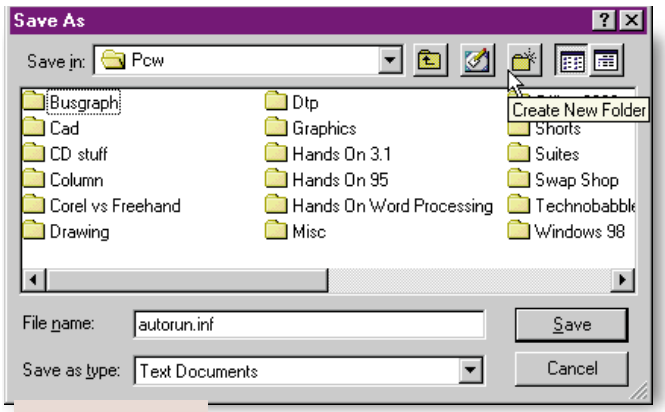
4 Control Panel – why not have this as a cascading menu from the Start Menu? Open the Start Menu and create a new folder. Give this the name 'Control Panel.{21EC2020-3AEA-1069-A2DD-08002B30309D}' excluding the quotes. The long extension will hide itself.

5 Dragging and dropping files – do you know which modifiers copy, move or create a shortcut and which is the default in all combinations of file type, source and destination? No – well neither do I. Instead, just right-drag and cho[redacted] the co[redacted]ext m[redacted] that app[redacted]

6 [redacted] No[redacted]

replacing the text to the right of the equals sign with a real path and file name. Save this as AUTORUN.INF in the root of the drive.

7 Create new folders on the fly when saving files. The little icon of a folder with a star at one corner in the standard Open/Save dialog does exactly that.



▲ NEW FOLDERS CAN BE CREATED WHEN SAVING

8 When browsing through nested folders, you can choose whether to open them in the same, or a new window, from View, Options (Windows 95) or View, Folder Options, Custom, Settings (Windows 98 or 95 + IE4). To get the best of both worlds, hold down the Control key as you open folders or go back up: this reverses the default setting.

9 **On a related note**, pressing Shift while closing a folder will also close all its ancestors.

10 **If you hold down** the shift key while restarting from the 'Shut Down Windows' box, the system will just reload Windows, rather than rebooting the PC.

Whoops!

If you are having difficulty getting August's wallpaper-stretching trick to work (which some of you obviously are), right-click on the desktop, select Active Desktop, and untick 'View as Web page'.

Further to the answer to Rohan Shenoy's question in August's Windows column, about creating right-click menu actions for all file types, there is an easy way. Look no further than Andrew Ward's Hands On NT column for July – 'Open with Notepad' – which works with Windows 9x as well. Thanks to several readers for pointing this out.

Questions & answers

Q How can I start Internet Explorer without connecting to the internet? Although I do use the internet, I often use IE to view HTML documents on my hard drive. Right-click, Open, on the IE5 desktop icon seems to do exactly the same as right-click, Open Home Page, and it's a drag to have to cancel the connection then choose 'Work Offline'.

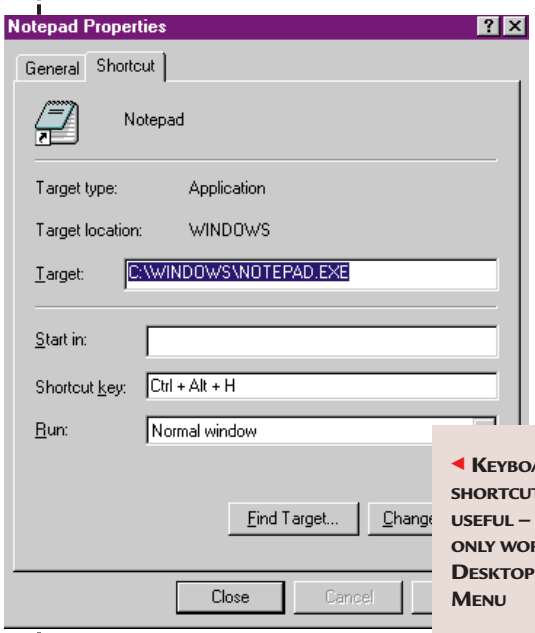
COLIN GREEN

***A** You can set your home page as blank or as a local file from General tab of the Internet Explorer icon properties. But if you want to keep your home page, the simplest is to create a blank text file on the Desktop and rename it with the .HTM extension. Double-click on this and it will load in Internet Explorer, without activating a dial-up connection.*

Q I'm a keyboard fan and have set up various shortcuts on my desktop with keyboard shortcuts. I wanted to assign other shortcuts to folders without cluttering up my desktop, so I created a folder in my Windows directory, and created the others in there. Unfortunately none of the key shortcuts that I've put here work, although the ones on the desktop still work fine.

RAJNISH BHASKAR

***A** This is, as they say, by design. Shortcut key combinations only work for shortcuts that are on the desktop or in the Start Menu hierarchy. If you Explore the Start Menu, you'll find you can right-click on the shortcuts therein, choose properties and assign key strokes.*



◀ KEYBOARD SHORTCUTS ARE USEFUL – BUT THEY ONLY WORK FOR THE DESKTOP OR START MENU

Q Recently my PC has started presenting me with the DOS-style boot menu every time I switch on. How do I return to the default of only seeing this if I press F8?

JILL DEAKIN

***A** The easy way is from TweakUI's Boot page – untick 'Always show boot menu'. If you don't have TweakUI (it's on the Windows 98 CD-ROM under Tools\Reskit\Powertoy), then you need to edit the file C:\MSDOS.SYS. See last month's Q and A for details – the line to change is Bootmenu=1, which should be changed to Bootmenu=0.*

Q Whatever happened to the Windows 95 'Send to any folder' PowerToy. It doesn't seem to be available in Windows 98 – is it hiding elsewhere? It was a very useful accessory.

ALAN WOOLEY

***A** There doesn't appear to be a Win 98 version of this, but the good news is that the Win 95 one appears to work fine.*

Q I copied the Windows 98 setup files from the CD-ROM to a partition on my hard disk, and now the PC thinks my E: drive is a CD – it runs the Setup program every time I click on it.

MIKE ELDER

***A** Sounds as if you've copied the Autorun.inf file as well – delete this from the root of E: and everything should go back to normal. You may also be wasting a lot of space – as there's a lot of surplus baggage in the Cdsample folder, such as 200 megabytes of video and sound advertisements. Simply copying the WIN98 folder off the CD should suffice.*

Q I search every month for all files that end with *.TMP. Last time I found in the Windows folder 390 TMP files that have filenames of the form: ffef585_{8E246A60-FB12-11D2-85EC-D7A2EEDD4A0D}.tmp. The files are empty (I opened them with Notepad, and they are 0kb). Is it safe to delete all these files, and what are they?

SALAR AL KHAFAJI

***A** I was as puzzled as you when I discovered that I, too, had a collection of these. The middle part of the file name looks like a Class ID as seen in the registry, but I couldn't find any matches. Examination of the file properties showed that they seemed to be created in pairs, at boot time. The culprit appears to be the Machine Debug Manager loading at start-up – this is a utility that comes with certain Microsoft development tools. I've deleted mine, and lived to tell the tale.*

PCW CONTACTS

Tim Nott welcomes your feedback on the Windows column. Contact him via the PCW editorial office, or email win@pcw.co.uk

Marked-up for death

With advances in XML and the introduction of XSL, Tim Anderson asks can HTML survive?

There are several reasons why you need to know about XML (eXtensible Mark-up Language). The first is that HTML is straining at the seams. Instead of hunting for the tag you need, and then checking which browsers and browser versions support it, why not define your own tag? This is what XML lets you do.

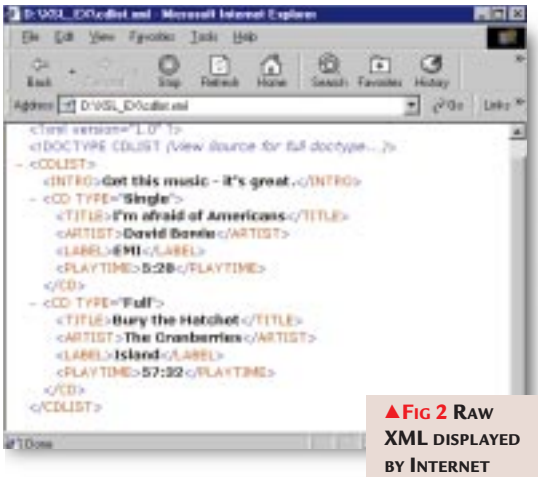
Secondly, XML has every chance of becoming the standard means of exchanging data, particularly across platform boundaries or over the Web. The great attraction of this approach is that it is both simple and robust. Take two applications that are able to generate and parse XML, add a means of transporting the XML data, and you have the essential ingredients of a distributed application. And last but not least, XML is a great way to handle documents.

An XML document is intelligent about its content, far more so than HTML. For example, in an HTML document you can tell what is body text, what is a list, and various levels of headings, although on a typical web page this scheme is likely to be subverted by the practicalities of web design. There may be body text in table cells, or headings might not use the built-in heading levels.

By contrast, an XML document can be much easier to understand. For example, a mark-up for a *Hands On* column could explain the different elements of the article, with text marked as key points, code examples, readers' questions, picture captions and so on.

XML can also include databases with records and fields, as well as separating structure, content and presentation. Documents can be transformed, either by processing or by use of XSL (Extensible Stylesheet Language). Transformation can take place either on the client or the server, so that you can use XML server-side while still presenting plain HTML to browsers.

You may wonder whether XML will replace HTML. The answer is 'sort of'. Nobody is planning to discard all the work that makes HTML a fine general-purpose mark-up language. Instead, HTML will eventually become an XML language. One implication is that web authors will need to tighten up their code, as XML is less forgiving about errors such as omitting closing tags.



▲ FIG 2 RAW XML DISPLAYED BY INTERNET EXPLORER 5

[FIG 1] A simple XML document

```
<?xml version="1.0"?>

<!DOCTYPE CDLIST [
  <!ELEMENT CDLIST (INTRO,CD*)>
  <!ELEMENT INTRO (#PCDATA)>
  <!ELEMENT CD (TITLE, ARTIST,LABEL,PLAYTIME)>
   <!ATTLIST CD TYPE (Single|Full)  #REQUIRED>
  <!ELEMENT TITLE (#PCDATA)>
  <!ELEMENT ARTIST (#PCDATA)>
  <!ELEMENT LABEL (#PCDATA)>
  <!ELEMENT PLAYTIME (#PCDATA)>
]>

<CDLIST>
<INTRO>
Get this great music.
</INTRO>
<CD TYPE="Single">
  <TITLE>I&apos;m afraid of Americans</TITLE>
  <ARTIST>David Bowie</ARTIST>
  <LABEL>EMI</LABEL>
  <PLAYTIME>5:28</PLAYTIME>
</CD>
<CD TYPE="Full">
  <TITLE>Bury the Hatchet</TITLE>
  <ARTIST>The Cranberries</ARTIST>
  <LABEL>Island</LABEL>
  <PLAYTIME>57:32</PLAYTIME>
</CD>
</CDLIST>
```

An eXaMpLe

Despite its name, XML is not itself a mark-up language but a way of implementing mark-up languages. Fig 1 shows a simple example of an XML document. This is a standalone document, which means it is fully self-describing. It begins with the XML declaration:

```
<?xml version="1.0"?>
```

which identifies this XML. What follows is in two distinct parts.

First, there is the DTD (Document Type Definition). This defines the mark-up language, which in this case is for creating lists of compact discs. More commonly, the DTD would be in a separate file referenced by its URL, but here it is included in full.

The DTD begins by naming the DOCTYPE, and then gives a list of elements – in other words, blocks of content – that are valid for this type of document. XML documents can have only one root element, which in this case is CDLIST.

The CDLIST element consists of one and only one INTRO followed by any number of CD elements – this is the meaning of (INTRO, CD*). The asterisk indicates the element may exist none or many times. The CD element has a TYPE attribute, which must be Single or Full, like an enumerated type, followed by several elements that describe each CD. Each element resolves down to #PCDATA, which means character data.

The second part of the document is

content – tagged according to the rules of the DTD. If you are familiar with HTML tags, it is easy to follow. Note that XML tags are case-sensitive. The whole content is enclosed in an opening and closing CDLIST tag, within which are a single INTRO element and two CD elements, as allowed by the DTD.

If you open the file in Internet Explorer 5, currently the only browser that supports XML, you will see it structured as in Fig 2. Note that IE does not fully validate the XML when it displays, although it will complain about some errors. A handy validator is available online at Microsoft's site, with example code for you to use IE 5's parser for validation.

Displaying XML

Internet Explorer's efforts in displaying XML in a tree structure are pretty, but not really the kind of thing you want users to see. There are, however, a number of ways to format XML for presentation.

One way is to create a second HTML document with a script that iterates through the XML and inserts its content into Dynamic HTML placeholders. Another method is to use XSL. When IE displays XML in the default view, it does so using a default stylesheet. You can provide your own stylesheet to customise the display. Fig 3 shows a simple example. To display the XML using this stylesheet, add the following line after the XML declaration:

```
<?xml-stylesheet
type="text/xsl"
href="cdstyle.xsl" ?>
```

Fig 4 shows the results in Internet Explorer. The important thing to realise is that a different stylesheet could display the same content in a completely different form. For example, you could use a table, or omit the label and playing time, or sort the CDs by title or by artist, or add extra text, simply by amending the stylesheet. Another point is that the displayed result is simple HTML, so if the parsing is done server-side it would be compatible with any browser.

[FIG 3] A simple XSL stylesheet

```
<?xml version="1.0"?>
<xsl:stylesheet xmlns:xsl="http://www.w3.org/TR/WD-xsl">
<xsl:template match="/">
<HTML>
<BODY BGCOLOR="AQUA">
<xsl:apply-templates select="//INTRO" />
<xsl:apply-templates select="//CD" />
</BODY>
</HTML>
</xsl:template>

<xsl:template match="INTRO">
<H3><xsl:value-of /></H3>
<HR/>
</xsl:template>

<xsl:template match="CD">
<P>
<xsl:apply-templates select="TITLE" />
<xsl:if match="CD[@TYPE='Single']">
<I>CD single</I><BR/>
</xsl:if>
<xsl:apply-templates select="ARTIST"/>
<xsl:apply-templates select="LABEL" />
<xsl:apply-templates select="PLAYTIME" />
<HR/>
</P>
</xsl:template>
<xsl:template match="TITLE">
<B><xsl:value-of /></B><BR/>
</xsl:template>
<xsl:template match="ARTIST">
<xsl:value-of /><BR/>
</xsl:template>
<xsl:template match="LABEL">
<xsl:value-of />.
</xsl:template>
<xsl:template match="PLAYTIME">
Playing time: <xsl:value-of />
</xsl:template>
</xsl:stylesheet>
```

Understanding the stylesheet

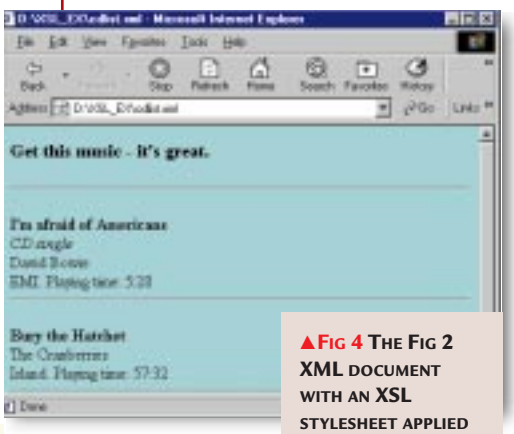
The stylesheet in Fig 3 looks at first sight like a jumble of HTML and XML. It is in fact an XML document which defines a series of 'xsl:template' elements. The 'xsl:' prefix indicates that these elements belong to the namespace referenced in the URL at the top of the document.

Each template element has a 'match' attribute that tells the parser which elements in the target XML document should be transformed. The first template has the attribute:

```
<xsl:template match="/">
```

which means the root element of the target document.

Within this template, other templates are applied, through the 'xsl:apply-templates' element. Specifically, it instructs the parser to apply first the INTRO template, and then the CD template to all matching elements. These templates are defined later in the stylesheet. The INTRO template uses the 'xsl:value-of' element to insert the INTRO data between opening and closing heading tags. The CD template uses a further set of 'xsl:apply-templates' elements to apply different templates for each sub-element. It also uses the 'xsl:if' element to inspect the TYPE attribute of the CD and print some conditional text.



▲ FIG 4 THE FIG 2 XML DOCUMENT WITH AN XSL STYLESHEET APPLIED

PCW CONTACTS

Tim Anderson welcomes your Web Development questions and comments, via the usual PCW address or via webdev@pcw.co.uk

- *http://msdn.microsoft.com/xml is a very good resource and tutorial for XML in IE 5.*
- *www.xml.com and www.xml.org are interesting sites with XML resources.*
- *www.w3.org is the W3C committee's site, with the latest on XML standardisation.*

An icon by any other name

Andrew Ward looks at how to name a machine so that users and administrators can find it.

The 'My Computer' icon is a regular bone of contention. Users naturally want to rename it to something much friendlier, but this causes no end of support issues when some poor helpdesk operative is asking the user to click on it. If they don't know the name, they're reduced to having to describe the icon and patiently wait while the user finds it. Michael Davies wrote in to suggest renaming it to include both the user name and the computer name, while retaining the words 'My Computer'. This neatly solves both problems, in that it has a recognisable name, while conveying something useful both to the user and to the support desk.

▲ USING A HELPFUL NAME FOR THE MY COMPUTER ICON CAN EASE SUPPORT PROBLEMS

You accomplish this via a registry hack, using regedt32, and not via renaming the icon on the desktop. Navigate to HKEY_CLASSES_ROOT\CLSID\{20D04FE0-3AEA-1069-A2D8-08002B30309D} and delete the existing <No Name> value. Create a new value and once again don't give it a name. Set the type to REG_EXPAND_SZ and click OK. When prompted for the string value, Michael recommends entering

```
"My Computer %USERNAME% :
%COMPUTERNAME%"
```

%COMPUTERNAME% and %USERNAME% are automatically replaced with the current user name and computer name. Obviously, either renaming the desktop icon or editing the registry and using the actual user and computer names would be unhelpful because, of course, these details may change.

By using this method, support desk personnel have a quick and easy way of finding out the current user name and computer name, while still standing a good chance of helping the user click on My Computer if required.

◄ THE OFFICE 97 TOOLBAR CAUSES A NUMBER OF PROBLEMS FOR NT USERS

Office Intrusion

The Microsoft Office toolbar may look pretty, but clicking on the Excel icon, for example, may actually cause Notepad to run – or in my case, create an email message with EXCEL.EXE as an attachment. These are just a couple of items related to Microsoft Office and its impact on Windows NT. For many users, the first thing they do after installing Office is to zap the FINDFAST process from the startup group and kill the office shortcut bar. Finally, there's some actual evidence to support at least the first of these actions beyond some faint suspicion that it impacts system performance and reliability.

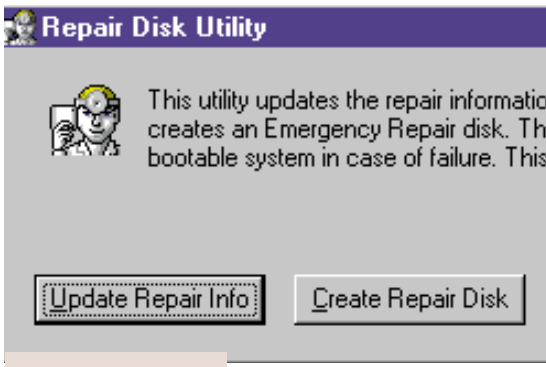
Microsoft has revealed a bug in Office 97 SR2 which causes the following error on all Windows NT 4 versions:

STOP 0x0000001E (0xc0000005,0 xa0055c99,0x00000000, 0x00000008) in WIN32K.SYS

To work around this problem, Microsoft suggests removing FINDFAST.EXE from the Startup group. Simple but effective.

James Stormont and several others (OK, many others) have complained that my suggested technique for persuading 'Open with Notepad' to appear at the top of the Explorer short-cut menu has an annoying side-effect. The Microsoft Office shortcut bar works on the (in this case, invalid) assumption that the first item on this menu will always be the application that is associated with that file type. Of course, if you put 'Open with Notepad' at the top of the list then that's no longer the case, and all that the Office shortcut bar ever does is open everything with Notepad!

As far as anyone can tell, it is only the Office shortcut bar that's affected – single-clicking document items on the desktop and any other activity still works as normal. This looks like another bug we can chalk up to Office 97; and although I have Office 2000 here, I don't have the nerve to install it to see if that suffers from the same problem.



▲ KEEPING YOUR REPAIR DATA UP TO DATE COULD SAVE YOU A LOT OF TROUBLE

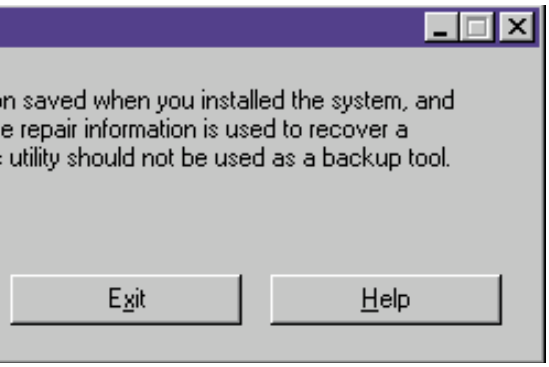
Beware the repair Disk!

Readers beware – RDISK doesn't normally save the SAM and SECURITY hives. A Windows NT repair disk can raise a lot of questions. As a reader discovered some months ago, if you don't keep it up to date you can be in big trouble. The problem is that it's not always possible to update it – as I mentioned a few issues back, mine is too big to fit on a floppy drive. In the past, I've suggested that you run RDISK to create a backup copy in the \repair folder

Clicking the Excel icon on the Office toolbar may actually run Notepad

on your hard drive. If the hard drive is still readable after a problem, or if you have a backup copy of it, then the NT boot disks can be used to recover the registry from this folder instead of the floppy disk.

However, I missed an important point. When you run RDISK, it doesn't usually save the SAM._ and SECURITY._ registry hives. There's a good reason for this: in Windows NT 4, user information is stored (rather unwisely) in the registry. If you have thousands of users, these hives could be massive and even when compressed by RDISK wouldn't stand any chance of fitting on a floppy disk. The good news is that when Windows 2000 appears (which could be about a month after you read this), all Active Directory information is stored within a JET database.



But for now, if you're reduced to using the hard disk backup method, or if you don't have too many users, then you'll definitely want to save these hives. Otherwise, you'll face hours of fun recreating user and group information, since the SAM and SECURITY hives saved in the /repair folder will only contain the default administrator account and the password used during Setup (and I hope you can remember what that was).

To back up these two additional hives, run RDISK with the /S option (it will also save the usual stuff). Following the backup, RDISK will ask you if you want to create an emergency repair disk. If you don't want to see that question then use RDISK /S- (note the minus sign after the S), and RDISK will exit as soon as it has finished saving the hives.

If you don't know whether you will run out of space on the emergency repair disk by using this technique, then first of all take a backup of everything in the \repair folder (the full path is <systemroot>\repair by the way). Then, after you run RDISK /S if you have a problem fitting the files onto a single disk, then you can reinstate the original \repair directory and abandon the idea of backing up SAM and SECURITY hives.

By the way, RDISK /S- is a useful way of getting the registry backed up if you are using a backup tool or medium that doesn't normally back up the registry. Before you run a backup, schedule RDISK /S- to run so that it copies the registry hives to your \repair directory, from where any backup program should be able to access them in the same way as any other normal file. Although the NTBACKUP program that comes with NT does backup the live registry, not every other backup program does. With the online backup service NetStore, for example, although the registry can be backed up this requires switching the program into 'all files' mode, whereby it backs up absolutely everything, necessitating many long nights of online time.

You'll definitely want to save these hives or you'll face hours of fun

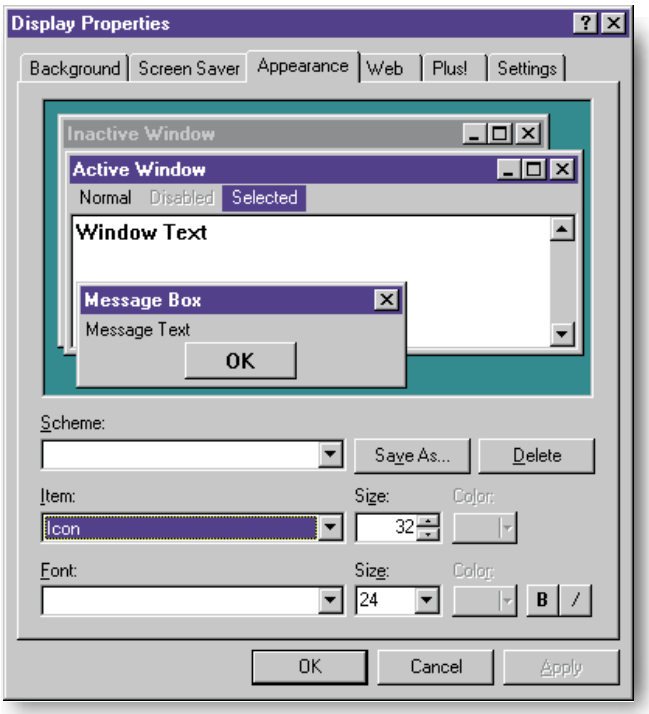
Dancing Icons

A frequent complaint from readers is that desktop icons don't stay where they're put. Tim Gathercole has suffered from this since a reinstallation of Service Pack 4; after a reboot, desktop icons don't remember their previous positions and reappear all lined up down the left-hand side of the screen. However, Tim has been able to throw a bit more light onto the issue. First of all, he suffers from the problem worst than most — his application windows don't remember their positions either. But he has also observed that if he closes all windows before closing down the system, then the desktop icons do remember their positions, and applications do start up with their windows in their previous positions.

The conventional answer is that the location of icons on the desktop is saved when you log out or shut down Windows NT. If the location of the icons has changed and the changes have not been saved, the previous positions are used; and you can force a save of the existing layout by clicking on the desktop and then pressing F5. Why would the changes not be saved? Usually, this is because Explorer is crashing at some point during the logoff/shutdown procedure (and this may or may not be apparent to the user). Alternatively, it's because for some reason Explorer is unable to write this information into the registry.

Active Desktop, Internet Explorer and TweakUI have all been suggested as likely culprits for interfering with desktop icons, so removing, disabling and/or reinstalling these can be worth a try. In particular, some people have a problem with TweakUI interfering with IE4 and causing icon corruption (rather than losing positions). The fix to this is to remove TweakUI and delete <systemroot>\ShellIconCache.

Interestingly, Microsoft also suggests you take the following step before you



delete ShellIconCache:
Open the Display control panel
Select the Appearance tab
In the Item box, select Icon
Increase the icon size by one
Select Apply
Decrease the icon size by one
Select OK.

Another interesting aspect to this problem, Tim says, is that on a second machine, while the same problem occurs, it only occurs for the user profile that was used to install the Service Pack.

Going for a drive

A quick note about the Windows NT Explorer. In many instances under Windows NT, drive C is not the main drive, but when you start up Explorer, drive C is usually expanded by default (that is, it looks as if you'd clicked on the + sign to open up the drive view). If your Windows system directory is on a different drive, then that drive would usually be the one expanded. However, many users would prefer to have a specific drive, or even no drive, expanded in this way. Here are two alternative command-lines that you can use.

This first starts up Explorer with no drive expanded at all:

```
<systemroot>\explorer.exe
/e,/root,,::{20D04FE0-3AEA-
1069-A2D8-08002B30309D}
```

Alternatively, this example opens up drive D instead of C:

```
<systemroot>\explorer.exe
/n,/e,D:\
```

Here is a full explanation of the command-line options for Explorer in Windows NT 4.0:

/n This opens a new single-pane window for the default selection (as if you'd opened it via the My Computer icon). This is usually the root of the drive which Windows NT is installed on. If the window is already open, then a new window opens.

/e This opens Windows Explorer in its usual view.

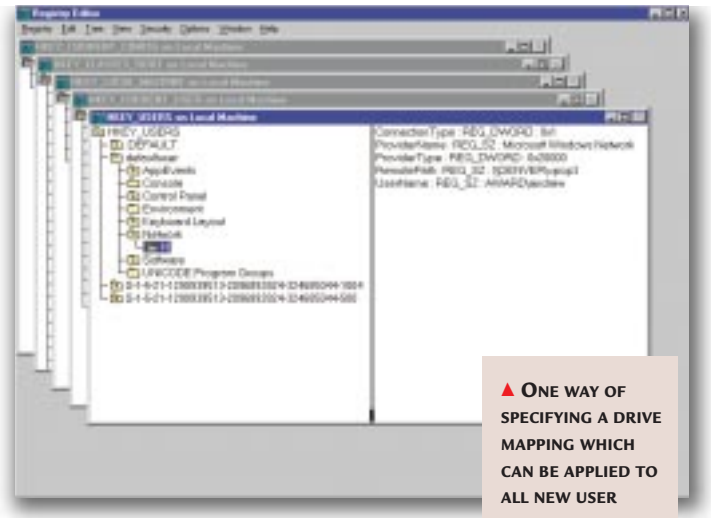
,/root,<object> This specifies the object to be used as the root of the view.

,/select,<object> This opens a window view of the parent folder and with the specified folder, file or application selected.

It is important to note that the /select option does not work if you choose the /e view, and that you have to precede the /root and /select options with a comma.

Default Desktops

Adrian Shephard would like to set up a basic default desktop for Windows NT Workstation systems, with pre-defined drive and printer settings. This would mean that when any new user logs in for the first time their drives and printers are mapped automatically.



▲ ONE WAY OF SPECIFYING A DRIVE MAPPING WHICH CAN BE APPLIED TO ALL NEW USER ACCOUNTS

Well, of course, one way to achieve this is for the network administrator to set up a logon script when creating the new user, but there is a way to configure a system (or domain) so that all new users automatically get particular settings without having to first create that script.

However, this is a rather messy procedure that involves extensive registry editing. An alternative method would be to use the System Policy editor, having first configured the template file appropriately.

When a new user logs on for the first time, the default user profile is used as the basis of their personal profile, so you have to start by editing the default user profile. This is stored as:

```
<systemroot>\Profiles\Default
User\NTUSER.DAT.
```

To make these changes, run the proper registry editor regedt32, go to the window called HKEY_USERS on Local Machine, drop down the Registry menu and select Load Hive. Navigate to the NTUSER.DAT file mentioned above.

Enter something suitable for the key name, for example 'defaultuser' (if you just use the word 'default' you are liable to get it confused with the key called .DEFAULT). Now, select the key name defaultuser within the window, and add a new key (using the menu option Edit, Add Key) with the name Network. Select the Network key you have just created, and add a new key under that with the drive name.

What you want to end up with is a key defaultuser\Network\H, for example, if the drive you want to be mapped is letter H. Now, create the values shown in Fig 1 using Edit, Add Value (The actual values you require may differ on your network, but you can find out what they should be by mapping a drive manually and inspecting the registry). Now, reselect the root of the hive (defaultuser) in the tree view, then in the Registry menu, select Unload Hive and Quit.

With any luck, when any new user logs onto that machine, they will have a new default drive mapping. It may be possible to leave out the UserName value to see if Windows NT will use the currently logged on user instead.

[FIG 1]

Value name	Type	Data
RemotePath	REG_SZ	UNC path to remote drive (eg \\DENVER\vpop3)
UserName	REG_SZ	A user with rights to the remote drive (eg \\DOMAIN\user)
ProviderName	REG_SZ	Microsoft Windows Network
ProviderType	REG_DWORD	020000 (in hexadecimal)
ConnectionType	REG_DWORD	1

PCW CONTACTS

Andrew Ward welcomes your comments on the Windows NT column. Contact him via the PCW editorial office or email NT@pcw.co.uk

Psion v WinCE

Microsoft looks set to blitzkrieg its way to a victory in the PDA war, says Mark Whitehorn.

Coincidentally, both the Symbian and WinCE developers' conferences were held within days of each other in June. Attending both seemed like a perfect opportunity to compare and contrast the development potential of both platforms. In turn I felt that this might allow me to deal with the 'ultimate question' that seems to be cropping up more and more frequently. The ultimate question has several forms, but they all boil down to the same thing:

'I want to buy the PDA that will ultimately survive, so should I buy a Psion or a WinCE machine?'

(I realise that Symbian and Psion are not the same company, but then they aren't exactly rivals either!)

I found an answer (and I promise it won't be 42).

The Symbian conference was held on a Thursday and Friday in London, the WinCE conference began in Denver on the following Sunday and ran till Wednesday. For a start, the sheer difference in size was boggling.

The entire Microsoft site is to move to a wireless network as an aid to the use of PDAs

How big?

The Symbian conference boasted about 426 attendees, 24 speakers' sessions and seven supporting artists (companies like Purple Software, which develop and sell software for the platform).

The WinCE conference claimed 2,000+ attendees, more than 90 speakers' sessions/labs and about 135 supporting artists.

So the WinCE conference was much larger and longer, a factor that is important because the more attendees and supporting artists, the more software is going to be developed for that particular platform.

Who were the attendees?

The suit/sandal ratio is a worthwhile indicator. A low suit/sandal ratio suggests that a conference is going to be fun and technical; a high ratio suggests that big business has become interested in the topic. The suits are looking for ways to make money that means some of the fun will be replaced by financial considerations. I reckon that the Symbian conference was low — enthusiasts were noticeable by their presence. However the ratio at the WinCE conference was stratospheric: so high that other attendees were, unbidden, commenting on the lack of open-toed footwear.

Which companies wanted to align themselves with which conference?

Ericsson, Motorola, Matsushita, Sun, Metrowerks, Nokia, Psion Enterprise, Psion Computing, Oracle, Sybase and ARM were at the Symbian conference and all the manufacturers of handheld devices (Casio, HP etc), together with IBM, Sybase, Oracle etc (in other words, lots of others) were at the WinCE conference.

So telecomms was well represented at the Symbian conference.

What did they want to tell us?

Psion talked about the new Psions — the 32-bit Series 5mx has a new half-VGA width back-lit screen, a stylus and a touch-type keyboard, 16Mb RAM, a CompactFlash card slot, a 36MHz ARM710T RISC processor. All of this is in a device weighing 354 grams and with a claimed battery life of a month on 2 AA batteries. There's also a Java Virtual Machine on the CD that ships with the Series 5mx. Wow.

If that wasn't enough there was the netBook, claimed to be the world's first truly mobile network computer, incorporating 100 per cent pure Java technology. This is more of a virtual device at present but promises, over time, to provide a range that will include a choice of quarter, half and full VGA resolution screens, pen and keyboard driven tablet and clamshell devices. The netBook features Psion's first implementation of colour on a full VGA screen, with pen-driven navigation and data input, together with a standard QWERTY keyboard. There's also a PC card drive and a slot for either a compact flash card or disk drive. Double wow.

The WinCE affair had two keynotes. Harel Kodesh, VP of Microsoft's Productivity Appliance Division, told the assembled developers what they wanted to hear – that they were the chosen ones. Predictably, this went down a storm.

Then he told them things like 'the emerging information appliance industry promises to enable form factors and scenarios that are currently not possible with today's software and hardware'. I was left wondering what exactly a 'form factor' was and whether the word 'scenario' wasn't due for a rest by now.

So far, a perfectly normal keynote from Microsoft, but then, without any warning at all, something of substance appeared. A 'demo' of Windows CE running on a petrol pump. The pump talks to the server in the station by email, from the station you can browse the state of the pump using TCP/IP and HTML.

Technically, the information was fascinating, particularly as we were assured that this wasn't vapourware, this was an operational system. But Kodesh spoilt it all by saying that the pumps 'revolutionise the consumer experience' — meaning that they showed the customer Coke advertisements while dispensing petrol (really, I'm not kidding). He clearly hadn't spotted the word 'developer' in the conference title. Then again, perhaps he had noticed the suit/sandal ratio...

Bob Muglia, senior VP of Microsoft's Business Productivity Group, gave the other keynote. He spoke mainly of the company's overall strategy, some of which actually had relevance to mobile computing, like the fact that the entire Microsoft site at Redmond is destined to move to a wireless network within a year. This is mainly as an aid to the use of PDAs on the site — which, as an aside, seems to indicate that Microsoft is genuinely interested in the use of PDAs and not just interested in selling WinCE.

So, Psion talked about new hardware; Microsoft, as it so often does, talked mainly in 'global terms', but it also demonstrated WinCE being used in a real life commercial application where it runs as an embedded system.

■ Where were the best toys?
Here there was no contest, the WinCE conference simply wins hands down with desirable toys, both hard and soft.

■ Which event had the best development tools?
If I were a professional developer for the PDA, there is no doubt which platform I would choose. WinCE scores again.

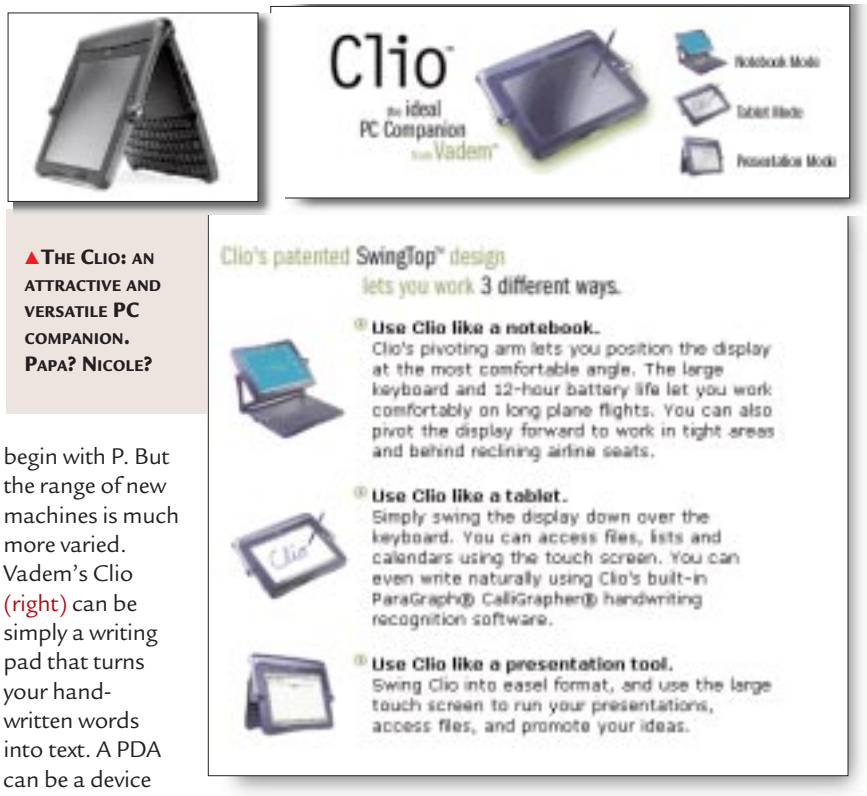
So, what conclusion did I come to about the future of PDAs after overdosing on their conferences?

Before answering, please forgive me for indulging in a brief historical review. Microsoft rose to power by developing an operating system that ran on PCs. PCs are essentially all BBBs (Boring Beige Boxes), so the company that controlled the OS controlled the market. Then Microsoft went on to control the software and on and on. 'Nuff said.

Meanwhile, in the PDA world, there were no BBBs because the technical margins were so much tighter. The challenge of optimising battery life, machine size, machine style, screen readability, software stability, software functionality, memory requirements, etc, defeated some companies completely. Two succeeded brilliantly — Psion and US Robotics (PalmPilot). Both of these firms bit the bullet and developed an OS and a machine that were tightly integrated. Only by doing so could all of the above factors be satisfactorily balanced, each against the others.

So much for history; Moore's law is implacable and the price/power ratio for PDA-type hardware has plummeted. So, crucially as far as Psion is concerned, the need for a tight integration between the OS and the hardware has gone.

Secondly, the diversity of PDAs is undergoing a sea change. PDAs have never fallen into the BBB category in any case – look at the Psion and the Palm; about the only similarity is that both begin with P. But the range of new machines is much more varied. Vadem's Clio (right) can be simply a writing pad that turns your hand-written words into text. A PDA can be a device for watching videos, something you wear on your wrist, it can be something that slots into a pocket of your suit and takes voice input via a tiny microphone and outputs via an earplug — all of these devices do or will soon exist and someone, somewhere will buy them.



▲ **The Clio: an attractive and versatile PC companion. Papa? Nicole?**

So, the situation is that:

- We no longer need to tie the OS to the hardware.
- PDAs are in the process of diverging into manifold forms.

Fine. WinCE can deliver many different machines; in fact, Microsoft doesn't have to do anything, it just delivers the OS and leaves it to the others to come up with the hardware. Psion is promoting new hardware, but Psion is only one company and cannot possibly deliver the diversity of hardware that the market requires.

If I was a PDA developer there is no doubt which platform I would choose

Indeed, given the history, we are moving into major irony territory now. Microsoft continues to be pilloried for trying to control the PC market but, by selling an OS solely for PDAs, it is actively promoting an open PDA market. It is companies like Psion, keen to sell a hardware/software combination, which are in danger of being accused of promoting a closed market.

■ So, who will win?
To summarise:

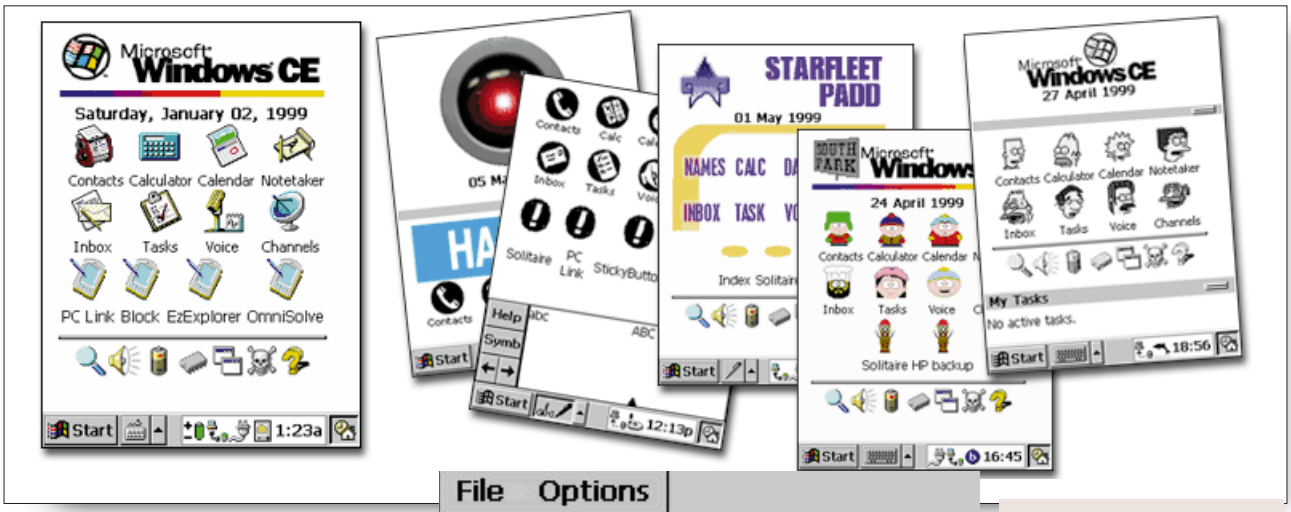
- WinCE has more developers and better development tools.
- The suits are interested enough in WinCE to attend the conferences, so the money is also there to develop applications.
- The hardware manufacturers are flocking to WinCE.
- People who aren't interested in the history of PDAs will buy whichever toy appeals to them from the range presented. There will be more WinCE machines in that range than Symbians.

There is really no contest.

In an attempt to forestall the flood of hate mail from Psion users, let me make it clear what I am not saying:

- That WinCE is technically better than EPOC. I think the reverse is true, but technical excellence is not going to be the deciding factor.
- The Psion PDA line is finished — Psion can continue to produce machines that I hope will sell well. I like the machines that the company produces.
- That might is right.

Also, please note that I have been



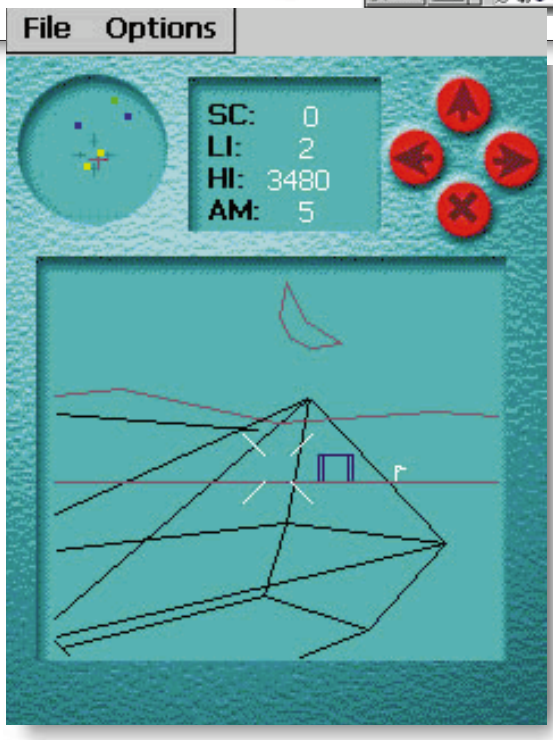
talking about PDAs. Psion is clearly in an impressive position to do great things with phones and that is a whole new ball game. Psion supporters will be delighted to learn that Microsoft only demonstrated one piece of software running on a phone — a 'micro-browser' that could talk to a server and pick up mail. It was dreadful.

What I'm saying is that it is now clear that WinCE will become the dominant OS on PDAs. If this affects your choice of a PDA, then buy one with WinCE.

Toy story

The WinCE show was a techno-toy freak's nightmare — too many goodies. I desperately tried to buy a Vadem Clio while at the show. This is a wonderfully bizarre PDA: as the screen shots on the previous page show, the screen is hinged so that it can be used either as a conventional display device or as a pad upon which you can write. So you can hold the device like a paper pad, write on the screen and the software will turn your words into text. It isn't that word recognition is new, just that the whole bundle works so well as a complete unit. And it was available at just $500. Sadly my attempts to buy one in time to carry it home came to naught, they aren't available in the UK and cannot be shipped. However, I have no doubt that they (or some variation) will appear here soon <www.vadem.com>.

Then there's the Casio E100. I already have one of the first UK spec machines and by the time you read this it should be available to buy. The processor runs at 131MHz, it has 16Mb of RAM, a 240x320 TFT screen providing 65,536 colours. This palm sized device is powerful enough to play video clips complete with stereo sound, and this sort of power also means that there is no longer a need for a tight integration of the OS and the hardware.



▲ Sticky buttons? Beam me up, Kenny

◀ TankZone 3D is Fighting for a good cause

Fun Stuff

John Kennedy <johnk@dircon.co.uk> has been at it again. His TankZone, the 3D shoot-em-up, is now available in colour for the Jornada 420 colour palmsize, as well as the 640x480 screen HPC Pro. (above). TankZone is a charity-ware program so it's fun and you can feel good about playing it.

Kennedy's Pocket Universe has also been updated to Pocket Universe 2000, and has many new features. Once again, support is included for both the colour and the larger screen size of the HPC Pro and the Palm machines.

Even more fun, John has produced Sticky Buttons, a brand new User Interface for WinCE machines. Sticky Buttons adds program launch icons to the Active Desktop of the palmsize PC. So, like a Palm, you can simply tap a large icon to launch the contacts or calculator display.

What's more, anyone can add their own icons to the display: already there are South Park, Star Trek and other free themes to download (Pictured at the top of the page). I've got it running on my Casio and it's fantastic. Especially the HAL version...

Andrew Hirst <ahirst@csi.com> writes: 'I thought you might be interested to know of some developer news for EPOC.

Neuon are developing a number of dialog OPX's to bring the diverse and flexible controls currently only available to C++ developers, within the reach of those who use OPL32. Releases and details are at www.neuon.com.

PCW CONTACTS

Mark Whitehorn welcomes your feedback on the PDAs column. Contact him via the PCW editorial office, or email pda@pcw.co.uk

Remembrance day

Chris Bidmead finds that Emacs beats the established word processors hands down.

What's the best word processor to run on UNIX? I've tried to persuade you on several occasions to take a radical approach to this question. If you're looking for Microsoft Word, you won't find it — although WordPerfect 8, StarOffice, Applixware, Ted, Maxwell, etc, should provide a lot of what you need. Or at least what you think you need. Me? I use Emacs.

I'm not going to rerun the old arguments here about the benefits of a completely tailorable, totally cross-platform, free, open source text editor that operates primarily in ASCII. But here's a brand new reason. Emacs supports the Remembrance Agent.

The Remembrance Agent is a search and retrieval tool being developed by Bradley Rhodes at the Massachusetts Institute of Technology's Media Lab. The idea is that we all have a mess of information lying around, and some of us (like me) may have been methodical enough to have organised it into a text retrieval database. This enables us to find anything we look for simply by typing in a search phrase — but there's a catch. What if there's a perfectly useful piece of information in there that you don't know about, and so miss looking up? The Remembrance Agent's job is to watch over your shoulder as you write or review documents, and suggest information that might be relevant to the text in front of you. That way it can offer you information you didn't even know enough to ask about.

What if there's a useful piece of information that you don't know about, and so miss looking up?

Rhodes' Remembrance Agent comes as a source tarball (available at rhodes.www .media.mit.edu/people/rhodes/RA) so you'll need to untar this and compile the code on your own machine. If you're running Red Hat Linux or something close there are ready-made i386 binaries for version 5.2 and 6.0.

▲ THIS IS THE REMBEMBRANCE AGENT, WORKING WHILE I WRITE THIS COLUMN. THE DATABASE IN THE LOWER PART OF THE EMACS WINDOW IS DERIVED FROM CORRESPONDENCE WITH READERS. THE BACKGROUND, INCIDENTALLY, IS ONE OF THOSE, ER, RISKY RANDOM IMAGES CONJURED UP BY BLINK

The basic retrieval system can be run from the command prompt, but to get the full benefit you'll need to have a recent version of Emacs or Xemacs on your system. If you do decide to explore this, please write in and let me know how you get on.

Source Code Unifies UNIX

In the commercial world, a lot of effort has gone into developing ways of distributing software that will install on different UNIX versions running on different processors. The one I remember was called ANDF (Architecture Neutral Distribution Format), but not much seems to have happened about this. There's a practical open source compiler at http://alph.dra.hmg.gb/TenDRA, and the GNU people reportedly have an ANDF project on their back burner.

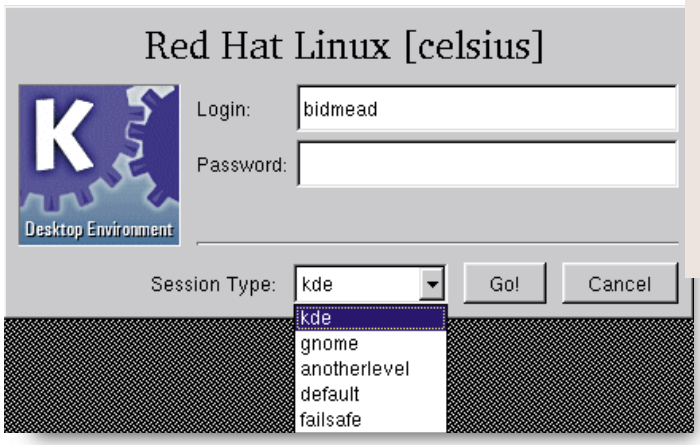
But the point of ANDF is to be able to distribute code in a closed form across multiple platforms. If the code you're distributing is open source, the task is a lot easier. The standard utility that controls how a particular piece of source code is compiled is called 'Make', and you'll find this on every UNIX-like system (except for some dumb commercial UNIXes sold as 'user systems'). Make's behaviour (which compiler it calls, which libraries it uses and so on) is controlled by a config file, usually called 'Makefile'. So, essentially, when compiling the same chunk of source code, the only thing different on my Sun system, my FreeBSD system or my AIX system is the Makefile.

OK, I'm simplifying. For example, there are key differences in some of the internals of the various UNIX-like systems that have to be taken care of by conditional branches in the source code, and this is all extra work for somebody. But if that somebody has done the work right, you as an end-user don't need to know about it. The point I'm getting to is

that source code, combined with a way of setting up the Makefile appropriate to your system, is an entirely viable way of distributing software cross-platform.

So how do you get the right Makefile? If you download the source version of the Remembrance Agent you'll see it comes with a script called 'configure'. You run './configure' and it checks the resources on your system against the requirements of the Remembrance Agent source code and creates the appropriate Makefile. It'll also warn you if any of the necessary components are missing. So I compiled the Remembrance Agent for my system by running './configure' and then 'make'. And then to install the binaries and man pages in their correct directories I ran 'make install' (make and the makefile can control all sorts of operations, not just compiles). So it's not that tough, really.

If you take a look through the configure script you'll get some idea (even if you're not a programmer) of the considerable platform incompatibility problems it is working around. But don't worry too much about Bradley Rhodes and his team getting distracted from the core project having to deal with all these cross-platform niggles, because the creation of the configure script is in turn automated by a utility called 'autoconf' (see http://sourceware.cygnus.com/autoconf for details).



◄ If you've installed Red Hat 6.0 and chosen the option to boot directly into X, this is the login screen you get, offering a choice of desktops. But the display you see here is running on my NeXT machine, which has called it up using the query option to X

Cat and Dog

If you haven't compiled source code before, try your luck with good-dog from http://jl.photodex.com/dog/. It's a simple enough piece of code not to need any of the auto-configure stuff – just compile it on any UNIX-like system that has the GNU gcc compiler.

Dog is a replacement for cat (if you hadn't already guessed), the not very exciting but indispensable utility that squirts files into stdout. Dog is more exciting, although perhaps not entirely meriting the tongue-in-cheek hype accorded it by authors Jason Cohen <dogboy@photodex.com> and Jacob Leverich <leverich@photodex.com>. "Dog 1.3 is riddled with incredible new features," they say. Well... it emulates cat, and supports network sockets, so you can treat an http site as if it were a file and squirt it straight to stdout (which certainly might be handy in a script for collecting URLs from the web, say). More immediately useful is dog's ability to translate between the different line endings used by DOS, the Mac, and UNIX. Oh, and it also supports the k-rad filter 'to convert text to a more readable form' (say the authors). iF you Don't kn0W WHa7 k-R4d is, 7his sHould gIVe y0u 5oM3 ide4.

Blink and you'll miss it

Fancy a utility that downloads JPEGs at random from the web and continually redraws them on the background of your X11 display? Well, yes, you can probably think of a possible snag with that, particularly if you're working in an open office. The author <dave@techweenie.net>, is aware of the problems too, and writes: "Blink may very well display something on your computer that you find offensive. Don't blame me. This is the web, ladies and gentlemen, anything goes. I have tried to filter the images somewhat, but this is by no means foolproof."

If you're drawn to high-risk situations (actually the few times I've run Blink it has only thrown up uncontroversial backgrounds like the one pictured in the screenshot on page 233) you can download it from www.techweenie.net/dave/. It's a perl script and as written it needs the graphics utility xv (but that should be easy enough to change). It's best if you have a permanent internet connection or don't care too much about your phone bill!

Even with all the publicity that Linux gets, it's still worth noting that there are other free UNIXes

Like-minded People

Nick Binns <NickB@mediplus.co.uk> writes: "As Linux is growing all the time, are there any meetings I could attend to find out more. I am still unsure about many of the issues connected with downloading data. I know that I should really do this on the internet, but getting together with like-minded people can be useful."

I suggested Nick visit www.ukuug.org (The UK Unix User Group) – Linux groups in the UK are listed there, as well as more general UNIX groups (which mostly tend to be pretty clued up and sympathetic to Linux anyway).

Linux evangelist and distributor Martin Houston <mhouston@deluxe-tech.co.uk> has sent me details about the Linux '99 Conference, which was held by the UK Unix User Group in June. The aim of the conference is to provide talks, forums and 'clinics' for developers, users and businesses interested in Linux. The 100 or so people who attended may well have expected the usual discussions about Linux maturing from a hobby to a full-scale business proposition, and technical analysis of recent features like symmetrical multiprocessing and support for the new high-performance I2O architecture (from the Linux kernel guru Alan Cox). But there were also less conventional offerings, like John Adams' explanation

of how he uses the ARM port of Linux in the creation of androids.

The XDMCP Adventure, Part II

Last month I began raving about XDMCP and gave you enough details, I hope, to have a crack at getting started with it. You'll need a minimum of two machines, each running an OS that supports X. I've been using a mixture of Xs for this, mostly XFree86 on several different Linux distributions, but including IBM's X implementation for AIX and the Cube'X server available for NeXTSTep.

As I explained last month, the xdm X Display Manager comes as standard with X, so you almost certainly already have it installed, even if you're not running it. To see whether it's running, type something like 'ps ax | grep dm' (the ps flags vary somewhat between UNIX distros) at the command line. That's 'dm' rather than 'xdm' because there are some variants, like gdm and kdm, the Gnome and KDE versions respectively.

If it's not running, just run it. It reads some configuration files (in somewhere like /etc/X11/xdm) on powering up, but in my experience these will already have been correctly set up for general use. The only problem I had was with the gdm supplied with Red Hat 6.0, which I couldn't get to work at all. But xdm and kdm are on the same distribution, and they work fine.

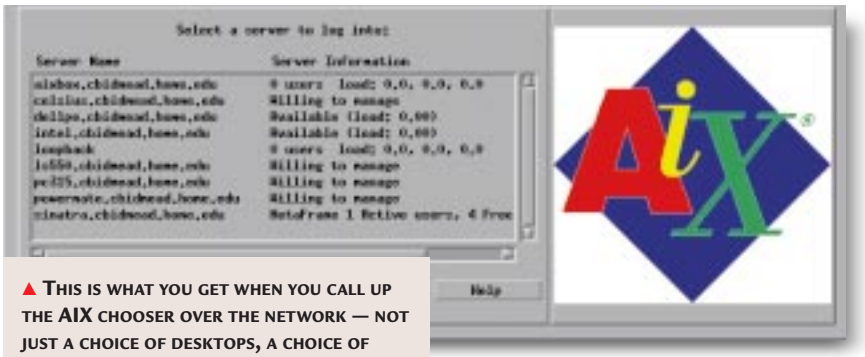
OK, lets say that you now have xdm running on two or more machines on your network. Go to the machine with the best video card and monitor, become root at a virtual terminal and from the command line type:

[redacted]

...where <other machine> is the host name of the remote machine. If the remote machine's xdm is running correctly you should get a login prompt. Respond with your username and password, and lo, you find yourself, as it were, sitting at the other machine.

Did that fail for you with something like 'Fatal Server Error: Server is already active...' or 'already running...'? [redacted]

This invites the new X server to come up on the same monitor (typically at VT8 instead of the usual VT7 if you're running Linux). Now you can use whatever local arrangements there are for switching between X:0 and X:1 (under Linux it'll be something like Ctl-Alt-F7 and Ctl-Alt-F8.



▲ THIS IS WHAT YOU GET WHEN YOU CALL UP THE AIX CHOOSER OVER THE NETWORK — NOT JUST A CHOICE OF DESKTOPS, A CHOICE OF LOGGING INTO ANY OF THE MACHINES ON THE NETWORK RUNNING XDM OR ONE OF ITS VARIANTS. YOU'LL NOTICE THAT MY SINATRA SERVER IS OFFERING METAFRAME, WHICH IS THE CITRIX-FLAVORED VERSION OF MICROSOFT'S WINDOWS NT TERMINAL SERVER

Here's one great use for XDMCP. As I mentioned last month, I have here on loan from Siemens a very powerful dual processor Celsius 2000 technical workstation. Unfortunately its Diamond Fire 4000 Pro video card is not supported by Linux. No matter – I simply run the Celsius via XDMCP from my IBM PC315. And from the same IBM machine I can switch around between the Celsius and any other machine on the network.

Another way to use XDMCP is by way of the intermediate 'chooser' utility that comes as part of xdm. The equivalent on AIX is called dtchooser (under AIX the XDM stuff seems to be all part of CDE in the /usr/dt directory). [redacted]

...from another machine on the network. As you'll have guessed, 'aixbox' is the hostname of my PowerPC-based AIX server. This time instead of putting me onto the AIX desktop, dtchooser powers up, scans the network for listening XDM machines and after a short delay presents me with a list of them to choose from (see the screenshot on this page).

If you have a network, however small, that is running more than one operating system that supports X (and there are X servers for Windows too), do give this XDM stuff a go, if you haven't already. And, as ever, drop me an email to let me know how you get on.

Other free UNIXes

Paul Lee <woodruff@stayfree.co.uk> raises the perennial question: Why Linux?

"Please do not interpret this email as a criticism of your fine column. It isn't. Even considering all the publicity that Linux gets, it's still worth noting that there are other free UNIXes out there, and wondering why Linux is taking off exponentially and they are not. The UNIXes I am on about are the BSD's, Open, Free and Net. Each seems to offer its own specialisation.

Yes, I agree, Paul, and I do get mail about this from time to time, suggesting that I put too much of an emphasis on Linux. I suppose a glib answer would be that Linux is easier to install on a wider range of hardware, and the benefits of the alternatives are too marginal to make an impact.

The 'specialisation' you talk about is a problem for a column like this. The historical reasons for the fragmentation of BSD are fascinating, but obviously don't help ordinary users get a coherent picture of what UNIX is. It's true that there are a variety of Linux distributions, but they'll all fundamentally the same operating system once installed.

My take on this question is that I'm writing the UNIX column, not the Linux or BSD column. Essentially I'm trying to get to the heart of what UNIX is all about, and it seems to make sense to focus on the UNIX that most of my readers seem to be using, if I can do this without getting too bogged down in Linux-specific issues.

PCW CONTACTS

Chris Bidmead welcomes your comments on the Unix column. Contact him via the PCW editorial office or email unix@pcw.co.uk

Theoretically tweaking

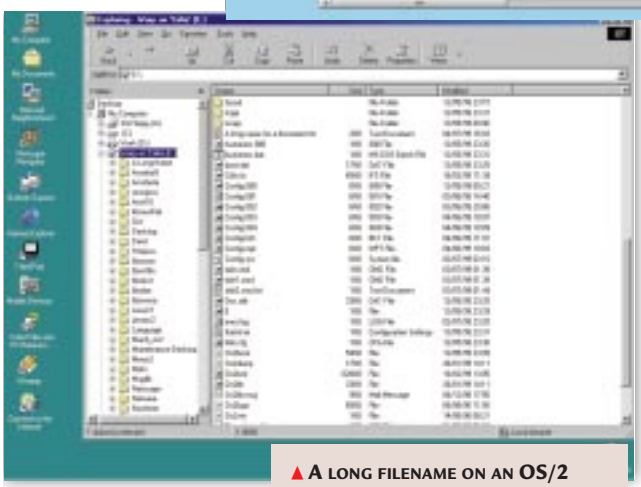
Promises, promises! Terence Green bites off more than he can chew pairing off Windows and OS/2

It was a mistake to make a noise in the last column about shifting back to networking questions after the DOIP months! Not long after that an email from Rupert Russell recalled my earlier promise to write something about the pitfalls of connecting Windows and OS/2 machines. 'Have you ducked out or is this promised article just undergoing a final polish?,' asks Rupert. Ouch!

The truth is, I chickened out. I have a network consisting of several PCs running multiple operating systems – OS/2, Windows and NetWare – and my original plan was to banish IPX and NETBEUI in order to run TCP/IP only. This works perfectly until you want to share drives and printers.

Windows and OS/2 machines require NETBIOS in order to make shared resources visible to each other. If I leave NETBEUI, a specialised workgroup protocol which (as its name implies) supports NETBIOS, on the Microsoft systems and run IBM NETBIOS on the Warp systems, everything works fine. However, dumping NETBEUI is easier said than done.

◀ FILES WITH LONG NAMES CAN BE MOVED BETWEEN SHARED DRIVES IN WINDOWS AND OS/2 WARP 4.0



▲ A LONG FILENAME ON AN OS/2 WARP 4.0 CLIENT VIEWED FROM THE WINDOWS 98 EXPLORER

In theory one simply removes NETBEUI on the Windows PCs and replaces OS/2 NETBIOS on Warp with IBM NETBIOS over TCP/IP. I started working through it, reading relevant messages in the comp.sys.os.os2.* groups on Usenet, and rifling through the IBM technical documents on the Internet.

I really thought I could handle it. But then it all got horribly complicated and I gave up. IBM's installer for NETBIOS over TCP/IP needs to be manually tweaked as it doesn't always edit the INI files correctly and, although the later Windows operating systems (95/98/NT) do NETBIOS over TCP/IP by default, there are differences in the protocol implementations which can lead to frustration.

Admittedly I didn't try very hard before giving up. But the fact that everything works just fine when NETBIOS is installed on both the Windows machines and the Warp systems tempered my desire to get the TCP/IP-only solution working. Eventually I decided that NETBEUI on Windows coupled with Warp's OS/2 NETBIOS works very well and I can heartily recommend it! But, now that Russell has called my bluff I plan to have another go at creating a step-by-step guide.

Russell also says that he has problems using the tape machine on his OS/2 Warp 3 Connect machine to backup Windows 95 machines across the network because Windows appears to truncate long filenames when sending a file to the OS/2 system. He says this happens even though his Windows 95 system can get long filenames from the OS/2 PC. I'm not sure of my facts with respect to Warp 3, but I don't see this problem in a Warp 4/Windows 98 combination.

As you can see from the screen shots I used Windows File Manager to create a file called 'A long name for a document.txt' on a shared Warp drive and copied the file back and forth without seeing any truncation. I suspect the problem on the OS/2 machine might be down to the OS/2 tape backup application rather than Windows. So, if any readers know the answers to any of the above problems, fire away!

■ Free ISPs revisited

The recent columns on connecting to free ISPs generated a large number of responses and questions. I'm sorry I haven't been able to reply to every email but I have tried to put all the information into the column. As ever, it's prepared some months ahead of the publication date, so you might only see a question answered some months after you send it in. Previously we mentioned FreeServe and BT Click in the column but there are now over a dozen free ISPs and it's well worth experimenting.

Several people have recommended alternative free ISPs and a couple have

complained about a slow response on FreeServe. It's possible that FreeServe is slow because of its rapid growth from zero to more than one million users. Certainly I've noticed that the response on my paid ISP (cix.co.uk) is much faster than FreeServe, but then CIX only has a tad over 10,000 users.

Roger Provins says he has successfully signed up with Freedotnet (fdn.co.uk) after using AOL for several years. Roger used the older 16-bit AOL Windows software in a Win-OS/2 session but says now he has moved to OS/2 and Netscape 4.4 on Freedotnet, his download speeds have improved to around 5.2Kbit/sec most of the time.

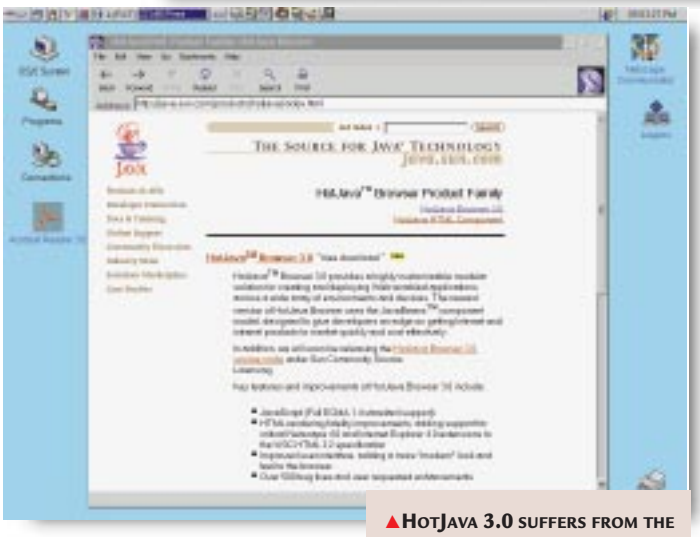
Clive Shearsby suggests Free-Online at www.free-online.net because it claims to support everything from Windows to Linux and mobile phones. Clive also mentioned in passing that he has struck it lucky with Fix Pack 40 (for Warp 3). He runs a Cyrix P166 CPU which reacted poorly to Fix Pack 30. Since upgrading to Fix Pack 40, Clive's system has been fine.

Steve Caine wrote in asking what had happened to the www.internic.com site I mentioned in regard to domain name searches. Well, it seems that in between writing the column and its publication my advice regarding InterNIC was rendered obsolete by events.

The InterNIC site was maintained by Network Solutions Inc. (NSI), which controlled domain name registrations for the .com, .net and .org top-level domains from 1993. This changed recently when a new 'Shared Registration System' was introduced. The new system is being managed by the Internet Corporation for Assigned Names and Numbers (ICANN), a non-profit-making corporation controlled by the Internet community, and they have had a few disagreements with NSI – resulting in some hiccups in the introduction of the new system.

But, you can now go to NSI's new site at www.networksolutions.com to check the availability of .com, .net and .org domains. If you're after UK domains (co.uk, org.uk, net.uk, ltd.uk and plc.uk) try Nominet at www.nominet.org.uk.

◄ **ADOBE ACROBAT READER VERSION 3.0 FOR OS/2 LANGUISHES A LITTLE BEHIND OTHER VERSIONS**



▲ **HOTJAVA 3.0 SUFFERS FROM THE USUAL COMPLAINT FOR JAVA PROGRAMS RUNNING ON OS/2 IN THAT IT IS DISAPPOINTING**

■ Acrobatics

I've had a few requests, in particular from Cecil Wallis and Holger Granholm, to put the OS/2 version of Adobe Acrobat on the cover CD. After earlier problems with applications I decided to stick to putting Fix Packs, Netscape and Java updates on the cover CD, when space allows. But the Adobe Acrobat licence says it may be freely distributed and it's only 4Mb so you should see it on the next CD. As we have come to expect, the OS/2 offering languishes at version 3.0, while the rest of the world can now download 4.0. But if we wanted to run the latest software we wouldn't be using Warp, would we?

While online at Adobe I also grabbed the preview version of the Acrobat Viewer for Java. The documentation says it needs the latest Java version 1.1.8 so I downloaded the 1.1.8 Preview for OS/2 from IBM, only to find that the Adobe installation program is faulty. Apparently it's a known problem.

Flushed with my lack of Java success I downloaded HotJava 3.0 from Sun and tried that on Preview 1.1.8. This is a lightweight browser, also available as a JavaBean component, which installs and runs on OS/2 Java.

Having been very enthusiastic about Java to start with, because it offered the prospect of new applications for OS/2, I've been disappointed by the reality. Java works well inside banks and financial organisations and is widely used on servers. But, it looks like we'll have to wait a while yet for mainstream applications for OS/2 clients, even though every Java benchmark thus far has shown the OS/2 implementation to be a stormer.

Undeterred, we hope to put the released Java 1.1.8 code onto the cover CD. This won't be ready in time for the next issue but we hope to place it on the December cover. We're also waiting for a July refresh of the Netscape 4.4 code and a rumoured 4.5 version for OS/2. We'll put all this on the cover at the earliest opportunity, but don't hold your breath – space on the cover CD for OS/2 material is becoming increasingly less available.

PCW CONTACTS

Terence Green welcomes your feedback on the OS/2 column. Contact him via the PCW editorial office or email os2@pcw.co.uk

Time for embed

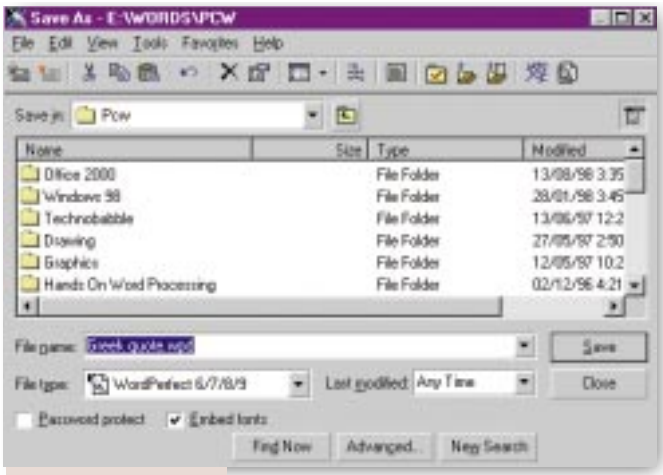
Tim Nott on how to ensure that your nicely formatted documents make sense at the other end.

Last month I mentioned one of the hazards of emailing Word files, in that they might contain information that is apparently deleted, but can be seen when loaded into a text editor. Another common problem with electronically transmitted documents is WYSINWTG — what you see is not what they get. If you email someone a document or send it on disk, they'll only see the fonts that are installed on their own system. So, if you've formatted all your headings in a tasteful Copperplate Gothic and the recipient doesn't have the font installed, then another font will be substituted, ruining your creative efforts. Even worse, if you've used a non-standard symbol or foreign language font, such as the Lotus Maths symbols or WordPerfect Arabic, then if the font isn't installed on the recipient's PC the result will be garbage.

There are several ways around this problem. The easiest is to use the technology known as Portable All-Purpose Electronic Rendering (PAPER). This ensures that fonts and graphics reach the recipient in exactly the same state as they appear when printed from your PC. Although transmission isn't quite as fast as traditional email, the paper product means the recipient doesn't have to be seated at a computer to read them.

A second way is to adopt the technology PCW uses for the Hands On back issues, when they appear on the CD-ROM (for space reasons, not this month). Adobe Acrobat provides a way of viewing pages as the originator intended, regardless of installed fonts or operating system – as long as they have the Acrobat reader. The disadvantage of this method is that usually you need the Acrobat Distiller software to create the Portable Document Format (PDF) files after they've been written in the originating word processor. Version 9 of WordPerfect, however, includes an option to publish straight to PDF.

The third way, should you be unwilling to confine yourself to the standard Windows core fonts, is to use Font Embedding. This, as the name suggests, wraps up a copy of the font file within the document file, so if the former isn't installed at the destination, the characters can still be displayed from the embedded copy.



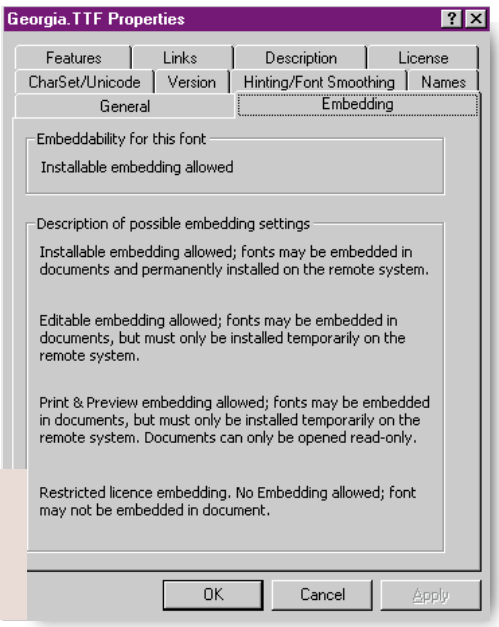
▲ EMBEDDING FONTS IN WORDPERFECT

All the big three word processors support font embedding — though WordPerfect has only just caught up in version 9. In WordPro, this is in Document Properties, Document, Options. In WordPerfect, there's a checkbox in the Save As dialog, and in Word it's in the Tools, Options, Save dialog — where there's also an option to embed just the characters used in the document. This cuts down on the file size but obviously the recipient won't be able to edit the text set in that font.

Word isn't very good at realising that the bold and italic files need embedding

However, embedding has its drawbacks. For a start, it can make substantial differences to file size, especially if several fonts are involved. A further point is that fonts – like other software – are protected by copyright and licence agreements, and it's up to the creator of the font to decide whether to allow embedding.

There are four levels of embedding permission. The most generous – which you'll see in the Windows core fonts and other free fonts that can be downloaded from the Microsoft site mentioned below is 'Installable'. Legally, this means the font can be both embedded in a document and installed on the remote machine. The latter should happen automatically, but I have noticed Word isn't very good at realising that the bold and italic files need embedding as well. My experiments showed that only the



►EVERYTHING YOU WANTED TO KNOW ABOUT FONTS, BUT WERE AFRAID TO ASK

Questions & answers

Q In Word 97 I am able to rotate text in tables using Format, Text Direction. It's very useful for lengthy column headings, for example, where contents of the cells below are short. Is it possible to do a similar trick with WordPerfect, which I now use at work?

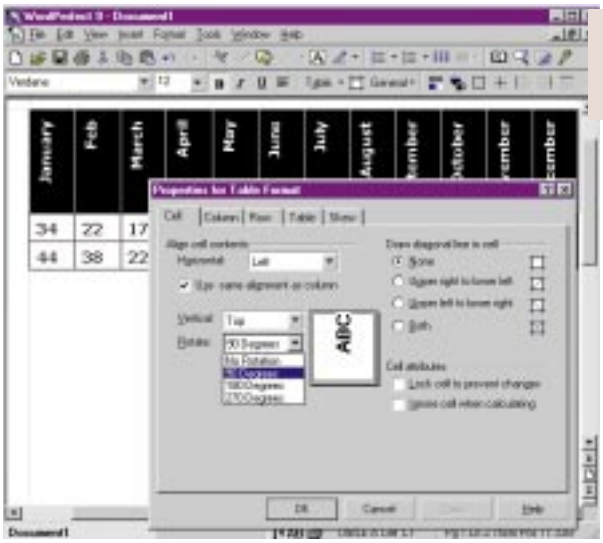
YOLANDE FERRIER

A ***Yes – highlight the cells to rotate, then right-click, Format, Cell. Select the angle from the Rotate list. Note that WordPerfect actually places the text in a frame, which – if you're not careful – can be dragged out of the table. If you want to edit the text, click on it. This will open the text box in a new window, which is a little disconcerting if the document is maximised in WordPerfect, as it appears that the rest of it has disappeared. Make the changes, close the window, and the table will return, reflecting the changes.***

Q I want to produce a set of fifty sequentially-numbered, but otherwise identical certificates in Word. Is this possible?

ALAN DAVIS

A ***The purist's way of doing this would be to write a macro that used a For... Next loop to print a copy, increase the number, print another copy, and so on. Another way would be to do a mail merge, with just the sequential numbers in the data source. An easier way is to use the page numbering feature of Word. Choose Field from the Insert menu, then Page from the Numbering category. If you don't want to start at the number one, then Insert, Page Numbers... and hit the Format button. Enter the 'Start at' number, OK out of the Format dialog, and hit the Close, rather than OK button in the Page Numbers dialog. Put a page break (Control + Enter) at the bottom of the page, then copy and paste to get the required number of pages. Select all the pages and press F9 to update the page number fields. Then print. If the certificates contain graphics, make sure the files are linked to, rather than stored in, the document – this will make a dramatic difference in file size.***



Q If I select all text (Control + A) while I am recording a Word macro, then format the text, I can't cancel the selection by clicking with the mouse until I stop the recorder.

K ROLAND

A ***You'll find that you can't move the cursor with the mouse at all when recording, as neither VBA nor WordBasic support mouse actions of this type. Use the Home, End, Page Up/Down and arrow keys instead.***

Q Back in the days of yore (Windows 3.1 and Word 2.0) I used to be able to display a list of all my Word files, which showed the contents of the documents for each file. Can it be done with Win 98 and Word 7? Also is there any way of deleting a file from inside Word 7?

PETER MOYES

A ***Yes – if you select 'Find file' rather than 'Open' from the File menu you are presented with a dialog which includes an Options button – and one of those options is to preview the file content. The same dialog also has a Delete button.***

◄TURNING THE TABLES IN WORDPERFECT

normal file was embedded and that italicising and emboldening were done by slanting or thickening the normal font, which is a hideous compromise.

The second level is 'Editable'. This means the fonts can't be installed permanently on the recipient machine but the document using them can be edited. Getting more restrictive, 'Print and Preview' embedding lets the recipient see but not touch — much the same as an Acrobat document — and finally 'Restricted Licence' embedding means you can't include the font in a document at all. Just to confuse matters, most of the symbol and special language fonts that come with WordPerfect 9 are in the last category. However, you can embed them in WordPerfect documents — but not elsewhere. Just to add a little more confusion, neither Word nor WordPro seem able to tell you if you're trying to embed a non-embeddable font – the process fails with no warning.

'Restricted Licence' means that you can't embed the font at all

So how can you tell the embedding status of a font? The answer is to download the free Font Properties Extension tool from www.eu.microsoft/typography. As well as addressing this problem it also adds several pages of information to a font's properties, including description, the character sets included, hinting/smoothing and other essential information for font junkies. Since I last mentioned this (July 98) it's been updated, and there is also a good selection of free fonts at the same site.

PCW CONTACTS

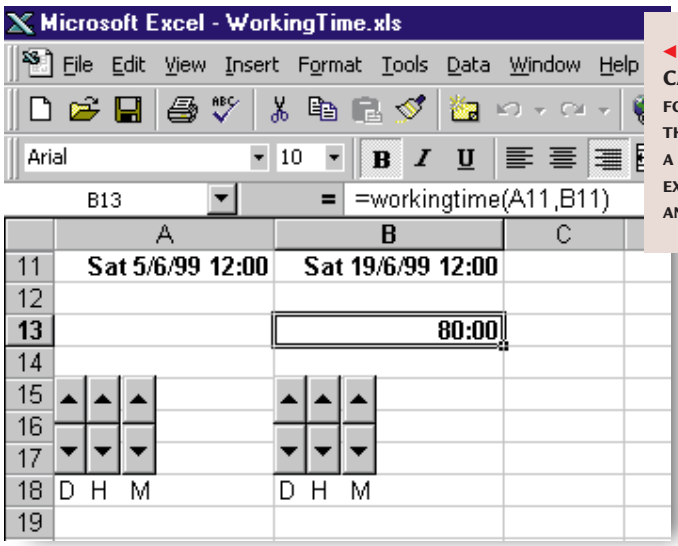
Tim Nott welcomes your comments on the Word Processing column. Contact him via the PCW editorial office or email wp@pcw.co.uk

Counting the days

Steve Wells reveals the hidden day-counting functions to save you from a laborious DIY job

Andy Caddy and Bill Alexander have both sent me listings of functions they have created for counting the number of working days between two dates. Andy's is a very fancy affair (much too long to list here) that expresses the difference in hours and minutes, and even features a worksheet with spinners on it for inputting the start and end dates and times [Fig 1]. His home-grown function, WorkingTime(Start_Time, End_Time), omits Saturdays, Sundays and several Bank Holidays, specified by actual dates listed in the macro for 1999 and 2000, and only counts the hours between 8am and 5pm.

Bill's WorkDays(FromDate, ToDate) function is a much more basic affair, simply counting days between two dates, leaving out the weekends, although the listing is lengthy.



◀FIG 1 ANDY CADDY'S WORKSHEET FOR CALCULATING THE HOURS WORKS IN A CERTAIN PERIOD, EXCLUDING HOLIDAYS AND WEEKENDS

Many readers may not realise that since Version 4, Excel has provided a NETWORKDAYS function. This counts the number of workdays, net of weekends, between two dates. If you can't find it, choose Tools, Add-Ins and see that the Analysis ToolPak Add-In is checked. If the ToolPak isn't listed, go to Control Panel, Add/Remove Programs and load it from your Office or Excel CD-ROM.

Excel will recognise a number of 1-2-3 functions and DATEDIF is one of them

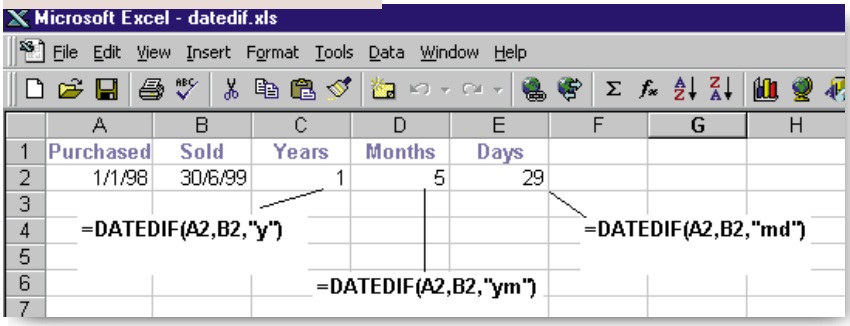
The NETWORKDAYS function takes three arguments: start_date, end_date, and holidays. All three have to be entered as serial date numbers. The easiest way to do this is enter the dates in cells (formatted to display however you like) and then use cell references for the arguments. You could put the start date in A1, the end date in A2, and list the dates of Bank Holidays or other dates to exclude in G1:G12. Then enter =NETWORKDAYS(A1,A2,G1:G12)

If you work a seven-and-a-half-hour day and want to calculate how many hours you worked from Monday August 16th to Friday September 3rd, enter those dates in A1 and A2 and (a Bank Holiday) 30/8/99 in G1. In A3 enter =(NETWORKDAYS(A1,A2,G1)*7.5) You can use the Custom format 0 'hours' and Excel will display 105 hours.

There is another function you can use for date-difference calculations, although it is undocumented in the Excel function listings or Help files. It is the Lotus 1-2-3 function, DATEDIF. There are a number of 1-2-3 functions that Excel will recognise and this is one of them. If the start date of a period is in A1 and the end date is in A2, and you want to count the days, enter =DATEDIF(A1,A2 "d"). To count the years use 'y' and the months use 'm'. To count days ignoring months and years, use 'md'. Count months ignoring years with 'ym.' Count days ignoring years with 'yd.' An example of its use would be in an inventory, [Fig 2]. An item purchased on Jan 1st '98 and sold on June 30th '99 would have been owned for one year, five months, and 29 days.

If you just want to calculate the time of an event like a boat race or a flight, you don't even need a function. Custom format cell A3 h 'hours' mm 'mins' and enter the formula A2-A1. Enter 2/10/99 6 PM in A1 (leave a space before the PM) and enter 3/10/99 9:47 AM in A2. Cell A3 will display 15 hours 47 mins, which is the correct duration.

▼FIG 2 CALCULATING THE DATE DIFFERENTIAL, OR TIME ELAPSED OVER A PERIOD, USING THREE VARIATIONS OF EXCEL'S DATEDIF FUNCTION



Optional printing

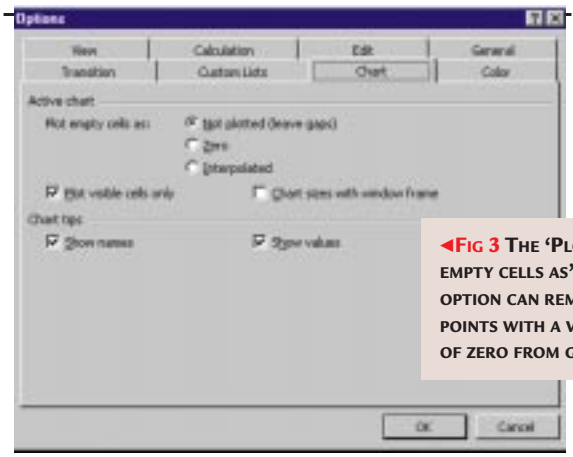
Barry McAleenan and Jim Turner have similar printing problems and if you have an answer I'll pass it on to them. Coincidentally, they both reminisce about the past. Barry uses Lotus 1-2-3

Questions & answers

Q I am employed by a construction company that has a number of remote sites, linked by a WAN. Each of these sites updates a progress report. I then pull together all of the information into an Excel worksheet, from which I draw a progress graph. The problem is if there's no data in a site's file, my report returns a zero that the graph plots. At present I manually add formulas to eliminate these plots but I'm looking for an automatic method, which doesn't involve VBA.

ANDREW KING

a ***With Excel 97, if you click the chart then choose Tools, Options, Chart tab, there is a section headed 'Plot empty cells as' [Fig 3]. Here you can have the zero plots ignored, or drawn, or interpolated – meaning the gaps in lines are joined up.***



◀FIG 3 THE 'PLOT EMPTY CELLS AS' OPTION CAN REMOVE POINTS WITH A VALUE OF ZERO FROM GRAPHS

Q I have a curious problem with Excel 97. At the bottom right hand side of the screen are the letters FIX (on the right of the NUM box) and when I type in figures in a cell, I get a completely different figure from what I've entered. If I type in 6, I get 0.06. How can I get it back to normal?

STEPHEN MOYLE

a ***You need to go to Tools, Options, Edit and uncheck the Fixed decimal box. But it's important to remember that this option is available when you have a lot of cash entries to make. It can save you having to keep putting the decimal point in.***

Q I wish to add a number of months to a date. For example, 6 June 99 + 12 months would return 5 June 00; and 1 October 98 + 5 would return 28 February 99. I must have missed something along the usual routes because I have been forced to produce a formula using conditional statements. Can you point me in the right direction?

MARK OVEREND

a ***If you start with 6 June 99 in A1 (which you produce using the custom format, d mmmm yy) and enter =DATE(YEAR(A1),MONTH(A1)+12,DAY(A1)-1) in a cell you get 5 June 00. Similarly, if you start with 1 October 98 in cell A2, and then enter DATE(YEAR(A2),MONTH(A2)+5,DAY(A2)-1) you can display 28 February 99.***

and says, 'I would like to print a row of cells IF a particular cell in that row has a value of 1 or more. Supposing I have a shopping list of 500 items. I only want to print a list of items I wish to purchase (say 100 rows). Years ago, I could have got a result in BASIC, but software is now too friendly to be truly obliging.'

Jim says, 'An old DOS shareware spreadsheet I use called CALC has a NOPRINT function. A row will not print if a cell in it meets certain conditions. I can't see how to do the same in EXCEL. I can't believe a sophisticated program can be outperformed by software more than 12 years old! I use a spreadsheet for clients' tax calculations. As an example, if a row is for "Interest on Savings" and they do not have any, then I don't want to take up space printing that item.'

Gobbledygook

Andy Williams says: 'I've been trying to access an Excel file from a colleague who has recently left our organisation. I have moved the file and renamed it, then tried to get into it via Access and Word, and also tried to link to it from another spreadsheet but all to no avail. I have managed to open it in Notepad but it is just gobbledygook. Do you have any ideas on how I can get to the data?'

This inaccessibility could be for a wide variety of reasons, but it may well be that the file is corrupted. You could try Excel recovery software such as Concept Data's Excel Recovery program at www.conceptdata.com or a program called ExcelRecovery at www.ExcelRecovery.com.

EXCEL SHORTCUTS

☛When you enter data and press the Tab key, the focus will move to the next cell along the row. But if you move the vertical scroll bar down, so that the first row you wish to make an entry in is at the top of the Window, and click on the column letter, the focus will go down the column. Correspondingly, click the row number, and you can move along the row using Enter.

☛When you drag down the Fill Handle of a cell it copies the contents (or a default series) and the format to the cell below, but if you right-click and then drag you have a number of options, including developing a series of your choice, or changing formatting.

☛If you point to any of the edges of a cell, you can drag the contents to another cell. But if you right-click, point and drag, you are offered a wide range of options.

PCW CONTACTS

Stephen Wells welcomes your comments on the Spreadsheets column. Contact him via the PCW editorial office or email spreadsheets@pcw.co.uk

◆ *Please do not send attached files unless they have been requested.*

Size matters

Mark Whitehorn finds that keeping PDAs up to date pits memory capacity against download time.

PDAs have tiny brains, at least in database terms. So a significant part of designing a mobile database system is deciding what data will go to which PDA. You have to think about: who needs which data set and which parts of the data should be editable. This is important because some non-editable data may not have to be downloaded to the PDA each time it is synchronised.

These decisions will all require the Wisdom of Solomon and the discernment of... well... the most discerning person you can think of, and you'll notice that I'm not being much help. The answer is that I can't be, and that this is an area where common sense will triumph. You need to balance the desire to shunt lots of data to the PDA with considerations of connect time and speed. You need to talk to the people who will be using the PDAs in the field and find out what they really do with the machines. And they almost certainly won't be able to tell you because they won't have used them in anger yet, so they won't have enough experience. The good news is that this is a major challenge and we thrive on challenges. Incidentally, I stress the 'design' side so much because actually implementing the process of sub-setting the data is trivial – that's what SQL is for.

Another aspect worth considering is that technologies such as the new IBM micro disks are set to revolutionise this process when they come on-stream in the latter part of the year – 340Mb is an order of magnitude improvement for PDAs. In some ways this helps to make the design process easier: as you don't need to spend so much time agonising over which parts of the data are required. On the other hand, sending too much data can be equally problematical because of the time the transmission can take.

The new IBM micro disks are set to revolutionise the design process

Working days

Database people clearly love calculating the number of working days – perhaps it's because we all work so hard; we need to know when we will be free. There has been a flood of mail about this. In particular, Ken Sheridan put a great deal of effort into the topic; amongst other contributions he translated Charli's dBASE code into Access.

[FIG 1]

```
1+DateDiff("d",[Start],[End])-
(DateDiff("ww",[Start]-
1,[End],7)+DateDiff("ww",[Start]-1,[End]))
```

The bottom line is that many people seem to use a simple system – division by seven and multiplication by five. This will often give the correct answer or at least give something close. But for those who need/want/demand an exact answer the problem is more complex. To begin with you need to take account of the start and end days. Secondly there are public holidays such as bank holidays. The second problem is only solvable using a table of dates, but we can address the first more easily.

Charli's code does this rather elegantly and I suggested that as an exercise you could try to figure out how it works. I was going to provide an explanation this month, however, Charli (who's in fact male – sorry about that!) wrote in himself and saved me the trouble. His detailed explanation will apear on a future cover disc.

Andy Robinson <andycrobinson@hotmail.com> sent in an Access specific answer which involves no coding at all – you could; for example, embed the formula in a form, as in Fig 1.

Record Ordering

On a different topic, David Saville extended the Record Ordering problem mentioned in the June issue. He defines another class of problem, together with a solution: 'A more interesting problem is to include record numbering actually within the output from a query, which is a problem I had to solve for one of our customers a while ago.

[FIG 2]

```
SELECT
tblTestContacts.Contact,
tblTestContacts.ContactDate,
basLineCounter([Contact]) AS LineNo
FROM tblTestContacts
ORDER BY tblTestContacts.ContactDate;
```

'The way we solved it was to create an incremental counter function, containing a static variable to prevent the value of the counter from being lost from one invocation to the next, and using this in a query [Fig 2], where the work is actually done by "basLineCounte".'

Stock answer

On the subject of stock levels, the following erudite contribution from Jacques Thoorens <Jacques.Thoorens

[FIG 3]

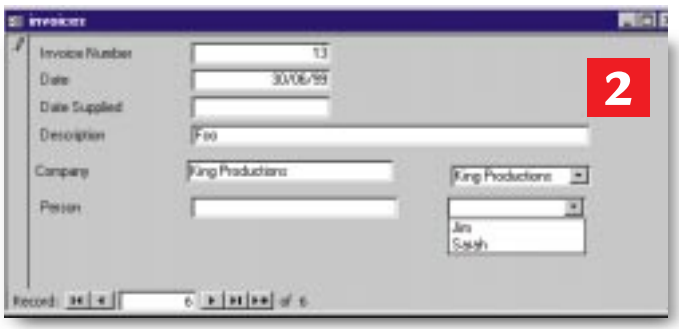
```
SELECT TotalNoItemsSold.ItemNo,
TotalNoItemsSold.Item,
IIf(IsNull([TotalNoOrdered]),0,[TotalNoOrdered]) AS TNO
IIf(IsNull([TotalNoSold]),0,[TotalNoSold]) AS TNS,
[TNO]-[TNS] AS StockLevel
FROM TotalNoItemsSold INNER JOIN TotalNoItemsOrdered
ON TotalNoItemsSold.ItemNo = TotalNoItemsOrdered.ItemNo;
```

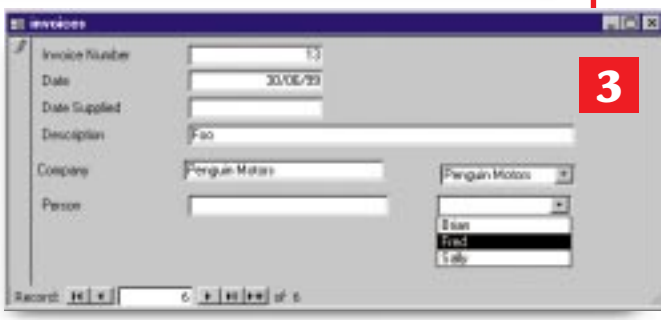
■ Multiple Combo boxes

Tony Kelly wanted to be able to use two combo boxes to subset data. For example, suppose that you have an invoicing system set up and you need to invoice people who work in different companies (screen shot1). On the invoice form itself, you want to be able to choose the company (screen shot 2) and then choose a person. However, the 'person' combo box should only show the names of the people who work for the company you have just chosen (screen shots 3).

Tony supplied an MDB file to do just this, and this will feature on a forthcoming cover disc. Have a play and you should be able to see how it works. The only point that may not be obvious is the On Got Focus property that is set for the second combo box.

Please note this database is simply to demonstrate these multiple combo boxes. It is not supposed to be the epitome of good design in other ways!





[FIG 4]

```
CREATE VIEW StockLevel
AS
SELECT TotalNoItemsSold.ItemNo,
 TotalNoItemsSold.Item,
 TNO = CASE
 WHEN TotalNoOrdered IS NULL THEN 0
 ELSE TotalNoOrdered
 END,
 TNS = CASE
 WHEN TotalNoSold IS NULL THEN 0
 ELSE TotalNoSold
 END,
 ISNULL(TotalNoOrdered,0) – ISNULL(TotalNoSold,0) AS StockLevel
FROM TotalNoItemsSold,TotalNoItemsOrdered
WHERE TotalNoItemsSold.ItemNo = TotalNoItemsOrdered.ItemNo
```

@ping.be> is worth reading, not only for information about stock levels, but also for information on differences between Access and SQL server.

'I read your column every month in *Personal Computer World Hands On* and I was very interested by your April paper about stock level.

Thinking about it, I have another solution to propose.

The problem is there is no way to make a calculation with Null. Or to say it another way, each expression containing a Null value is evaluated as Null. Fortunately, Access provides a unique function whose purpose is to avoid this "contamination" : IsNull( ).

Here is a proposal for replacing your StockLevel query : instead of using TotalNoOrdered and TotalNoSold, which can contain Nulls, I use TNO and TNS, two expressions built with IIf( ) and IsNull( ) functions [Fig 3].

Knowing that your column is not about Access but databases, I wondered if this solution could be used on any RDBMS. I tried to apply it to SQL Server 6.5. However, Isnull() behaves differently in SQLServer, so you will have to find another solution.

The method I suggest uses two different ways to avoid Null. The first uses the versatile CASE WHEN THEN ELSE construct and the second one the more compact function ISNULL(). To illustrate both of them, I have mixed them together [Fig 4], where TotalNoItemsSold and TotalNoItemsOrdered are views made in the same fashion as your queries.

■ Future disc

The full text of the examples from this month's column will be available on a CD-ROM soon.

PCW CONTACTS

Mark Whitehorn welcomes your feedback on the Databases column. Contact him via the PCW editorial office, or email database@pcw.co.uk

DVD on your PC

Gordon Laing looks at ways of giving your PC a front row seat in your home cinema

Today's half-decent PCs come fitted with DVD-ROM drives, but are they necessary, and should existing CD-ROM owners upgrade? In the near future we'll have properly authored PC DVD titles, but in the meantime, these drives are being pitched as high-quality movie machines. In this *Hands On* Hardware special, we've taken a close look at the various issues involved in watching DVDs on your PC, and discovered you may want to think carefully before settling down with a box of popcorn.

Two sides to a story

DVD-ROM drives look exactly like CD-ROM drives, and use the same ATAPI EIDE or SCSI interfaces. Once connected, a DVD-ROM drive behaves in the same way as a CD-ROM drive: the OS assigns it a drive letter, and it'll happily read both DVDs and CDs.

The actual drive is only one half of the story. By itself, it may be able to access the data on the discs, but not necessarily know what to do with it. The video on DVD movies is digitised and heavily compressed using the MPEG-2 format, while the audio is encoded using a variety of systems, commonly Dolby Digital and MPEG, and more rarely DTS and Linear PCM. Each one of these audio formats is digitally delivered by DVD and simply needs to be converted into analog for us to hear it. The video too needs to be decompressed and converted into an analog signal for us to see it.

Anyone who wants flawless DVD playback needs a hardware decoder card

Three steps to heaven

There are three ways to decode DVD's video and audio streams on a PC: first by using dedicated hardware muscle, second by using cunning software running on a sufficiently quick CPU, and third by sharing video and audio decoding between both dedicated hardware and cunning software. We'll be looking at how each of these works with their pros and cons.

◀ WITH SETUPS LIKE THE DIGITHEATRE FROM VIDEOLOGIC YOU'LL NEVER HAVE TO ENDURE SCREAMING KIDS AT THE CINEMA AGAIN

Dedicated hardware solution

Using dedicated hardware to process and decode DVD movies was the first, and remains the most superior solution for PCs. VideoLogic's DVD player card costs £65, and Creative Labs' Encore DVD bundles a 6X DVD-ROM drive and card for £138. A bundle is the best choice for those wanting to watch movies on their PC but currently without any DVD equipment of any description.

The suppliers of DVD decoder cards surprisingly play their benefits down, describing them as ideal for anyone wanting to watch movies on slower PCs which can't take the strain of software decoding; typically they'll work on a P133 upwards. Many cards are also sold to owners of fast PCs which came supplied with a DVD-ROM drive, but found the bundled software decoding disappointing.

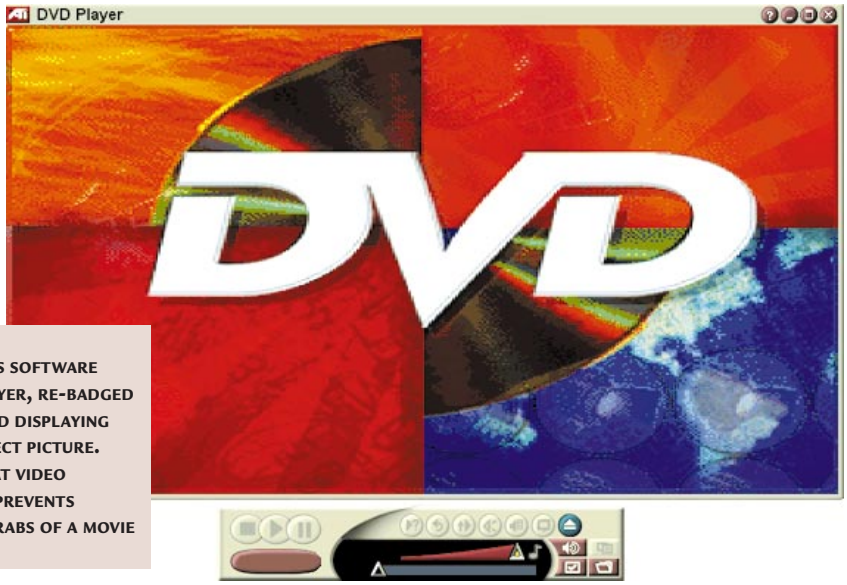
These cards also tend to feature TV outputs, which deliver the pure decoded PAL or NTSC video signals in a composite or, preferably, S-Video format. These outputs usually don't render your Windows desktop, making them no good for playing games or browsing the web on your telly. However, by delivering plain video only, the quality is a lot higher than simply displaying video in a desktop window, even when using the full PC screen.

Decoder cards also win on the audio front. Most feature an SPDIF (Sony/Philips Digital InterFace) socket that delivers the raw digital audio signal to an external surround sound processor. This signal could contain linear stereo PCM (such as CD audio), or compressed multi-channel digital surround sound. The mandatory standard for audio on DVD movies is Dolby Digital, encoded in two or six separate channels, and compressed using the AC3 algorithm.

Two-channel audio can contain hidden matrixed surround information. It'll sound fine played back through two speakers, but a Dolby ProLogic processor will extract two additional signals for a centre speaker and pair of

rear surround speakers. Hence basic analog surround sound.

Six-channel surround sound is commonly referred to as 5.1 audio. This refers to five separate full range channels for the three front and two rear speakers, along with a dedicated subwoofer deep bass channel, known as point-one. Most DVD titles take the original uncompressed 5.1 soundtrack, digitise (if necessary), and then compress it. Dolby Digital squeezes 5.1 channels into a bitstream of between 384 and 448 kb/sec, while higher quality systems such as DTS don't compress as heavily, but require something around 1.4Mb/sec for 5.1 audio.



▶ZORAN'S SOFTWARE DVD PLAYER, RE-BADGED BY ATI AND DISPLAYING 16:9 ASPECT PICTURE. NOTE THAT VIDEO OVERLAY PREVENTS SCREEN GRABS OF A MOVIE

A dedicated PC DVD decoder card will take the Dolby Digital signal, and mix it down into two-channel stereo (whether originally 2.0 or 5.1 channels), then deliver this as an analog stereo output; normally this will be fed to your speakers via your soundcard. The SPDIF output, however, provides external access to the original digital audio signal, which then can be fed to a separate Dolby Digital decoder. VideoLogic's DigiTheatre (£250) and Creative Labs Desktop Theatre 5.1 (£139) are 5.1 channel speaker systems, with amps and Dolby Digital decoders for a simple home-cinema audio setup. No PC solutions currently handle DTS soundtracks, unfortunately, but then the existing titles are rare and sold in the States only.

So far, so good, but in order to display DVD video on your PC monitor, decoder cards often employ VGA pass-through cables in the same way as Voodoo2 3D accelerator cards. Whatever the manufacturers say, pass-throughs degrade the quality of your standard windows desktop image, particularly at high resolutions. If your monitor has two inputs, you could connect the decoder to one and the video card to the other, sacrificing video overlay but retaining a good looking desktop. Some decoder cards won't operate properly, or calibrate themselves when disconnected from the main video card, but it's worth experimenting.

Software solution

Technology enthusiasts love software solutions. Why bother with expensive, power-consuming hardware when the same effect can be emulated using software running on a sufficiently-fast main CPU?

First of all, 'sufficiently-fast CPU' means a Pentium II running at 350MHz at least. In fact in tests we experienced dropped frames and out-of-sync audio on processors up to PIII 550s. Such glitches admittedly rarely occur, but the human eye and brain spot them immediately, ruining the effect of the film for discerning viewers. Try running Windows system monitor to see the effect of software decoding. Even our PIII 550 totally maxed out at 100 per cent, leaving nothing behind. You'll also curse every time your hard disk performs routine maintenance, jerking the playback. Do make sure you've quit any background processes such as virus checking, though.

Speed aside, there are other issues. Eliminate a decoder card and you, er, eliminate the plugs it supplied. There may be video on your PC monitor, but without a suitable socket, how are you going to get it to your TV? We tried the TV-out sockets on modern video cards, but by delivering the entire Windows desktop, even full-screen DVD playback looked washed out and poor compared to the dedicated video outputs of decoder cards.

Audio-wise it's also all going through your soundcard. Sadly, none of the software decoders we tried would re-route the raw Dolby Digital signal to soundcards with built-in SPDIF outputs. The software took the Dolby signal and downmixed it to two-channel analog stereo, whether you liked it or not. The best you can do with this is run it

SCALING TO FIT YOUR SCREEN

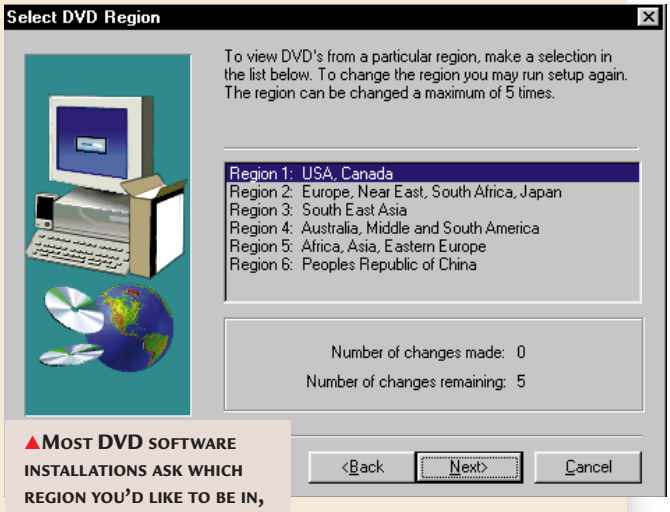
When watching a movie on your monitor, you want it displayed full screen. The problem is that DVD video only measures 640x480 pixels and most PC displays run at higher resolutions.
Games get around this by switching the desktop resolution on the fly, but all PC DVD players we've seen actually put in the effort of scaling and interpolating the image to fit the screen. This process again can prove quite intensive on your processor, so users of software-based decoders may want to manually switch their desktop resolution to 640x480 to give it the easiest job. Then again DVD video interpolated to 1024x768 or higher still can look pretty smooth. In effect your PC is acting as a budget line doubler and de-interlacer, both pieces of equipment that cost a fortune for domestic home theatres.

REGIONAL CODING

In an attempt to control worldwide releases, Hollywood divided the globe into six regions for DVD movies. Region 1 is North America, Region 2 is Europe and Japan, and so on. The theory is that players from one region will only playback titles from its home region, and reject foreign material. However, the slow take-up of DVD outside the US has driven tweakers to adjust players to allow them to access titles from all over the world. This involves soldering a new chip into a domestic player; however, there are regional hacks for PC playback.

All the DVD transport utilities we've installed ask upon installation which region you are in; in effect they're asking which region you'd like to be in, and will happily accept the Region 1 option, allowing playback of imported North American titles. However, the utilities usually only let you change the region when reinstalling the software, and most restrict the number of changes to five.

We found that setting up two otherwise identical Windows Hardware profiles from the System properties Control Panel could solve the problem. Simply install the utility as, say, Region 1 for the first profile, then restart Windows, choose the other profile, and install Region 2 drivers. In almost all cases you'll now be able to playback titles from wherever you want by changing Windows profiles. Bear in mind that there's talk of fitting hardware restrictions to DVD-ROM drives, but in our experience, there's no player – domestic, software or on a card – that can't be regionally modified.



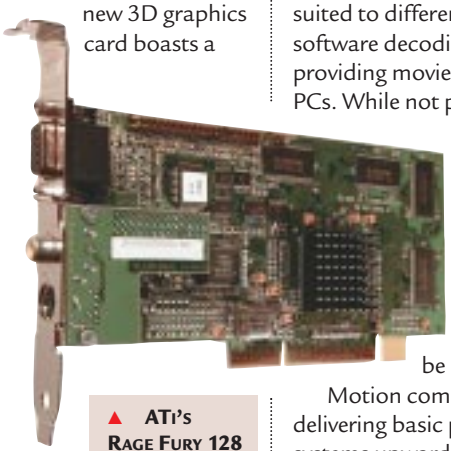
▲ MOST DVD SOFTWARE INSTALLATIONS ASK WHICH REGION YOU'D LIKE TO BE IN, BUT ONLY LET YOU CHANGE IT FIVE TIMES. USING WINDOWS HARDWARE PROFILES YOU CAN INSTALL MULTIPLE REGIONS

through a Dolby ProLogic surround processor. In this instance you should choose two-channel Dolby stereo over Dolby Digital 5.1 when playing back DVDs, as it required slightly less processing muscle for the final downmix. With any luck, future soundcard drivers and software players will be able to use existing SPDIF outputs for all types of audio streams.

☞ Mix 'n match

You can't help noticing that almost every new 3D graphics card boasts a DVD feature known as motion compensation. This actually takes care of decoding and processing the complex video signal, leaving the relatively simple audio decoding to your main CPU.

In our tests the main processor hit was typically reduced to around five to ten percent when using an ATi Rage Fury 128 card for DVD playback. Better still was that for display on your monitor, there were no nasty pass-through cables. However despite allowing you to play games on your TV, the PAL/NTSC video outputs remained inferior to those from dedicated cards, and once again the audio was software-downmixed analog stereo.



▲ ATI'S RAGE FURY 128 DID WELL, BUT DEDICATION'S WHAT YOU NEED

■ Conclusions

These three PC decoding solutions are suited to different environments. Pure software decoding is a very cheap way of providing movie playback on fast new PCs. While not perfect in many respects, it allows users to cheaply evaluate the format for a more serious purchase in the future. Also as CPUs get faster and hardware drivers more cunning, most of the issues will be resolved.

Motion compensation is great for delivering basic playback on mid-range systems upwards, and anyone considering a new graphics card should definitely make sure it has this handy facility. Like software decoding, however, it's only currently suitable for toying with movie playback on your PC monitor.

Anyone who wants flawless DVD playback using a PC still needs a hardware decoder card. They supply the best signal to a TV and most offer SPDIF output, providing access to the Dolby Digital 5.1 soundtrack. Do bear in mind the pass-through cables, however.

So saying, if you want to connect it to your TV, you'll need your PC in the same room, or a very long cable. If it's in your lounge you'll have to put up with its noise let alone the looks, while if it's in another room, then how are you going to control it? Additionally, who wants to wait for a PC to start up to watch a film in the first place? It might be possible to playback DVD movies on your PC, but if you're really serious about home cinema, buy a domestic player – a regionally modified Pioneer 717 or Sony 7700 are our recommendations.

PCW CONTACTS

Gordon Laing welcomes your comments on the Hardware column. Contact him via the PCW editorial office, or email hardware@pcw.co.uk

Big audio dynamite

Stephen Helstrip gives you the low-down on MP3 – the CD-quality audio format that has the music industry in a flap

A column devoted to MP3s is long overdue, so this month we'll be looking at the technology behind them and the software you need to create and play them on your PC. Although there has been some controversy surrounding the format – particularly in the music industry where copyright issues are a major concern – we won't be getting into any of that.

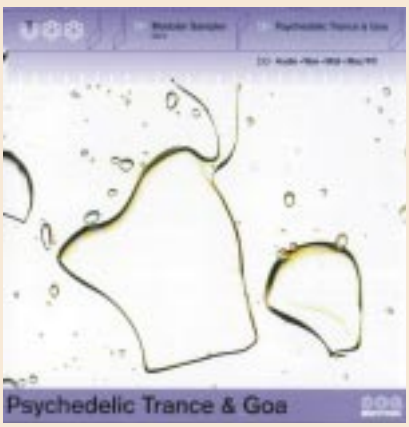
▶ **Fig 1** MusicMatch Juke Box has everything you need to encode and play MP3s

So what are MP3s? MP3 is an abbreviation for MPEG-1 Layer 3 and is a standard for compressing and storing audio at ratios as high as 96:1. MPEG was developed as a compression tool for

Fig 2: Table of MP3 compression ratios

Reduction Ratio	96:1	48:1	24:1	26-24:1	16:1	14-12:1
Sound Quality	Telephone	Better than Short-wave radio	Better than AM radio	FM Radio	Near CD	CD
Bandwidth	2.5KHz	4.5KHz	7.5KHz	11KHz	15KHz	>15KHz
Mono / Stereo	Mono	Mono	Mono	Stereo	Stereo	Stereo
Bitrate	8Kb/sec	16Kb/sec	32Kb/sec	56-64Kb/sec	96Kb/sec	112-128Kb/sec

Beatnik Psychedelic Trance and Goa



If there's one genre of dance music that has taken off in a big way this year then it has to be trance. Judge Jules, Pete Tong, Dave Pierce – they're all at it. But where do you get all those sounds that make trance what it is? Unless you're prepared to spend upwards of ten grand for a truckload of synthesisers and effects processors, sampling CDs are your best bet.

Psychedelic Trance and Goa is the first in a series of modular discs from Beatnik. Its modular aspect means that all loops (drum, percussion, bass and synth lines) come with the original MIDI files and their constituent parts. So not only can you see how the loops are put together (which is one of the best ways to learn how to do it yourself), you can swap one sound for another within a loop, change its tempo or just use the samples to create something new.

Each title comes with two discs: an audio version, and a CD-ROM containing the sounds in .wav format and the said MIDI files. The first six tracks provide samples in a construction kit format to enable you to get a track up and running. The production is first class. The remainder of the disc is crammed with loops, single-shot drum sounds, multi-sampled basses, synths, pads and analog effects. Again, the production is excellent and there's plenty of variation to inspire. At a shade under £40 they're excellent value as well.

Each disk costs £39.95 (£34 ex VAT) from SampleZone 0800 731 2939

Questions & answers

Q I want to record some tracks to CD-R but I'm having a bit of trouble. I've connected my MiniDisc to my PC via the line input on the sound card and can hear music in stereo through the speakers.

However, I don't seem to be able to record it to the hard drive. I've tried running Sound Recorder while the music is coming through, but it just doesn't pick it up. Can you tell me what I am doing wrong?

PAUL EALEY

***A** From what you've described it sounds as though Windows is setup to record from a device other than your sound card. Have you got a voice modem installed? To sort this out you need to run the Multimedia applet from the Control Panel and select your sound card as the preferred recording device. That should do the trick.*

Q I have a case of Atari-formatted discs filled with Cubase song files and would like to use them on my PC. When I try to load a file, Windows reports that the disc in drive A is not formatted. I've heard it is possible to load the discs, do you know how?

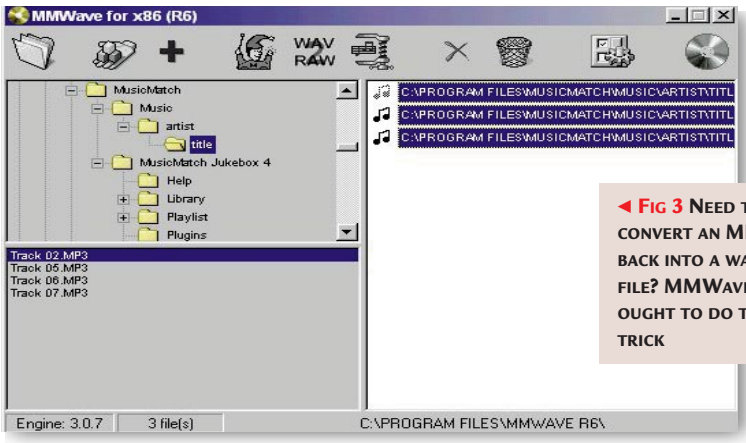
NEIL CHIPCHASE

***A** There is a way round this but you will need to dig out your old Atari. As you point out, PCs wont accept Atari discs. However, an Atari will read a PC-formatted disc providing it's one of those double density ones (720Kb). All you need to do is save your songs on to one of these and you're flying.*

Q I'm quite keen to use my PC for making music but being a complete novice I'm not sure where to start. I already have a MIDI keyboard (a Roland D-50) and fancy a go at sequencing and maybe trying out some of those plug-ins you're always talking about. Can you recommend a good book to get me started?

SIMON WEST

***A** The best book I've seen is PC Music the Easy Guide. It's perfect for someone like yourself and covers everything you're likely to want to know. As well as chapters dedicated to sequencing and direct to disc recording, there's info on sound cards, software synthesis, wave editing and those plug-ins. It costs £9.95 from PC Publishing.*



◀ FIG 3 NEED TO CONVERT AN MP3 BACK INTO A WAVE FILE? MMWAVE OUGHT TO DO THE TRICK

video and audio. Recently, though, it has become associated mainly with the latter and has been accepted as the de-facto audio format for internet users.

MP3 has benefits for the PC musician as well, and has become the standard for a good reason – it requires less space than other compression techniques and sounds much better. For example, you can fit up to a minute of CD-quality (44.1 kHz, 16-bit stereo) audio in just 1Mb. By comparison, you would need around 10Mb for the equivalent .wav file.

How does it all work, then? When we listen to music there are many elements of sound which our ears don't detect, for example, when one sound is masked by another. Using a mathematical model of the human ear, MP3 encoders (aka rippers) are able to sift out these redundant frequencies. So, we end up with much smaller file sizes, yet the perceived output remains more or less the same as the original recording. An MP3 player (or decoder) is much less complex as it isn't required to apply a psycho-acoustic modal – it just plays back what's there.

To create your own MP3s you will need an encoder. There are a few good ones available on the internet for free, although some do require a registration fee. For playback you'll need a decoder. One of the most popular ones is Win Amp because it can handle RealAudio, mod and MIDI files together. Both programs can be downloaded from www.maz-sound.com.

Perhaps the most useful MP3 utility I've come across to date is MusicMatch Juke Box [Fig 1]. As well as encoding and decoding, it is able to rip audio tracks straight from a CD and compile play lists. It can also encode from an audio source connected to your sound card's line input.

A dedicated webpage provides graphics, lyrics and track contents for a growing number of albums, but perhaps best of all, it's easy to use, quick, free and fully functional. The only limitation is that you cannot encode in full CD quality, only near CD quality. Registering will unlock this feature, though. To get yourself a copy, point your browser to www.musicmatch.com

At some point you may find you need to convert an MP3 back into a wave file. One rather neat utility for doing this is MMWave [Fig 3]. It's available from www.xs4all.dk and is completely free.

MP3s can be encoded with varying degrees of sound quality. Fig 2 shows a table of compression ratios which should give you some idea of the bit-rates that are required for the six most common formats.

PCW CONTACTS

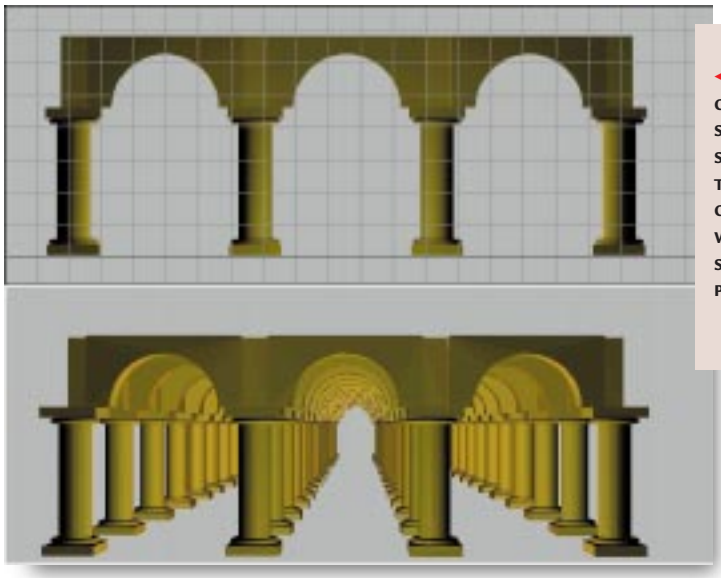
Steven Helstrip welcomes your feedback on the Sound column. Contact him via the PCW editorial office or email sound@pcw.co.uk

Show business

Benjamin Woolley on how cinematography is pushing 3D animation into the realms of Hollywood.

Creating 3D animations is often compared to making movies and this is a fair, as well as gratifyingly glamorous, analogy. It also explains why 3D graphics production is such hard work, as the artist effectively has to act as combined director, scriptwriter, set designer, set builder, props buyer and casting director. And there is another role, one universally recognised in Hollywood as key to the success of a production, but curiously neglected in the world of 3D: cinematography.

Cinematography is hugely important in 3D graphics because one of the most powerful tools that you have for viewing and rendering the scene you have created is a camera.



◀Fig 1 Two views of the same object seen from the same position. The top shows the orthogonal view, while the bottom shows the perspective view

Many 3D artists build and render their scenes using 'perspective' or even just 'orthogonal' viewports. Orthogonal views are the computer equivalent of the 'plan and elevation' drawings produced by an architect. They are abstractions, and it is not possible to really look at an object 'orthogonally'. Perspective views, on the other hand, simulate what the eye would see if the objects were real [Fig 1].

The reason why orthogonal viewports are useful is that they reveal an object's true geometry, so they are ideal for modelling. Fig 2 shows the same model shown through different viewports. The 'real' shape is in Fig 2a, in which the object can be seen from the top in an orthogonal viewport. Fig 2b shows the same object at an angle of 45 degrees to the horizontal, in a perspective viewport.

Fig 2c, the most distorted of all, isn't a perspective view, but one produced by using a virtual camera – the distortion has been created by exploiting the camera's capabilities.

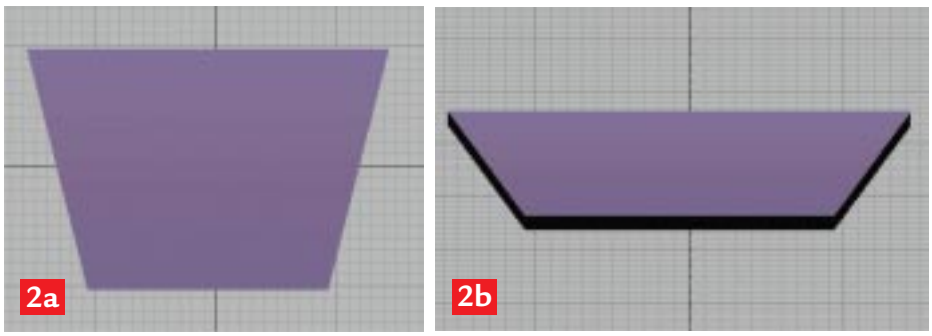
In the world of 3D graphics, cameras are odd entities. They are objects that you place within a scene and can move around like any other, but with a number of distinctive qualities. Like real cameras, they have lenses, and they can zoom. But they do not have tripods or viewfinders. Instead you can put them just about anywhere you want, and view what they 'see' through a viewport. Their position in the scene is represented by an icon or gizmo. You can have as many as you want, and none of them will be visible in the final render. The camera gizmo usually has another object attached to it, a 'target'. By moving this around, you can alter the camera's orientation. If you place a target inside another object, that object will appear to be in the middle of the scene from that camera's point of view.

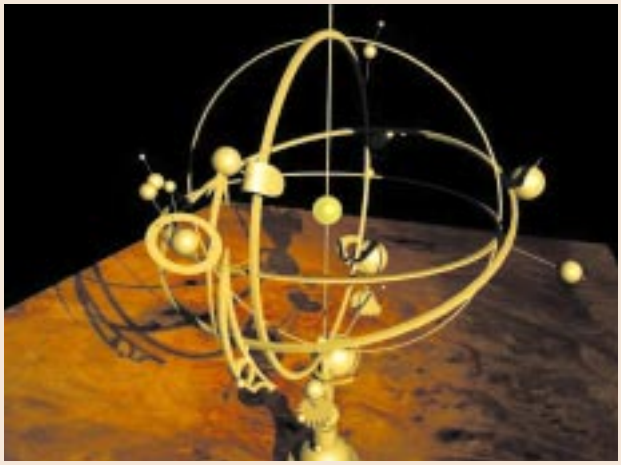
In some 3D packages, you can move the camera around from within the camera viewport. For example, you can 'dolly' (move away from or towards the camera's target), track from side to side, pan (look from left to right or vice versa without moving the camera itself, like swivelling the camera on a tripod) and roll. This is extremely useful for tweaking camera positions.

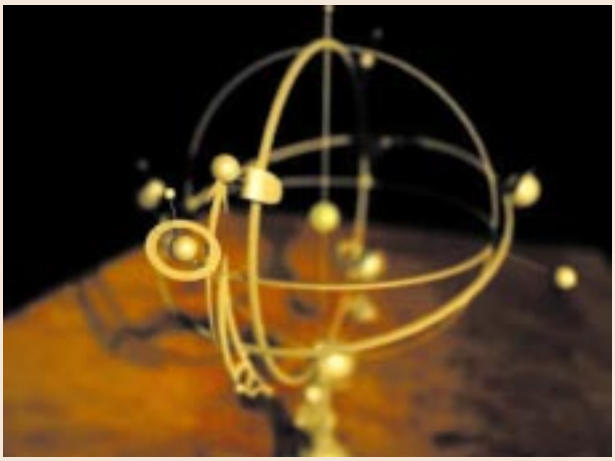
Of course, you can achieve some of these results using a perspective viewport. But a camera has another feature: a lens – or, more accurately, an adjustable focal length. This allows you to play with the perspective, and achieve the sort of result seen in Fig 2c.

Focal length determines the camera's field of view. A short focal length (say 15mm) produces a wide field of view

▼Fig 2 Three views of the same object. The first is orthogonal, revealing its true shape [2a]; the second is through a perspective viewport [2b], the third is through a camera [2c]







Virtual cameras have one fundamentally different quality to their optical equivalents: they have infinite focus whatever the focal length, lighting conditions and depth of field. Everything is always pin-sharp. This makes the virtual camera capable of feats impossible to reproduce using a physical camera.

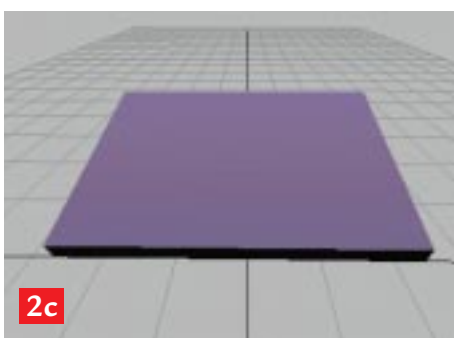
For an animation I made a few years ago for the BBC's *The Net*, I had the camera move from a room interior, out of a window, over some trees, up into the sky (illuminated by a firework display), through the atmosphere and deep into space – all in a single 'take'. This would have been optically as well as physically impossible if attempted 'for real', because no single lens would be capable of dealing with such a variety of focal lengths, exposures and focus-pulls.

Such freedoms are, of course, liberating, but they can be a liability too. They can produce artificial-looking results. We are all unconsciously aware of many of the limitations of the camera lens, because we see so much of the world through one. The pin-sharp focus you get in 3D graphics is particularly noticeable, and deprives the artist of one of the cinematographer's most useful tools. By manipulating the focus in a cinematic scene, you can manipulate the audience's focus of attention. You can also provide useful depth-of-field cues, showing the distance of one object from another by having one in focus and the other blurred.

As far as I know, no package yet includes focus as a parameter for a virtual camera. There are, however, plug-ins now becoming available that can be used to simulate focal effects. I've just been trying Defocus Dei, which is bundled with TGS's 3D modelling program Amapi 3D and can also act as a plug-in for SoftImage, Lightwave and 3D Studio MAX (A demo can be downloaded at www.blackfeet.com).

Defocus Dei works by generating a special file for each frame of an animation that contains depth (or 'Z-buffer') information. In post-production, this file can be used to determine which part of the scene is in focus, the depth of the region in focus, and the degree of blur for those regions that are out of focus. Because it uses the Z-buffer information in the Defocus Dei depth file, the result is a proper 3D effect. In other words, it determines which objects in the scene will be in focus according to their distance from the camera as set up in the original 3D model. The results, as you can see from the images above, add a dramatic hint of realism.

(like a wide-angle lens); a long focal length produces a narrow field of view (like a telephoto). The standard focal length of most real cameras is 35mm, and when you set up a virtual camera within a scene, this is usually set as the default. However, in the virtual environment of a 3D scene, you can have lenses of just about any focal length you want, including several that would be unfeasible in the real world.


2c

With normal cameras, the decision about the sort of lens to use will often be restricted to where you can physically place the camera. This means that short (ie wide-angle) lenses have to be used in tight interiors simply to get as much in as possible, while long (ie telephoto) lenses are necessary in wide open spaces where you want to film something distant and inaccessible. With a virtual camera, which can be placed just about anywhere, the choice of lens has much more to do with depth of field. If you use a short lens, depth of field increases. In other words, the distance between the objects in the scene appears greater. This means if you want to emphasise the distance between the foreground and the background in a scene, and provide a sense of space, you should use a shorter lens. If you want to give the impression of everything being close together, you use a longer lens.

Next month I will look at how you can manipulate this depth of field to produce more dramatic effects, and also look at another important feature of the camera: the ability to animate it.

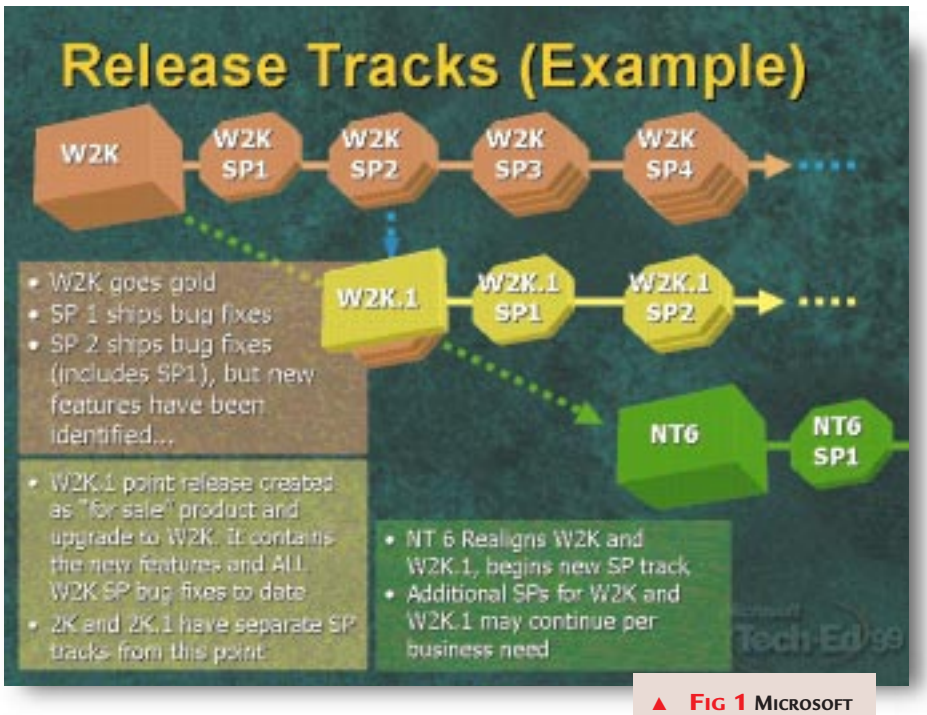
PCW CONTACTS

Benjamin Woolley welcomes your comments on the 3D Graphics column. Contact him via the PCW editorial office, or email 3d@pcw.co.uk

Arrested development?

Are you ready for Windows 2000? Tim Anderson looks at what it means for developers

Windows 2000 is coming – in fact there is every indication it will be released before the end of 1999. Developers are wondering if their applications will still run, and whether the new Windows will be more reliable than the old. At Tech-Ed, Microsoft's annual European technical conference in Amsterdam, I took the opportunity to quiz those who should know what Windows 2000 will mean for developers. Here are a few key points.



▲ **Fig 1** Microsoft is proposing a two-track service pack scenario for Windows 2000

Will applications still run?

Most applications that run on Windows NT 4.0 will run on Windows 2000. The main problem area is installation. The major version number has changed to 5.0, which can trip up some installers.

Because it is the install that is most likely to fail, some applications will migrate smoothly if the system is upgraded to Windows 2000, but will not install otherwise. Another potential problem is that Windows 2000 has a new memory manager. Microsoft says this may expose bugs in your application that previously went unnoticed.

It does not end there. Windows 2000 has changes to the NTFS file system, changes to the API, and changes to the way networking is implemented. A Windows 2000 network may not have NetBIOS, the basic Microsoft network API, installed at all; it can all be done through the new Active Directory and internet-style DNS (Domain Naming System). Put another way, this is a different operating system so nothing can be taken for granted.

What about new features?

Having your application run is only half the story. Windows 2000 has new features, and applications which do not support them will not be popular with some users.

For example, multiple-monitor support means handling negative screen co-ordinates correctly. Built-in power management means taking appropriate action when the system tells you it is going into suspend. Another issue is classifying the file and configuration data used by an application, so that it works with roaming profiles. Server applications need to be aware of the Active Directory.

Will it be more stable?

The two most common reasons for Windows instability are first, mismatched versions either at system or application level, and second, bugs in device drivers. There are a couple of changes in Windows 2000 that should improve the situation.

First, there is an extensive list of protected system files, including everything in the SYSTEM32 directory on the Windows 2000 installation CD that has the extension .SYS, .DLL, .EXE or .OCX. The system will not allow these to be overwritten, except by official service packs or operating system upgrades.

Second, applications are now expected to install all their components into the application directory, increasing the likelihood of duplicate files but ensuring that each application finds the version it expects. Even COM components are accommodated, since the system is able to handle different versions of the same COM component being used by different applications, by redirecting the library loading to the application directory.

Windows 2000 will probably prove more stable than NT 4.0, and protecting system files is a great idea, but it won't be perfect. The success of the new approach will hinge primarily on Microsoft's quality control and discipline.

If you look closely at the proposals, there is some worrying untidiness. For example, there are four ways to install a protected system file: from the install CD, from a service pack, from the Windows update website, or from a QFE (Quick Fix Engineering).

This last, also known as a hot fix, is Microsoft's way of providing quick solutions to specific problems (for example a security hole discovered in Internet Information Server). With three ways to apply updates, there will still be some variety in the exact blend of system files found on individual machines.

Another worry is that Microsoft is proposing a two-track service pack programme. The idea is that one track will not introduce any new features. Called the 'Service pack track', it will only include critical fixes. The second track, called the 'Point release track', will include new features.

If all you want to do is to keep applications running, use the safe track, while if you want enhancements, then the second track is for you. You can hop on board the safe track at any point, which implies a multiplicity of service packs.

For example, you might want to fix the feature set at Windows 2000.1, but still apply critical fixes, so there will have to be separate service packs for Windows 2000 and for Windows 2000.1, and again for Windows 2000.2, when and if the time comes [Fig 1].

The Microsoft Installer

If you have looked at Office 2000, you will already have seen the Microsoft Installer, which includes clever features like 'install on demand' and 'application repair'.

The installer itself is really a service provided by the operating system, with an API and a COM interface. It comes as part of Windows 2000, and can be added to Windows 9x or NT 4.0. One of the benefits is that component reference counting should work more reliably, so that you can trust the dialog that invites you to delete a component because it is no longer used.

For Windows 2000, the message is that you have to use the installer, or fly in the face of the official guidelines. Unfortunately it is fairly complex, so in practice more developers will use an installation kit such as InstallShield or Wise rather than rolling their own setup application.

Certified applications

Use of the Microsoft Installer is mandatory if you want your application certified for the Windows 2000 logo. This is intended to be a more rigorous scheme than previous Windows logo efforts. It involves following a specification, obtainable now from Microsoft, that lays down the requirements for a well-behaved Windows 2000 application.

Developers who do not want to pay Veritest, the authorised testing body, for certification may still want to follow the guidelines. Topics covered include power management, the Active Directory, multiple monitor support, and the absence of any16-bit components.

▲ Major apps running on NT should run on Windows 2000

Apparently if you plead a strong case you might get away with some 16-bit stuff, for example to support a legacy system, but be warned: after Windows 2000 comes 64-bit Windows, which will probably not support 16-bit code at all.

SQL Server for everyone

Microsoft has quietly released the MSDE (Microsoft Database Engine) as a free update to Visual Studio 6.0. This is big news. MSDE is the database engine of SQL Server, so you can use this instead of JET (the Access engine) in applications, and still distribute them freely.

Of course, there are restrictions. MSDE is intended for up to five users only, and has a 2-gigabyte database size limit. The minimum system for MSDE is a Pentium 166 with 32 MB RAM. The main benefits are for applications where a laptop user wants to connect to SQL Server and then work with the data offline.

By using MSDE, you can use the same data access code for both the local and server databases. You also get easier replication and more reliability, since MSDE logs transactions, enabling recovery after a system failure.

After Windows 2000 comes 64-bit Windows, which probably won't support 16-bit code at all

Quick results from SQL Server

Richard Cowley asks: 'I am upgrading an application, currently written in VB3, to VB6 and SQL Server 7. I am using True DB Grid pro bound to ADO data controls. I have a Data Environment connection to the SQL Server. When I have to display a large recordset, say 16,000 records, the grid does not display any data until the entire recordset has been acquired.

Is there a way to display the grid quickly, showing enough records to fill at least 2 pages while the remainder of the recordset is being acquired? This is the way that Access works.'

This begs the question: does anyone really want 16,000 rows in a grid? They will hog memory, and few users want to scroll through that many records.

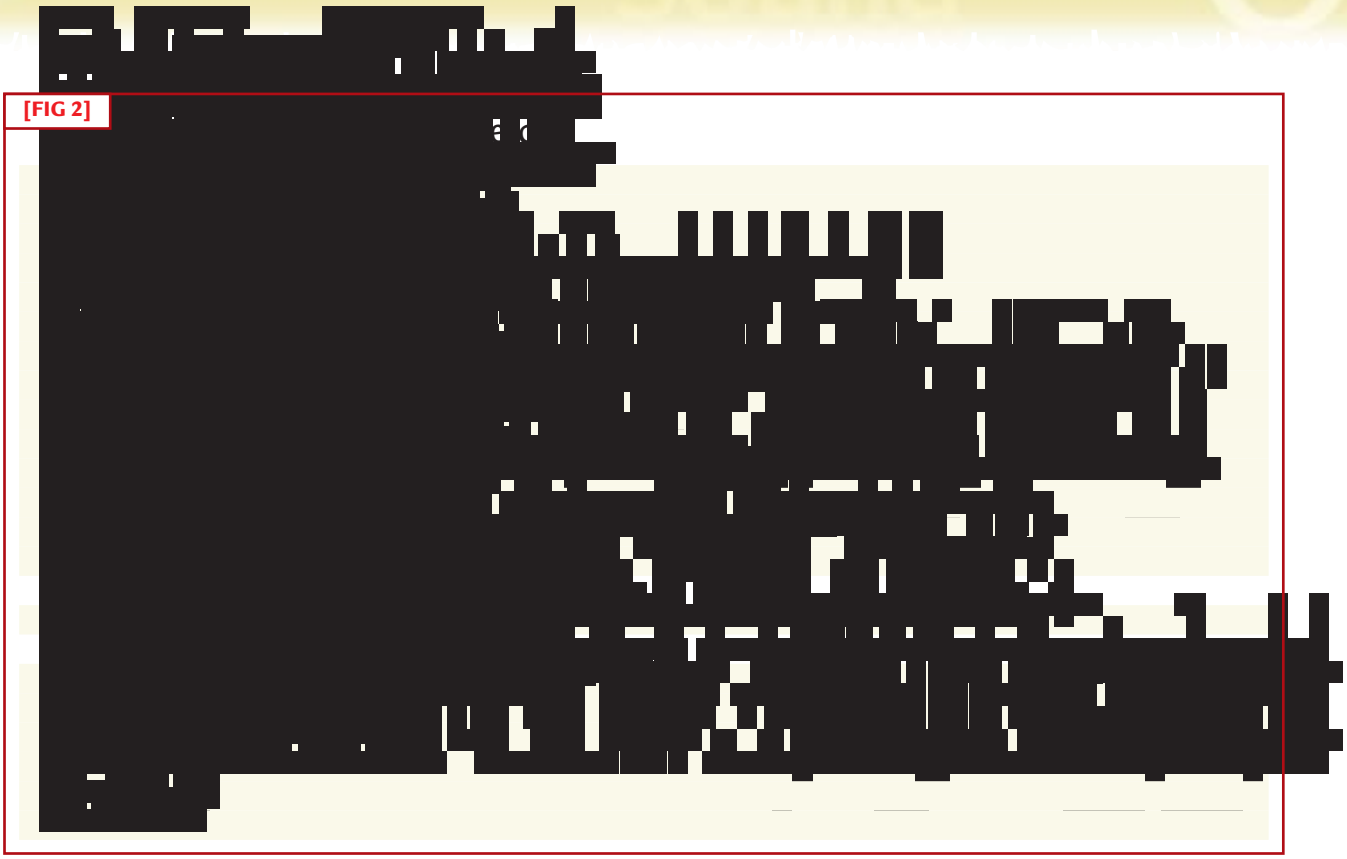
The first answer then is to think of ways to avoid the problem, perhaps by having letters of the alphabet, or regions, or product categories, that you can select to narrow down the results. Even so, there is a way to do what Richard asks and it is called an asynchronous fetch.

The idea is that the first results are returned almost immediately, so that the user has something to look at while the rest are being obtained. The bad news is that I cannot find a way of doing this through the Data Environment – reader suggestions are welcome.

Fortunately you can easily do it in code. Fig 2 shows an example. There are a few points to note. The ADO recordset object is declared using WithEvents, so that you can handle events fired by ADO. When you do this, you will find that you can select the recordset variable in the left-hand dropdown in VB's code editor. The right-hand dropdown then gives you all the available events, including FetchComplete, used here to inform the user that all the records have been retrieved. There is also a FetchProgress event, but it appears this is not really supported by SQL Server, as it only reports 0 or 1 in the current release.

A key decision in any SQL Server query is the cursor type and location.

[FIG 2]



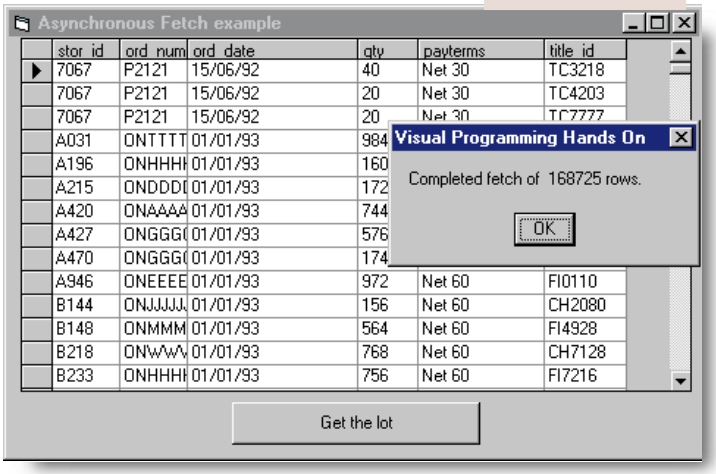
Look up cursor types in the VB and SQL Server documentation for more information. The choice here can make a huge difference to performance. The Recordset's CursorType and CursorLocation properties determine this. There is also a MaxRecords property, useful if you only require the first part of a result set.

The asynchronous fetch itself is obtained by using the adAsyncFetch constant in the Options parameter, when calling the Recordset's Open method. In this example, I got the following approximate results:

- **Standard query, unordered result set: 20 seconds**
- **Standard query, ordered result set: 30 seconds**
- **Asynchronous fetch, unordered result set: <1 second first rows, 28 seconds to complete**
- **Asynchronous fetch, ordered result set: 7 seconds first rows, 35 seconds to complete**

The figures demonstrate that although the asynchronous fetch is slower to complete, the benefit to the user is a much quicker response. If the query is unordered, it is near instantaneous. In general, you should never order a query unless you have to. Even though ordering the query reduces the benefit, it still delivers results far more quickly. Most users will perceive this as better performance, even though the overall time is longer.

▼ASYNCHRONOUS FETCH GIVES THE USER A FAST RESPONSE ON LARGE RESULT SETS



■ **Which database path?**

Richard Harrison asks: 'How would you go about using a connection string or a Universal Data Link with an application that could be installed anywhere on a user's PC?'

There are a few choices you have if you need to know the location of a file or database, but want the user to be free to install anywhere.

First, you can use a location relative to the application directory. At runtime you can detect the application path and go from there. This might not always be suitable, for example if you wanted a database on a different drive from the client application, or if it were shared between several applications.

To overcome this, you can use either an old-fashioned .INI file in the Windows directory – frowned upon by Microsoft's guidelines but very easy for you to troubleshoot – or the registry. Both of these options provide central locations for configuration data like path names, so that any application can find them.

PCW CONTACTS

Tim Anderson welcomes your Visual Programming comments and queries. Contact him at visual@pcw.co.uk or via the PCW editorial office.

◆ *For developer information about Windows 2000, the Microsoft web site is the place to look, starting at msdn.microsoft.com. Here you can find the Application Specification as well as compatibility information. Download MSDE from www.eu.microsoft.com.*

On FireWire

Another bright spark from Apple catches hold as the computer industry feels the need for speed

Apple's adoption of USB for the iMac and its new G3 PowerMacs has been an important step forward for the Mac platform. That's why we've looked at a number of USB products in recent columns. However, USB isn't the only important new feature that can be found on the latest Macs.

Although it's missing from the low-cost iMac, all of the 'professional-level' G3 Macs include two FireWire ports. FireWire has actually been around for a few years now and, for a while, it looked like it might just be another good idea from Apple that got ignored by the rest of the industry.

Even now, Macs are still the only computer systems that include FireWire as a standard feature. However, it does look like FireWire might be taking off at last, so this seems like a good time to examine the technology, its capabilities, and its potential for the future.

FireWire is basically a kind of Super-USB. It provides the same simple plug-and-play installation, but it's much, much faster than USB. A USB interface provides a maximum data transfer rate of 12Mbits/sec. That's fine for simple peripherals such as a mouse and keyboard, or even entry-level colour printers and scanners. But USB just can't cope with the sheer amount of data involved in more demanding applications such as full-screen digital video.

FireWire can handle data rates as high as 400Mbits/sec, which leaves USB standing. In fact, when Apple first developed FireWire, back in 1994, nobody paid much attention to it simply because nobody believed that we'd ever need anything that fast.

It was the arrival of digital video that finally gave FireWire a chance to strut its stuff. A couple of years ago, companies such as Sony and Hitachi began to include FireWire interfaces in their new DV cameras, simply because it was the only type of interface that could handle high-quality, full-screen video.

So, if you've got a G3 PowerMac with FireWire built-in, you can plug a DV camera straight into the Mac and capture high-quality, full-screen video with no need for any additional hardware. Apple's QuickTime video software supports the DV format, so you don't need any extra software either.

◀ THE LOGO THAT COULD BECOME A HOUSEHOLD NAME

FireWire could spread through the entire consumer electronics industries as well

The ability of G3 Macs to work so easily with digital video is one of the reasons why Apple bought the Final Cut video editing program from Macromedia. It's rumoured that Apple is planning to bundle Final Cut with certain PowerMac models, in order to provide a low-cost, all-in-one video-editing system. Annoyingly, Apple has yet to produce a PAL version of the software that can be used in Europe, but we hope to have more information about Final Cut in time for next month's column.

It's worth pointing out that FireWire is actually known by more than one name. FireWire was the original name trademarked by Apple, but any technology that hopes to get adopted by the rest of the industry has to be ratified by the IEEE – the Institute of Electrical and Electronic Engineers. So Apple handed it over to the IEEE, who decided to call it IEEE1394. But that's not exactly catchy, so everyone carried on calling it FireWire.

However, FireWire is an Apple trademark, so other companies that use the interface in their products either have to call it IEEE1394, or give it another name entirely – Sony calls its version iLink, for example. One interface with three different names – only the computer industry could manage that.

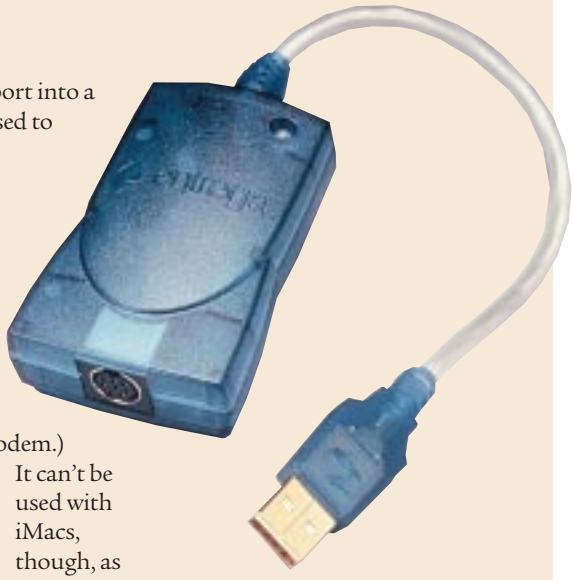
Whatever it's called, if you've got huge video files on your hard disk it makes sense to use a FireWire interface on the hard disk as well. That way you can retrieve those files and play them or edit them without having to wait ages for the files to load. FireWire hard disks are just starting to appear, and they're versatile as well as fast. You can connect and disconnect a FireWire hard disk while your Mac is running, without doing any damage. And, if you're actually playing video when the disk is unplugged, all that happens is that the video pauses on screen. Plug the disk back in and the video carries on as if nothing's happened.

FireWire could also be used in high-end printers and scanners in the pre-press industry. Low-cost printers and scanners designed for home users tend to use USB, but if you're working with huge colour graphics files you need the speed of FireWire.

More important, though, is the potential for using FireWire outside the computer industry. There is a group of electronics companies – including, er, Sony and Hitachi again – which is planning to use FireWire as a method of networking audio-visual devices such as TVs, VCRs and CD players. If this takes off, FireWire could spread through the entire consumer electronics industry as well as the computer industry.

But, Apple being Apple, there has to be a fly in the ointment somewhere. In this instance it was Apple's attempt to charge a licensing fee. It was rumoured that Apple wanted to charge a fee of $1

LET'S GET SERIAL



At long last, there are a number of USB floppy disk drives available in the UK which can be used with iMacs and G3 PowerMacs. However, until now, I've been completely stumped for an adaptor that will allow you to use other types of peripherals, such as modems and digital cameras, with these machines.

Like Mac printers, these peripherals originally used serial ports to connect to the Mac, but the entire Mac range has now abandoned serial ports and adopted USB instead. There are a number of options for using old printers with USB Macs, such as InfoWave's PowerPrint, but these tend to be designed specifically for printers, and often don't work with modems and other types of peripherals.

Fortunately, there are now two answers to this problem. The first is the Stealth Serial Port. This connects to the internal modem socket inside all the new G3 Macs and turns the modem port into a serial port that can then be used to connect any kind of serial peripheral.

I tried it with a modem, an Epson printer and a digital camera and it worked perfectly. It's easy to install, but it assumes you don't already have an internal modem in your machine. (I don't, so this is an easy way for me to use my old serial modem.) It can't be used with iMacs, though, as these have internal modems built-in.

The entire Mac range has now abandoned serial ports and adopted USB instead

The other option is Entrega's USB-to-Serial Adaptor. One end of the adaptor plugs into a USB port on the iMac or G3, while the other has a serial port allowing you to connect serial peripherals. The only drawback is that the adaptor isn't compatible with a wide range of printers. Entrega's got some useful USB gadgets in its range, but seems to have trouble with the software for the Mac versions of these products. However, take a look at Entrega's web site www.entrega.com to see if the adaptor is compatible with the peripherals you want to use.

or $2 for every single product that included a FireWire interface. That might not sound like much, but if you're Sony and you're selling millions of CD players, TVs and VCRs every year, it can soon add up to an awful lot of money. Apple eventually settled for a licence fee thought to be about 25 cents, but not before it had scared off a lot of potential FireWire licencees.

▲ THE G3 POWERMACS HAVE FIREWIRE AS STANDARD

Even if FireWire doesn't find its way into other types of electronic devices, its sheer speed makes it invaluable for working with digital video. So FireWire will probably continue to be used in Macs and in various digital video products. However, it remains to be seen whether Apple can attract enough support from the rest of the computer and consumer electronics industries to allow FireWire to reach its full potential.

PCW CONTACTS

Stealth Serial Port
Price: £49.99+VAT
Contact: Computer Warehouse 0181400 1234
Entrega USB-to-Serial Adaptor
Price: £42.55+VAT
Contact: Entrega 0118 965 7751

Cliff Joseph welcomes your feedback on the Mac column. Contact him via the PCW editorial office or email mac@pcw.co.uk

Keyed up

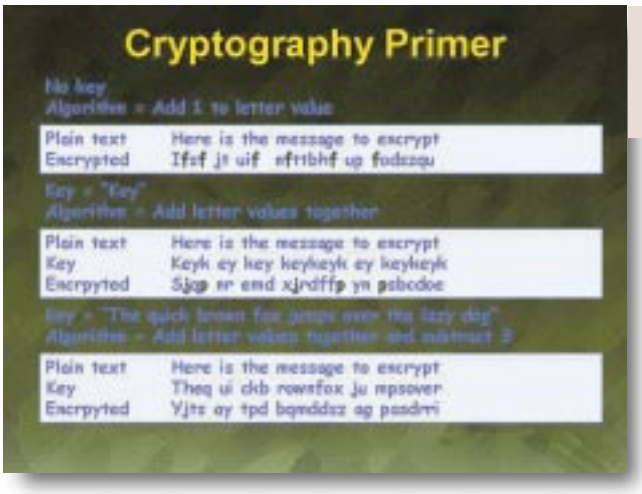
Bob Walder unlocks the facts you need to protect data being shared over unsecured links

If you have been following our advice in recent months you will have looked at Internet and network security issues, as well as implementing email services – whether using an ISP or hosting your own mail server.

These areas are not exclusive and it is at this stage that you should consider email security. But before we jump into the practicalities of implementing public key security, we need to cover some of the theory behind it. Basically what we are talking about is encryption – to keep the content of your messages private – and digital signatures to authenticate the origin of those messages.

In the best tradition of the James Bond novel, encryption is all about secret codes, transforming plain text into a form unreadable by anyone without a secret decryption key. Its purpose is to allow secure communication over a general-purpose insecure channel, such as the Internet.

Although the mathematics behind it can be very complex, encryption itself is pretty straightforward. Cast your minds back to when you were kids and you wanted to send secret messages to each other. The simplest form of encryption was the one where every letter of the alphabet was substituted for the one 'n' positions following it.

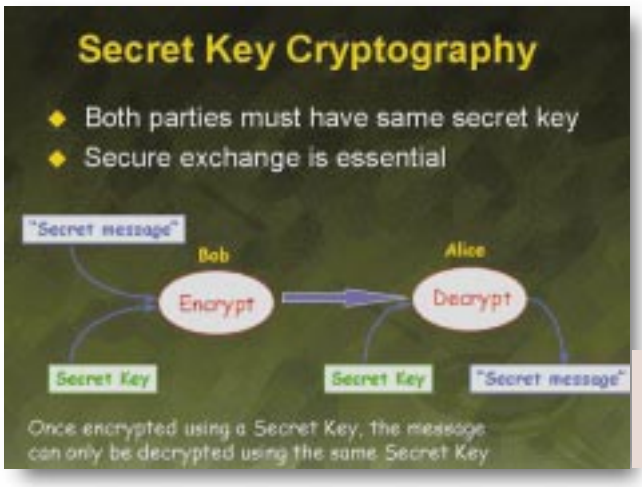


◀ENCRYPTION IS EASILY EXPLAINED AS A CHILD'S SECRET CODE

The two important buzzwords in this field are key and algorithm. The 'key' represents the number of positions we are shifting the letters, while the 'algorithm' is simply the idea that the encrypted letter is the one 'n' places following the plain text letter. Using this logic, encrypted text = plain text + n.

There are two ways you can beef up security on this front: increase the length of the key and devise ever more complex algorithms. Luckily, we don't have to create our own algorithms, as there are perfectly acceptable standards out there. The most widely used standards are DES (Data Encryption Standard), triple DES, IDEA (International Data Encryption Algorithm) and RC4 (an algorithm developed by Ron Rivest of RSA as a stream cipher with a variable key length).

Whereas the original DES algorithm uses 56-bit keys, later and more powerful systems use much longer ones, forcing potential hackers to run through trillions of combinations in any attempt to find the right one by brute force. Triple DES is an enhanced version of the original DES algorithm and encrypts data three times using three different keys (providing an effective key length of 112 bits). IDEA is a 128-bit mechanism developed by the University of Zurich in 1992 and is currently a favourite of European financial institutions.



◀WITH SECRET KEY ENCRYPTION BOTH PARTIES NEED A KEY TO SWAP DATA

Secret Key Cryptography

As you would imagine, the longer the key length, the more secure the encryption. Going back to our simple cipher, if our single digit key is represented by a letter of the alphabet, a potential hacker only has to try 26 possible combinations in order to crack the code. Now, if we increased the length of the key and wrote it beneath our original message (repeating the key over and over until it was equal to the length of the message), each character in the key would represent a different shift for the letter above. Of course, if short keys are used, then repeating patterns may begin to emerge in the message. The most secure method is therefore to use a key the same length as the message itself, but this is impractical in real life situations. Combine long keys with sophisticated algorithms, however (something more complex than 'shift each letter of the message by the value of the key character beneath') and you are in business.

Unfortunately, 'secret key' (or 'symmetric key' cryptography as it is known) relies on both parties involved having access to the same secret key. This is because the sender uses the key to encrypt the message, and the receiver uses the same key (together with the

A MUST HAVE FOR YOUR BOOKSHELF

Travelling quickly through what the author calls the 'basic transports and plumbing', the book covers the OSI model and everything about the various network interfaces and services, before giving us all the gen on the multitude of Internet transport protocols – IP, TCP, UDP, ICMP and so on. No frills, no fuss – just a solid reference manual for anyone involved with the Internet.

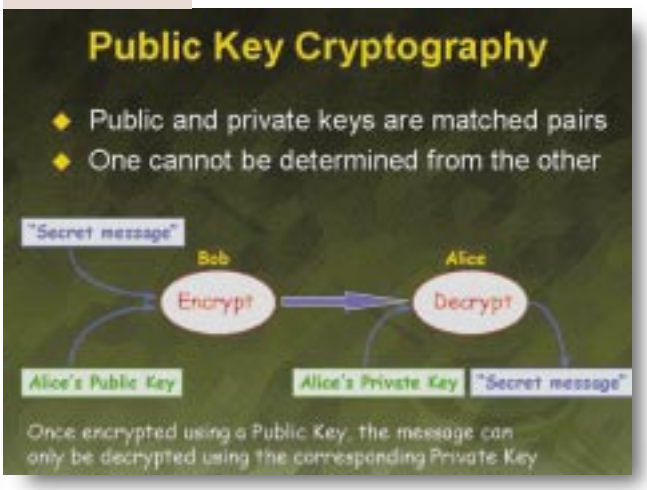
Title: **Internet Standards and Protocols**
Author: **Dilip C. Naik**
Publisher: **Microsoft**
Price: **£27.49**
ISBN: **1-57231-692-6**

same algorithm in reverse) to decrypt the message. This introduces a potential problem – how do you ensure that the key is distributed in a secure manner?

If you have regular contact with the person, you can pass the key face to face – you cannot get much more secure than that. In business terms, secret keys (such as bank PIN numbers) are often sent out by mail in special tamper-proof envelopes. They can also be encapsulated in hardware devices such as smart cards, where the issuing authority never gives the customer access to the key information at all.

But in the case of one-off Internet transactions with hitherto unknown parties, we do not have that luxury. As a result of the unique key-pair arrangement between the two parties, it is impossible to exchange data with someone to whom you have not already been 'introduced'. Neither of you has a shared secret key, and there is no secure channel over which to exchange one. For this reason, secret key cryptography works best when a single issuing authority maintains a service for a user base. Information can then be safeguarded by a registration process that takes place prior to the exchange of data.

▼PUBLIC KEYS CAN BE PUBLISHED OPENLY BUT STILL REQUIRE THE PRIVATE KEY TO BE DECIPHERED



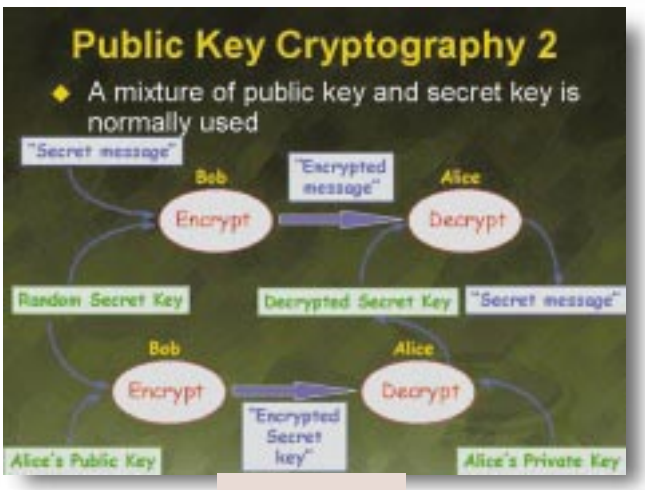
Public Key Cryptography

One way of overcoming the problem of secure transactions with partners you have had no previous dealings with is to use 'public key' or 'asymmetric key' cryptography. The mathematics behind public key cryptography are exceedingly complex, but the procedure can be explained fairly simply. Using this system each person gets a pair of keys, known as the public key and the private key. The public key is generated from the private key using a complex algorithm, following which the public key can be published, while the private key remains secret.

Any message that is encrypted with a given public key can only be decrypted using the corresponding private key, and there is no known way to derive the private key from the public key.

Now, if Bob wishes to send a message to Alice, he will encrypt it using Alice's public key (which can be published in a directory or distributed via unsecured e-mail). The only person who can decrypt the resulting message is the holder of the appropriate private key – in this case Alice. Thus, the need for sender and receiver to share secret information is eliminated, since all communications involve only public keys, and no private key is ever transmitted or shared. The best known and most widely used asymmetric key technologies are Diffie-Hellman and RSA.

Although providing the highest levels of security, public key cryptography is notoriously heavy on system resources, particularly when working on large messages. For performance reasons, therefore, RSA is usually used only to exchange keys, whilst a conventional



▲MIXING TYPES OF ENCRYPTION CUTS DOWN ON USED RESOURCES

secret-key cryptography system (such as DES) is used for the bulk of the message.

Suppose Alice wishes to send an encrypted message to Bob. She first encrypts the message with DES, using a randomly chosen DES 'secret' key, which can be different for every message sent. Then she looks up Bob's public key and uses it to encrypt the DES key. The DES-encrypted message and the RSA-encrypted DES key together form a 'digital envelope'. Upon receiving this digital envelope, Bob decrypts the DES

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