hands on

We're all guilty of paying too much attention to all things new and not enough to things we already know. Playing around with new toys is fun, whereas mastering those that you already own can be hard work.

Well, in this month's **Workshop** (p250) Stephen Wells is on hand to show you how to get the most out of that old workhorse Excel. He guides you through some of the more advanced features and time-saving short cuts you may have missed out on if you're a casual user of the package.

Meanwhile, over at **Graphics and DTP** (p274) Ken McMahon shows you how to be a master at cutouts using Photoshop 5.5 LE's eraser tools.

In **Web Development** (p282) Tim Anderson has a step-by-step guide to creating a guestbook for your website using PHP and MySQL. And as Tim says, the humble guestbook is a real interactive web application that can be easily adapted for other purposes.

Benjamin Woolley in **3D** (p276) gets to grips with Blender and looks at Toon3D, an authoring environment for animating simple models.

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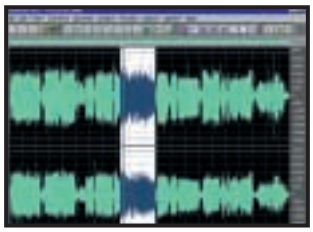
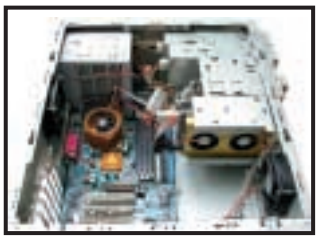




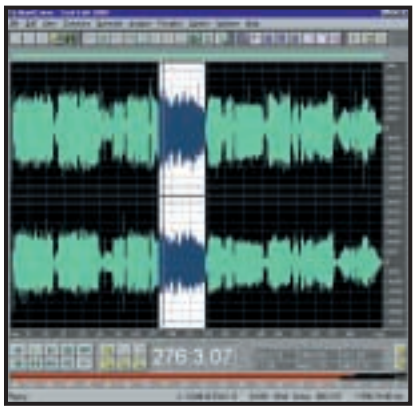
Advice from our experts

Got a problem? Our *Hands On* columnists answer questions and solve your problems.

Windows

Q *I want to make a CD of a 20-minute music tape, but the software that comes with my CD-writer has no provision for recording sound, so I am trying to create a .wav file on my hard disk before using this to create an audio CD. If I try to record using the Windows 95 Sound Recorder, I'm limited to 15 seconds of recording time. How can I increase this?*

Ian McPherson via email



Cooledit is better than Windows Sound Recorder

A One way round this is to record the 15 seconds, then use the Edit, Copy, and Edit, Paste Insert, commands repeatedly. This will double the length at each round. When you have sufficient length, rewind and record over it. To record at CD quality, you'll need around 200MB. A better solution is to find some decent recording software. Cooledit 2000 is available on a 30-day trial from www.syntrillium.com, will do what you want, and will also remove extraneous noise, such as tape hiss.

Q *When I boot up, I seem to have lost the Windows logo – do you know how I could get it back?*

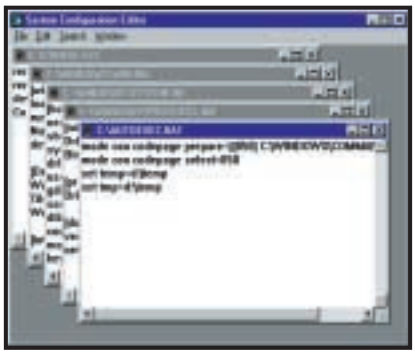
Nick Bearman via email

A First, delete (or rename) any file named LOGO.SYS in the root of C:\ (assuming your PC boots from the C: drive). Also, make sure in the file C:\MSDOS.SYS that the entry logo=0 is not present in the [options] section. You will probably have to clear the Read-only attribute from MSDOS.SYS in order to edit it. If Windows won't let you do this then open an MS-DOS box and type: attrib -s -h -r C:\msdos.sys (you have to remove the system and hidden attributes as well this way). Don't forget to reinstate the attributes (using the plus sign instead of a minus) afterwards.

Q *How can I change the Temp directory that Windows uses? I tried adding the line SET TEMP="D:\TEMP" to Autoexec.bat but this had no effect. Nor did using Winset.exe in the RUN section of the System Policy Editor.*

Nick Lee via email

A You lost me with the Winset stuff, but your initial approach is along the right lines. First, you don't need the quotes. Second, you also need the line SET TMP=D:\TEMP in Autoexec.bat. This should do the trick.



You need two entries to change Temp folder

Q *I keep setting my default signature in Outlook Express to my own text file. After reboots or restarts, Windows often – but not always – discards my signature file and replaces it with some empty KAK.HTM file. I then have to reset my signature. Any idea what is going on or where this appropriately named KAK is coming from?*

Harry Collier via email

A This, I'm sorry to say, sounds like the Kakworm virus, which spreads itself in this way. It's specially insidious as it doesn't rely on the victim opening an attachment. You can get rid of it by finding and deleting the file KAK.HTA (use Windows Find, Files, All hard drives, Include subfolders). Having done that, run REGEDIT and find and delete the following Registry key: HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\Run\ cAgOu.

There's also an Outlook patch to protect against Kakworm available at www.microsoft.com/technet/security/bulletin/ms99-032.asp.

Spreadsheets

Q *How can I quickly weed out the duplicates in an Excel 97 list?*

Eve Tibbles via email

A Make sure the list has column-heading labels. Then click anywhere in the list and choose Data, Filter and Advanced Filter. Click the Copy to another location radio button, and check the Unique records only box. The range of your list should appear in the top box, but check that it is correct. Leave the Criteria range box empty. Click in the Copy to box and then a cell several rows below your list. Click OK to close this dialog box and a revised version of your list will be displayed that will omit any duplicates.

Weeding out Excel 97 duplicates

Q *Using Excel, how can I enter a series of consecutive dates leaving out the weekends?*

David Smith via email

A Enter the first date, then point to the Fill Handle, which is the small black square in the corner of the cell. Press the right mouse button and draw

the dates down the column or along the row. When you first let go, you'll be offered a whole bunch of options. Choose Fill Weekdays (see *Workshop*.)

Q *How can I enter a fraction in the Works spreadsheet module?*

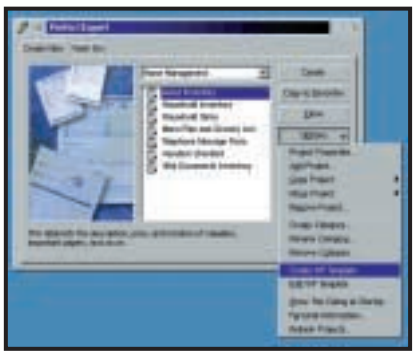
Lynda Long via email

A In either Excel or Works all you have to do is type a space between the number and the fraction. For example, enter 23, space, 1/4. Both spreadsheets will display 23 1/4, although they'll store the number as 23.25, so you can add or multiply this number in other cells. If you just want a fraction by itself, enter a zero, then a space and then the fraction.

Word Processing

Q *How do I create a new template in WordPerfect 9?*

Jeremy Doyle via email



Hardly intuitive, but easy: creating a new template in WordPerfect 9

A This is easy, but somewhat counter-intuitive, as you first have to go to File, New from Project. In the dialog that appears, click on the Options button and choose 'Create WP Template'. Add whatever text, prompts, other macros and toolbars you want, then save; you will be prompted for a name, description and category.

Q *Can you explain why I can't use Word 97 text boxes properly. It will only create large boxes whose size won't adjust. What am doing wrong?*

Ian Sugarman via email

A It sounds as if you have the 'Snap to grid' option enabled, together with a large grid size. You can turn this off by clicking on the Draw menu on the Drawing toolbar, selecting Grid, then clearing the snap settings or changing the grid size.

Q *I am using Word 97 and would like to check spelling in more than one language – in particular, Swedish. I've searched the Microsoft website, but all I have got is frustrated. If I don't have to pay, so much the better.*

Scott Ballentyne via email

A The good news is that you can get a Swedish spelling checker, thesaurus and hyphenation dictionary (but not a grammar checker, unfortunately) online from www.alki.com.

The bad news is that it will cost you about £48. An alternative is to upgrade to Word 2000, which includes English, French and Spanish proofing tools as standard. Unfortunately, Swedish isn't included as standard, but a Proofing Tools pack, comprising 40-odd languages is available from Microsoft dealers in the UK for around £75.

Hardware

Q *I have a PIII 600E Flip Chip Pin Grid Array (FC-PGA) that I would like to fit into an Asus P2B-S motherboard Rev 1.02 using the Iwill Slocket II. How do you set the CPU core voltage to the appropriate 1.65v?*

Howard Barnfather via email

A First the bad news – according to Asus' website, you need Rev 1.04 of the P2B-S to support Coppermine CPUs. However, also according to Asus, you need Rev 1.12 of the P2B to do the same and we've had our Rev 1.10 work fine with the help of Iwill's Slocket. Simply set the core voltage to 1.65v on the Slocket and the correct clock multiplier on your P2B-S (6 x 100MHz) and everything should be fine – you should, however, also flash your BIOS to the latest version.

The 600E may also overclock to 800MHz using a 133MHz FSB (front-side bus), but you may need to increase the Slocket voltage to 1.75v, use additional cooling, switch your PCI bus to one-quarter and ensure your memory is 133 compliant – your AGP graphics card may complain, but it's worth a shot!

Q *I have a Chaintech 6ltm motherboard with an LX chipset, running a Pentium II 233. Would it be possible, with the aid of a slocket, to upgrade to a Celeron 500 processor?*

Kevin Martin via email

A Intel's website says the LX can support Celerons and your motherboard will already be running at the right voltage and FSB for Plastic Pin Grid Array (PPGA) Celerons up to and including the 500MHz model. All you need to do is to make sure your motherboard supports sufficiently high clock multipliers, which for a 500MHz Celeron is 7.5 times. Almost any slocket will do too, as you don't need compatibility with the newer FC-PGA Celerons or PIIIs which demand lower core voltages.

Q *Can I mix an Ultra160 SCSI hard disk and a SCSI CD-R without dropping the performance of the disk? I already attach two scanners to my Adaptec 19160's legacy SCSI connector and fear they may drop the performance of the CD-R if attached to the same channel, too.*

Peter M Pascoe via email

A Keep the hard disk and any other U160 or U2W LVD drives by themselves on the LVD channel, as any non-LVD drives, such as the CD-R, will compromise the bandwidth. The CD-R will work perfectly well with the scanners on the legacy channel.

Q *In July's* Hands On, Hardware, *you stated that the SuperMicro PIIIDME 840 chipset motherboard uses Intel's MTH. After hearing about the MTH problems on the 820 chipset I ran Intel's MTH ID utility and it did not detect an MTH on my motherboard – what's going on?*

Stany Thibaut via email

A Hands up, you caught us out! Both the 820 and 840 chipsets were designed for RDRAM memory, but Intel developed a chip that would translate the protocol so that SDRAM could be used instead. This chip on the 820 is the ill-fated MTH, which is now in a process of refund or replace. The higher-end 840 chipset instead uses the different MRH-S chip which, while recently revealed not to get on with ECC SDRAM, appears to be in the clear – for now.

Databases

Q *In Access I created a query which worked fine, so I saved it as Query1. Later I renamed it and now when I run the query it asks me for a 'parameter' which it then ignores! This problem disappears when I rename the query back to Query1.*

Andrew Walker via email

A Our guess is that, after saving it as Query1, you used the Sort button while looking at the answer table generated by the query and then saved the query again under the same name. Then you later renamed the query and hit the problem.

When you use the Sort button on an answer table and then close the table, Access will ask if you want to save the query. If you agree, it writes something like Query1.ColumnName into the properties of the query. Renaming the query doesn't cause this parameter to be rewritten, hence the problem. Rename the parameter to: NewQueryName. ColumnName and all should be well.

Unix

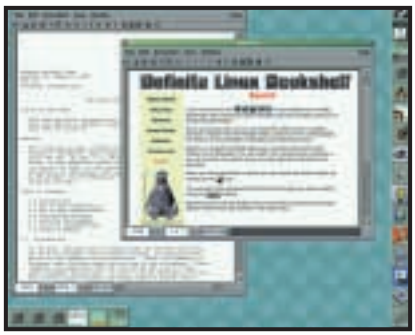
Q *Your Unix column sweet-talked me into installing Linux, but I'm fed up with having no modem, no printer, no scanner, no sound and that's just for starters. I've zapped Linux, but I'm still left with Lilo and can't get rid of it. I bet you'll try persuading me to give Linux another try.*

David Berry via email

A To solve your problem, boot from a DOS floppy and use fdisk/mbr to overwrite the Lilo code with the standard DOS master boot record.

As for persuading you to try again, we've no intention of doing that. It's up to you. It happens that millions of Linux users out there modem happily through to their ISPs; they have printers that print and scanners that scan as their sound cards chortle out their MP3s. And their CDs automount if and when they want them to (which incidentally isn't always – this is an operating system where the user calls the shots).

Most modern Linux distros sort all these things out automatically at install time and if there are glitches, Linux users are proactive types who read the docs and ask around, fix the problems and learn a lot in the process.



These days you don't need to be a rocket scientist to run Linux. But it helps a lot if you have a healthy curiosity about how things work, and are prepared to put in the time maintaining that curiosity and sharing your discoveries with others.

For starters there is a ton of documentation out on the Internet. Phone-bill conscious Linux newbies may prefer something such as the Definite Linux Bookshelf, described as 'A gigantic collection of Linux reference material on one CD-ROM'. It contains copious PDFs relating to every facet of Linux use and you can get it from www.definitesoftware.com for around £10

Graphics and DTP

Q *I have a video-capture card (Motion Picture) that refuses to work with a new motherboard/processor combination I had fitted recently. Can you suggest any video cards that I can use for capturing stills from a Hi-8 video camcorder: I haven't got around to needing editing – yet – so that feature would be helpful, but my primary requirement is to capture stills.*

Mike Gerynant via email

A Matrox, Pinnacle and ATi all produce reasonably priced cards that will allow you to capture and output analog video stills and movie clips. Cards such as the ATi All-in-Wonder 128 Pro also provide MPEG-1 and MPEG-2 digital video compression as well as a TV tuner and DVD player all for under £150.

Q *I am a professional photographer specialising in sports photography. I have a problem with regard to re-sizing photographic scans. At the start of each football and basketball season I attend as many games as possible, shooting stock action of the players. I use a Polaroid Sprintscan Plus and always scan at maximum optical resolution (2,700dpi) which results in JPEGs of around 3-6MB each, 14-24MB uncompressed. This is an ideal size for my main uses but NOT for distribution to newspapers, which usually stipulate a maximum uncompressed file size of 6-8MB.*

I wish to batch convert several hundred pictures to match this specification but cannot do it in Photoshop – or any other program I have tried (including DeBabaliser). You can set the width, height, etc, but not the resulting finished file size. Any ideas?

Pete Murphy via email

A The reason you cannot set the file size is that it depends on the nature of the image. Pictures with large areas of flattish colour will compress more efficiently than those with lots of detail. You can demonstrate this by creating a 1,000 x 1,000 pixel RGB image filling it with flat colour and saving it as a medium quality (5) JPEG file. Then apply 50 per cent gaussian noise and resave

The top image is 18KB in size... whereas the one below is 626KB

with the same settings. When I did this the first file was 18KB, the second 626KB. So, even if it were possible to make all your files the same (compressed) size, it might not be desirable as the quality would vary widely.

As the newspapers stipulate a maximum uncompressed file size, why not save the files as uncompressed TIFFs, you can work out arithmetically, or by trial and error the pixel resolution that will generate a 6MB file. Then you can zip the files before sending, which has the added advantage that you need only send one file, rather than any number of images.

CONTACTS

All of our experts welcome your queries: simply respond to the appropriate address at the end of their *Hands On* columns.

Balancing act

Uncovering Excel's hidden depths Stephen Wells finds shortcuts to keep your accounts in order.

The spreadsheet was the killer application that got Apple started. In 1978, Dan Bricklin, a Harvard Business School student with some experience of computers from summer jobs with Wang, worked with Bob Franckston, a programmer friend, to simulate the accountant's worksheet on screen. That's where the columns and rows came from. The really clever bit, though, was that they allowed hidden formulas to be embedded within the worksheet that could perform calculations on the visible data.

This is how VisiCalc for the Apple II personal computer was born. More than 700,000 copies of VisiCalc were sold and Apple sales boomed. The VisiCalc program that ran on the IBM PC in 1981 still runs on today's PCs. It is only 27KB long and can be downloaded from www.bricklin.com/history/vcexecutable.htm and run under Windows or DOS.

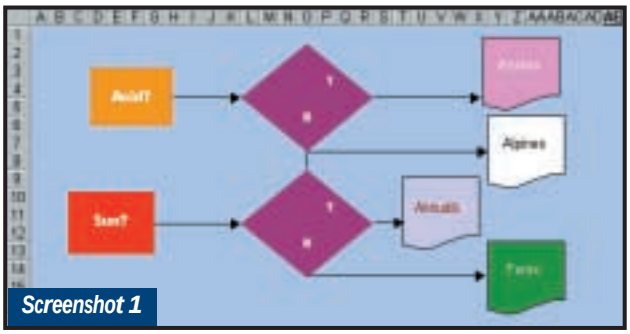
By 1984 VisiCalc had disappeared, though vestiges of it live on in Lotus 1-2-3. For years 1-2-3 was the dominant spreadsheet, but Lotus was slow to move on from its DOS-based versions. Microsoft stepped in with Excel, the first Windows spreadsheet and, after a slow start, took the market by storm.

Since the boom in the Internet, PCs have almost become household appliances and many businesses and families have acquired Excel, Lotus 1-2-3, Corel Quattro Pro, or the Works spreadsheet module as part of a software bundle with their machines.

The problem is that most people never get the best out of their spreadsheet package. So we're going to take a look at Excel in this workshop and help you understand some of its more useful features that you may have initially missed. Becoming familiar with these can save a lot of time.

First steps

You may not have realised that Excel includes several templates for producing invoices or purchase orders. To access these just choose File, New, Spreadsheet solutions. If the selection presented doesn't appeal to you, there is also a link from here to the Village Software website where you can order many more – although, as the company is in Boston, Massachusetts, you will have to anglicise these forms for use on these shores.



Excel will create simple flowcharts using just the Drawing and Formatting toolbars

But time-saving isn't just about templates and shortcuts. Often a graphic representation of tabular data enables it to be quickly understood. Stock prices are a good example of this. Excel can make a chart instantly. All you have to do is highlight the whole table, including row and column labels and press F11. Excel will open a new sheet and put a bar chart on it with both axes labelled. If you want to change the chart type, just click on the Chart wizard tool and choose another one. To reformat any part of the chart, right-click on that element and make the changes.

Instead of bar charts, you might want to draw flowcharts. You can draw these with Excel using the tools on the Drawing toolbar. On a new sheet, click the Select All button – the grey area where the row and column headings meet. Draw the join between column headings A and B slowly to the left until the column width is reduced to 2.00. The cell borders now offer a grid for aligning AutoShapes.

For a decision shape, hit AutoShapes, Flowchart, Flowchart:Decision. Drag the mouse on the sheet, holding down Alt to snap to grid. Click on the edge of the AutoShape, right-click and choose Colors and Line, Fill Color. Then select a new colour for the decision diamond.

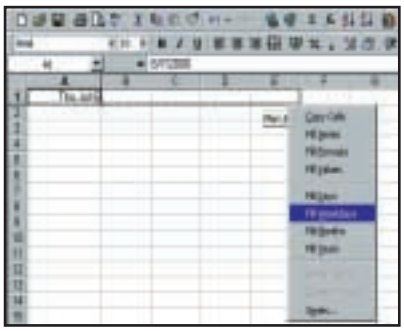
To draw connecting lines, click on AutoShapes, Connectors and choose one. To eliminate the conventional spreadsheet gridlines, choose Tools, Options and uncheck the Gridlines box. For a colour background, click the Select All button and click the Fill Color button on the Drawing toolbar. With a little practice you can create flowcharts like screenshot 1 in no time.

Perhaps the biggest time-saving feature of Excel is its support for macros. Many users don't realise Excel offers listings for a number of useful macros in the file, Samples.xls. There is code that will start a macro when someone enters data in a worksheet, a macro for looping through an array, one for retrieving data from a database and one for copying an Excel chart into a Word document.

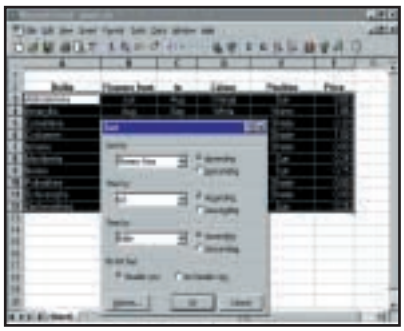
To enter a macro listing in Excel just press Alt & F11 to open the VBA for Excel editor. Double-click on Sheet 1 (if that's your current worksheet name). If there is already a macro listed there in the right-hand box, you can still add another one after it. Either way, carefully type or paste in the macro code. Press Alt & Q to return to your workbook. Press Alt & F8 to open the Macro dialog box. Click on Options and you can assign a keyboard shortcut which will run your new macro. The job's done.

Excel can do a lot more than you may have thought a spreadsheet was capable of. For example, the file Mapstats.xls, included with Excel, offers you a look into the world of mapping. The root software for Excel's mapping facility is provided by MapInfo. Its British affiliates offer datasets on everything from all the parishes of Britain to the postcode boundaries of Switzerland. You can buy lists of 13,000 UK estate agents, or 10,000 pubs, which are instantly mappable in Excel. Subscribers to a

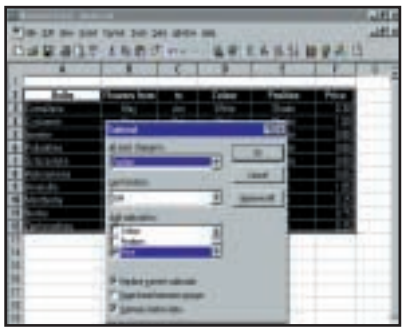
Six helpful built-in Excel features



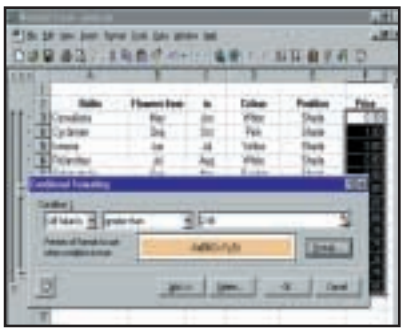
1 To enter a series of consecutive dates down a column or across a row, you can drag the Fill Handle at the bottom right of the cell. But supposing you want to skip the weekends? Simply hold down the right mouse button before you drag and you're offered lots of options, including skipping Saturdays and Sundays. Or you could have a series of dates 10, 15, 30, 60 or 90 days apart. Just fill in the Step value box.



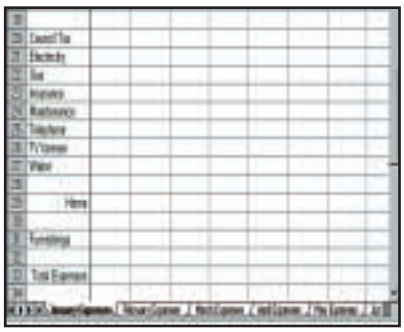
2 To leave space around your list or format the heading labels bold, click on any cell within the list. Choose Sort on the Data menu. Your labels will appear in the drop-down boxes. Pick Ascending if the list is to be sorted in alphabetical or growing order. Here the flowering months were entered as 1/1/00 and so on, and then given a Custom Date format of mmm. The sort order is: month flowering starts; then when it ends; then by name.



3 Here a sort has first been made based on the Position column. Choose Subtotals on the Data menu. From the drop-down boxes choose Position as the main key, Sum as the function to enter and Price as the column in which to subtotal. When you click OK, subtotals will be added for the Shade plants, and the Sun plants, with a grand total at the bottom. You can display all the list, or just the subtotals, or just the total.



4 Excel can automatically change formatting by recognition of a specified condition. Highlight the full range of cells for which you wish the condition to apply and choose Conditional Formatting on the Format menu. Here we have chosen to make any cell in the prices column have an ochre background if the cell's value is more than £2.99, but the range of options is enormous. In this particular case it produces that colour in the subtotal and grand total cells.



5 To make entries apply throughout a workbook, you can Group the worksheets. Click on the tab of the first worksheet, then hold down the Shift key and click on the last tab and the whole group of sheets will react as one. For just particular sheets, click them holding Ctrl. You can enter any labels, formulas or formatting on one sheet and they will appear on all the others. To separate them, right-click on a tab and choose Ungroup sheets.

6 To ensure all your data appears on the printed page, highlight the range you expect to print and choose File, Print Area, Set Print Area. Then choose File, Page Setup. In this dialog box, under the Page tab, check the paper size is correct, and the portrait (vertical) or landscape (horizontal) orientation of the paper. Click the Scaling radio button which specifies one page wide by one page tall. This automatically adjusts the image size so your table will fit.

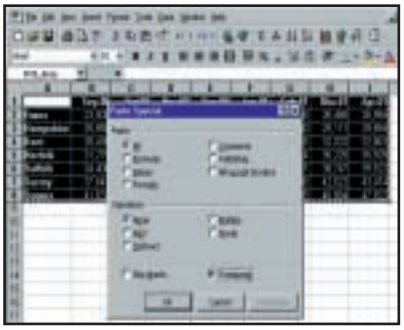
service can even track ambulances and delivery vans on a map live, using a GPS (global positioning system). See the MapInfo site at www.datasets.com.

If you're interested in other specialist spreadsheet applications, you can invest in an Excel Add-In, such as those from Eastern Software Publishing in Essex. Run by spreadsheet lecturer Grenville Croll, Eastern distributes programs on risk analysis, neural networks, staff scheduling, diagramming, cost modelling, genetics, customer valuation and many more. Check out its site at www.eastern-software.com.

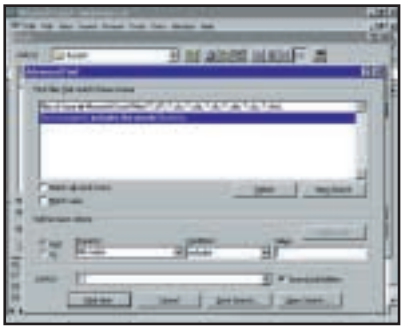
If it's Excel utilities you're after, then your first port of call should be Edwin's Power Tools at http://users.vol.net/edwintam/EPT.HTM. Edwin offers Excel Add-Ins for Excel 2000, 97 and 95 for Windows, and Excel 98 and Excel 5 for the Mac.

Another useful Excel site run by an enthusiast is Alan R Barasch's site at www.barasch.com/excel/. But the most widely appreciated non-commercial site has been maintained for some years by

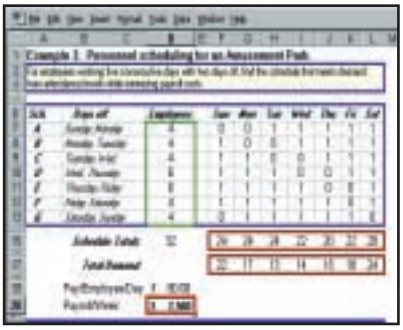
Six more advanced Excel features



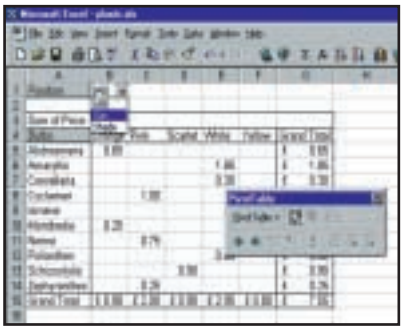
1 If you would like to switch a table around, moving the column headings to become row labels and the row labels to become column headings, it's no problem. Highlight all of the table, right-click and choose Copy. Click on a cell at the top-left corner of a clear range which is away from the table. Choose Edit, Paste Special. In the dialog box that appears, choose All under Paste, None under Operation, check the Transpose box and then click OK.



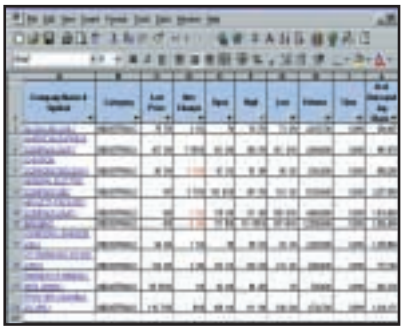
2 Can't remember the name of a file? If you can recall a word in it, choose File, Open and enter the word in the 'Text or Property:' box. This only works for files in the specified directory. If the workbook is in some other directory, click the Advanced button. Now you'll see there is an important box at the bottom named 'Search subfolders'. Check that and change the 'Look in:' box to C:\ – if that's your main hard drive.



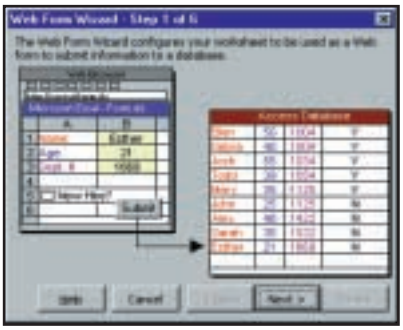
3 When you have a problem to calculate based on a set of rules, lay out the basic table and use Excel's Solver Add-In to work out the answer. Choose Tools, Add-Ins and check the Solver box. Then it's available under Tools, Solver. For a quick tour of Solver, and four examples of its use, first find and open the file Solvsamp.xls. The example illustrated here is for scheduling staff to meet customer demand at maximum efficiency.



4 You can view a list in numerous ways by presenting it in a Pivot Table. Click in the list and choose Data, Pivot Table Report. In the ensuing Wizard, you can move the labels of your list with the mouse into boxes representing Column, Row, Data or Page. In this example, using the plants list, we moved the label, Position, into the Page box, Colour into the Columns box, Bulbs into the Row box and Price into the Data box.



5 Many websites offer information for downloading straight into a spreadsheet. Often this is simply in CSV (Comma Separated Values) but some sites provide special templates called Web Queries. To try out an example choose Data, Get External Data, Run Web Query. Then select Dow Jones and connect to the Internet. As shown in this example, the template includes drop-down boxes so you can pick the top 10 stocks in price rise, or volume of sales.



6 If you have a website and there's an appropriate Access database on your web server with CGI (the Common Gateway Interface), you can display an Excel form that visitors can use to send you information. Choose Tools, Add-ins, and confirm that the Web Form Wizard box is checked. Then choose Tools, Wizard, Web Form. Step five lets you enter a thank-you message for visitors. Step six will create the .xls, .idc, .htx and .mdb files needed.

Californian John Walkenbach at www.j-walk.com/ss/. John is also the author of a number of spreadsheet books.

With so many users of Excel sharing their problems with Microsoft, the first place to look for an answer to any question is the Microsoft Knowledge Base. To get Excel-specific information, go to http://support.microsoft.com/search/default.asp. Then, in the 'My search is about:' box, pick your version of Excel. You can search by keywords, a KB article ID number if you know it, or see what's been added in the past few days.

Finally, for more articles and sample applications for Excel, see The Microsoft Excel Developers' Forum at www.microsoft.com/exceldev/e-a&sa.htm.

CONTACTS

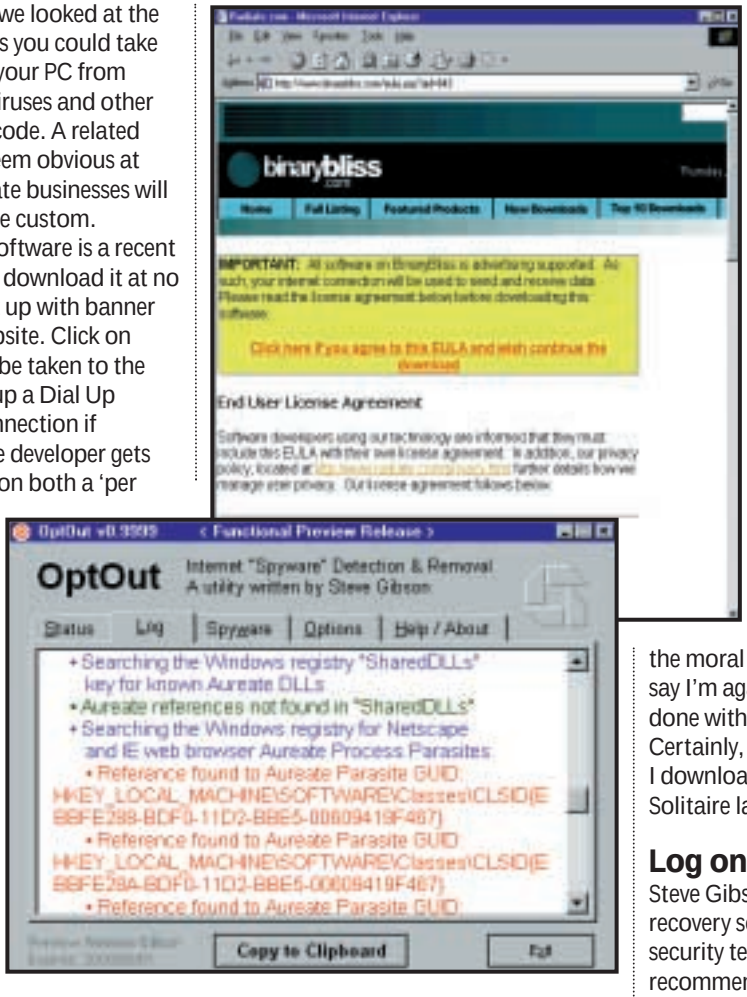
Stephen Wells welcomes your comments on the subject of spreadsheets. Contact him via the *PCW* editorial office or email **spreadsheets@pcw.co.uk**.
Please don't send any attached files until requested.

Beware of spyware

A lot of 'free' software does more harm than just send you the odd advert, warns Tim Nott.

Last month we looked at the precautions you could take to protect your PC from attack by viruses and other malicious code. A related issue, which may not seem obvious at first, is how far legitimate businesses will go to attract your online custom.

Advert-supported software is a recent development – you can download it at no charge, but have to put up with banner ads, exactly as on a website. Click on one of these and you'll be taken to the advertiser's site, firing up a Dial Up Networking (DUN) connection if necessary. The software developer gets paid by the advertisers on both a 'per display' and 'per click-through' basis; one of the first operators in this field was Aureate, which provides advertising content in freeware such as Go!Zilla and the Free Solitaire game mentioned last month.



Left: You have been warned, but not all sites supplying adware are this forthright Below: Gibson's OptOut shows what you may not be aware of

However, there is rather more to this than meets the ad-fatigued eye. Scare stories posted earlier this year claimed that the Aureate software posted software inventories of users' PCs, details of users' surfing habits and other personal information back to the company's site. This was denied by Aureate – which is also known as Radiate – and independent analysis appears to confirm that those scary rumours were, indeed, false. But, remember, just because you're paranoid, it doesn't mean they are not out to get you, so read on.

Typically, when you download one of these freeware packages, you'll be prompted to fill in a lengthy questionnaire. This – according to Radiate – helps tailor the ads you will see. Note that the questionnaire is voluntary, and if you are happy to answer it then you can't really complain about invasion of privacy.

Fresh adverts are delivered to your PC, even when you are not using the software

However, fresh adverts are delivered to your PC, even when you are not using the software, and stored on your hard disk. Information regarding which ads you have seen – and more importantly, those you have clicked on – is transmitted back to Radiate. This, in turn, provides the information to pay the software authors and further 'tune' your advert profile.

All this can happen without your knowledge and can continue even after you have removed the original ad-bearing software. Individual profiling in this way opens a can of particularly juicy and wriggly worms. Now I'm not going to go on at length about the moral pros and cons: suffice it to say I'm against it, especially when this is done without the user's knowledge. Certainly, I had no idea of this when I downloaded and wrote about Free Solitaire last month.

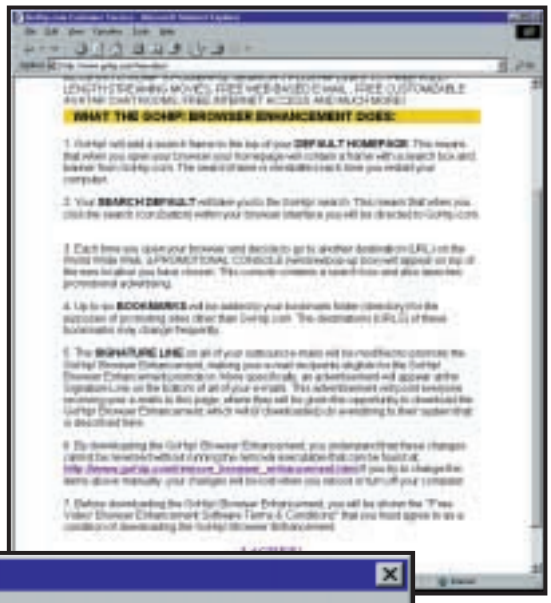
Log on, click in, opt out

Steve Gibson, author of the Spinrite disk-recovery software and the ShieldsUP security testing website (both highly recommended), has taken the matter of 'spyware' very seriously. His website (http://grc.com/optout.htm) contains a detailed explanation of how Radiate and similar systems work and you can get a copy of OptOut, which will detect and/or remove spyware from your system. Steve points out that privacy is not the only issue: other problems can also include security problems and browser crashes.

I ran Steve's OptOut on my system and it found several Registry entries and files belonging to Radiate. Having decided that the Free Solitaire was too expensive, I removed it with Control Panel, Add/Remove programs. This took out the Free Solitaire program, and the store of adverts (which I'd never realised I had), but left behind the Radiate Registry entries and two DLLs –

ADVERT.DLL and AMCIS.DLL. This can't be excused as sloppy housekeeping, as the next day I did a bit of spying myself, with the Windows System Information tool. As soon as I ran Internet Explorer, both DLLs were loaded into memory, and the WINDOWS\AMC folder (used to store the adverts) was recreated. I ran OptOut again and this time chose the option to remove these parasites – as Steve Gibson aptly calls them – from my system.

In the interests of fairness and accuracy, I went to download Buddyphone from www.binarybliss.com (a site apparently owned by Aureate Media, shown left). Here the download screen stated clearly that the software was advertising-supported and that you should read the End User Licence Agreement below – which, in turn, stated: 'understand that this software will connect to the Internet UBIQUITOUSLY to download advertisements and/or to provide software updates. You also accept responsibility for any network usage costs or any other costs incurred by using this software'. Reasonably frank, but mysterious in the use of UBIQUITOUS (its capitals): does this mean it connects everywhere or often? After download, the installation offered no further information until the application was started, when the optional questionnaire appeared – and was dismissed unfilled. Once again, OptOut reported the presence of ADVERT.DLL and AMCIS.DLL and once again these managed to survive an uninstall of Buddyphone before I let OptOut deep-six them.



Left: No – this is not a joke Below: That's odd – I'm sure I said 'Copy'. Your shortcut keys may lead to unexpected places when using WinPopup

Not all sites and applications are this candid – I downloaded Aureate Go!Zilla from Tucows and received no warning at download, on installation or on use, although the same advert software was installed. However, this time uninstalling removed the DLLs – but not the Registry entries nor the advert files, so once again OptOut was asked to do its stuff.

At the time of writing, OptOut was free of charge, (and a mere 31KB download) but it only dealt with the Aureate/Radiate system – others, such as the Conducent Tsadbot that gets installed by the trial version of CuteFTP, weren't detected. By the time you read this, however, OptOut will be a commercial product and expanded to detect and remove Tsadbot and other systems. Aureate/Radiate also claims to supply a remover for its DLLs: to find this you need to go to the (again very small print) 'privacy policy' link on the home page. The contents of this page openly states what Radiate does and makes the sensible suggestion that 'if you don't want your personal information collected, please do not submit it'. I found a link on this page to 'Aureate/Radiate DLL Remover', but clicking on this produced a '404 – not found' message.

If you don't want your personal information collected, please do not submit it

The obvious defence is to read the small print carefully and avoid ad-supported software (unless you like that sort of thing). However, there is another defence – although the Radiate DLLs hook into Internet Explorer and Netscape Navigator, they won't affect some other browsers, such as the fast and lightweight Opera.

In fairness, Radiate is by no means the only player in this arena and I'll be keeping a beady eye on other intrusive advertising technologies that take liberties with your operating system. One I'll mention now, as it deserves a prize for bare-faced cheek, is the search'n'shop portal www.gohip.com.

Download the 'Browser Enhancement' and it changes both your home page and your search engine to Gohip's. It adds 'up to six' changing bookmarks to your favourites folder. It opens a 'Promotional Console' each time you open your browser or go to another URL, which contains advertising and a search box.

The final, horrifying, touch is that it adds an advertisement for itself to your Outlook Express signature. This will point recipients of your mail to the Gohip site, where they, too, can have the opportunity to download and help bring a new meaning to the word 'enhancement'. Fortunately, you are told about this before you can download the file and have to click on an 'I am a complete idiot' button to continue. All right, I made up the last bit – it's 'I agree', but the rest is true.

If, by some inexplicable oversight you have fallen for this, then here's what to do. First, don't send any email messages, especially to me. Next delete 'Windows Startup' (winstartup.exe) from Windows\Start Menu\Programs\Startup. This is essential, otherwise all of the other reparations will be in vain.

Now you can reset your home page and your search engine: if you're using Internet Explorer you can reset these to the defaults by going to Internet Properties, Programs and Reset Web Settings. You can then change the home page from the General tab. Next, reset your Outlook Express signature from Tools, Options, Signature. Alternatively,

Gohip offers its own remover on its Customer Service page.

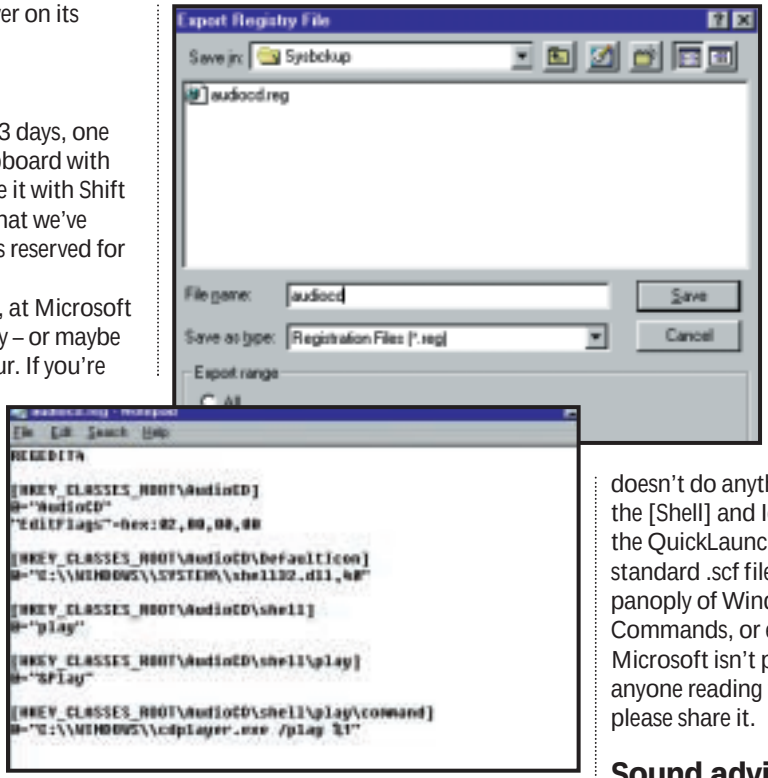
Copy or kill?

Way back in pre-Windows 3 days, one would copy stuff to the clipboard with Control & Insert, then paste it with Shift & Insert. The Control & C that we've come to know and love was reserved for aborting DOS commands.

Somebody, somewhere, at Microsoft must have a sense of history – or maybe just a weird sense of humour. If you're not connected to a network, you probably haven't experienced the joys of WinPopup, which is a utility designed to send short text messages to other members of your workgroup.

Apart from important tasks such as announcing the lunchtime pub venue, it's quite useful for sending information such as 'Here's that email address/phone number/URL you wanted...' So, bingo, you highlight the relevant part of the message, hit Control & C and it isn't copied to the clipboard.

Instead, you are asked if you want to delete all your messages (see screenshot on previous page). Admittedly, you can copy with a right mouse click, but if you're a habitual keystroke copier, you may find this irksome. Take heart that, amazingly enough, Control & Insert still works in WinPopup – as it seems to do in Windows generally.



Top: Backing up the Audio CD default behaviour...
Bottom: ...and what the standard settings should look like

The shortcut to SCF

Windows 98 brought us the mysterious Windows Explorer Command files. These, which have the .scf extension, are plain text files that act as shortcuts. Two come as standard on the QuickLaunch toolbar. The first opens Explorer, but as this defaults to a view with the C: drive expanded, I long since replaced it with a standard shortcut that has the command line C:\WINDOWS \EXPLORER.EXE /n,/e,/select, C:\ which, as regular readers will doubtless recognise, opens Explorer without expanding any drives in the left-hand pane. The other is the very useful 'Show Desktop' command. This has a similar effect to the Minimize All command available from a right-click on the Taskbar, but it's one less click, and applies to objects (such as file, shortcut, and Control Panel property boxes) that the latter can't reach.

If you've removed this useful little icon, here's how to restore it. Open Notepad and type the following:

```
[Shell]
Command=2
Icon File= explorer. exe,3

[Taskbar]
Command= ToggleDesktop
```

Save this in C:\Windows\Application Data\Microsoft\Internet Explorer\Quick Launch as 'Show Desktop.scf'. The third SCF file is the View Channels button, which I am not going to dwell upon, but all this gave me a healthy curiosity as to what else could be done with .scf files. After a search of first the Microsoft website and then, with a variety of technology, the Internet, I found absolutely nothing, save a rather lame tip on using a button that doesn't do anything (ie, just consists of the [Shell] and IconFile= lines) to divide the QuickLaunch bar. So either the three standard .scf files encompass the full panoply of Windows Explorer Commands, or else there is more that Microsoft isn't prepared to tell us. If anyone reading this knows any more, do please share it.

I still like to be able to stick an audio CD in the drive and have the plain old player pop up

Sound advice

Over the past few months I've played with a variety of music players and these seem to sever the connection between Audio CDs and the Windows CD Player – even after they are uninstalled.

Wonderful though the various juke boxes are (see July's *Hands On*, *Windows*), I still like to be able to stick an audio CD in the drive and have the plain old player pop up automatically. So, given that the CD player is working properly, a quick piece of pre-emptive prudence is to run Regedit, go to HKEY_CLASSES_ ROOT and select the AudioCD entry. Now, go to the Registry Menu and Export Registry File: choose a name and destination and make sure the 'Selected branch' option is chosen. You'll then have a small text file with the .reg extension: double clicking on this will merge it back into the Registry, restoring the original settings. Note that you'll still need to make sure 'Auto Insert Notification' is enabled for the CD drive in Device Manager.

CONTACTS

Tim Nott welcomes your comments on the Windows column. You can contact him via the *PCW* editorial office or email: **win@pcw.co.uk**. Please do not send unsolicited file attachments or queries concerning the *PCW* CD-ROM or website.

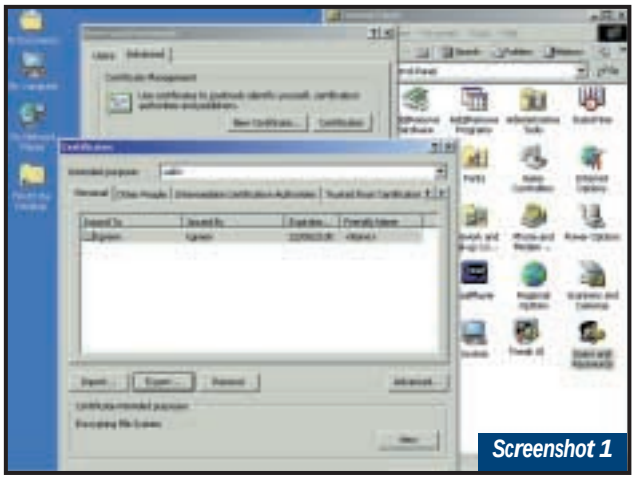
Permission granted

NTFS is key to a secure Windows environment, Terence Green unlocks the resilient file system.

When Windows NT first shipped in 1993 it sported an all-new file system, the NT File System – known as NTFS – which proved to be far more resilient than the File Allocation Table (FAT aka FAT16 and FAT32) file systems of Windows 9x. However, NTFS was revamped with added features, such as file encryption, for Windows 2000.

Although Windows 2000 supports FAT for backwards compatibility, using NTFS has advantages for performance, reliability and security. But there are also traps for the unwary. Security measures protect your data from unauthorised access, but can also prevent you from accessing your own data if you forget your passwords or fail to back up your encryption key.

NTFS is resilient. It can recover from errors, such as sudden power cuts, that can destroy FAT-formatted disks. This is because it keeps a transaction log of disk writes that enables NTFS to roll back to a pre-disaster consistent state. NTFS can't do magic. Data held in memory or that has only been partially written to the disk can't be recovered. NTFS also keeps multiple copies of file system data in case of physical problems, such as bad sectors which can spell disaster for FAT-formatted disks.



When using EFS, always export and save your certificate and private keys in a safe place

The file system provides enhanced data security to protect your sensitive data. It maintains Access Control Lists (ACLs) of security permissions (read, write, execute, etc) that can be applied to files and folders. As of Windows 2000, NTFS also provides encryption for files. Windows 2000 ACLs and encryption are only available on NTFS. We don't have space here to fully explain ACLs and encryption, so we'll concentrate on the important gotchas. (The 'Security' section in the Contents of Windows 2000 online Help has more information if you want some more background knowledge on the subject.)

Permissions allow several people to share a Windows 2000 computer without exposing their files to other users, except for administrative users, who can take ownership of any file and reassign the security permissions. Used sensibly, this is a security measure enabling access to the files of a user who has forgotten their password or has left the company. Ideally, a single responsible person holds administrative rights and everyone else has a regular user account.

NTFS was revamped with added features, such as file encryption, for Windows 2000

ACLs can also control program execution. With eborne viruses a growing threat, this can be really useful. An administrator can deny the right to execute a file or group of files. One way to tackle the ILOVEYOU virus problem might be to deny execute permission for Windows Scripting Host (WSH) to everyone except the operating system itself. This will prevent a VB script virus from activating, even if the attachment is opened. This method also bypasses Windows 2000 System File Protection (SFP), which prevents you from deleting system files.

Encryption

In an ideal world, security permissions would secure our data, but unfortunately, in real life, they're not impregnable. In particular, a couple of free programs from www.sysinternals. com – NTFS for DOS and NTFS for Windows 98 – can read NTFS disks regardless of security permissions. To use either you must have physical access to the computer and be able to boot it. Paid-for versions of these utilities can write to NTFS from DOS and Windows 98. Seemingly a huge security hole, these tools can in fact be very beneficial in recovering data from crashed systems, allowing users with dual-boot systems to read their NTFS files from Windows 95/98.

Oddly enough, because they can only be used to read NTFS drives by someone with physical access to the computer, they help security by highlighting an aspect which is often overlooked. If you can't secure physical access to your computer you can at least use the BIOS passwords to control who can boot it and to disable booting from floppy. On some computers, IBM ThinkPads for example, BIOS passwords cannot be circumvented, but on many desktops password security can be disabled on the motherboard. Password boot security also won't provide much of a defence against someone in possession of the passwords or with the opportunity to move the hard disk into another system.

Enter the Windows 2000 encrypting file system (EFS), which scrambles files or folders so that only you can open them.

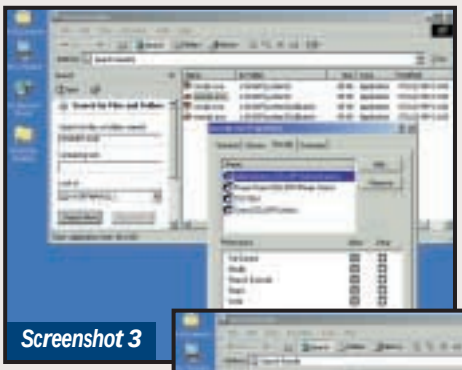
Security permissions

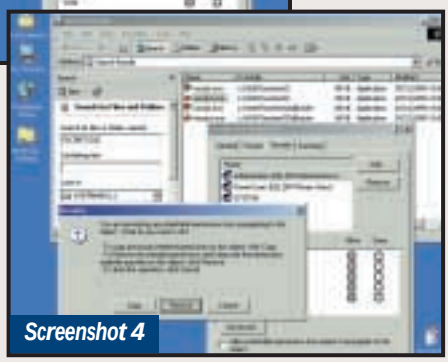
To change the default permissions for Windows Scripting Host, log in with the Administrator account and locate WSCRIPT.EXE and CSCRIPT.EXE (the console version of WSH) by using Start/Search/For Files or Folders to search for ?SCRIPT.EXE on the Windows 2000 system drive (see screenshot 3). You'll find four entries. The duplicates in DLLCACHE folder are the copies that the System File Protection copies back into the SYSTEM32 folder if WSCRIPT.EXE or CSCRIPT.EXE are ever deleted. Try deleting WSCRIPT from SYSTEM32 if you like. It will reappear within minutes. There's no need to alter the permissions on the DLLCACHE versions.

Change permissions for the two system files. Right-click on WSCRIPT.EXE to open Properties/Security. You can't change permissions here as the file has inherited them from the folder hierarchy. This is represented by the grey backgrounds of the ticked boxes. Untick 'Allow Inheritable permission' A warning message pops up because you are trying to alter these inherited permissions (see screenshot 4). Click on Remove and both the Name and Permission lists will be cleared. (Note: the defaults can be restored by ticking 'Allow' and clicking on 'Apply'.)

Now give SYSTEM complete rights to the executable. Click on Add, select SYSTEM from the list and click on Add. Click on OK to return to Properties/Security and tick the Full Control box. Click on Apply to confirm the changes, and OK to exit. Repeat the procedure for CSCRIPT.EXE. Now, whenever anyone attempts to run a script file such as a VBS script embedded in an email attachment they'll be refused access. Test by creating a Notepad file on the desktop, naming it TEST.VBS, and double-clicking it.

This is the briefest run-through of one of the many uses of permissions. Experiment with care, as you can easily prevent yourself from running applications, or even from accessing your own system. Should this happen, log in as Administrator and take ownership of the file from the Advanced window of the Security Properties page.


Screenshot 3


Screenshot 4

Right: Restricting the use of Windows Script Host can prevent VBS viruses from running Below: Remove the inherited permissions for all users to fully disable WSH

This is great for laptops and shared computers holding sensitive files. This being Microsoft, you can't share encrypted files or folders, but we are assured that this feature will be added in due course. View the online Help (search on EFS) for more detail and also search the KnowledgeBase for 'EFS' for tips (www.microsoft.com/technet/).

The big gotcha with EFS is what to do when things go wrong. EFS is enabled via digital certificates and it's possible to lose your digital certificate – as the result of a computer crash for instance – in which eventuality you won't be able to access your files. A corporate network will have recovery measures in place, but standalone users need to take three steps to cover for this eventuality: back up; export and save a copy of your digital certificate and keys (see screenshot 1, opposite); and lastly, export and save a copy of the default recovery agent's certificate and keys.

These keys should be kept in a secure location on floppy or on another drive. The recovery agent keys and certificates can be used to decrypt any encrypted file on a standalone system. An individual's certificate and keys can be used to decrypt files which have been relocated to another system using NT Backup.


Screenshot 2

The step-by-step guide to EFS has invaluable advice on the use of the Encrypting File System

Copying an encrypted file to an unencrypted location converts it to text, whereas NT Backup keeps encryption.

To understand the export process, have a look at the information in the Knowledge Base, including a step-by-step guide to EFS, at www.microsoft.com/windows2000/library/planning/security/efssteps.asp (see screenshot 2). Standalone systems should adopt the procedures described under 'User Scenarios' in the guide.

EFS offers extra cover for Windows 2000 systems, especially for mobile users, but it must be used with care. As the first cut also has deficiencies, you'll have to forego sharing on encrypted files, including off-line folders. Hopefully these omissions will be rectified before long.

CONTACTS

Terence Green welcomes your comments on the Windows 2000 column. Contact him via the *PCW* editorial office or email: **win2000@pcw.co.uk**

Get on the bus

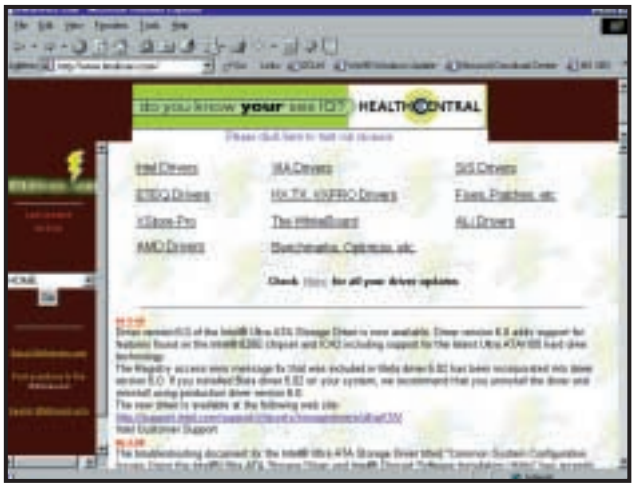
Roger Gann makes a return trip to the subject of bus mastering for improving performance.

Back in July I waxed lyrical about the possible performance gains you can achieve with IDE hard disk subsystems by the simple task of turning on DMA using the simple (and free) DMACHECK.EXE download from Microsoft's website.

Now, I know that Windows NT4 and SCSI were simply made for each other and that to run IDE drives on an NT rig is heresy, but the fact remains that IDE offers tremendous bangs per buck – it's cheap and pretty damn fast, providing you've got it configured properly under NT4. It's often said by SCSI proponents that IDE (aka ATA) drives cannot touch the miniscule CPU utilisation posted by SCSI drives. This is untrue if DMA is used. The problem is, as we've seen, that DMA operation is, by default, switched off in a standard NT4 installation.

Now we know how to turn on DMA support, courtesy of DMACHECK.EXE, what can you expect in the way of performance gains? Quite a lot, is the short answer. With the right IDE device driver, turning DMA (aka bus mastering) on you can cut CPU utilisation from as high as 75 per cent down to less than two per cent. Not only that, the data transfer rate is also significantly improved as well – gains of 33 per cent are not exceptional. Check out www.9-muses.com/freak/viewpoint/nt/nt_busmastering_3.shtml for some interesting benchmarks.

For day-to-day use, you may not notice much improvement, but if you multitask and run many programs that access the hard drive, you'll probably notice less lag, especially during heavy disk accesses. You'll also be doing your other peripherals a favour. For example, if your IDE CD-R is bus-master capable, then you should be able to do other things while it's burning CDs, since the CPU doesn't have to watch over the entire process.



BMdrivers.com will happily supply you with DMACHECK.EXE

Back of the bus

The transfer model for IDE devices has traditionally been PIO (programmed I/O) where data is transferred to and from IDE devices explicitly via CPU instructions. This is a straightforward and simple technique, but requires a relatively large amount of dedicated CPU time, especially when transferring large amounts of data to and from hard disk drives. If your PC's chipset includes support for bus mastering, then the burden on your CPU can be seriously reduced. A bus master is a chunk of microcode that controls traffic on the computer bus or input/output paths. The bus master is the 'master' to the I/O devices on the bus, which are its 'slaves'. Once these paths are set up, the flow of data bits goes directly between the I/O device and the microprocessor.

For example, the common Intel 430 and 440 chipset series contain a PIIXn IDE controller function. The PIIXn IDE controller acts as a PCI bus master on behalf of IDE DMA slave devices, performing DMA transfers to and from devices on either primary or secondary IDE channels. More modern chipsets can also increase bandwidth via the UltraDMA33 hardware interface.

The table below maps Intel chipsets to PIIXn devices and notes each chipset's IDE hardware interface.

Chipset	PIIXn Device	IDE h/w interface
Intel(r) 430FX PCIset	82371FB (PIIX)	ATA16
Intel(r) 430VX PCIset	82371SB (PIIX3)	ATA16
Intel(r) 430HX PCIset	82371SB (PIIX3)	ATA16
Intel(r) 430TX PCIset	82371AB (PIIX4)	UltraDMA33
Intel(r) 440FX PCIset	82371SB (PIIX3)	ATA16
Intel(r) 440LX AGPset	82371AB (PIIX4)	UltraDMA33
Intel(r) 440EX AGPset	82371EB (PIIX4E)	UltraDMA33
Intel(r) 440BX AGPset	82371AB/EB (PIIX4/4E)	UltraDMA33
Intel(r) 440GX AGPset	82371EB (PIIX4E)	UltraDMA33

Bus mastering

The original version of NT4 shipped with an IDE driver that didn't permit bus mastering. Consequently, the maximum transfer rate was limited to PIO Mode 2 or 8.33Mbytes/sec. For NT4 Service Packs 3 and above, Microsoft includes an UltraDMA-capable bus-mastering IDE driver. It's the 'IDE CD-ROM (ATAPI 1.2)/Dual Channel PCI IDE Controller' you see in the SCSI Adapters applet in the Control Panel. However, by default, it is not enabled for compatibility reasons. To enable it, use the DMACHECK.EXE utility described in the July NT column – you can get it from http://support.microsoft.com/support/kb/articles/Q191/7/74.ASP. Or look out for BMNT4.ZIP at www.bmdrivers.com.

Other bus-mastering IDE/ATAPI drivers are available, principally from Intel, and these offer slight advantages

over the current Microsoft bus master IDE driver – you might want to experiment here and find out for yourself. For example, Intel's Bus Master Driver version 2.05 has been popular. They were designed for the Intel 82371AB/EB controller found in the 430TX and 440 family chipsets.

There are several different versions to be found floating around the Internet, some originating from the Hewlett-Packard website. For 800 series Intel chipsets, you'll need Intel's Ultra ATA Storage Driver 5.0. This does actually work with most BX chipset boards, but results will vary. An interesting thing about this driver is that it does not show up in the SCSI Adapters section in the Control Panels. For instance, it shows up in the Devices, but does not show up in the Drivers tab. However, it does come with its own utility that lets you see how your devices are configured. It looks like the SCSI Adapter Control Panel, but with a lot more detail.

Left and below: There are plenty of resources out on the Internet and you can get the latest Ultra ATA drivers from Intel's site

Don't forget that it's a good idea to keep similar ATAPI devices on the same chains. For instance, don't connect a CD-ROM drive to your UltraDMA-2 hard disk because it will force your hard disk to operate at the lowest common denominator, ie CD-ROM data transfer rates. For example, on my Compaq PWS-5000, there's only one IDE channel. Connecting the CD-ROM and an IDE drive on the same channel disables DMA. Also, some ATAPI devices may or may not function correctly using bus mastering. In that case you should keep them on a separate chain to prevent them from causing problems.

Driver sources

A good source of info and drivers is BMDrivers.com at www.bmdrivers.com/. Intel's very latest Ultra ATA drivers can be picked up from the Intel website at http://support.intel.com/support/chipsets/storagedrivers/ultraATA/. For previous releases, see the Intel Chipset Software Installation Utility Archive page: http://support.intel.com/design/software/drivers/platform/archived_inf.htm.

Power management

Back in the July column I also alluded to the availability of power management software for the Windows OS. NT4 has no inherent support for any form of power management, which made it unpopular as an operating system for battery-powered notebooks simply because of the poor battery life it returned. However, for the past couple of years most major notebook vendors, eg Compaq, IBM, Toshiba and even Dell, have been offering their notebooks with Windows NT4 pre-installed, complete with power management software and hot-swappable PC Card support.

There are a fair few third-party vendors offering drivers and software that bestow a reasonable degree of power management onto Windows NT4, mainly for laptops, but one is available for desktop PCs.

SystemSoft makes a number of Windows NT4 'mobile' utilities, including PowerProfiler/SE for about £30, which is perhaps the best-known APM add-on. It provides extended suspend/resume controls and battery-status information on APM 1.x systems. PowerProfiler/SE lacks features found in PowerProfiler, but the latter only comes preinstalled on a laptop. The software will run on any notebook with a BIOS that supports the APM (Advanced Power Management) 1.1 or 1.2 specification.

Phoenix Technologies sells Desktop APM for NT www.ptltd.com/platform/power.html, although this appears to be an OEM product, not retail. TouchStone Software, www.touchstonesoftware.com/, sells a retail version of CardWare 6.0 (£70) that, as well as offering APM power management, additionally includes full PC Card support.

Finally, Softex (www.softexinc.com/deskmktg.html) sells DeskPower Controller for around £25. This package is specifically aimed at desktop PCs and offers BIOS-independent power management. It features an APM-like user interface, support for CPU Idle, display time-out settings, hard disk spin down settings and it updates the system time on a resume from suspend. It supports the Win32 Power Management API, so that power-management-aware applications under Windows 95 will now also be power-management-aware under Windows NT.

CONTACTS

Roger Gann welcomes your comments on the Windows NT column. Contact us via the *PCW* editorial office or email **nt@pcw.co.uk**

More routing around

Adding PPP software is the finishing touch to Chris Bidmead's Apricot Xen II ADSL-router project.

We're now on the last stage of building the Linux-based ADSL router on my old Apricot Xen II 486 machine, based on the download from www.coyotelinux.com. Last month we got the floppy disk image, intended to route between a pair of Ethernet cards, back onto the hard disk so we could do some surgery on it. We need to add PPP software to drive the serial interface to the HomeChoice set-top box, and bring that up at boot time instead of the Internet-facing Ethernet card.

I'm not going to venture too deep into the details of the changes I made because at the time of writing the current free version of Coyote (version 1.13) now includes a script for creating a PPP dialup version of the router, which would cut out a fair bit of the fiddling I had to do. But I want to cover some of the principles involved in peeking inside the disk image and the tarballs it contains. The operation throws up some generally useful Unix and Linux techniques that are worth exploring even if you're not trying to build a router. And you can always email me if you need help with specifics.

FIG 1 **Using df. to display space usage within a filesystem**

```
df .
Filesystem           Size  Used  Avail Use% Mounted on
/tmp/apricot/coyote.xen.image
                     1.4M  1.2M  158k  89%  /tmp/apricot/mp
```

To access the entrails of the floppy disk image we've mounted it using the Linux loop device, with the command line:

```
mount -o loop -t msdos ↙
coyote.image mp
```

(*Key: ↙ code string continues*)

...which means we can now duck inside the mp/ directory to find the tarballs (here called .lrp rather than the more usual .tgz or tar.gz) that the SysLinux boot system automatically untars when the floppy is booted.

With a little tweaking, recent versions of the Midnight Commander filemanager might be a good way of inspecting the contents of these tarballs (drop me a line if you know more about this), but I went straight for an old-fashioned pipeline. For example, tar tvzf config.lrp reveals a file named var/lib/lrpkg/config.help. One shortcut to reading its contents might be:

```
tar xvzOf config.lrp ↙
var/lib/lrpkg/config.help ↙
| less
```

...remembering that the O switch redirects tar's output to stdout.

After some research it turns out that the tarballs I needed to edit were etc.lrp, config.lrp and modules.lrp. I also needed to add a ppp.lrp tarball as well as modify a couple of setup files.

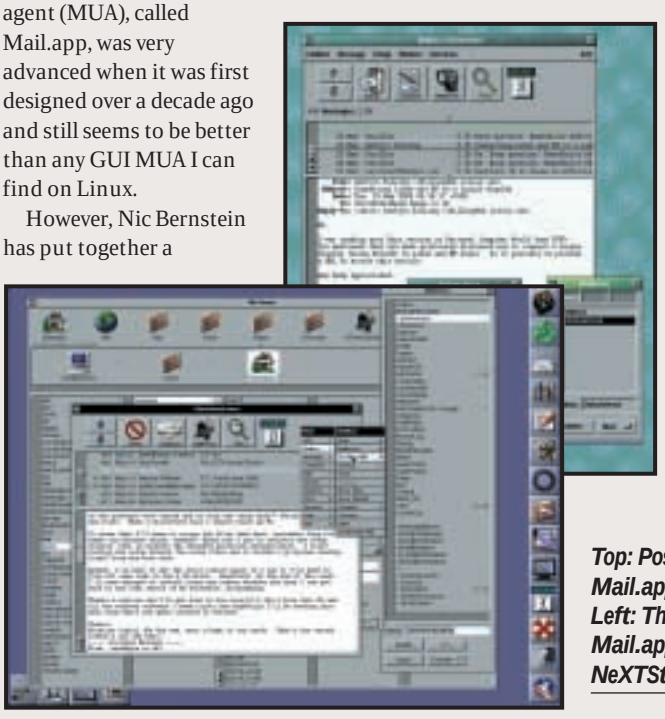
It wouldn't be too smart to try to expand any of these tarballs directly inside the mp directory (eg tar xvzf modules.lrp), because mp is a separate floppy-sized filesystem (within coyote.image) and it'll fill up. The command df is used to display the space usage within filesystems and I get the result as shown in figure 1 above.

So I added the C switch to make sure the expanded files end up outside mp in a pre-established empty directory (so

Mail user agents

I still handle all my email from a NeXTStep system running on a 486-based Canon object.station. NeXTStep's mail user agent (MUA), called Mail.app, was very advanced when it was first designed over a decade ago and still seems to be better than any GUI MUA I can find on Linux.

However, Nic Bernstein has put together a NeXTStep Mail.app lookalike for Linux called Postilion (www.postilion.org). It's based on Martin Forssén's TkRat MUA (www.dtek.chalmers.se/~maf/ratatosk) and is aimed at eventual inclusion in the GNUStep project (www.gnustep.org). It's written in C and Tcl/Tk, so should be portable across most Unix-like operating systems. Currently, I'm running it on Linux Mandrake side by side with the Real Thing on my faithful NeXT machine.



Top: Postilion mimics Mail.app under Linux Left: The genuine Mail.app running under NeXTStep

that it's easy to retar the files back into a .lrp file).

```
tar xvzfC modules.lrp ↙
/tmp/working
```

(If you're new to tar the 'modem-noise' string of command-line switches reads 'expand (x) verbosely (v) while decompressing (z) the file (f) into the switched directory (C)'. The values for f and C follow as modules.lrp and /tmp/working, and have to be in the same order as the relevant command-line switches.)

The modules package inside the disk image didn't include the necessary ppp.o module in the /lib/modules directory, but it was there in the Coyote distribution under ../packages. I discovered that ppp.o also needs slhc.o to run, so I added that too. It's also necessary to add these names (without the .o) to the /etc/modules config file. Having done that I retarred the contents of my /tmp/working directory back into a new modules.lrp tarball to replace the original.

I used the same technique to open up etc.lrp and looked at the startup script in there called /etc/rc.d/rc.inet to work out the best way to get the pppd daemon up and running. Because Coyote is adapted from existing work done by the Linux Router Project (www.linuxrouter.org), the start-up script was already set up to look for a file called /etc/rc.d/rc.ppp and include it if it existed.

```
elif [ "${USEPPP}" = "YES" ↙
]; then
        # Dialup PPP Sharing
        [ -x /etc/rc.d/rc.↙
ppp ] && . /etc/rc.d/rc.ppp
```

All I needed to do was write this script, based on the single workstation PPP connection to HomeChoice I'd already figured out (see July issue):

```
echo "Attempting to start ↙
pppd"
/usr/sbin/pppd /dev/ttyS0 ↙
115200 local receive-all ↙
noauth defaultroute
```

You'll notice that the elif stanza above depends on a variable called $USEPPP. I could have simply snipped this out, but it seemed better not to depart unnecessarily from the existing architecture, so I looked to see where this variable gets set. Early on in the rc.inet script is the line:

```
# Read in the Coyote ↙
configuration script
. /etc/coyote /coyote.conf
```

This led me to investigate the config.lrp tarball, where cat /etc/coyote/coyote.conf produced:

```
LOCAL_IPADDR= 192.168.1.50
LOCAL_NETMASK= 255.255.255.0
LOCAL_BROADCAST ↙
=192.168.1.255
LOCAL_NETWORK =192.168.1.0
USERRM=NO
USEDHCP=NO
IPADDR=
NETMASK=255.255.255.0
GATEWAY=
DNS1=
DNS2=
DOMAINNAME=
DHCPSERVER=NO
DHCPD_START_IP=
DHCPD_END_IP=
```

The IP addresses come from values I'd supplied in running the original script to create the floppy disk image. I added a line:

```
USEPPP=YES
```

...and recreated the config.lrp tarball. Last month I mentioned that although the running version of Coyote uses RAM disks exclusively (so mods to files like /etc/coyote/coyote.conf are volatile) there is a script for saving such changes back to the floppy. Happily this means that the management of the disk image I'm discussing here doesn't have to get all these values exactly right – they can be tuned on the fly.

At first I cheated by disabling the built-in Ethernet and plugging in an EtherLink card

To cut a long story short, the rewarding result – after writing the diskette image back to a diskette with

```
|dd if=coyote.image ↙
of=/dev/fd0|
```

was a working ADSL router for the price of an obsolete, diskless 486 box and a few hours' industrious exploration at the very edges of my competence (and where better to spend a few hours?).

I could have saved the time. An alternative, if you happen to have a few bob to spare, is GnatBox (see www.globaltech.co.uk, where you can download a demo version of a very similar commercial single floppy disk router that times out after 180 minutes). The full working version costs £995. GnatBox is sold and supported in the UK, and the UK sales director Kate Vidgeon tells me you can buy a dedicated hardware version for £1,995.

The GnatBox licence says I've agreed not to 'modify or adapt' the software, or 'attempt to discover the source code'. This may be great for a small business that needs a commercially supported router-cum-firewall, but I think I'll stick with Coyote, which encourages modification and access to the source code and so makes it very easy for me to change the pppd options and add features such as remote logging whenever I want.

Driver reviver

The Apricot Xen II 486 machine's built-in Ethernet connection is based on the i82596 Ethernet controller chip and last month I mentioned that the Linux driver for this (apricot.o) stopped working a few years ago with newer versions of the Linux kernel. It was originally written by Mark Evans, who I ran into again recently at the Linux 2000 Conference.

Mark told me that he'd stopped maintaining the driver when he parted company with his old Apricot. The new maintainer, Richard Hirst, generalised the driver to work with other network hardware based on the same i82596 Ethernet controller chip. Unfortunately, under its new name, 82596.o, it still no longer worked with the Apricot Xen II.

So, how did I handle the Ethernet side of the router operation? At first I cheated by disabling the built-in Ethernet and plugging in a 3Com EtherLink card, but this struck me as inelegant and wasteful. Obviously, it would be worth taking a look at the code for 82596.o and fixing it. So I did.

Well, I don't deserve all the credit. In fact, narrow-minded commentators might be inclined to ignore my contribution altogether. But, hey, I blew the whistle. I ran the driver and found it didn't work. I didn't whinge (well, I didn't just whinge), I damn well sought out the source code and ran my expert eye over it. I don't write C and I

don't understand much about C, but I do recognise an author's email address when I see one.

I dropped a line to Richard and he wrote back saying that he was interested in restoring Apricot Xen compatibility for the next official release of the Linux kernel. He didn't have a Xen, but he sent me some revised code to test on mine. The revision didn't work either, but I returned the diagnostics to him and within a couple of days we had a working driver.

I say 'we'... well, yes, I do say 'we'. The moral is that even if you're not a codester, there's still a proactive role to play in all this. This is what being a Linux user is all about, and it's one reason that Linux is the fastest-growing, fastest-improving operating system in the history of the world.

Administry over the web

Jon Hawkesworth (jon@unity.demon.co.uk) writes: 'I haven't seen mention of Webmin in your column. In case you haven't heard of it, have a look at www.webmin.com/webmin.

'It's a system administration tool for Unix, which can be handy, since it supports lots of distributions, but gives you the same web-based interface to all of them. As with any useful admin tool it is not a substitute for understanding what you are trying to achieve, but it can speed up repetitive administrative tasks and let you concentrate on sorting out the more tricky stuff.

'I'm sure someone that you have never met raving about a piece of software you haven't used isn't the most riveting read, so I'll stop here and let you draw your own conclusions. Hope you find it worthy of a mention in a future column.'

Well, thanks, Jon, for drawing my attention to a great piece of software. Can't think how I missed this. Webmin is now owned by Caldera, but is BSD-licensed, and – as you say – runs across many Unix platforms. There's an RPM package that installs directly onto RedHat and Mandrake Linux systems (I haven't tried it with SuSE), and source code is available for pretty much every Linux distribution you've ever heard of, as well as Solaris, FreeBSD, OpenBSD, HP/UX, SGI Irix, SCO UnixWare and even MacOS X.

Webmin is impressive, consisting of a simple web server and a number of CGI programs that directly update system files such as /etc/inetd.conf and /etc/passwd. So, unlike Linuxconf and SuSE's YaST there are no intermediate special configuration files to add to the complexity. The web server and all the CGI programs are written in Perl version 5, and use no external modules. So, if Perl 5 is available for a platform, Webmin will run on it without compilation.

Left: Webmin conceals the complexity of system administration behind a tab notebook-style interface with distinctive icons. But don't think of it as 'Admin for Dummies'. I agree 100 per cent with Jon's warning: 'As with any useful admin tool it is not a substitute for understanding what you are trying to achieve'

Setting up cron jobs traditionally involves understanding the crontab conventions, where, for example, a line such as:

```
42 4 1 * * root run-parts /etc/cron.monthly
```

...means 'run the script called 'run-parts' with the parameter '/etc/cron.monthly' as user 'root' at 42 minutes past four am on the first of each month'. Webmin's GUI-ified cron editor takes the pain out of this, although it's still worth getting to grips with man crontab so you know what's going on underneath

As Jon says, this gives you a uniform overview of every system on the network. But Webmin can also administer down to the minutest level of detail, such as editing ../rc.init scripts and cron scripts. It's also easy to add your own individual administrative elements by writing your own Webmin modules, or, more directly, simply by setting up arbitrary utilities to be run through the web interface. Several third-party Webmin modules are available from the website (including one written by Jon).

CONTACTS

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

Asus deals an ace

Triumphant Gordon Laing assembles a plus-1GHz BX solution that out-SYSmarks RDRAM.

Last month I had great fun getting my old Asus P2B motherboard to overclock a poor 866MHz Flip Chip to the heady heights of 1GHz, and actually outperform brand new 1GHz systems with expensive RDRAM! The trick was to overclock the aging BX chipset from 100MHz to 133MHz – it's a project which seems to have caught the imagination of hardware enthusiasts the world over, in a way only matched by the dual-Celeron Abit BP6 a few months back.

Of course, no self-respecting tweaker can leave anything alone for long, so this month I took my overclocked 1GHz system one step further, along with trying out new BX solutions. All that performance generates a fair amount of heat though, so I got myself down to the local computer fairs and bought the cream of case coolers.

Finally, FedEx delivered a pair of PowerLeap Neo370s that promise to let legacy PPGA motherboards accept new FC-PGA processors – could this mean dual-PIII action on an Abit BP6? Grab your anti-static wrist bands and read on!

BX – nearing retirement?

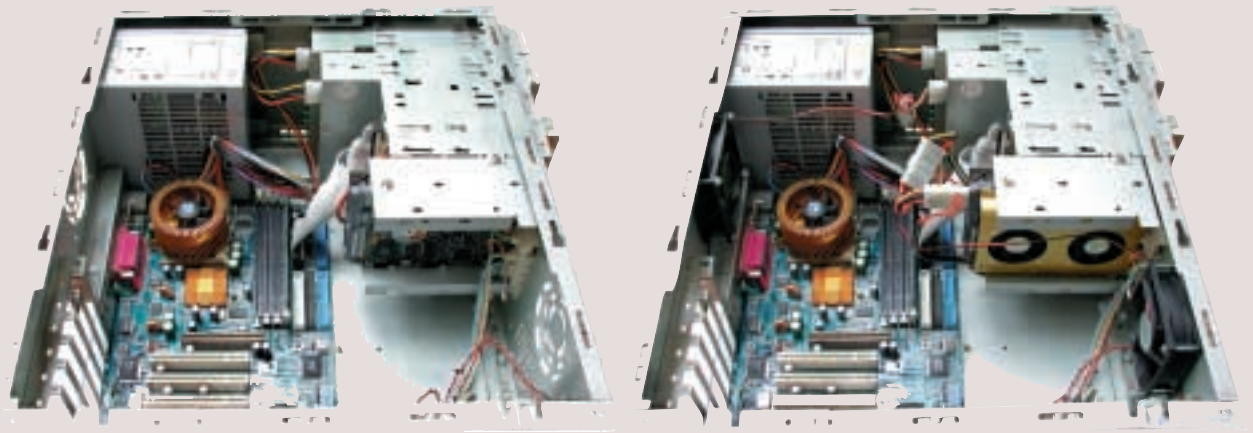
It's funny to remember that the Intel 440BX chipset is now over two years old – funny since most chipsets have a considerably shorter lifespan of around six months. It was the first chipset to support front-side bus frequencies up to 100MHz and AGP transfers of 2X. Time, of course, stands still for no chipset, so the i820 was introduced as a replacement, supporting higher 133MHz FSB frequencies, AGP 4X and doubling the bandwidth of the onboard IDE controller from 33Mbytes/sec to 66Mbytes/sec.

The problems started when Intel designed the 820 to use only RDRAM, which still costs around three times the price of SDRAM today. Component manufacturers and system integrators the world over demanded an SDRAM solution, so Intel built the Memory Translater Hub (MTH) chip and thought everyone would be happy.

Sadly, as most people know by now, the 820 with MTH suffered from poor SDRAM performance and recently was revealed to even spontaneously reboot under certain circumstances, forcing Intel to offer a refund or replacement program. In the meantime, the BX chipset has enjoyed a comeback, at first as enthusiasts demonstrated old boards were quicker with SDRAM than the 820/MTH solution, then second, as genuinely new products arrived from innovative Taiwanese motherboard manufacturers singing 'better the devil you know'.

I've got some cracking results from my old Asus P2B BX motherboard, with a little encouragement here and there. First, I got around incompatibilities with Coppermine CPUs (PIIIs above 600MHz and Celerons above 566MHz), by using a Slocket convertor, which boasted an FC-PGA compatible socket and manual core voltage adjustment. Second, to get the really high CPU frequencies, I needed to run the FSB at 133MHz. Consequently, I bought 133MHz SDRAM, set my PCI divider to one quarter and kept my fingers crossed that my AGP card didn't mind being run at 89 instead of 66MHz.

It all worked beautifully, but I felt there may be a better motherboard solution – one based around a BX chipset, but which was happy to accept Coppermine FC-PGA CPUs as standard.



Can't stand the heat? This overclocking and high-performance I/O is all very well, but things can get pretty hot inside your PC case. I recently noticed disturbing hot-wafts coming from mine, so I decided to do something about it. I headed down to the Tottenham Court Road computer fair and bought a variety of case fans for between £5 and £10 each. Along with conventional case fans, I found ones designed to cool high-speed hard disks and others to suck out nasty hot air through a spare blanking plate. If your case has two fan mountings, place one to suck air in at the bottom and the other to blow it out at the top. I've done this on mine, along with mounting another to cool my new Ultra160 hard disk

Back in June's *PCW* we tested and recommended a Gigabyte GA-BX7 motherboard that did just that, but shortly afterwards, the GA-BX7+ arrived, just begging for a spin!

The GA-BX7+ boasts several advantages over its predecessor. Instead of three, it features four DIMM slots which support up to 1GB of SDRAM. Lack of native UltraDMA66 support on the BX chipset is remedied by the inclusion of an onboard Promise UltraDMA66 controller, with its own pair of channels. The Abit BP6 offered something similar from HighPoint, both with the advantage that instead of the traditional pair of IDE channels, you now have four to play with, doubling the number of supported IDE devices from four to eight. Finally, the GA-BX7+ features a unique Dual-BIOS facility for backup purposes and a 'Magic Booster', which increases CPU core voltage by 10, 20, 30, 40 or 50 per cent. Sadly, there are several capacitors located very close to the Socket 370, which made fitting a large heatsink like my Titan Majesty a bit of a squeeze.

I built a system using an 866MHz FC-PGA PIII, 128MB of PC133 SDRAM, a 13.6GB UltraDMA66 Quantum Fireball Plus KX and an ATi Rage Fury Maxx graphics card. Last month I built an identical system using an Asus P2B and an Iwill Slocket II CPU convertor, which scored an impressive 173 in SYSmark 2000 under Windows 98 SE. The same configuration on the new Gigabyte board scored 176, which isn't bad when you consider both boards use the same chipset and had the same components installed.

You won't be surprised that I next attempted to overclock my 866 CPU, but even with the help of the Magic Booster, the GA-BX7+ wasn't having any of it. This was a shame considering I'd got the same CPU to run reliably at 1,000MHz on my P2B/Slocket combo, scoring a huge 187 in SYSmark 2000. I guess that proves overclocking isn't an exact science, it sometimes works, but not always. I would, however, expect the GA-BX7+ to score slightly higher than 187 with a genuine 1GHz CPU in the same configuration described above.

Powerleap NeoS370

I couldn't leave this column without mentioning the pair of PowerLeap Neo-S370s that I recently bought over the Internet at an end-cost of £35 each.

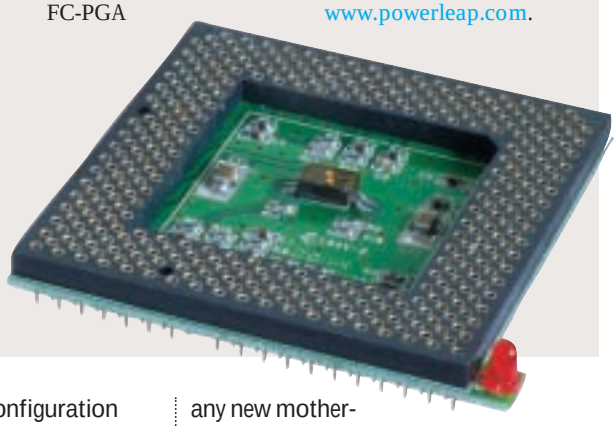
They're supposed to allow you to fit new FC-PGA CPUs into old PPGA sockets. I tried an 866MHz PIII in my Abit BP6 and, while it did boot, the system was rather unreliable.

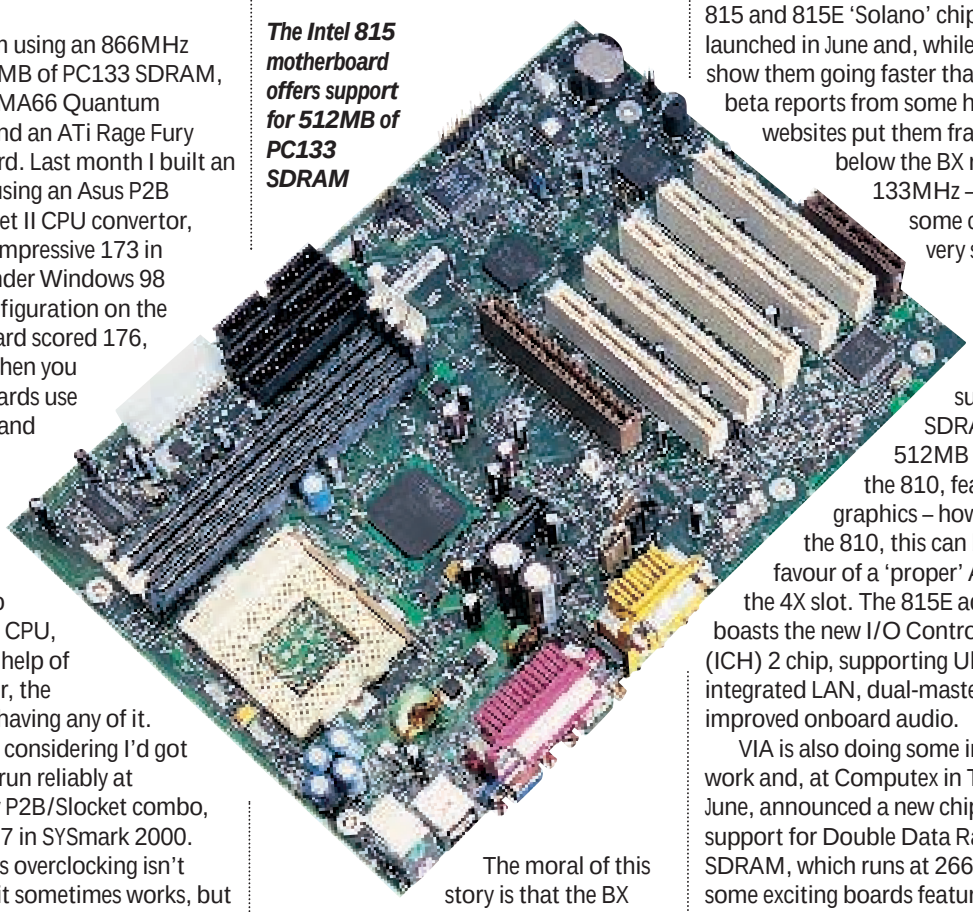
When I tried a pair of 866s, with stepping certified by Intel for SMP use, the system wouldn't even start.

Do I need an updated BIOS? Do I need different CPUs? Do I need a bit more patience? Instead, how about more sensibly spending the £70, plus a tad more, on a new dual-FC-PGA motherboard, such as those launched at Computex in June – far more sensible.

Price: $25 plus postage and import tax (approximately £35)

Contact: PowerLeap, www.powerleap.com.





The Intel 815 motherboard offers support for 512MB of PC133 SDRAM

The moral of this story is that the BX chipset still cuts it. The sad news, however, is that they're now in seriously short supply and you're unlikely to see any new motherboards released with them. Intel's new 815 and 815E 'Solano' chipsets were launched in June and, while early results show them going faster than 820 boards, beta reports from some hardware websites put them fractionally below the BX running at 133MHz – I'll run some comparisons very soon.

For the record, both 815s officially support PC133 SDRAM (but only 512MB of it) and, like the 810, feature onboard graphics – however, unlike the 810, this can be disabled in favour of a 'proper' AGP card in the 4X slot. The 815E additionally boasts the new I/O Controller Hub (ICH) 2 chip, supporting UltraDMA100, integrated LAN, dual-master USB and improved onboard audio.

VIA is also doing some interesting work and, at Computex in Taiwan during June, announced a new chipset with support for Double Data Rate (DDR) SDRAM, which runs at 266MHz. Expect some exciting boards featuring DDR later this year, but in the meantime it looks like supply will soon dry up on the BX. We at *PCW* salute it and wish it the

best of luck in chipset retirement – it'll certainly not have any bother from the doddering 820.

SCSI versus IDE

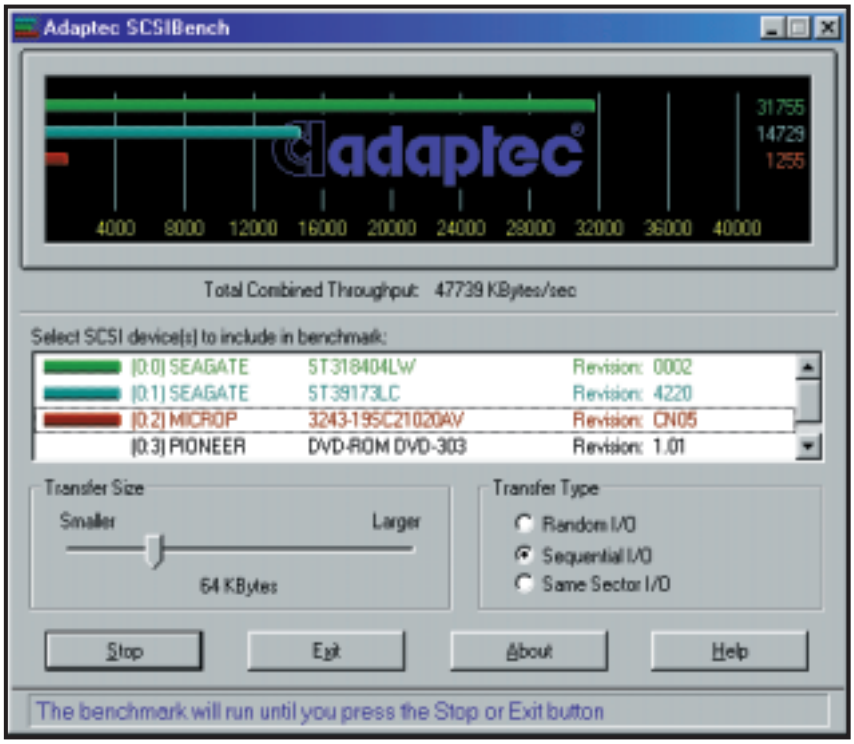
I've been accused of being an I/O snob. You see, over the years I've come to prefer SCSI as the interface of choice for high-performance peripherals, not to mention the broadest flexibility – IDE in its various guises just never cut it for me. It all started with my photographic interests and the absolute need in the early days of scanning to have a SCSI card in your PC. I noticed very early on that the data transferred much quicker from one SCSI peripheral to another, than if it had to get off the SCSI bus and catch the IDE one instead; one SCSI hard disk later and my destiny was set.

Today I have all-SCSI DVD-ROM drive, Iomega ZIP and Jaz, two hard disks and still have plenty of opportunity to connect external SCSI peripherals, something IDE has never been able to do. However, over the years, IDE (in terms of interface and devices) has begun to catch up in terms of raw performance. Out of curiosity, I decided to try out my SCSI card and drive on the Asus P2B system described above, with 866MHz CPU, ATi Rage Fury Maxx and 128MB of PC133 SDRAM. My hard disk was a Seagate ST39173 9GB Ultra2 drive and my controller an Adaptec 2940U2W.

Much to my surprise, my SCSI system actually went a tad slower in SYSmark 2000 than the IDE Quantum one described earlier – 168 on SCSI versus 172 in IDE. While the SCSI subsystem still suited me overall in terms of better connectivity, I admit I felt a bit miffed.

In last month's *Reviews*, I tested an Armari R8-2000E workstation, which featured IBM's brand new 75GXP UltraDMA66 hard disk. Armari is normally a big SCSI fan, but reckoned this new drive really cut the mustard. IBM claims it sustains a whopping 37Mbytes/sec, which, for once, actually demands the bandwidth of the UltraDMA66 interface. In our tests it certainly did fly, so the challenge really was on for SCSI to regain some ground.

Taking no prisoners, I decided to go for a new Seagate Cheetah 18XL 18GB Ultra160 hard disk, spinning at 10,000rpm. While this would work on the 80Mbytes/sec LVD channel of my Adaptec 2940U2W card, I opted for a new controller: the Adaptec 29160,



Adaptec's SCSI-bench shows the relative performance of sequential data transfers on three disks on my system – note the Ultra160 drive is sustaining more than double the throughput of my older U2W drive, while an ancient SCSI-2 drive has virtually given up the ghost

which as its name implies, supports the latest Ultra160 SCSI specification.

I set up the same configuration once more, ran SYSmark 2000 and was delighted to score 180, compared to 168 with the old SCSI hard disk. Out of sheer greed, I overclocked my CPU to 1,000MHz, ran the tests again and achieved a whopping 198! Suddenly, the mid-180s scored by production RDRAM 1GHz systems seemed relatively slow.

Out of curiosity I fired up Adaptec's EZ-SCSI tests and set the Seagate Ultra160, Seagate U2W and an old Micropolis SCSI-2 sequentially firing at the same time. My U2W drive sustained just under 15Mbytes/sec, but the new Ultra160 drive delivered over 35Mbytes/sec. The old SCSI-2 disk plodded along at just over 1Mbyte/sec, albeit slightly slowing itself and the Ultra160 in the process. The moral of this story is that a fast disk can make all the difference. I'd recommend a new Ultra160 SCSI subsystem any day, while the new IBM 75GXP will do wonders for an UltraDMA66 system.

Thanks!

After all that excitement, I'd like to thank several readers for doing my job for me and tracking down some tricky suppliers! In reference to Richard Pankhurst's request for some DOS CD-writing software, Alistair Cunningham and Andrew Gratton both suggested DAO from www.golden hawk.com. James Pearson suggests looking up www.fadden. com/cdrfaq for a list of DOS CD-R apps, while Ross Rundle uses a home-made DOS batch file employing XCOPY to write to CD-RWs that have been formatted as removable drives using Adaptec's DirectCD.

I may have gone all the way to Japan to find an Iwill Slocket II and Titan Majesty fan, but Howard Barnfather and Cyril Holmes beat me by finding UK suppliers that were cheaper to boot!

The Iwill is available from Vision Multimedia Systems: www.vmsystems.co.uk, 01274 403040, and the Titan Majesty from Hills Components: www.hillscomponents.co.uk, 01923 424344.

CONTACTS

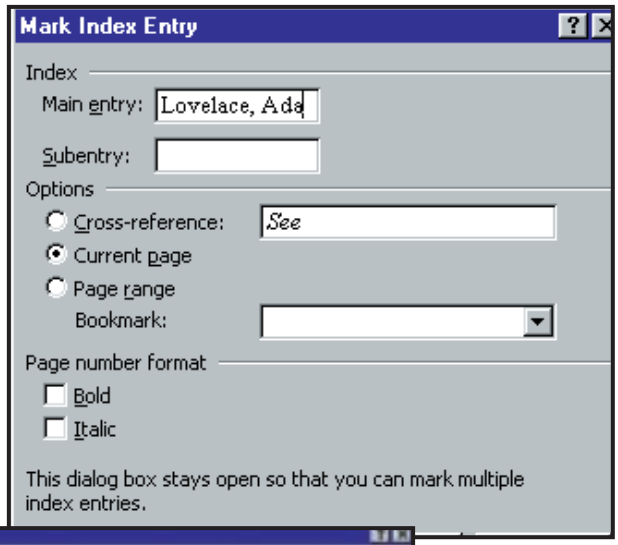
Gordon Laing welcomes your comments on the Hardware column. Contact him via the *PCW* editorial office or email: **hardware@pcw.co.uk**

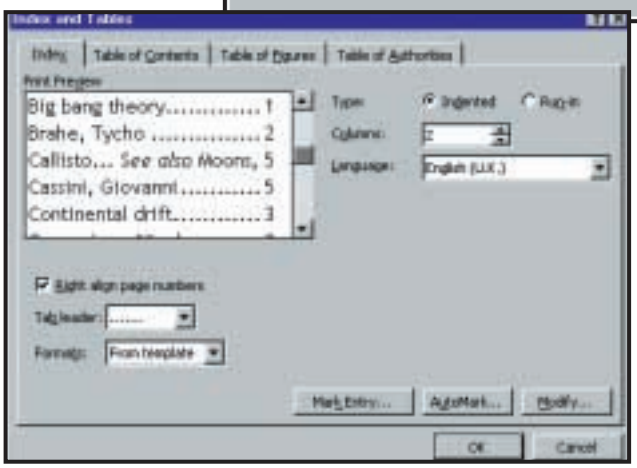
Index-linked

You don't appreciate a good index until you need one, so Tim Nott tells you how to make your own.

One of the great things about electronic documents is that you can search through them easily. You don't have to fumble about in an index or thumb through the pages. However, if you are writing, say, a history of computing or a study on the wines of the Quercy that is destined for the printed page, then you are going to need a conventional index.

Using Word, this doesn't pose too much of a problem. Start reading your opus on screen. When you come to a word or phrase you want to index, you select it, then mark it as an index entry. You can get at the necessary dialog through the Insert, Index and Tables command, but since you'll be doing rather a lot of this it pays to learn the keyboard shortcut – Alt & Shift & X. There are several options here, but we'll keep it simple.





Left: Marking some text for indexing Below: Creating the index itself

Type the main entry you want to index under, as it will appear in the index. Then hit Mark. This inserts an XE field in the appropriate place: normally this is hidden, but Word will obligingly turn on the view of non-printing symbols and text. A better strategy than hitting Mark (who might hit you back) is to click the Mark All button instead, which does exactly as it says – all occurrences of the word or phrase will be tagged.

To be absolutely accurate, only the first occurrence of a word in the paragraph is flagged and multiple instances on the same page will only be referenced once in the actual index. You need to be careful when creating an index entry – usually you'll want to capitalise it, and you need to do this at the time of creation, as the text in the index itself will not retain directly-applied formatting.

Having marked the text to be indexed, creating the actual index is a doddle. Place the cursor where you want the index to appear and Insert, Index and Tables, Index, OK. You have a few options here, such as the number of columns and aligning the page numbers. The index itself is another Word field, so if you want to add entries after it has been created, select the index (it should turn grey) and press F9 to update it. If you add text that contains words already indexed to your book, then you will need to refresh the tags by repeating the Mark All process.

You may want to index a different word to an existing entry – your computing history may refer to Augusta Byron, Ada Byron King and the Countess of Lovelace, who are all the same person. You can do this by typing in the title of an existing entry when indexing the other forms. Be careful though, as the index is case sensitive: if you type in 'drink' when there's an existing 'Drink' entry, you'll create a second index entry.

A better way of dealing with this, using formatting and reusability, is to create a concordance file. This wonderfully biblical-sounding device is actually nothing more than a two-column word table. The left-hand column contains the words as mentioned in the text, the right-hand column the index entry. This makes it easy to create different texts in the left-hand cells that refer to identical entries in the right-hand column.

You can also use this to harness different word forms or synonyms – drinking, drunk, boozing – to the same entry. Note that, like the index entry titles, the tagged text is case sensitive – you'll need to enter both Wine and wine to get both forms tagged. Creating the index is again a two-stage process. First you go to Insert, Index and Tables... Index and click the Automark... button. This brings up a standard file open dialog and you choose your concordance file. This closes all the dialogs and marks the entries. You then need to go back and Insert, Index and Tables... Index, OK.

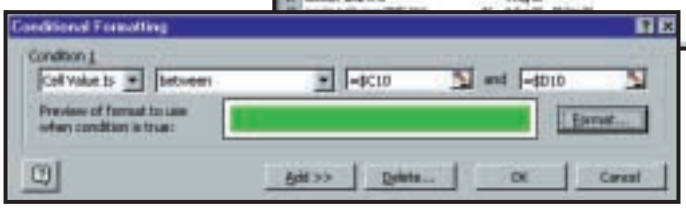
CONTACTS

Tim Nott welcomes your comments on the Word Processing column. Contact him via the *PCW* editorial office or email: **wp@pcw.co.uk**. Please do not send unsolicited file attachments.

Task masters

With project management, time is of the essence, so Stephen Wells shows you how to save it.

Every now and then I receive a request to solve the problem of having Excel change the formatting in one cell, based on an entry in another. Those readers will be interested in this excellent example (right) contributed by Simon J Warren. Earning himself a well-deserved £25 book token for his contribution, it is a worksheet Simon uses for project management and simulates the type of planning and progress chart devised by American, Henry L Gantt.



Top: Simon J Warren's home-made Gantt chart created by using Excel's built-in conditional formatting facility
Above: A typical format instruction used to make the Gantt chart

Task descriptions are entered in column A with the number of days each task takes entered in column B. Columns C and D are the start and end dates of each task. Except for the first in the list, they are calculated from the preceding one.

All cells in column E equal the value in the start date cell and cells in column F onwards equal the previous cell plus seven. The columns are made quite narrow and formatted with the font in white on a white background, so they don't display by default.

Here's where the Conditional Formatting comes in. In Excel 97, find it on the Format menu. It is used to display a green font on a green background only if the date in the cell is between the start and end dates. The stored value never displays but the cell becomes a block of green and part of a chart bar. For example, cell L10 has, as shown in the screenshot above, the conditional format that it shows green if the cell value is between C10 and D10. The formula it holds is K10+7. As the result of this formula is not between 28 Apr (C10) and 5 May (D10) the cell shows white.

This Gantt chart works perfectly. If you find a task is going to take longer than originally planned, you just change the number of days in column B. The end date of the task, and all the other end dates, automatically change in column D. The adjacent bar lengthens to reflect the change and all of the following chart bars shift to the right as they should.

Simon admits that his creation doesn't have the sophistication of, say, Microsoft Project 98, but it does the job and may be something you could adapt.

With books first editions are the most valuable. With software the opposite is true

Old timers

In the July column I mentioned that Excel doesn't recognise dates prior to 1900 and pointed reader Rod Strong toward Corel Quattro Pro 8. This led Matthew Inns to email me and suggest an Excel add-in available for downloading from John Walkenbach's excellent spreadsheet site. You can read all about this series of XDATE custom functions first at www.j-walk.com/ss/excel /files/xdate.htm. The add-in only works with Excel 97 or 2000, not Excel 95, nor Excel for Macintosh, and is not guaranteed to be accurate prior to 1752. Still, it's fully functional and free. Just download and execute the xdate.exe file and it installs eight XDATE functions including XDATE, to give a date for a year, month, and day; XDATEDIF which returns the number of days between two dates; and XDATEDOW which gives the day of the week of a date.

Excel 2000 fixes

With books, first editions are the most valuable. With software the opposite is often true as you are often best advised waiting until the publisher has responded to initial customer complaints. To see a list of the changes made to Excel 2000 so far, download the 326KB file at www.microsoft .com/office/ork/2000/download/ SR1Changes.xls. It includes all 620 changes to the different applications in Office 2000, including over 80 for Excel. The actual SR1a file is much too large for most people to download but you can order the patch CD using www.microsoft.com/uk/office/update/sr1order.htm, or phone Microsoft Connection on 0345 002 000 in the UK or 01 450 2113 in Ireland.

CONTACTS

Stephen Wells welcomes your comments on the Spreadsheets column. Contact him via the *PCW* editorial office or email **spreadsheets@pcw.co.uk**. Please don't send attached files until requested.

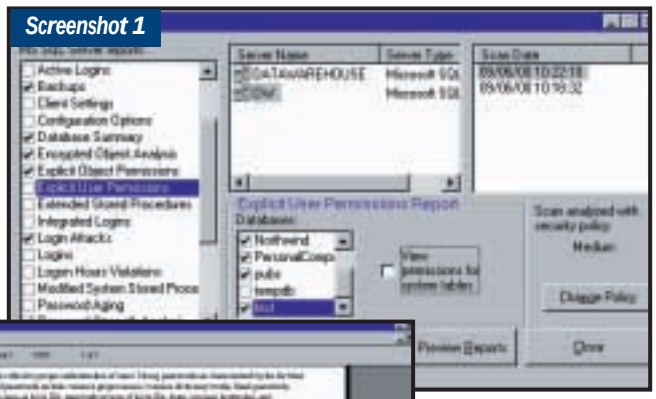
A secure base

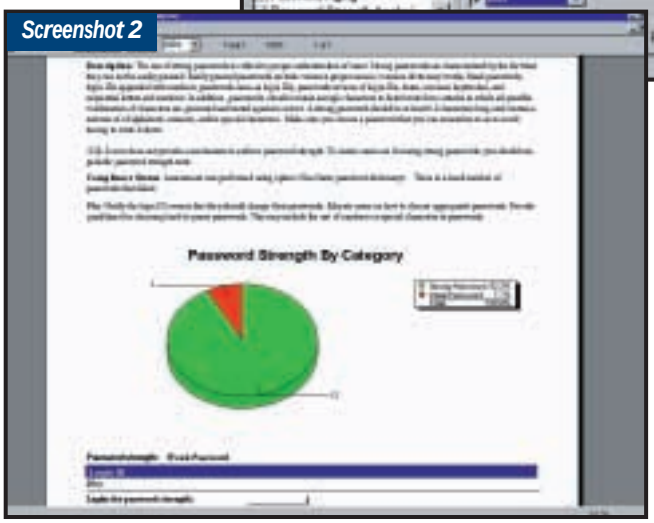
Database security is in question as Mark Whitehorn looks at password-checking software.

Now I like to think I run a tight ship, database-wise; I didn't get where I am today by running loose databases. Client-server databases such as SQL Server and Oracle provide high levels of security, but it is up to the Database Administrator (DBA) to ensure that they are used and I certainly do that. Absolutely.

But how can I really be sure that I haven't missed anything? And how can I be sure that the users are playing the game? After all, I tell all my users to use non-guessable passwords, but since I can't make sense of the password file, I can't tell if they are following my instructions.

The answer is to use a product such as ISS Database Scanner. This intriguing piece of software runs entirely on a client and simply requires a Systems Administrator login to the database server in question. From the client you can initiate a scan of the database security. This takes some time to run (the time depends on the size of the database, number of users, level of security check required etc), but your patience is rewarded by an extremely comprehensive report on a host of security aspects (see screenshot 1). From this you can choose to print it all or simply focus on one aspect. In this case I have chosen to look at password strength and I am pleased to report that 11 of the 12 users are using strong passwords. (This is a real operational database, incidentally, and these are real users). The twelfth person is new to the database and I had forgotten to suggest that she scatter numbers in among the letters – so this one is my fault.





Top: Some of the report components from Database Scanner
Bottom: Oops, there's a weak password in there

For this particular test Database Scanner has a huge file of known passwords which it throws at the password encryption algorithm and then checks to see if the products match the entry in the password file. It also checks to see if the password is the same as the login name, the reverse of the login name etc.

One of the joys of this product is that the printed reports not only give you bold information about the state of your database, they also try to put the information in context. For example, in the report on passwords, not only does it provide general information about what makes a strong password, it also includes SQL Server specific information (the fact that it has no mechanism to enforce strong passwords). If I had run this against an Oracle database, the report would be tailored for that platform.

If you select all the options, the complete report runs to over 120 pages. The software itself has an unpolished feel, not in terms of the functionality, which is excellent, but in terms of the interface. It feels clunky and unhelpful, which is at odds with the highly polished and helpful reports that it ultimately produces.

The cost of Database Scanner is the non-trivial amount of circa £650 for SQL Server and £1,200 for Oracle. On the other hand, how much does a security breach cost? You can find out more information at www.iss.net.

Teaser tables

In the July issue I posed an SQL teaser from Paul Edwards (pedwards@e-promotions.co.uk).

He has two tables, which are tblSubject: SubjectID, SubjectName, ShowCount and tblArticle: ArticleID, ArticleTitle, ArticleText, WhenCreated, SubjectID.

He wants a list of recent articles, but wanted to see the 10 most recent articles on SQL,

```
SubjectName = "SQL", ↙
ShowCount = 10;
```

the five most recent on Windows NT,

```
SubjectName = "Windows NT", ↙
ShowCount = 5
```

and only the two most recent on DOS,

```
SubjectName = "DOS", ↙
ShowCount = 2
```

(*Key: ↙ code string continues*)

I was deluged with replies and thanks are due to all who responded. Check my website (www.penguinsoft.co.uk) for the file DBCSEP00.MDB. In this are solutions from Neil Sunderland (neilsunderland@freeuk.com) and David Portas (dportas@acm.org) and in AC.MDB is a solution from Andrew

Cumming (andrew@dcs. napier.ac.uk).

So, how do they work? There are various approaches and I strongly advise having a look at the three solutions provided and performing your own 'compare and contrast' exercise. However, let's consider Andrew's variation. This solves the problem using:

```
SELECT A.ArticleTitle
FROM tblArticle AS A, ↙
tblArticle AS B, ↙
tblSubject  AS S
WHERE A.WhenCreated <= ↙
B.WhenCreated
AND A.SubjectID = ↙
B.SubjectID
AND A.SubjectID = ↙
S.SubjectID
GROUP BY A.ArticleTitle, ↙
S.ShowCount
HAVING Count(B. ArticleID)↙
<=S.ShowCount;
```

To explain this he breaks it down into two stages. The first is:

```
SELECT A.ArticleID, ↙
A.WhenCreated, B.ArticleID, ↙
B.WhenCreated
FROM tblArticle AS A, ↙
tblArticle AS B
WHERE A.WhenCreated <= ↙
B.WhenCreated
ORDER BY 2 DESC;
```

This generates an answer table in which every article in the table appears a number of times. The number of times each one appears is related to the number of articles that have an equal or more recent date.

In Andrew's example, Article 21 – the most recent – shows up just once, linked with itself. Article 20 shows up twice, linked once with 21 and once with itself. Article 19 shows up three times – with 19, 20 and 21.

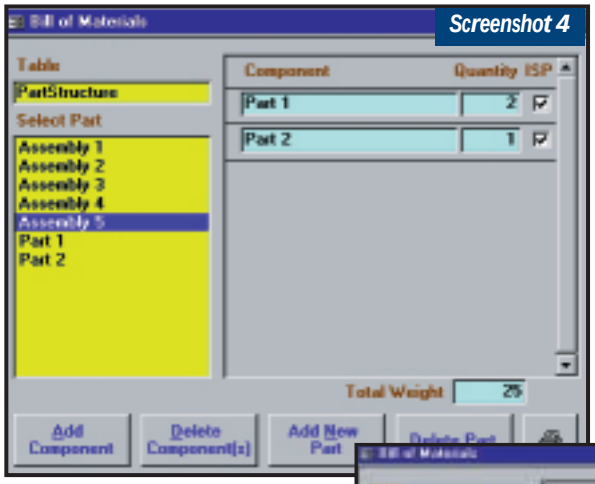
This becomes even more relevant if we expand the WHERE clause:

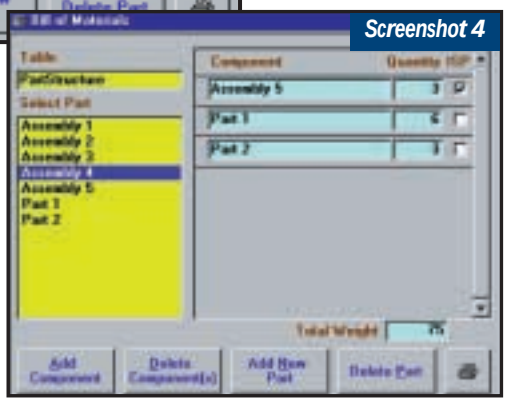
```
WHERE (A.WhenCreated<=B.↙
WhenCreated) AND ↙
(A.SubjectID=B.SubjectID)
```

that ensures that only the articles on the same subject are counted together.

Clearly, the number of times that an article appears in this answer table gives us information about how recent it is, so all we have to do is to count the number of times each article appears, for example:

```
SELECT A.ArticleTitle, ↙
Count(B.ArticleID) AS ↙
CountOfArticleID
FROM tblArticle AS A, ↙
tblArticle AS B
WHERE (((A.When↙
Created)<=[B].↙
[WhenCreated]))
AND (A.SubjectID=B.↙
SubjectID)
GROUP BY A.ArticleTitle
ORDER BY 2;
```





Left: The shin part's connected to the knee part...
Below: ...and the knee part's connected to the thigh part...

Several people warned, quite correctly, that there are three things to bear in mind here. One is that these solutions work fine on small data sets and poorly on large ones; in other words, this is not an 'Order n' solution. Second, there are problems with articles having identical dates. Andrew's example demonstrates this with two of the DOS articles having the same date. Thirdly, in reality, articles are likely to have relevance for more than one subject, so an intermediate joining table may be required.

For people interested in further information on this classic problem, see *SQL for Smarties: Advanced SQL Programming* by Joe Celko (ISBN 1558605762).

Sounds like...

Mechanisms for calculating how alike two words sound to the human ear have been mentioned in two issues recently (June and August) so I don't want to spend more time on it here (unlikely as it sounds, there may be some people for whom the subject is beginning to pall). However, I'm still interested and mail keeps arriving so check out the file SOUNDEX.TXT on my website for the latest.

Explosive parts

Imagine that you run a company that puts together parts into assemblies (which in turn can be used to create more complex assemblies). The parts have properties such as weight and, given that you know which parts go into which assemblies, you can calculate the weight of the final product. Well, that's exactly the problem facing reader Ken Sheridan.

For example, part one weighs 10 units and part two weighs five. So, assembly five, which is composed of (two * part one) and (one * part two) weighs a total of 25 units (screenshot 3). Assembly four is composed of (three * assembly five) which makes a total of (six * part one) and (three * part two) giving a total weight of 75 units (screenshot 4).

All of this is fine and dandy and perfectly logical. The problem isn't the logic, the problem is how you model all of this in a database. If you have been pondering a similar problem, read Ken's email in the Soundex.txt text file and take a look at BOM.MDB (Bill of Materials) on my website.

CONTACTS

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database@pcw.co.uk

Living on a player

Ian Waugh sounds out the new Windows Media Player and finds it adapting to market needs.

You can imagine the call coming down from somewhere on high at Microsoft: 'Time to revamp the Media Player, fellows.' That useful one-stop app for playing MIDI, audio and movie files is looking a bit long in the tooth and doesn't support any of the neat media, CD audio or Internet-related stuff we now take for granted.

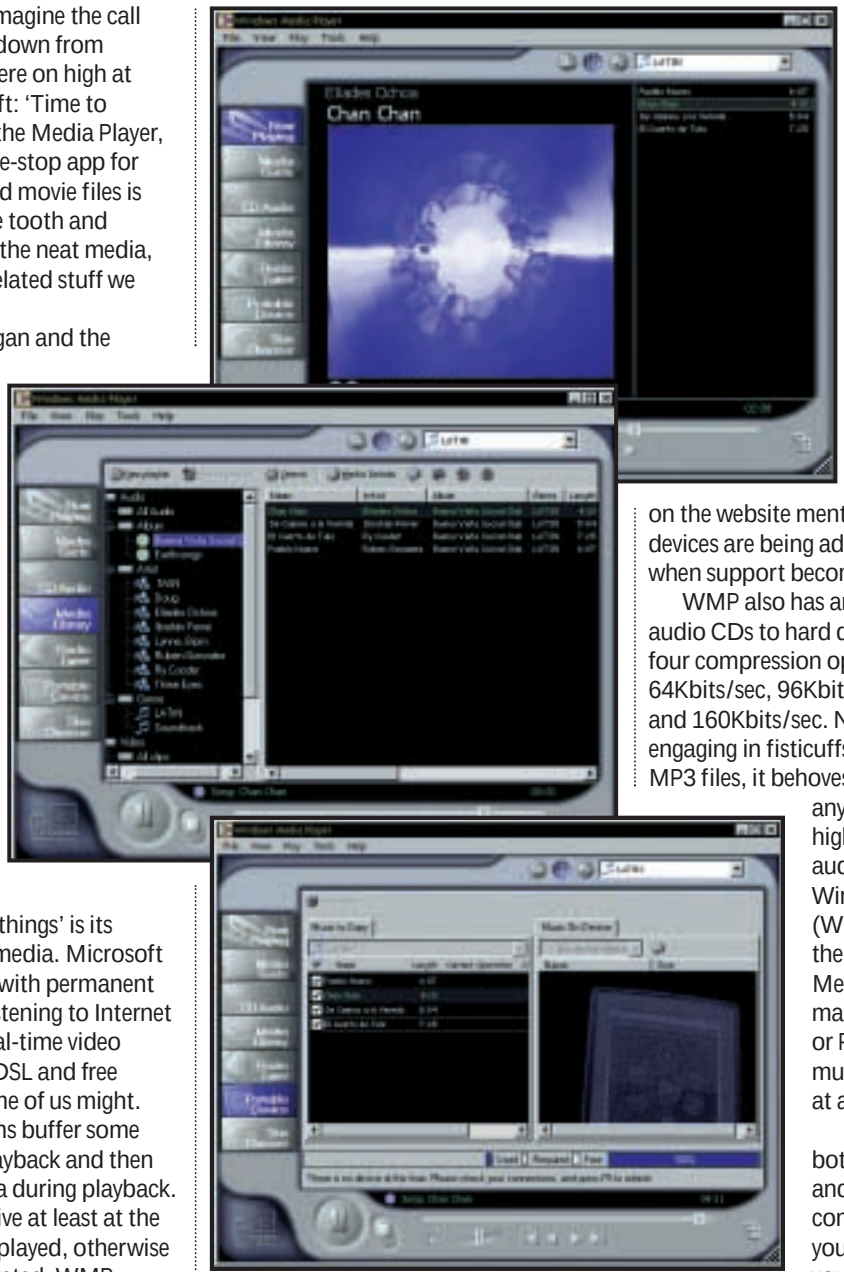
So development began and the Windows Media Player (WMP), although still in beta, is now into version 7. It has had so many changes it is now a totally new program. There are seven main options on tabs down the left of the window: Now Playing, Media Guide, CD Audio, Media Library, Radio Tuner, Portable Device and Skin Chooser. Here, we're going to concentrate on the audio stuff.

One of WMP's 'big things' is its support for streaming media. Microsoft expects us to be sitting with permanent Internet connections listening to Internet Radio and watching real-time video broadcasts. Roll out ADSL and free Internet access and some of us might.

All streaming systems buffer some data before starting playback and then continue to receive data during playback. Hopefully, data will arrive at least at the same rate as it is being played, otherwise playback will be interrupted. WMP incorporates intelligent streaming, which attempts to detect network conditions and adjusts the properties of the stream to maximise playback quality. The object is to deliver the highest quality playback whatever the conditions, although this requires the media to have been encoded at multiple bit rates, which not all media is. At least not at the moment.

WMP supports a whole range of media file formats, but of prime interest to audiophiles is support for Windows Media (.wma and .asf), Wave (.wav) and MP3 (.mp3). These can be copied to a portable device for playback. Three levels of compression are offered – 32Kbits/sec, 64Kbits/sec and 128Kbits/sec.

The software supports what Microsoft calls portable devices, but by this it really means PDAs supporting its new Pocket PC OS. There's a list of compatible models on the website mentioned later and new devices are being added to the list as and when support becomes available.



Left: Windows Media Player can display groovy graphics as it plays your music
Middle: The Media Library keeps track of all your audio and video files
Below: You can copy files from the Media Player to a portable device

WMP also has an option to copy audio CDs to hard disk and there are four compression options here – 64Kbits/sec, 96Kbits/sec, 128Kbits/sec and 160Kbits/sec. Now, without engaging in fisticuffs about the quality of MP3 files, it behoves one to suggest that anyone interested in high-quality compressed audio should try Windows Media Audio (WMA) and compare the file quality. Windows Media can pack twice as many tunes into a player or PDA as MP3 so it must be worth looking at and listening to.

Considering that both Windows Media and MP3 are lossy compression formats, you will do well to let your ears suggest which formats you're happy using.

However, it's the audio CD copying process where it gets interesting with WMP version 7. The ripping process is straightforward, but it copies the files in .wma format, so you may not be able to import them into every music program. There is no option to save such files as Wave files: a veritable missed opportunity, but doubtless an intended miss.

Part of the logic behind this may have something to do with WMA's support for licensed files. Such files may be downloaded from the Internet, perhaps after payment of a fee, and the licence restricts where and how the file can be played. Now, in itself, that's not a problem; the labourer is worthy of his hire and all that.

But these licences can restrict playback to the computer onto which the file is downloaded. It's like buying a CD and only being allowed to play it on your sister's My Little Pony player. You may not even be allowed to copy it to a portable device. Of course, this begs many questions that the record companies love to ask – such as, when you buy a 'song', do you buy the right to listen to it anywhere and play it on any system capable of playing the media? The licence system says: 'absolutely not'.

How well this and other restrictive licensing systems succeed depends entirely upon the take-up by the great unwashed – you, the music-buying public. If lots of people think it's a good idea and buy into it, the freedom we take for granted of being able to play our music collection where and when, and how we want, could be curtailed.

Above: The CD Audio function copies audio files from CD to hard disk in Windows Media format
Below: Get online with the Media Guide and find the latest cool stuff to look at and listen to

It's like buying a CD and only being allowed to play it on your sister's My Little Pony player

What is also interesting is that the CD audio preferences in WMP have a Personal Rights Management option. If this is enabled, when you rip an audio CD, a licence is generated preventing the files from being played on any other computer. Yes, I tried it and it works! However, if you don't enable this during copying, you may then be prevented from copying the file to a portable device if that device supports SDMI (Secure Digital Musical Initiative). You don't suppose anyone has realised that it's possible to make two copies with and without the option enabled?

The main message would seem to be, that if you want to put your CD collection onto a portable player, stick with MP3. Lest the odd reader or two gets the idea that this is promoting music piracy – far from it. What it does advocate is freedom to listen to music that you have paid for in different locations. Just like we used to be able to do in the good old days.

Back with WMP, it can look up CD information on the Internet to save you typing in the names – and this worked just fine, albeit after a bit of a slow start.

The Media Library section is used to organise your media collection. A CD track can be added simply by clicking a button and you can add URL links as well as physical media files. Collections of files are stored in a playlist and you can create any number of playlists containing any combinations of files.

The program will search your PC for both music and video files – you may even discover a few you had forgotten about or never knew you had – and it can search the web for files, too. This feature links to a website which appears in the middle of WMP and from which location you're supposed to navigate. This is a real pain. The address is actually http://windowsmedia.com (www.windowsmedia.com doesn't work) so use this instead as it makes navigation far easier.

Using the Media Library options, you can set rights for the contents of your Library for applications and Internet sites. You can prevent them accessing your playlists, or allow them to read and edit the files.

One of the main problems with the WMP is that it is currently very slow. The term 'wading through treacle' comes to mind. This isn't just when it's doing anything clever; it can take an age to switch from one option to another when you click on the tabs. Oh, and it does crash sometimes.

So, WMP has some good ideas, even if some are severely limited and not everyone will welcome them. It also still needs several tweaks to make it of 'merchantable quality' – yes, even though it's free! But it certainly shows how Microsoft sees the music, media and Internet markets developing.

The latest beta of Windows Media Player can be downloaded from www.microsoft.com/windowsmedia. It's a hefty file, weighing in at 7MB, so if you're on a slow connection, you may be better off waiting for the final version.

CONTACTS

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Digital scissors at work

Ken McMahon rubs shoulders with Photoshop's erasers to create flawless cutouts.

Some of the most fun to be had with image editing involves cutting out images. Whether you want to create a montage, or just remove an ugly background, producing cutouts can be a rewarding, though difficult business. When it's done well, you'd never know the digital scissors had been at work, but poor technique is visible a mile off, fringing, messy edges, stray background pixels and cut-off foreground detail are all evidence of tampering which will destroy the illusion of reality in an instant.

There was a time when the only way to produce flawless cutouts was to apply a great deal of concentration, time and effort with the pen tool and even then soft and wispy stuff like hair, fur and out-of-focus detail was extremely difficult to deal with.

Then along came Photoshop 5.5 with a batch of eraser tools that make producing cutouts an altogether much simpler, less tedious task.

There are three eraser tools that between them are up to the task of removing virtually any subject from its background. The good news for anyone who bought a scanner bundled with Photoshop 5.5 LE is that this cut-down version contains all the same eraser tools as the full version.

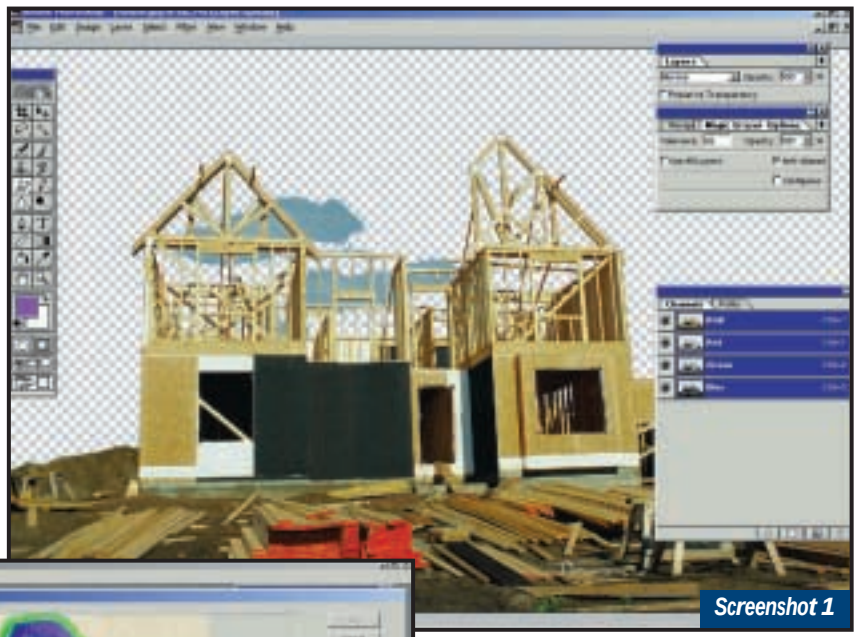
The magic eraser is the simplest to use, though the least effective of all. It works in the same way as the magic wand – deleting, rather than simply selecting pixels. The pixels are selected on the basis of proximity to the first pixel clicked and the tolerance value set in the magic eraser palette. In contiguous mode the magic eraser deletes only adjacent pixels, anything that is surrounded by pixels outside the tolerance remains.

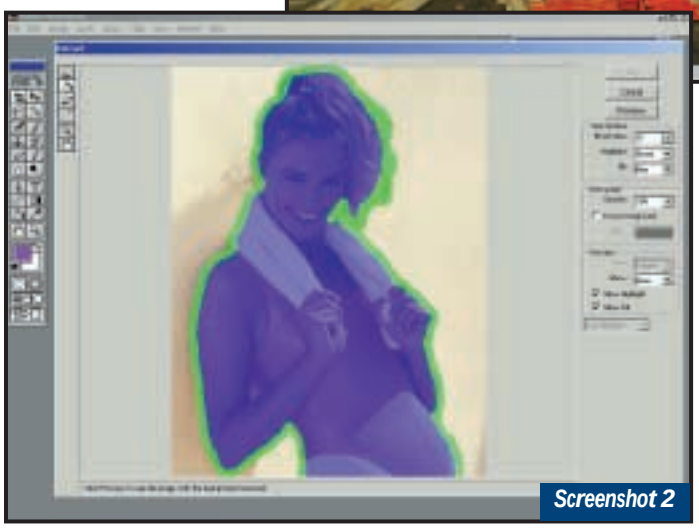
Unless you are fortunate and your background consists of pixels of a similar colour all within the tolerance value, you'll need to click in several different areas to remove all the unwanted detail and this is likely to have the undesirable result of taking out some of the foreground detail too. But with certain kinds of images the magic eraser works like, well, magic.

Screenshot 1 shows a good example of what you can do with the magic eraser on a background of broadly similar colour. First, I've unchecked the contiguous mode so that the fiddly sky detail in between the roof rafters will be erased, even though it's separated from the main block of sky by the roof timbers. Then, clicking on the blue sky detail in the top right quarter of the image with a tolerance setting of 100 has removed all but the lighter blue areas where the clouds are. Clicking on this remaining detail with the tolerance reset to 32 gives a perfect result.

The Background eraser is a sophisticated tool. Drag it along the edge of your foreground image and watch it erase the background as you go. The key to success with the background eraser is in optimising the parameters for the particular subject you're dealing with.

Sampling mode can be set to once, continuous or background swatch. Set to once, you'll need to erase in short strokes, otherwise, when you begin to move away from your starting point the background may no longer match the original pixel. You need to be precise with the background eraser and make sure


Screenshot 1


Screenshot 2

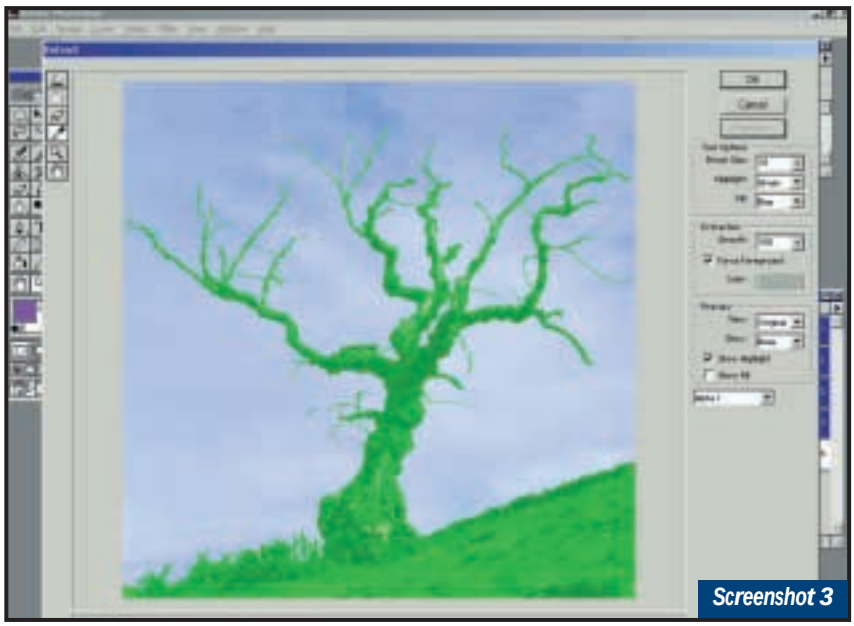
Above: The magic eraser works its spell removing the sky in two stages
Left: Make sure wispy hair and other fine detail is well covered with the highlighter

that you start on the background and don't accidentally start erasing foreground, though this can easily be undone. You can also guard against accidental foreground erasure by checking the 'Protect Foreground Colour' box in tool, options, palette and sampling a prevalent foreground colour with the eyedropper (Alt & click).

In continuous mode, the background eraser samples as you go, so if the background is complex – say brightly coloured flowers – you'll get a much better result.

Photoshop's extract command is the most powerful of the eraser tools, but the power comes at the price of complexity. Extract uses its own dialog box that you access using image, extract or Ctrl & Shift & X. The process is quite simple – it's the options that give extract its power and complexity.

First select the highlighter tool from the toolbar on the left of the preview window and trace the edge of your foreground subject. It's important that there is no break in the outline and that you completely cover the boundary between the foreground object and background – you can change the brush size in the tool options palette, or even adjust it while you trace using the left and right square bracket keys. Holding down either of these keys accelerates the rate of change of the brush, so you can go from tiny to big very quickly.



For complicated outlines use an alpha channel to create the highlight and force foreground colour to keep subject detail

the highlighter tool to draw straight-edged lines.

When you're satisfied that you've done a reasonable job on the outline and fill, click on the preview button. If the results look good click OK to apply the extraction.

If you don't get good results first time you may need to adjust the smoothness setting above its default of zero. High smoothness settings are particularly effective for dealing with wispy hair. Make sure all of the hair is covered with the highlighter before filling (screenshot 2).

High smoothness settings are particularly effective for dealing with wispy hair

Next select the fill bucket and click inside the outlined object. If the fill colour bleeds out into the background it means there is a hole in your outline. Select view original from the preview palette and plug the hole using the highlighter before refilling. Unfortunately there is no undo, so if you make a mess with the highlighter you'll have to erase the problem area with the eraser tool and have another go.

The trick with the highlighter is to use a narrow brush for areas of precise detail and a broader brush to cover softer, less well defined borders. It's much easier to do this using a tablet, but if you're using a mouse, or just find it hard work, you can make life easier by Shift clicking with

For objects that are hideously difficult to trace, you can sometimes convert one of the colour channels into an alpha channel and use this as the basis for your selection in the extract dialog.

First check which of the colour channels provides the best contrast between subject and background detail by pressing Ctrl & 1, 2 and 3 to view the R, G, and B channels. Duplicate your chosen channel by dragging it to the new channel button in the channels palette and open the extract dialog. You can use the levels or curves command to further adjust the channel, increasing the contrast between the areas you want to keep (black) and background detail you want to lose (white). Select Alpha1 from the load highlight pulldown, click the force foreground button, select the eyedropper and click on the most generally representative colour in the body of your subject (screenshot 3).

If you duplicate the layer you are working on before starting the extraction process you can clean up any scrappy edges using the history brush and background eraser tool. To reinstate lost foreground detail click the state in the history palette prior to the extraction and use the history brush to paint back in the missing subject detail.

Don't worry if you also paint in some unwanted background as you can remove it easily using the background eraser set to sample once.

You can also use this technique when compositing images by placing the layer containing your foreground subject on top of the new background before extracting it from the old one.

See also this month's image-editing workshop earlier in the issue.

CONTACTS

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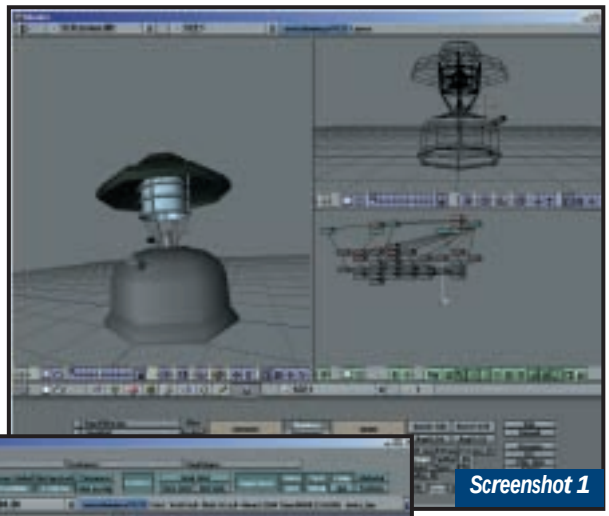
Getting into the mix

Benjamin Woolley casts intuition aside in order to make sense of Blender's idiosyncrasies.

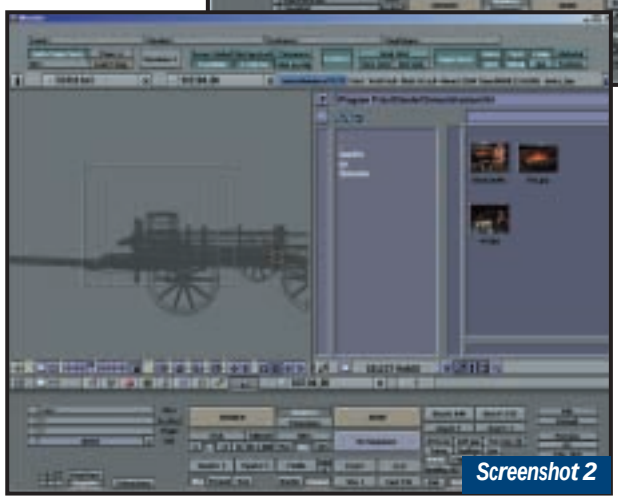
Following the inclusion of Blender for Windows and BeOS on *PCW*'s July cover CD, reader John Wellbelove sent me the following email:

'I've been writing software and using computers since the early 1980s and I'm usually pretty quick at figuring out how to use the basic features of a program without having to look at the manual, but Blender is beyond belief. I spent 15 minutes fiddling about, pressing buttons, selecting menus etc, which usually gives me an idea of the basics, but this program was almost completely incomprehensible. I got nowhere!

'Can I put this program forward as a candidate for "The most unintuitive program of the year" award. If there isn't such an award at *PCW*, can we start one?'



Screenshot 1



Screenshot 2

Left and below: Mind Blender – the interface that sent John Wellbelove over the edge is, to say the least, complicated, but will yield its secrets to those who persist

Blender has become the Linux of 3D. Created by Ton Roosendaal while he was at the Dutch animation studio NeoGeo, he decided to offer it as a 'freeware gift to the worldwide computer graphics community'. It now boasts a global user base of 65,000 and is available as a free download from the Blender website (www.blender.nl), in versions for virtually every platform (BeOS being the latest).

A glance at its interface (screenshots 1 and 2) shows how the free thinking behind its marketing extends to its interface. As John so succinctly put it, to anyone brought up in the world of Windows or the Mac, or even of Linux, it is completely incomprehensible. And if you try to explore it blind, as John and many of us did, you quickly become unstuck.

To make matters worse, Blender does not offer any sort of context-sensitive help, nor a comprehensive manual, although there is a rather basic version available online and a more professional printed version, published by NaN, that you can buy for around £25.

Other 3D software tends to be almost exclusively mouse driven. Blender is not

Even practised Blender users can find it flummoxing. Blender forums are packed with cries of bewilderment. One of the FAQs on the Blender website begins with the plea 'Help! The "Add menu" gets stuck!'.

However, with Blender, as with so many things in life, first impressions are misleading. No-one could claim that the interface is an example of software design at its best. It is cluttered and the feedback you get from mouse or keyboard actions is often perplexing, sometimes downright perverse. Nevertheless, once its strange ways become familiar to you, it begins to reveal some virtues as well.

To master Blender, you have to first follow the piece of advice you see repeated over and over again in the Blender forums and FAQs: you need to have a hand on the keyboard and one on the mouse. Other 3D software tends to be almost exclusively mouse driven. Blender is not. Theoretically, you could probably do most things with the mouse, but it would become laborious and awkward. For example, you toggle in and out of 'EditMode' (the mode for editing an individual object's geometry) by pressing Tab; you invoke the toolbox by pressing space; you exit by pressing 'Q'.

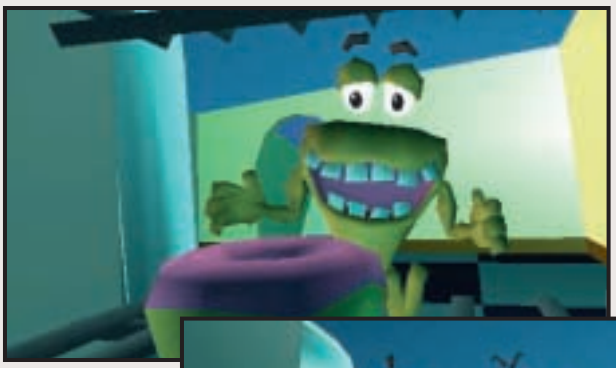
One other strange quirk of Blender is that it relies on a three-button mouse, with an option for simulating the third button if you haven't got one by using Alt-LeftButton.

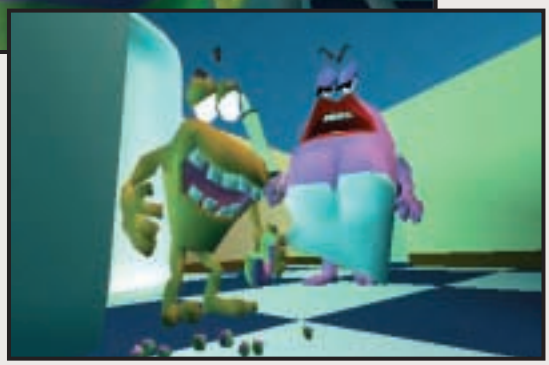
The workspace is, as with more conventional packages, split into windows, but there comforting familiarity once again ends. There is no menu along the top – the nearest equivalent is the popup toolbox. You can change the number and position of all the windows, although none can float: they are always 'tiled' to fill the

Stay tooned – The Shags are coming

The prize for the least promising name for a family of cartoon characters has to go to Toon 3D's 'The Shags'. These grisly little monsters do not, thankfully, live up to their name. In fact, their role is more prosaic: to demonstrate the latest tool for delivering 3D animations over the Internet.

Toon3D is an authoring environment for animating simple models and publishing the resulting movies. There is a range of keyframe animation tools as well as a facility for adding 'Toons'. These are used to control objects, allowing you to assign them such behaviours as those of the inimitable 'Dad Shag', featured in the demo, who likes to snaffle doughnuts from the fridge.





Above and right:Scenes from 'The Shags', demonstrating some of the animation possibilities offered by Toon3D

However, there are problems with the technology demos (which you can find on Toon3D's website at www.toon3d.com). One is that currently only Lightwave objects can be imported; another is that the movies can only be viewed with Internet Explorer, although I don't really think the repulsive 'Shags' help much, either. On the positive side, the files are very small and the animations seem to run smoothly enough, if somewhat slowly.

Version 2, or GameBlender, is geared towards gaming

workspace. Each window can be configured to be one of several types, an odd assortment that includes a 3D window, which displays the objects in the scene, an 'OopsWindow' which shows a schematic diagram of the data objects (eg the meshes, materials and so on) in the scene and their relationships to one another, a SequenceWindow, for post production, and a FileWindow, for loading and saving files. You can identify which type of window you are in by an icon/button displayed in the left-hand corner of its 'header' (which, confusingly, is sometimes displayed at the foot of the window). If you point and press on this icon and slide the mouse to the right or left, you can scroll through the different window types.

By exploiting such features, you have an infinite number of ways of both arranging the workspace and messing it up. One of the most common experiences I found with Blender was getting stuck in a window with no obvious way out.

Another cause of confusion is the mouse. Double clicking apparently has no effect, but you will find the middle mouse button often and unexpectedly does. For example, suppose you manage to find your way to the file window and navigate through to the file you want to open. If you click on its name, nothing happens. It turns out you need to click on its name using the middle button, or select its name using the left button and then press Enter.

Of course, committed Blender users would say this is all part of the charm of the package. Critics might say that it is a blatant attempt to make it unusable without the manual, for which you have to pay. However, even if the latter was true, you would still be getting a very useful 3D package for less than £30 and that is money you can be sure is going to the good cause of future development. Furthermore, by judicious use of the free resources available on the web, both from the Blender site itself and from a growing number of third-party sites, such as www.blendermania.com, you can get enough information to get to know this fascinating, frustrating package.

At the time of writing, Blender was facing a number of radical changes. Version 2, to be called GameBlender and aimed at being a combined authoring and publishing package for games developers, was about to be released, and the practice of selling 'keys' to unlock some of Blender's more advanced facilities was about to be dropped. There were also promises of new documentation.

For those who penetrate the interface that poor Wellbelove found so perplexing, such developments, and a general enthusiasm for Blender's freeware principles, promise an exciting future and I will aim to continue bringing you news of it in these pages.

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Coming clean

Tim Anderson builds a web service with Microsoft's SOAP toolkit and answers readers' queries.

According to Microsoft, the next big thing in development is web services. This is another kind of remote object invocation, as also offered by CORBA, DCOM, or Java's Remote Method Invocation. The difference is that web services use SOAP (Simple Object Access Protocol), which is based on XML and HTTP. In one sense there is nothing particularly clever about SOAP. Sending and receiving data via HTTP is basic functionality, and you do not need SOAP to call a CGI script on a remote computer, pass it arguments and read the results.

What SOAP brings to the party is standardisation. Through SOAP, your application can query a remote site to discover what services it offers, in order to invoke them correctly as required.

There are several advantages over more elaborate schemes such as COM and CORBA. The loose coupling is more suitable for frail Internet connections and the simplicity of the link means different object technologies can be easily bridged.

Full support for web services will come in the next release of Visual Studio, but in the meantime Microsoft has issued a preview SOAP toolkit that you can use now. Here is an example of how it works. The starting point is a COM DLL server such as you can easily create with Visual Basic or Delphi.

This example was produced using Visual Basic 6.0. By choosing File, New Project, ActiveX DLL you can create a skeleton Quoteserver project. The class module is named 'quoter' and it has a single method, GetQuote, which returns a random quotation. This functionality can now to be offered by SOAP.

The SOAP toolkit includes an SDLWizard. SDL stands for Service Description Language and it is an XML format that publishes the web service. The wizard asks you to select the ActiveX DLL you want to publish and next the services you want to expose. You then select a server-side web technology, either ASP or ISAPI. ASP is easier to work with, although performance is not as good. Select ASP and the wizard generates two files. Quoter.xml is the SDL file for the service (see figure 1) and Quoter.asp is a skeleton ASP page that implements the service.

While the specification of SDL may change, the essence of it will not. Note that the generated XML includes the web address of the service and a description of the interface. In this case a single method that takes no arguments and with a return type of String.

Most of the work is done by listener.asp, a supplied generic ASP page that is included in pages generated by the wizard. This is code that receives SOAP requests, calls your code to get results, and sends replies in the standardised format. To publish the web service, all you need to do is to place these files in a web directory. The web server also needs access to the ActiveX Server DLL itself.

Coding a SOAP client

A SOAP client has several tasks. First, it must read the SDL file to discover what services are available and how to call them. Next, it formats an XML request conforming to the service description,

FIG 1

Quoter.xml

```
<?xml version='1.0' ?>
<!-- Generated 15/06/2000 20:33:31 by Microsoft SOAP ↙
Toolkit Wizard, Version 1.0.204 --><serviceDescription ↙
name='Quoteserver'
   xmlns='urn:schemas-xmlsoap-org:sdl.2000-01-25'
   xmlns:dt='http://www.w3.org/1999/XMLSchema'
   xmlns:quoter='quoter'>
<import namespace='quoter' location='#quoter'/>
   <soap xmlns='urn:schemas-xmlsoap-org:soap-sdl-2000-01-↙
25'>
      <interface name='quoter'>
         <requestResponse name='GetQuote'>
            <request ref='quoter:GetQuote'/>
            <response ref='quoter:GetQuoteResponse'/>
         </requestResponse>
      </interface>
      <service>
         <addresses>
            <location ↙
url='http://youripaddress/quoter.asp'/>
         </addresses>
         <implements name='quoter'/>
      </service>
   </soap>
<quoter:schema id='quoter' targetNamespace='quoter' ↙
xmlns='http://www.w3.org/1999/XMLSchema'>
      <element name='GetQuote'>
      </element>
      <element name='GetQuoteResponse'>
         <type>
            <element name='return' type='dt:string'/>
         </type>
      </element>
   </quoter:schema>
</serviceDescription>
```

(*Key:* ↙ *code string continues*)

posts it to the service address and finally parses the XML response.

The SOAP toolkit simplifies the task with a set of objects called ROPE (Remote Object Proxy Engine). ROPE is also used by Listener.asp. It does the job of parsing and generating XML in the correct format and has methods for posting data and reading the response.

The neatest ROPE trick is its Proxy object, which lets you treat the remote web service as if it were a local COM object. Figure 2 shows minimal code for a Quoter client. It reduces the client to a couple of simple steps. First, the ROPE Proxy object loads the SDL file, before calling the GetQuote method.

How does the client know that the GetQuote method exists? This information is contained in the SDL file, but clearly the code in the example relies on advance knowledge that GetQuote will work. It would be possible to write a generic client that retrieved the available methods dynamically. More likely, you would use the SDL at design time and write code accordingly. In this scenario, the application will work provided that the SDL remains compatible. As with COM objects, the onus is on the web-service provider to continue supporting a published SDL.

Although COM is used in this example, there is no necessity for it either on the client or the server. For example, you could instead use a Java servlet at one end and a VB client at the other.

The concept works best where there is a permanent Internet connection. For example, send a postcode and get back a map, or a weather or traffic report. Ecommerce is another natural use for this technology. There is no need to view a web page, so it is ideal for PDAs or other visually-challenged devices.

How visual is visual?

Mark McKeachan asks: 'What is the difference between C++ and Visual C++? Is visual a "drag and drop" environment as opposed to typing out code?'

The difference between C++ and Visual C++ is that one is the name of a programming language, and the other the name of a product. To create applications with C++ all you need is a text editor and a compiler, such as GNU C++ or Borland C++, both of which you can download without charge.

The purist view of visual programming is that you should be able to construct both the interface and the logic of an application by drag-and-drop. The most widely used example of this is IBM's VisualAge series, particularly VisualAge for Java.

More often, supposedly visual tools let you create an interface by drawing it on the screen, but resort to text-based code for the program logic. Visual Basic, Delphi, JBuilder and C++ Builder all fall into this category.

Surprisingly, Visual C++ is one of the least visual of programming tools. There is a visual dialog editor, but in other respects you have to rely on code to design your interface. By contrast, C++ Builder is similar to Delphi. Whichever product you use, the bulk of a developer's time is likely to be spent writing code rather than messing with dialogs and drawing objects.

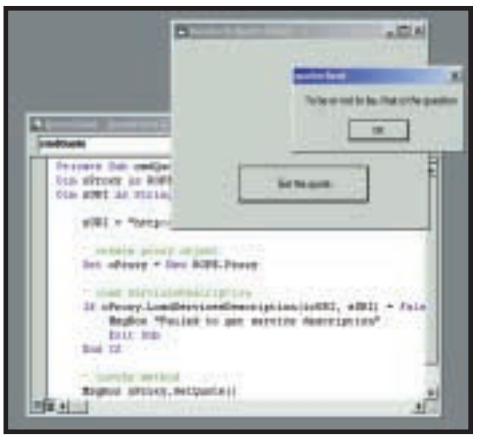
The rest of the code is in class libraries and, in theory, fully debugged. Delphi and C++ Builder use the Visual Component Library, while Visual C++ uses the Microsoft Foundation Classes and the Active Template Library. Visual Basic is more of a black box, although the objects presented by Visual Basic, such as Forms and CommandButtons, are the equivalent of a class library. Java has its own extensive class library.

So, when choosing a programming tool, consider what class library you want to work with, and which development environment you like the look of. You can mix and match to some extent, such as using C++ Builder to work with MFC, or using Visual C++ with the cross-platform Standard Template Library, but you lose the benefit of many of the supplied tools.

FIG 2 **A basic Quoter client (code adapted from the SOAP toolkit)**

```
Private Sub cmdQuote_Click()
Dim oProxy As ROPE.Proxy
Dim sURI As String

    sURI = "http://youripaddress/quoter.xml"

    ' create proxy object
    Set oProxy = New ROPE.Proxy

    ' load ServicesDescription
    If oProxy.LoadServicesDescription(icURI, sURI) = False ↙
Then
        MsgBox "Failed to get service description"
        Exit Sub
    End If

    ' invoke method
    MsgBox oProxy.GetQuote()

End Sub
```

(*Key:* ↙ *code string continues*)



The Quote client in action. Using the ROPE proxy reduces the amount of code needed

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To find the SOAP toolkit and other online resources, visit http://msdn.microsoft.com/xml/general/soaptemplate.asp
Also try www.w3c.org/tr/soap/

Sign on the dot-com line

Tim Anderson looks at how PHP and MySQL are the bricks and mortar to the online guestbook.

The difference between static and data-driven websites is the difference between online publishing on the one hand and web applications on the other. What follows is an explanation of how to create an online guestbook using PHP (Hypertext Preprocessor) and MySQL, an open-source database server. The humble guestbook is a real interactive web application and this example can be easily adapted.

Despite its simplicity, designing a guestbook involves a number of tasks. These include database administration, web server configuration, page design and coding. This tutorial assumes you have successfully installed PHP and MySQL, or that your friendly ISP has done this for you. PHP and MySQL run on Linux and other Unix-like operating systems as well as Windows. One of the best ways to proceed is to design and test on a local intranet, before deploying it live. This is also excellent technology for use on an intranet.

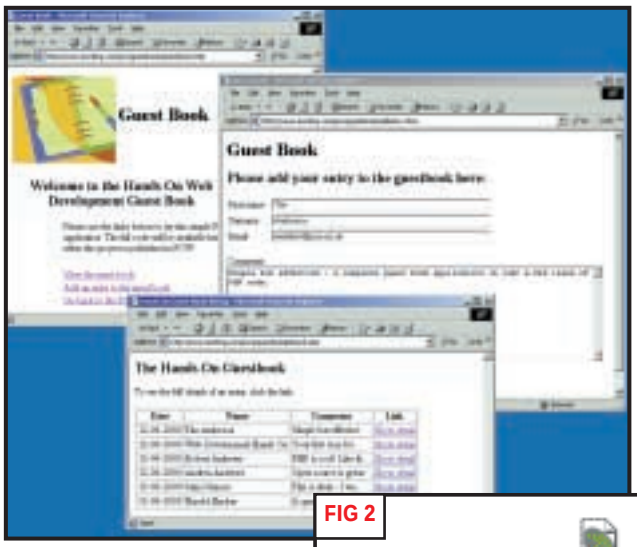
1 Create the database

MySQL lacks the user-friendly visual IDE with which Windows developers may already be familiar. Instead, it is driven through SQL commands. The MySQL client is an SQL shell that lets you type commands interactively and has a batch mode so that you can run scripts.

FIG 1 **Script to create the guestbook database table**

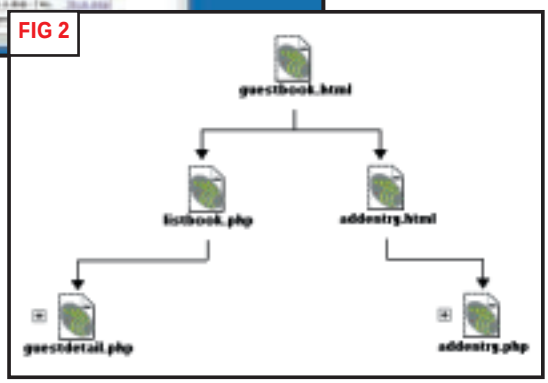
```
USE guestbook;
CREATE TABLE thebook (id ↙
INT UNSIGNED NOT NULL ↙
AUTO_INCREMENT, firstname ↙
CHAR(60) NOT NULL, ↙
lastname CHAR(60) NOT ↙
NULL, email CHAR(60), ↙
regdate DATE NOT
NULL,
comment BLOB, PRIMARY KEY ↙
(id), KEY name ↙
(lastname,firstname), KEY ↙
regdate
(regdate)
);
```

(*Key: ↙ code string continues*)



Left: The pages that make up the Guest Book web application Below: Figure 2 shows the layout of Guest Book

FIG 2



The guestbook database needs only a single table called 'thebook'. At a minimum, the fields must include a primary key, name fields, date of entry and a comment field. Here is the structure:

ID: primary key, auto-increment field
Firstname: 60-character field
Lastname: 60-character field
Email: 60-character field
Regdate: date field
Comment: Memo or blob field for comments.

Typing a long Create Table command interactively is error-prone, so the best way to get this into MySQL is with a script such as that in figure 1. To use this script you need to have first created the guestbook database. Then you can run the script with the following command:

```
mysql < thescript.txt
```

You will probably need to give MySQL a valid hostname, username and password, in which case the syntax is:

```
mysql -h host -u user -p < ↙
thescript.txt
```

(*Key: ↙ code string continues*)

If you make a mistake and need to recreate the table, simply run the MySQL client, use the guestbook database and enter the command: drop table thebook;. You can then recreate the table as needed.

2 Design the app

Like most database applications, the guestbook interface must allow for the searching, viewing and updating of data. A delete facility is not included, but could be easily added, although you would probably want to add security to prevent users deleting other people's entries. Figure 2 shows the site layout. From the guestbook.html page users can either view the existing entries, or add a new one. The link for viewing the guestbook is listbook.php, which generates a table showing each existing entry in one-line summary form. Comments are presented as a few words with an ellipsis. To see the full detail, a generated link on each line takes you to guestdetail.php. The form for adding a new entry is held in

addentry.html, and when the form is submitted it calls addentry.php to verify the data and add the record.

The pages with .php extensions are pre-processed by PHP before being sent to the web browser. Therefore, the input to the PHP scripts is contained in the HTTP request that calls the page. The output is the HTML surrounding the scripts along with whatever you choose to generate from the script itself.

A flaw in this initial design is that the entire guestbook is returned on a single page. This is fine for a few hundred entries, but would not suit a large database. An obvious enhancement would be to return only a limited number of lines, while also providing a 'More results' link or other search options.

3 View the guestbook

The simplest script to start with is listbook.php, most of which is shown in figure 3. Note that PHP variables always begin with a $ character. The function mysql_connect() makes a database connection, the hostname, username and password parameters should be substituted as required. The connection is closed when the script ends, so there is often no need to call mysql_close(). The die() function is a handy way to check for errors. It simply outputs a message and terminates the script. The following construct exits the script if the function returns false:

```
$var = func() or die("error message ");
```

After making the connection and selecting the database, the script sends an SQL query to the database. Assuming success, the results are read row by row with mysql_fetch_array, which stores the data in an array, where each field name is an index into the array. The date field is returned in standard SQL format, which is yyyy-mm-dd, although you may want to reformat this for display.

This script returns an HTML table. Each row includes a hyperlink to another PHP page, including the ID field as part of the URL. This is a simple and effective technique for providing a detail page.

The detail page itself is similar, except that it only retrieves a single record. The other difference is that the PHP script needs to read the value of an argument in the URL. This is simplicity itself. If the URL is like this:

```
href= "guestdetail.php?id=123"
```

PHP then creates a variable $id containing the value. Therefore, the script in guestdetail.php begins like this:

```
if ($id==0) {
die "No entry specified ";
}
```

4 Add a new entry

The starting point for adding a new entry is an HTML form. The form tag itself begins like this:

```
<form method= "post" action = "addentry.php">
```

The 'post' method means that the form's data is sent separately from the URL, unlike 'get' which tags it onto the URL itself. This is the W3C (World Wide Web Consortium) recommendation and avoids the length limitation of get. Each field in the form has a name attribute, using text boxes and a textarea to hold the data. There is no need for the form to provide the date or ID fields, since the date is taken from the system date while the ID is generated by MySQL.

The script for adding data is shown in figure 4. PHP automatically creates a variable for each control in the form ($controlname), or you can read the values from the $HTTP_POST_VARS() array. For the date, PHP has a gmdate() function which gets the Greenwich Mean

FIG 3

Script to list the guestbook entries

```
<table width="75%" border="1">
  <tr>
   <th><b>Date</b></th>
   <th><b>Name</b></th>
   <th><b>Comments</b></th>
   <th><b>Link</b></th>
 </tr>
<?
$conn = mysql_connect("hostname","username","password")
or die("Database connection failed");
$db = mysql_select_db("guestbook",$conn) or die("Failed
to use database");

//construct SQL query
$sql = "SELECT id, firstname, lastname, regdate, comment
FROM thebook
ORDER BY regdate ASC;";

$result = mysql_query($sql,$conn) or die("Error retrieving
data");

//add results to table
while ($record = mysql_fetch_array($result)) {
$id = $record["id"];
$firstname = $record["firstname"];
$lastname = $record["lastname"];
$regdate = $record["regdate"];
$year = substr($regdate,0,4);
$month = substr($regdate,5,2);
$day = substr($regdate,8,2);
$comment = substr($record["comment"],0,20);
$comment .= "...";

echo "<tr><td>$day-$month-$year</td><td>$firstname
$lastname</td><td>$comment</td>";
echo "<td><a href=\"guestdetail.php?id=$id\">Show
detail</a></td></tr>";

}
?>
</table>
```

PHP tips

If you find that .php files are not running at all, check the configuration of the web server. Sometimes PHP is configured so that a .php3 extension is required. For Apache, check the AddType directive or the mime.types files.

PHP's mail command is a handy way to keep in touch with users of your website. Simply use:

```
mail("me@myisp.com",↙
"subject","content");
```

For example, you could have PHP mail you every time an entry is added to the guestbook.

The database support in PHP is determined by compilation options. Thus, MySQL support may not always be available and other databases such as SQL Server, ODBC and Oracle may be supported. For maximum flexibility, do your own PHP build.

FIG 4

Script to add a new entry

```
<?php
//Get the form values
$firstname = $HTTP_POST_VARS["edFirstName"];
$lastname = $HTTP_POST_VARS["edLastName"];
$email = $HTTP_POST_VARS["edEmail"];
$comment = $HTTP_POST_VARS["txtComments"];

$regdate = gmdate("Y-m-d"); //use SQL format

//Check for no surname
($lastname != "") or die("You must enter a surname. Go back ↙
and try again");

$conn = mysql_connect("hostname","username","password") or
die("Database connection failed");
$db = mysql_select_db("guestbook",$conn) or die("Failed to ↙
use database");

//construct SQL query
$sql = "INSERT INTO thebook (firstname, lastname, email, ↙
regdate, comment)
values ('$firstname','$lastname','$email',↙
'$regdate','$comment')";

$result = mysql_query($sql,$conn) or die("Error ↙
inserting data");

echo("<p>Thank you for adding your entry to the guest ↙
book</p>");

?>
```

(*Key:* ↙ *code string continues*)

Time date, which is useful if you run a UK site that may be hosted on a server in a different time zone.

After getting the data, you can do any validation that is required. The script shown checks that a surname has been supplied. PHP has a full range of string and arithmetic functions for additional validation. You might also want to check for duplicate entries with a SELECT query, restrict the length of the comment data, or run other sanity checks.

Valid data is appended to the database with an SQL INSERT INTO command. To work seriously with MySQL you will want to get hold of an SQL tutorial, as the supplied documentation does not cover this well. After inserting the data the script returns a confirmation message to the browser. Next time the user views the guestbook the new entry will be included.

Why PHP/MySQL?

The PHP/MySQL combination is popular and with good reason. It is reliable, easy to use and its performance is excellent. PHP version 4 introduces some sophisticated new features including a session management scheme similar to that used by Active Server Pages (ASPs). Both products are open source and you can generally run PHP and MySQL on the web without paying licence fees. If you run MySQL on Windows a fee is payable.

You can extend PHP with your own C code, but PHP is not as clever as Microsoft's ASPs with its COM support. MySQL is a simple affair alongside the major commercial database servers and lacks support for transactions along with other SQL functions such as sub-queries. Even so, many web developers find MySQL does all they need and makes a fast and cost-effective solution.

Getting a count

Debs Eppie asks: 'You published an example music database using ASP. Any idea how to get a record count?'

There are several ways to get a record count in a web application. If you are looping through a series of records to create formatted output, you can simply maintain your own counter variable. Alternatively, the SQL COUNT function is useful. A query like:

```
SELECT COUNT (*) FROM mytable;
```

returns a one-row, one-field result set which contains the count. COUNT DISTINCT gives you the number of unique values. You can use this with a WHERE clause to count records in a subset of the data. If you are using Microsoft's ADO (ActiveX Data Objects), you can also inspect the RecordCount property of any recordset, although this may return -1 if the database driver or cursor (result set) type doesn't support it.

CONTACTS

Tim Anderson welcomes your comments on the Web Development column. Contact him via the PCW editorial office or email: **webdev@pcw.co.uk**

Guest Book can be found at www.itwriting.com/pcw/guestbook/guestbook.html. For more information on PHP see *PCW* April 2000. The home pages for PHP and MySQL are at www.php.net and www.mysql.com respectively, and these sites have further links to web resources. Reader Richard Thomas mentions PHPmyAdmin at www.phpwizard.net, a freeware product for web administering a MySOL database

Slot machines

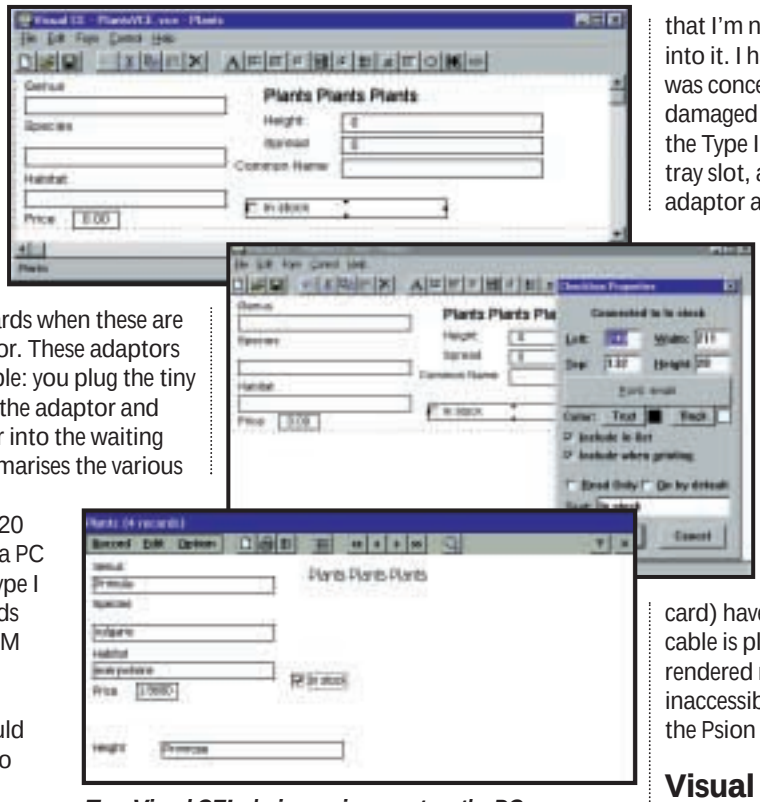
Mark Whitehorn sorts out what slots and what's not, delves into CE apps and scribbles on-screen.

I've recently been asked a lot about the slots in various Psion models and what follows is a brief résumé of the card-carrying members of the Psion clan, namely the Series 5s and the Series 7s.

The story starts comparatively simply. There are CF (Compact Flash) Type I slots which take CF Type I cards – these are roughly matchbook-sized but very thin. CF Type II slots take the marginally deeper CF Type II cards but will also accept Type I cards. Then there's the PC slot which will accept a PC Card (the credit-card sized ones) and also CF Type I or CF Type II cards when these are slotted into an adaptor. These adaptors are fairly freely available: you plug the tiny Type I or II cards into the adaptor and then slide the adaptor into the waiting PC slot. Figure 1 summarises the various options available.

FIG 1

Card type	Slot type: PC	CF Type I	CF Type II
CF Type I	✘	✓	✓
CF Type II	✘	✘	✓
PC	✓	✘	✘
CF Type I + adaptor	✓	✘	✘
CF Type II + adaptor	✓	✘	✘



Top: Visual CE's design environment on the PC
Middle: Objects on a Visual CE form have properties that are accessible by double clicking; these are for a check box control
Bottom: A Visual CE form as viewed on the PDA

I have a Jornada 820 with a CF Type II and a PC slot as well as three Type I cards, two Type II cards (one of which is an IBM Microdrive) and an adaptor. Every combination you would expect to work does so without drama.

And now the Psion story. Series 5s have one 'memory disk' (Psion's term) slot into which CF Type I cards fit. My Series 5 happily detects each of the Type I cards, although my 5mx detects only the Kodak Digital Science 8MB card and not the Kingston Technology 8MB cards, consistently giving the error message 'Drive not present'.

My guess is that this is a glitch in my machine, but if you have the same problem and decide to send the machine back to Psion, it might be worth sending the undetectable card back as well, so it can be seen not to work. Otherwise there's the danger of it checking out fine when Psion tests it and opening the door to endless wrangling over the problem.

The Series 7 has, on the left of the machine, a slide-out CF card tray that will accept either a CF Type I or Type II card. On the 7's right is a PC Card slot.

A Type II card is a very tight fit in the card tray; the clearance is so minimal that I'm not happy fitting the Microdrive into it. I have done so and it works, but I was concerned that something might be damaged in the process. That aside, all the Type I cards worked from the card tray slot, as they did when fitted into the adaptor and then into the PC slot. The bewildering thing is that the Microdrive, fitted to its own adaptor and placed in the PC slot, doesn't work.

The CF card tray is a strange 'innovation'. It has a vertical plate that forms the leading edge of the tray when it's pulled out and shuts off the slot neatly and completely when it's closed. Modem and network cards (such as the Xircom Ethernet card) have a connector into which a cable is plugged. This connector is rendered neatly and completely inaccessible when the card slotted into the Psion 7. Great design feature, guys.

Visual CE and Report CE

I've been playing with Visual CE and Report CE from Syware (www.syware.com) and have been impressed by both, especially by the strong database bias of Visual CE.

With Visual CE, you can build form-based applications for Windows CE devices, that is, applications with a form or a collection of forms that make up the interface.

The software is installed on a PC while the CE device is connected and thereafter the design stage takes place on the PC with the completed form being downloaded onto the CE device. This is the method I used, although if you have

an HPC Pro you can perform the whole process from there.

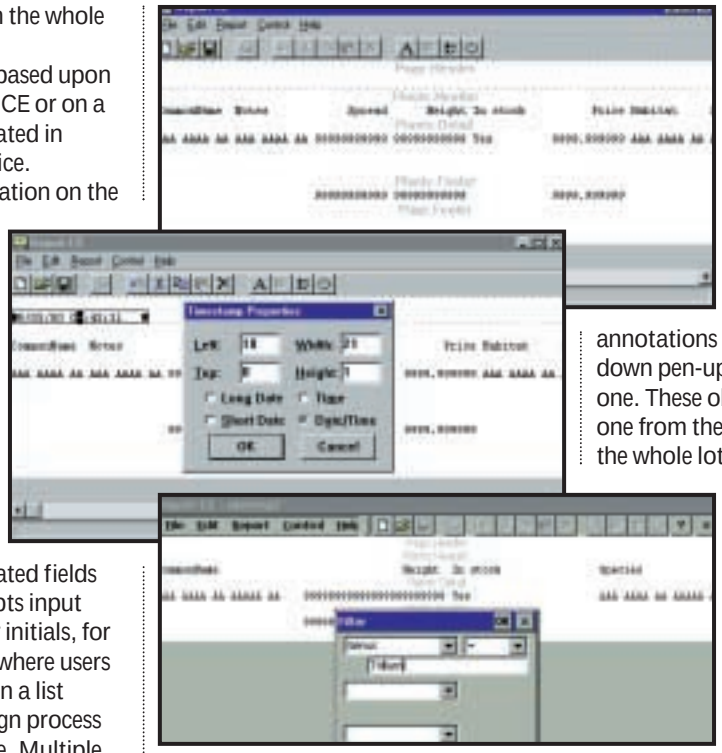
A Visual CE form can be based upon a table created within Visual CE or on a table that's already been created in Pocket Access on the CE device. Alternatively, given an application on the PC that supports ODBC, data from this can be used to create a Visual CE table. This lets you work with an existing Access table from the PC, without having to convert it to a Pocket Access table.

There are 12 types of control that can be placed on a form: edit, note and check boxes, labels, radio buttons, timestamps, calculated fields and a scribble box that accepts input from a stylus – a signature or initials, for example. Drop-down boxes where users choose input can be based on a list created during the form design process or from data in another table. Multiple objects on a form can be selected for speedy alignment and there's a snap-to-grid option too.

Downloading forms and reports to the CE device was quick, although opening a small Pocket Access table took about 19 seconds despite the fact that I'd only been experimenting with small data sets.

Report CE is, as you've probably guessed, a reporting tool for data from a Visual CE application, Pocket Access, any application that uses its .cdb format or any table held in the Windows CE Database Object Store.

Reports are of the ubiquitous banded type and easy enough to set up. Given the iterative nature of report design, the lack of a Print Preview button is a pain: you have to go to the File menu and select it. Timestamp, calculated controls, labels and 'column controls' (the data from the underlying field) are at the designer's disposal. Data from several tables can be combined in a report and records can be filtered to show a subset of records either when you run the report or as part of its definition.



Top: The Report CE design environment on the PC. The A and 9 placeholders give it a somewhat crude appearance
Middle: Adding a timestamp control to a report
Bottom: Here a filter is being set up before the report is run on the PDA

These are seriously useful tools for developing CE applications. The only bugbear is the price, which ranges from about £50 to £400 for the Enterprise Edition – check out the website for further details of versions and downloading.

Annotation's what you need

Sometimes electronic editing of documents just isn't expressive enough. Have you ever yearned, when staring at a Word document that you've been asked to comment upon, to pick up a fat red marker and scrawl 'NO!' across an offending paragraph? Happily for Palm users, you can now do just this with enotate from Informal Software.

Imagine the scene: a Word document is on your PC's screen. Your Palm is plugged into the PC which also shows the Word document on its screen. Pick up the stylus. Scribble a comment on the Palm's screen across the reviled paragraph and circle it – magically these annotations appear on the PC. You can add freehand annotations to your heart's content and then save the document. Cleverly, enotate saves the annotations as Word objects, each pen-down pen-up action creating a separate one. These objects can be deleted one by one from the document as it's revised, or the whole lot can be removed at once.

You can also annotate PowerPoint presentations or .jpg images in the same way.

You can also start from a blank screen on the Palm and attach your artwork to an email, or you can load up an image from your digital camera, add an arrow to show exactly where you fell into the river, save it (in this case annotations will be embedded into the JPEG) and email it to those unfortunate enough to miss the event.

One of enotate's great strengths is keeping everything digital: the annotated fax is an anachronism in the paperless age. Serious applications might include annotated images of archaeological evidence, damage reports from insurance assessors – imaginative uses abound.

Check out www.informal.com for details: it costs about £30 and is great fun, has all manner of uses and is clever too.

These are seriously useful tools for developing CE apps. The only bugbear is the price

Club Palm

Jon Alsbury sent me details of the North London Palm User Group (NLPUG). Founded early last year and now boasting over 70 members from all over the UK (despite the name) and Europe, the group held its first meeting in May with others in the pipeline. Check out www.nlpug.org for the latest.

CONTACTS

Mark Whitehorn welcomes your comments on the PDA column. Contact him via the *PCW* editorial office or email **pda@pcw.co.uk**

Selling made simple

Spam is a very cheap marketing ploy, but making your site simple is the key, says Nigel Whitfield.

While this is only the second of our ecommerce columns, over the past few months *PCW* has covered a number of topics that touch on the subject and some of those have prompted readers to write in to me.

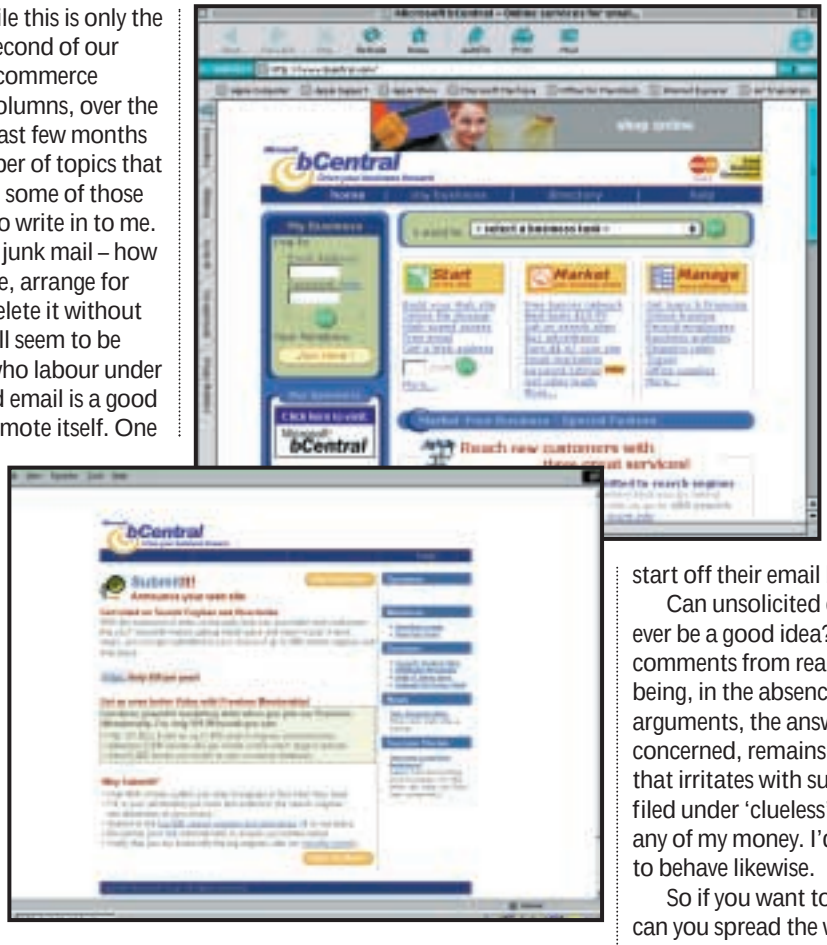
One recent topic was junk mail – how to avoid it and, if possible, arrange for your email program to delete it without prompting you. There still seem to be some people, however, who labour under the belief that unsolicited email is a good way for a business to promote itself. One reader wrote: 'Now we must not use unsolicited email to promote ourselves and we must not start with an empty site. How the hell do you think Yahoo started?

'I might have hoped that you would be more encouraging of those who would give it a go. But instead you are positively discouraging. In your article you make no mention of those of us who might like to make genuine and sensible use of spam. You do not consider the problems you are creating for those who might like to try and get started.'

I'd welcome comments from other people who have businesses online. And doubtless someone will correct me if I'm wrong, but Yahoo never sent unsolicited email promoting its site. And yes, I will continue to be positively discouraging to people – there is no 'genuine and sensible use' for junk email.

My correspondent, I fear, has not considered the problems he'd be creating for himself by setting out to give his business a bad reputation online. His view is that sending a single email to selected addresses, saying at the top of it that people won't get any more messages, is acceptable.

I'm afraid I disagree; junk email is unacceptable however you do it. My Demon Internet account is virtually unusable for email, receiving dozens of pieces of junk each week. Many of those promise that they're just going to send the one message. A distressingly large number now say that I'm a subscriber to an 'opt-in' list, giving the impression that I somehow asked to receive their junk. I didn't and I certainly won't do business with companies that start off their email by lying to me.



Left: Microsoft's bCentral is a good place to find out about promoting your business online, without resorting to spam Below: Submit-It enables you to have your site listed on a popular search engine

Can unsolicited commercial email ever be a good idea? I'd welcome comments from readers. For the time being, in the absence of any compelling arguments, the answer, as far as I'm concerned, remains 'no'. Any business that irritates with such tactics is mentally filed under 'clueless' and won't be seeing any of my money. I'd urge other people to behave likewise.

So if you want to do ecommerce, how can you spread the word? As my correspondent pointed out, many avenues of promotion may be out of the reach of small businesses – but that's no excuse for annoying potential customers.

Building your business

The first rule of building up a customer base has to be to make sure your site works well to begin with – you can spend as much as you like on promoting a website, but if visitors have a bad experience when they try to find out about you and your products, they're unlikely to come back. Perhaps one of the best examples is the late Boo.com – a slow site packed with the latest technology resulted in frustration for many users.

Similarly, make sure key information is easy to find. If I want to check a price, I want to do it without registering, or downloading an obscure plug-in. And if I

Any business that irritates with such tactics is mentally filed under 'clueless'

Setting out your virtual stall

Over the next few issues, I'll be looking at some of the practical issues involved in setting up a site, using a variety of different systems to provide online shopping facilities, ranging from the 'drag and drop' type of catalogue-building program, to systems that provide you with much more customised control over how your site will look. As well as setting up the site itself, we'll be looking in more detail at some of the other aspects – including arranging the payment mechanisms, which can be the trickiest thing to sort out for many, especially if they're starting a business from scratch, with the aim of putting it on the Internet.

There are many different packages available to help create online shops. The first two that we'll be looking at are Shop@ssistant (www.floyd.co.uk), and MiniVend (www.minivend.com), which is a full-featured package written in Perl.

Before you choose a system for your own site, you'll need to check a number of different things.

First, what are the requirements for the web server that will host your site? Does the shopping package you've chosen need special programs running on the server?

Next, what payment services are supported by the shopping system? You'll need to decide if you want realtime processing of transactions and whether or not the card-processing service you use is compatible with the software.

And finally, do you need to make special arrangements with your ISP to provide a secure server, or have it run software to connect to card services? Some ISPs will offer this as part of a business package, or you can arrange to have your ordering page hosted by some of the payment services on the Internet.

The two systems we'll be looking at initially take a completely different approach to setting up your online store.

Shop@ssistant handles most of the work, with the exception of the final processing of secure credit card transactions, in the user's own web browser. It uses JavaScript, which you can add to your web pages via cut and paste – or using the supplied objects for popular web design tools – to control movement around the site and calculate prices and things such as postage. Aside from the secure credit card processing, you could run a complete online shop using the free web space given by many ISPs – all you need on the server is a script for sending email. A single-currency version of Shop@ssistant costs £199.

MiniVend runs as a script on the web server, so it's compatible with more browsers, but installation is much more difficult. Like Shop@ssistant, it relies on adding information to your existing pages, but in this case, they're in the form of special tags, which are converted on the fly by the MiniVend server program. It's also extendable – you can link it to SQL databases, for example, to integrate with the rest of your in-house systems. It's a free program – which has implications for support, as well as the startup cost.

We'll return to both of these programs next month, in more detail.

Shop@ssistant makes life easier for ecommerce businesses

can't find a price for a product on a site, then I'll go somewhere where I can.

Email can be a way of informing people about your site – but make sure that you only email people who have requested that you do so; make it quite clear when you collect email addresses that you intend to send out information, and give people the option of declining.

You can increase the likelihood of your site appearing in search engines by ensuring that you use META tags to supply keyword and description information for web robots – but you'll also need to make sure there are links to your site from others. Ask companies you do business with, or other appropriate pages, to link to you.

Tools such as Submit-It (www.submit-it.com) can have your site listed on popular search engines – with costs starting from around £40, it's well within the reach of small companies. Advertising can be surprisingly cheap too, with Microsoft's bCentral (www.bcentral.com) offering 5,000 adverts a month from around £12.50.

Of course, a small business can't expect to build a brand quickly overnight – but even if you did, could you cope with a massive increase in orders? For most firms, building slowly is the best way – and word of mouth will help more than just about anything else.

Rather than dream about how many people you could reach with junk mail, remember instead the damage you can do by sending it out. There are other ways to promote your business – not least of which is offering good service.

CONTACTS

Nigel Whitfield welcomes your comments on the Ecommerce column. Contact him via the *PCW* editorial office or email **ecommerce@pcw.co.uk**

Ever-ready Ethernets

Troubleshooter Roger Gann shows you how to effectively detect and locate cabling problems.

Modern Ethernet CAT 5 twisted pair network cabling is pretty robust these days, certainly a heck of a lot more reliable than coaxial cable. You fit it and forget it, it's that simple. But even so, problems can crop up from time to time and this month's column is devoted to basic network cabling troubleshooting.

OK, let's say a server has disappeared from the browse list. As far as the system is concerned, you have a network, but no server. You've tried downing it and rebooting: it comes up seemingly OK, but it still remains invisible to the workstation clients. How do you track down the cause of this break in the network chain? The basic technique is simple – you methodically substitute every link in the chain with a replacement you know to work 100 per cent.

Most 10BaseT and 100BaseT networks consist of a trio of hardware components: a network interface card (NIC) in a client or server computer, a port in a hub, switch, router, or other device and the cable connecting the first two components. Problems at the NIC typically involve faulty drivers, network configuration settings within the operating system and, rarely, jumper or DIP-switch settings on the card itself.

At the hub end, the port rarely causes problems, although if it is a switch or a router, there could be complex configuration issues, such as VLAN definitions or policy settings. The cabling comprises several elements, typically twisted pair cable with an RJ-45 plug. There'll be a drop cable to the wall socket, internal cabling to a punch-down block in a patch panel and, finally, a patch cable that runs to the hub, switch, or router port. Once the cable segment is correctly installed, it will rarely cause problems.

The first thing to check is that the link light is on, at the rear of the NIC. Older coaxial-based 10Base2 and 10Base5 NICs usually don't have link indicators, but practically every 10BaseT and 100BaseT NIC sold these days has two or three status LEDs. These lights help indicate whether a problem exists with the connector, cable or hub. The Link or LNK LED lights up whenever the interface receives link pulses from the hub at the other end. 10BaseT interfaces generate link pulses about 60 times each second when there is no data on the cable.

The Activity or ACT LED illuminates (or blinks) when the NIC detects read or write activity on the network, even when there is no activity on the adaptor. If the ACT LED is not on, make sure that the hub and network are operating and that the correct drivers are loaded.

You may also find a third indicator: the 100 LED illuminates when a 100Mbits/sec connection is established.

There is a corresponding Link LED back at the hub port as well. If the Link LEDs at both ends of a questionable link are lit (and if they go off when you unplug the cable), you can be confident that the cable is wired and connected correctly, that the NIC and the hub are powered up and capable of receiving data, and that the most likely source of the problem is the configuration of the computer or the network interface.

If only one Link LED is on, the cable segment is almost certainly bad; the interface at the lit-up end is successfully receiving link pulses, while the interface at the other end is sending them but not receiving them. If possible, plug the computer into another cable that supports a working system. If the computer works on the other cable, you know the computer is configured properly. If a computer known to be

Above: Unlike hubs, switches can cause problems due to their configuration
Below: The LEDs on the back of NICs indicate the source of a cabling problem

working properly shows the one-link-light-out symptom on the original cable, you have added reason to suspect the cable segment.

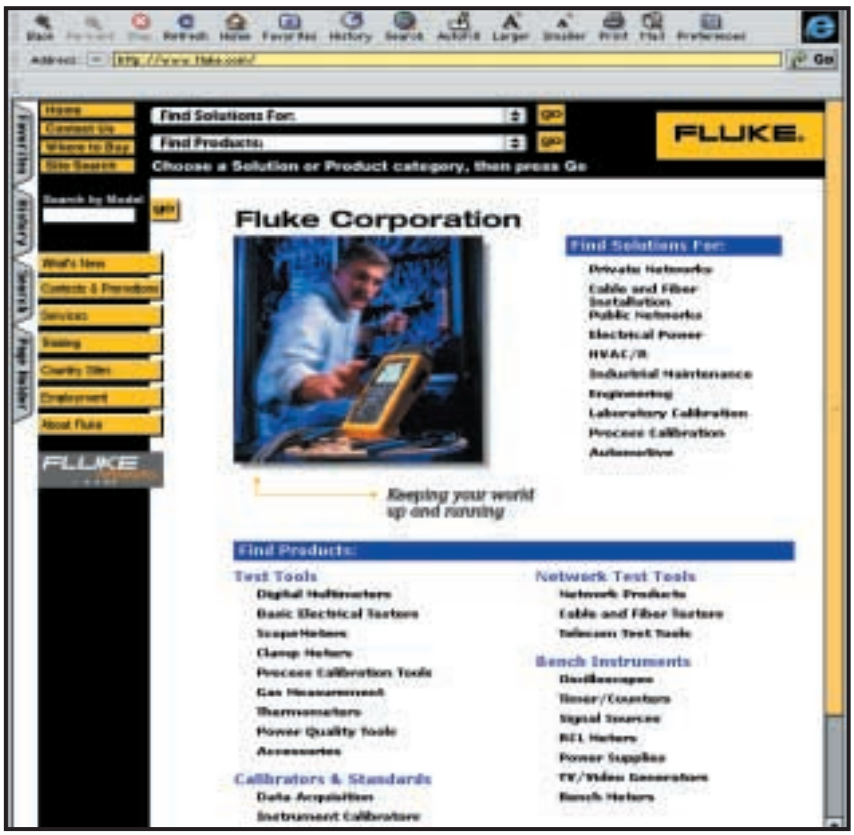
If both Link LEDs are OFF, there might be a bad connection or cable or a problem with the hub. For example, you might have the cable plugged into the wrong wall socket or the port itself might be faulty. The easiest way to test this problem is to see if another Ethernet-capable computer can connect using the port. Check that the patch cable to the hub is actually plugged in!

Another possibility is dud cabling. Make sure both ends of the cable are firmly plugged in and are in good shape (ie there are no cracks in the plastic, no bent pins, etc). The easiest way to test this problem is to swap in another Ethernet cable and see if this solves the problem. If you have a cable tester, use it to pinpoint the problem to a particular length of cable or to a connector along the path. It's useful in situations such as this to use a working networked laptop as a diagnostics tool – it allows you to rapidly substitute the suspect computer for a known 'runner'.

If you installed your own Ethernet hardware, you also may not be getting a Link LED because the Ethernet hardware isn't installed correctly. Try reinstalling the network drivers that came with the NIC. Or check the manufacturer's website and download the latest drivers.

Rarely, you'll come across a problem where the Link LED is on, but there's still no connection. The Link LED tells you that your computer can see the link pulse from the network, but a complete connection is a two-way street, so it's necessary for the network to see the link pulse from the computer as well. If you can, swap in an Ethernet cable you know is working. Try swapping the card as well.

If both Link LEDs are off, it could be down to a 'smart' hub: they're designed to automatically 'partition' or isolate faulty ports, so a malfunctioning port might be behind the absence of Link LEDs. To check this, plug the cable into a different port on the hub and see if the Link lights come on. If a known 'good' hub port doesn't light up the Link lights at both ends, you should connect a known 'good' computer, such as your laptop, to the computer end of the cable segment. If the lights stay out at this point, then something along the cable path is definitely the culprit.



Investing in a cable tester from specialists such as Fluke can save you a lot of time rather than resorting to trial and error

The other indicator LED you'll see on hubs is the 'collisions' LED. A flicker of the collisions light every few seconds is to be expected on a normal network, but anything resembling a constantly lit collision indicator is likely to indicate serious problems. The most common reasons for excessive collisions are violations of the 10BaseT rules: no links longer than 100 metres and no more than five repeated segments, with no more than three of the segments populated and no more than four repeaters (hubs) between any two nodes.

If everything checks out but you're still having connection problems the next step requires a slightly more analytical approach. If you can't log on to a server when others can, or if you can't ping a destination that responds to other pings, then the cable comes under suspicion again, even if the link lights are on. Particularly at 100Mbits/sec, CAT 5 cable can be sufficiently below spec to prevent a link from working, without obvious electrical or mechanical faults. Inadequate connectors, electromagnetic interference and poor wiring techniques are three of the most common ways the cable link might fail while still letting the Link lights come on.

It might be worth investing in a cable tester. A cable tester that can measure near-end crosstalk and attenuation across the frequency band from 0Hz to 100MHz is the only way to be sure of a good cable link for 100BaseT. If you have a lot of coaxial cable-based Ethernet to troubleshoot, cable testers that estimate the distance of problems along the cable using time domain reflectometry can save a lot of trial-and-error operations.

The big names in cable testing are Fluke (www.fluke.com), Microtest (www.microtest.com), Wavetek Wandel Goltermann (www.wwgsolutions.com/), Datacom Textron (www.datacom.textron.com), and Hewlett-Packard/Agilent Technologies.

CONTACTS

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