



# The deed is DUN

If you're one of the many with auto-dial dramas, Andrew Ward, our new pair of hands on the NT scene, can calm you down and straighten it out. Plus, he sorts out NT Scheduler.

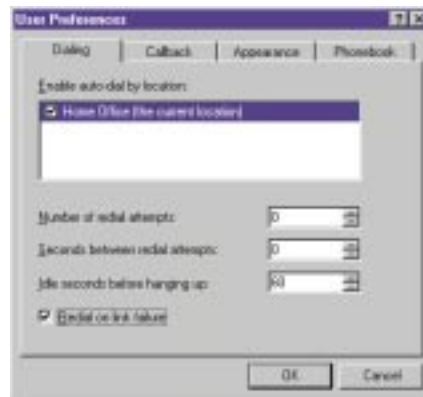
One of the more useful aspects of Windows NT 4, but one which seems to give people a lot of trouble, is dial-up networking (DUN). The basics of setting up DUN were previously covered in this column (*PCW* December 1996) but auto-dial deserves a second look.

Auto-dial is a great feature and should be particularly useful for internet access — if you can get it to work. But to judge by the volume of queries about auto-dial, many people are having as much trouble as I did to make it fly.

The theory sounds good: you run up Internet Explorer or click on the Fetch New Mail button in your preferred mail client, and auto-dial automatically kicks in to call your Internet Service Provider (ISP). When it works, it works well, and provides almost transparent internet access. Apart from the dial-up delay (which is fairly small if you use ISDN) you can pretend you have a permanent internet connection.

Like most users I soon discovered that auto-dial needs to be turned on from the phone book: it isn't enabled by default. For those who haven't yet stumbled across this, open up the phonebook and select More/User Preferences. (For internet use, ignore the Logon Preferences — these are for logging on to remote networks.)

Under User Preferences there should be a table of locations, although usually with only one entry; check the box to enable auto-dial. But oh, if only life were that easy! Run Internet Explorer and I can almost guarantee your system will not dial your ISP. By a process of experimentation I've come up with the following sequence of actions which, by and large, seems to kick auto-dial into life.



**Fig 1** Typical settings for DUN auto-dial

## Kick-start

1. Enable auto-dial, as shown in Fig 1, then restart the system.
2. Once the system has restarted, manually dial the phone book entry corresponding to your ISP (by clicking on Dial).
3. Once a connection has been established, run your web browser and connect to any site (the default home page will do). This step is necessary to "prime" the registry with the address of a remote site and to tell DUN which phone book entry it should use to connect to it.
4. Restart the system and run your web browser again. You should find that DUN will now automatically dial your ISP. (It must be said that even this procedure doesn't work for everyone.)

Unfortunately, even when you do get all this to work, auto-dial in Windows NT 4.0 still suffers from an annoying bug, up to and including service pack 2. The problem is as follows: if you log off and then log on again as another user, auto-dial will never work again; until the next reboot of the entire

system. Fortunately, this problem was fixed with service pack 3 for Windows NT 4.0.

When using auto-dial, DUN should time-out automatically after the time you set in User Preferences, or you can force it to hang up manually if you prefer. Timing out (or even hanging up) can cause problems later. For instance, you may have been browsing with Internet Explorer (IE) and the link has timed out because you've gone off to do something else. When you return to IE and click on a link or enter a new URL, nothing will happen (actually, you'll see an error message, but DUN won't auto-dial).

Now, remember the User Preferences dialog box? Did you notice the Redial On Link Failure checkbox? If you'd checked that, then auto-dial would reconnect in the circumstances just described. And of course, it will also reconnect if the link does actually fail during a session.

In spite of having done battle with auto-dial and, eventually, emerged the victor, I've actually given up using it altogether. That's because I use ISDN, and I've abandoned DUN and an ISDN terminal adapter (TA) in favour of a router. The result is a huge improvement, for many reasons which generally fall into two categories: ease of use and performance.

Although I've cracked auto-dial, it's still quite a pain to set up. Installing the correct modem type for the ISDN TA and then following the procedure above, involves several reboots. In theory, of course, you only have to follow this process once, but in practice I reinstall NT quite often — and setting up DUN adds a fair amount of time to the procedure. The router, on the other hand, only needs setting up once.

### Another route

On the performance side, the router offers several advantages. First of all, the connect time is much faster: DUN can sometimes take several seconds to page into main memory on my NT machine, and the router takes less time than that to complete the connection.

Throughput is higher with the router, too. Because it connects via ethernet, it has a potential 10Mb/sec at its disposal, rather than the maximum 112Kb/sec of the serial port (whereas ISDN, if you use both channels, can go up to 128Kb/sec). To be completely honest, I'm actually using a quadrupling serial card, so the maximum serial throughput for me is four times that figure. But if you don't already have one of these cards you're better off adding a network adapter, which has far more uses.

A further reason that router throughput is higher is because data transfer isn't plagued with errors. Fast serial communications place a high load on the CPU (which is in itself another good reason not to use a TA — people generally have better things for their CPU to do). Unfortunately, there are problems with the Windows NT EIDE disk drivers, as well as drivers for some graphics boards, which mean that interrupts are disabled for too long. As a result, serial characters can be missed which then results in CRC and overrun errors. Retries overcome the problem but throughput takes a massive hit.

Lastly, from the performance viewpoint, routers offer a much lower latency. Using the "ping" command reveals a consistent difference of around 60ms between the times reported via a router against a terminal adapter.

Of course, if you have more than one machine on a network, a router is the perfect choice. Without disrupting any of the machines on your network (you will have to set up a default gateway for TCP/IP, but that's all) you can provide internet connectivity to everyone simply by plugging the router into your hub.

You should be aware, however, that a router can only be used to connect to ISPs which offer PAP or CHAP authentication — it's no good where they require a plain-text logon script. When my predecessor on this column, Dale Strickland-Clark, first wrote about NT's dial-up networking, UK Online was the only ISP which offered ISDN connections of this type. Now, you can add BT Internet, MSN and Demon (and many

smaller operators) to that list, so there's enough choice for everyone.

There are drawbacks to routers, though. If you rely heavily on the internet you may have accounts with more than one ISP. Using Windows NT's DUN you can easily choose which one you dial — if one or the other is experiencing problems, for instance. It's a bit more of a fiddle to have to re-program a router to use a different ISP.

Finally, whether you use a router or a terminal adapter, you should be aware that internet protocols — and that includes the Point-to-Point Protocol (PPP) used for dial-up connections — are rapidly evolving. Hence, you may need to update the router firmware or Windows NT, as appropriate, to keep up to date with standards.

As an aside, it's worth mentioning that internal ISDN adapters (depending on the type) are treated differently by Windows NT. They're considered to be network adapters rather than modems and so are a lot easier to configure. Of course, you have to take your computer apart to install one so they won't suit everyone. And if you want all machines on the network to be able to use ISDN, you'll need to install a proxy server or similar software.

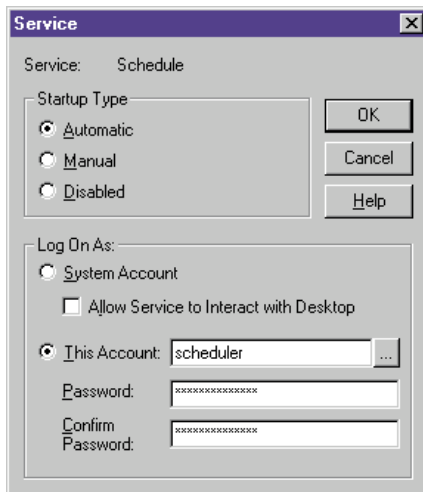
### Windows NT Scheduler

One aspect of NT that has triggered a lot of questions is the built-in schedule service. Typically, what users find is that commands which work perfectly when run from the normal logged-in user account appear to do nothing at all when triggered by the scheduler. Since this is often used for fairly mission-critical operations like taking backups, these problems can give administrators a real headache.

Firstly, you must be sure that the schedule service is running. If you're going to rely on it, you'll want it to start automatically each time the system boots. Go to Control Panel / Services, highlight Schedule in the list, and select Startup to change the options.

Right away we hit on one of the problems with the scheduler. By default, when it starts up, it logs on as the "localsystem" account. The permissions which this account has are unlikely to be useful for whatever you have in mind for the scheduler and this serves to illustrate an extremely important point.

For any Windows NT service you add, you absolutely must think very carefully about what permissions it will require and



Set up a user ID especially for the scheduler

then set up a dedicated user account specifically for that service. In this case, say, you might set up an account called simply "schedule". In order to get your scheduled service to work, it's tempting to give the account administrator rights. That's fair enough as a starting point but for security reasons you should, at some later date, make an effort to determine what rights it really needs and set it up appropriately. This is what I've done with the Microsoft Personal Fax add-on for Windows NT. Unfortunately I've yet to work out exactly what rights it does and does not need, so it still runs with administrator privileges.

In general, the documentation supplied with other Microsoft products (such as the Back Office components) does make it clear that you need to set up new accounts for services. But not everyone reads the manual, as I recently discovered when called in to investigate a failed Microsoft Exchange server. What had happened was that the person installing it had chosen a pre-existing administrator account for the Exchange service to log in with: and when someone changed the password on that account, then clearly the service could no longer function.

However, when using a built-in service which comes with Windows NT, you could be forgiven for not realising that you need to set up a special account: the schedule service is the one exception where you must, but unfortunately the problems don't stop there.

The next problem arises with the use of network drives. Drives which are mapped at the desktop are not necessarily visible to the schedule service and will change

## Quick look at a book

### ■ Microsoft Windows NT Server Resource Kit, Version 4.0, Supplement One

Price £37.49.

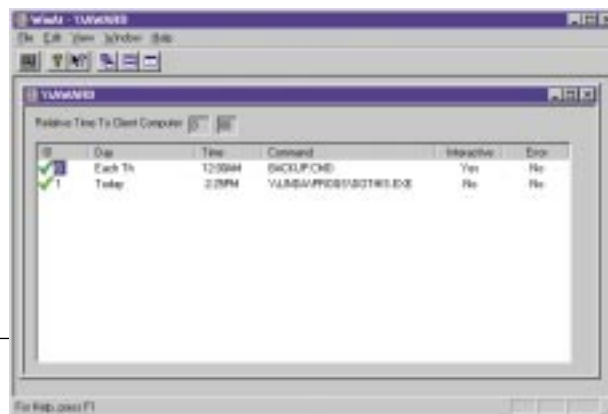
Contact Computer Manuals 0121 706 6000.

ISBN 1572315598.

This manual is largely devoted to Microsoft's Internet Information Server (IIS), and provides a wealth of information on how to optimise IIS performance. Security issues are also covered and there's a useful section on connecting to the internet with IIS. Much of this is fairly basic, but would be helpful for people with little internet experience — a market that Windows NT and IIS are no doubt reaching now.

There are some revisions to the existing Resource Kit manuals. The final chapter is a fairly brief look at some of the interoperability issues encountered in heterogeneous environments. The CD contains the entire set of resource kit tools and utilities, including several new and revised ones.

If you're making serious use of IIS, or already own the Resource Kit, you should find this supplement useful.



Top & above

The Resource Kit supplement includes a utility to check web page links

Left The Resource Kit includes a graphical interface to the scheduler

depending on what user is logged in at the desktop and what they choose to do. Therefore, any scheduled jobs should use UNC paths to access network drives (such as \\machineb\batchfiles).

Alternatively, you can use an "at" command to map a drive letter but in that case you should use a further command to un-map it: otherwise, the drive letter won't be available to the desktop user.

Usually, only system administrators may submit jobs to the schedule service, although for security reasons you may prefer to avoid this requirement and allow System Operators to be able to submit jobs, too.

You can allow this by finding the following registry key:

```
HKEY_LOCAL_MACHINE\SYSTEM\
CurrentControlSet\Control\Lsa
and adding the value
Submit Control [REG_DWORD]
0x00000001
```

There is no way for other users to submit AT commands.

## PCW Contact

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# The PC in profile

Roaming Profiles allow your Desktop, Start menu and recent documents to be accessible from wherever you log on. Dale Strickland-Clark shows you how. Plus, a visit to Zero Administration.

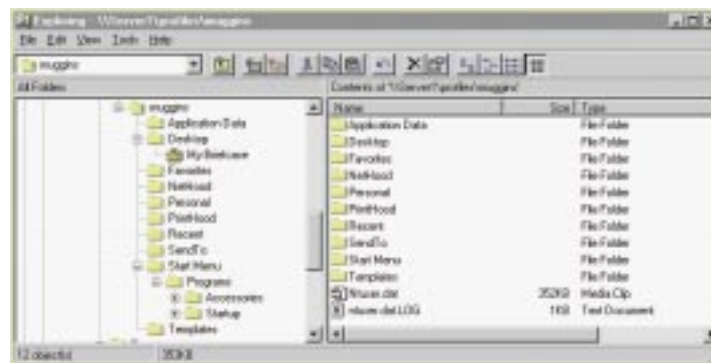
One of the great advantages of mainframe computers equipped with dumb terminals was that all the configuration information for each user was stored centrally. You could go to any terminal, log on and find yourself working with the same, familiar environment you had been using earlier, over on the other side of the office building.

PCs changed all that, and with the advent of Windows, the degree to which a user could alter the look of their PC could render it almost useless to anyone else. People tended to own their PCs in the same way they owned their desks and God help anyone who messed with your PC. Popping over to log on to someone else's PC was often unproductive. Network administrators spent the next few years trying to reproduce the effect of the dumb mainframe terminal so that users could log on anywhere, but enjoyed varying degrees of success (usually very little).

I'm a great believer in the black box PC in a business environment. All PCs are configured with the same standard software and as close as possible to a standard hardware configuration. The fewer differences the better. Then, if a PC loses the will to live or you need to change the office layout, you simply swap them around.

NT and Windows 95 give us the ability to avoid many of these configuration problems and enable us to treat the PC as a black box. Users can roam from workstation to workstation but still log on and pick up their own customised settings.

These settings are stored in a Profile, the use of which is optional with Windows 95 but standard on NT. However, to make a Profile available from any workstation, you



**Fig 1** A typical user Profile directory tree. This is what the system creates but you can add your own folders to extend your Profile

need to move it to a shared directory, probably on a server, and configure the user appropriately.

## What is a Profile?

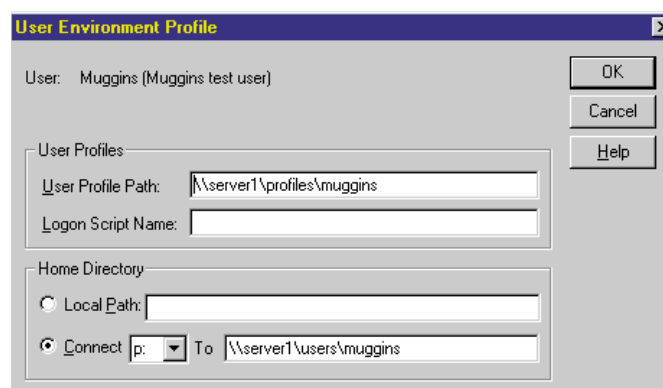
Your Desktop, Start menu, recent documents menu and many personal options are stored in a directory structure called your Profile (Fig 1). You find it by looking for a folder called "Profiles" off your Windows NT directory. Within will be a separate folder, created by the system for each user who has logged on to that PC. Within each of those, along with the Shell folders (Desktop, Start menu) you will find the files called ntuser.dat, which is the

user's Registry, and ntuser.dat.LOG. This latter is a transaction log for the Registry and provides fault tolerance.

Unless you tell it otherwise, NT creates a Profile for each user on each PC they use. But it won't follow them around and they will have to establish their preferences at each machine the first time they use it. New Profiles are always based on a copy of the Default User Profile on that workstation.

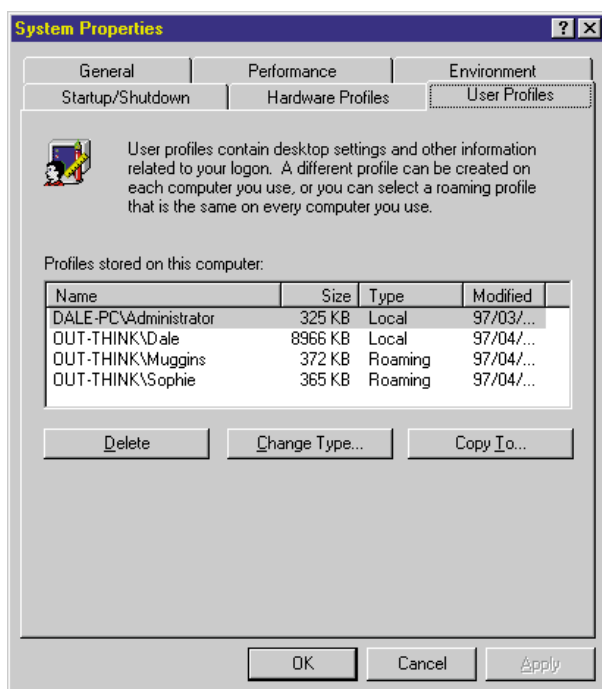
## Roaming Profiles

To make a Profile roam and be available to a user wherever they log on, you specify a User Profile Path (Fig 2) with the User Manager. The path should refer to a



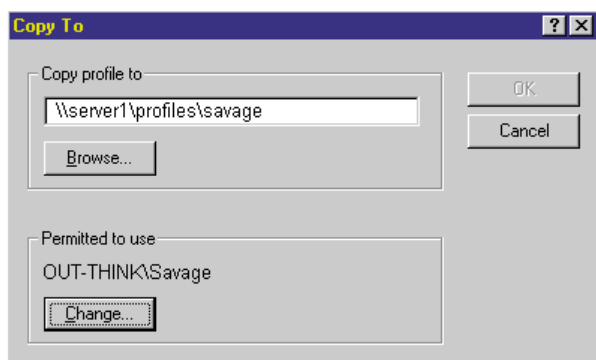
**Fig 2** To give a user a roaming Profile, you put the path to the Profile in the User Profile Path field. As long as the share exists (e.g. '\\server1\profiles') NT will do the rest. If this field is blank, the user will get a different local Profile on each PC

p265 >



**Fig 3 (left)** The System Properties applet shows all the local Profiles and cached roaming Profiles stored on the PC. Deleting a roaming Profile is harmless if it has been successfully copied back to the server, but a local Profile might be the only copy

**Fig 4 (below, left)** You can create a copy of a Profile as a backup, to copy a standard configuration for another user or to convert a local to a roaming Profile



location so you can pick out bits you're particularly keen to hang on to, or restore the whole thing from a backup.

Profiles *should* be kept small, but this is almost impossible to enforce because users like to store files on the desktop and there are distinct advantages to this for mobile users. Consider the

subdirectory of a share on a server. The share should already exist but the system creates the subdirectory tree when the user next logs on. Well, not quite: it creates just the root of the user's Profile when the user first logs on; the rest is copied from the workstation when they log off.

Each time they log on to a PC, the Profile is copied from the server to that PC where it is used as a cache for the duration of the session. When they log off, it's copied back to the server. The initial copying is skipped if the copy on the workstation is already up-to-date.

You really don't want to interrupt this copy back to the server (by resetting the workstation, for instance). It isn't performed in a fault-tolerant fashion and you could end up with a scrambled and unusable Profile. I've suffered from this more times than I can remember and, on each occasion, it was the `ntuser.dat` file that was damaged. If NT can't read this file when you log on, it ignores the whole Profile and creates a new one. The old one is retained in its original

load on the server, collecting all the updated Profiles, if everyone were to log off at the same time in the evening. Microsoft recommends not storing files on the desktop but using a Shortcut instead. This is at odds with Microsoft installing a Briefcase on every desktop by default. If your Briefcase is stuffed with files, your Profile will be large.

### Going mobile

On a mobile PC, the Briefcase is a useful tool for taking files away that you share with others, but if you are the only one who needs the file you can simply store it on your desktop or any other folder you create in your Profile. As long as the Profile on the mobile PC is up-to-date when you disconnect from the network, you can work on the file in the cached Profile. When you next connect to the network, the Profile will be updated, back on the server.

Watch out for the ways in which Windows 95 and NT treat Profiles. If your mobile PC is running Windows 95, it won't pick up your



## Book Reviews

### ■ Windows NT Workstation 4.0 — At a Glance

**Authors** Jerry Joice and Marianne Moon

**Publisher** Microsoft Press

**Price** £15.49

This primer is for the first-time Windows user. It begins by naming the objects you will find on-screen and dealing with important mouse techniques.



The authors have attempted to avoid technical jargon while covering those tasks users will need to negotiate daily. Each task is limited to a two-page layout, with plenty of screenshots and tips to accompany the numbered steps. There is sufficient information here to help even the most hesitant user make a start on their own, but even so, there is nothing more than you would find in the help files. It is not for the more confident or adventurous: they will be able to figure it out for themselves.

### ■ Working with Active Server Pages

**Authors** Michael Corning,  
Steve Elfanbaum, David Melnick

**Publisher** Que

**Price** £36.99

Active Server Pages (ASP) is a new feature of IIS. It greatly simplifies the job of web developers to build a dynamic web site without



messing about with CGI scripts. It covers every angle of using ASP, starting with a quick look at IIS and how it sits on NT, through to writing VBScript, the ASP object model, and on to database programming. It's a well thought-out book which deals with subjects in a logical order. I would specially recommend the last few chapters on database programming and ActiveX Data Objects. The authors had some difficulty in containing their excitement over this new

data access technology and leave the reader in no doubt that this is an area to watch closely for developments.

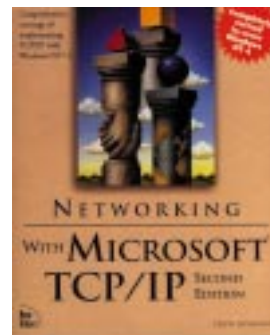
### ■ Networking with Microsoft TCP/IP

**Author** Drew Heywood

**Publisher**

New Riders

**Price** £41.49



This second edition (revised) covers NT4 and is as complete a volume on

TCP/IP as you're likely to find. It not only covers Microsoft's interpretation of this dominant protocol but also looks at the history and background, explaining why the protocol has evolved. Every possible component is covered in this NT-orientated book, including all the installable services like DNS, DHCP and WINS along with the console utilities such as PING, TRACERT and NETSTAT. An excellent book, and all most mortals will ever need on the subject.

NT Profile. Windows 95 Profiles are stored on the Home Drive as defined in User Manager and not in the User Profile Path.

### Management

You do not need to have hard and fast rules about the use of roaming Profiles. If users' needs change, it is easy to convert a Profile from local, to roaming, and back.

You can most easily achieve this from the PC where the local Profile is, or will be. When going from local to roaming, first make sure the user is not logged on and that you've updated the User Profile Path with User Manager to point to the server path where the Profile is to go.

Create the target top-level directory on the server (for example, \\Server1\Profiles\Savage), then open the System Properties applet (Fig 3) in the Control Panel (also accessible by clicking once on My Computer and pressing Alt-Return) and click on the User Profiles tab. Select the Profile on which you want to work and click the Copy To... button (Fig 4). Enter the path for the Profile and if necessary change the user with access permission to this.

Changing a Profile from a roaming one to a local version is simpler because it merely changes the state of the cached Profile on the PC to a static local one. Again, from the System Properties applet, select the Profile you wish to change, click the Change Type... button and check the Local option. There's no copying involved here but you might want to make sure the cached Profile is up-to-date by getting the user to log on to the PC before performing the operation.

Of course, there is far more to it than just setting up a few roaming Profiles to establishing the full ability of users to log on to any PC: you have to make sure the user's view of applications and data is consistent between PCs. This generally means that users must not store files on the PCs' local drives — also a requirement of the black box PC principle — and that if applications are installed on the PC, they are always installed in the same directories, or at least mapped to the same drives. If you install NT on your PCs from a common, preconfigured installation image, this should be automatic.

### Zero Administration

It's worth mentioning Microsoft's Zero Administration Initiative here because it extends the idea of the black box PC by making it possible to administer a PC without ever visiting it (which is where the "zero" comes from). It uses existing features like preconfigured Profiles and mandatory Profiles, and adds some attractive new ideas for automatic software installation on demand and remote problem diagnosis and resolution. The result is a PC which is much better able to look after itself but when it can't, demands less effort to fix.

The Zero Administration Initiative is not a product but a combination of tools and methodology, much of which will be in NT5 although you might need SMS (Systems Management Server) to administer other than NT5 workstations.

### PCW Contacts

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# Heavenly host

Dale Strickland-Clark shows LAN users how to arrange global email via a software package by setting up an SMTP host to talk to their ISP. NT books and a CD are reviewed, too.

Last month I looked at the provision of a cheap internet service to users on a local area network. Rather than adopt the traditional approach and use a router, I chose a software alternative and used a proxy server to channel and direct internet traffic. I finished by abandoning the modem because it was running slower than a one-legged man with a bad leg, and switched to a Pace Ultralink ISDN terminal adaptor. I shall conclude this month by outlining the steps needed to bring global email to these same users.

As I mentioned in the first part, you need an internet service provider (ISP) which offers mail forwarding and an intelligent SMTP (simple mail transfer protocol) host. Your job is to set up an SMTP host at your end to talk to it.

There are several ways to go about this. One inexpensive option is a package called NTMAIL which is available from [www.net-shopper.co.uk](http://www.net-shopper.co.uk). I haven't tried it myself but I've heard good reports. NTMAIL will, as far as I understand, drag mail from your ISP's SMTP host and hold it

on your server until someone with a POP3 (post office protocol) mail client connects to inspect their mailbox. POP3 is the protocol most often used by ISPs for general subscriber access so there is an abundance of cheap client software about, including the free bits of Exchange that come with Windows these days.

However, I'm partial to Microsoft Exchange for email because it's flexible, easy to manage and is excellent if you like to keep synchronised copies of your mailbox on several PCs. The price of flexibility is complexity, and Exchange does its best to muddle you with a skip-load of options that you can safely ignore in a simple case like this.

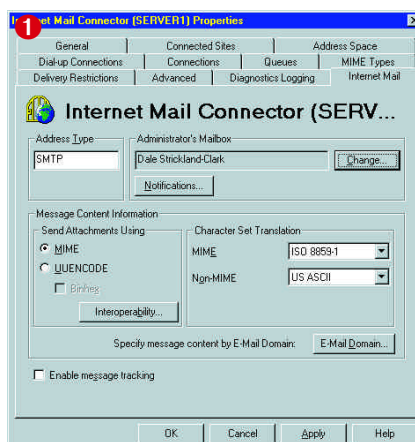
I'm going to assume Exchange is already installed and operating correctly for internal email, and that you have a working Dial-Up Networking connection defined for your ISP. You need to add and configure an internet mail connector (IMC): the IMC comes as part of Exchange Server Enterprise edition or you can add it to Standard Edition with the Exchange Server Connector Series.

Log on to the server as Administrator, start the Exchange Administrator program and select New Other from the File menu. From the fly-out menu, select MTA Transport Stack. It will display a list of available transports. Select RAS MTA Transport Stack (if this isn't in the list, run Exchange Setup again and make sure you've installed it).

A multi-tabbed dialog box will appear (Fig 1) and you will first need to insert the mailbox of the person who is to play Post Master in the administrator's mailbox field. They are told of problems with mail passing through this connection and you can set the level of reporting with the Notifications button.

On the Address Space tab, click the New Internet button and enter an asterisk in the email domain field (Fig 2). This routes all SMTP traffic through the IMC.

Click the Dial-Up Connections tab and select the dial-up networking entry that connects to your ISP from the list. Set the scheduling information to suit the connection frequency you feel appropriate. The example in Fig 3 exchanges internet



## Books & CDs

### ■ Microsoft Windows NT Workstation 4.0 Starts Here (CD Only)

Publisher Microsoft Press

Price £27.99

This multimedia CD assumes the basic level of user interface knowledge you need to find your way around but then, half way through, teaches you those same concepts. How the authors expect you to manage up to that point *without* this essential knowledge escapes me.

You are guided through most of the tasks essential to file management, launching applications, sharing information and using dial-up networking. It uses your own desktop as the starting point for each lesson and assumes a standard configuration. The course makes no attempt to detect whether the student is sticking to the prescribed route or has gone hopelessly astray. However, as the course window stays on top and has a demo button for a video run-through, the student should be able to figure it out eventually.

Each lesson is introduced by a short, typically American video which may not impart much information but will probably help retain the student's interest. The course will probably do its job but lacks the background information that may help the student understand just why the steps they have taken actually work and what the alternatives might be.



### ■ Designing & Implementing Microsoft Index Server

Author Mark Swank & Drew Kittel

Publisher Sams.net Publishing

Price £36.50

The Index Server is an extension to IIS that adds a search capability to your web server. It's a free download and lacks full support from Microsoft, so this book offering installation and configuration guidance could prove useful. It's a bit slow to get started and wastes most of a chapter describing how to download the software from Microsoft and install it; instructions which you can reduce to fetch the installation material from [ftp2.microsoft.com/msdownload/indexsrv11](http://ftp2.microsoft.com/msdownload/indexsrv11) and run it. But from chapter six it all becomes worth the effort. From here the book contains much useful information on configuring the Index Server and setting up a web site packed with information which is still easy to find. There are lots of examples, and if you're planning to use the Index Server, this book will make your life easier.



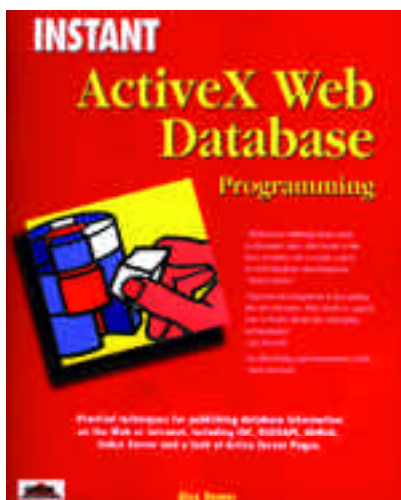
### ■ Instant ActiveX Web Database Programming

Author Alex Homer

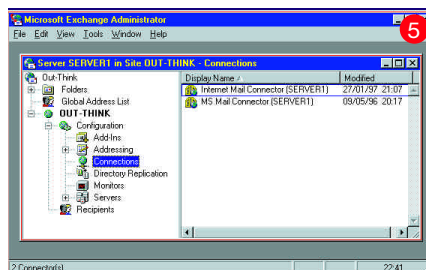
Publisher Wrox Press

Price £27.49

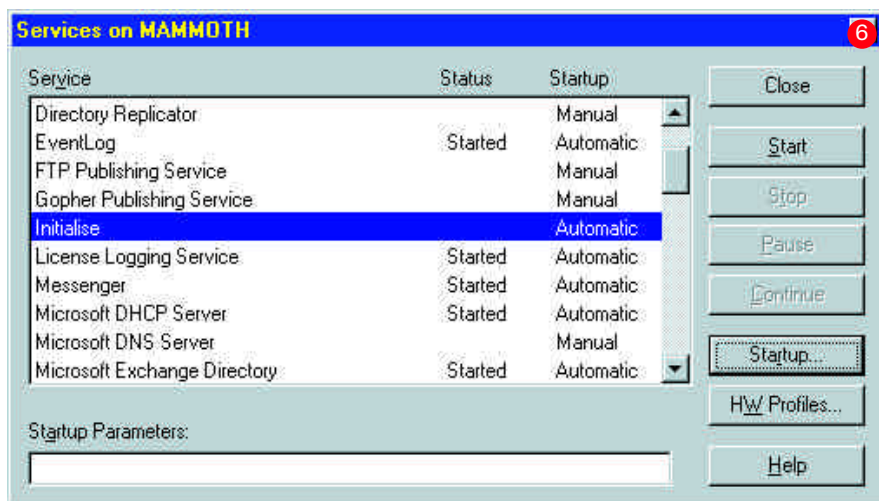
The level to which ActiveX plays any role in shaping the contents of this book is minimal. But drop "ActiveX" from the title and this leaves the real meat of the book. Sadly, though, it's another of those books which are padded with screenshots of a magnification that is doubtless helpful to the short of sight but unnecessary for others. However, there is some worthwhile reading on IIS and ISAPI, the IDC, dbWeb and Active Server Pages. The author shows how to put applications together using these tools with a bit of VB, where it helps. It's a useful book for comparing various approaches, but it should be smaller.







**Fig 6 (below)** Using a service to run a batch file allows you to have it start when the system is restarted



email just once a day at 18:30.

Finally, select the Connections tab (Fig 4). Assuming your ISP has an intelligent SMTP host, you can avoid messing about with DNS servers and simply forward all email to them to distribute. Select "Forward all messages to host" and enter the domain name of your ISP's mail server. Click on "Dial using" and select the dial-up networking entry from the list. This simply means that mail to all destinations goes via that connection. And that's it (Fig 5). You

shouldn't need to worry about the other configuration settings.

Once it's all set up, you will probably want to test it. You need to start the IMC service (called MSeXchangeIMC) before it can do anything but you can queue messages as soon as it's properly created. If you send yourself a message using a fully qualified internet email address, it should go out to your service provider and come straight back, once you get the link started. (If it takes a longer route, you might like to

have a quiet word with your ISP about its mail routing.)

Because we've chosen to forward all outbound mail to the ISP's mail server, starting the IMC isn't quite as simple as it could be. During start-up, it likes to be able to talk to this important host at the other end of the link, and if it can't, the IMC refuses to start. That means you need to

dial the Dial-Up Networking connection before you start the IMC; a sequence that won't happen automatically. I found this a chore each time I restarted the server or reconfigured the IMC, so I wrote a small batch file to simplify the procedure. The routine is shown in Listing 1 and uses the sleep command from the Resource Kit to introduce a couple of delays: The first waits for ten minutes, giving Exchange enough time to get its act together so that the routine can be run immediately after a restart. The second is used in the dial retry loop, which you will notice has no limit on the number of retries: it will keep trying until a connection is made. You might like to modify this to report the difficulty if the connection continues to fail.

This batch routine is all very well, but you still need to start it. It's no use putting it in the Start-Up group on Administrator because it will only get run when Administrator logs on, which may be a long time after a restart or several times during the day. The best place to run this is from a system service where it will start automatically during a restart (Fig 6).

To run a batch file as a system service needs the help of two more Resource Kit tools: SRVANY and INSTSRV. The first runs the batch file as a service and the second is used to set it all up properly. I won't list the steps involved to put this together because it's well documented in the SRVANY.EXE section of the Resource Kit Tools Overview help file.

SRVANY doesn't (or can't) stop the service when the batch file has finished so I added a line at the end of the routine to stop itself and free the resources it's using. If you don't call your service "Initialise", you will need to change that last line. I was a bit dubious about a service stopping itself in this way, but it seems to work.

If you progress to installing the DNS service on your NT server, you can perform your own mail routing rather than forward it all to your ISP. You should then be able to start the IMC without the link being up beforehand and thus do away with the Initialise service.

### Listing 1: A sleepy batch file

```
REM Wait for Exchange to pull itself together
Sleep 600

:Dial
Rasdial "Demon ISDN" && goto StartMail
sleep 60
Goto Dial

:StartMail
net start MSeXchangeIMC

net stop Initialise
```

### PCW Contacts

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Computer Manuals 0121 706 6000



# Mind your own business

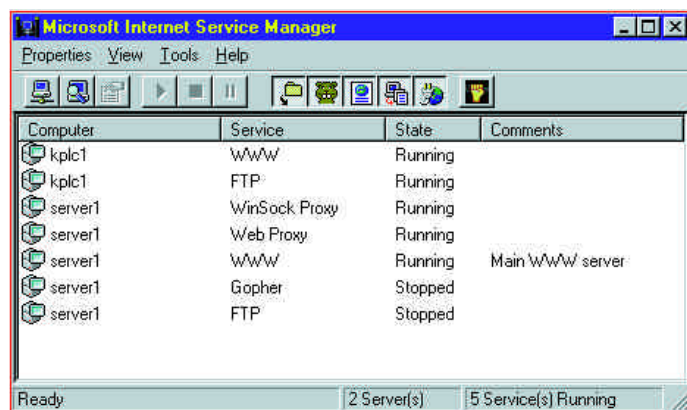
Are you a small business and keen to take advantage of the internet? Then why not set it up yourself. Dale Strickland-Clark helps you keep control of your system — and your money.

**T**he world is changing the way it conducts its business. Companies are getting on the net, and now even the smaller companies are finding the advantages too compelling to ignore. Email is generally the first consideration, but a corporate presence on the web and equipping users with browsers may also be important. Whatever the objective, if you have an NT server, it needn't be a complicated job to set it all up.

There's more than one way to achieve this, and many people might turn to a router to provide the bridge between the LAN and the internet. However, I've chosen a different approach which gives you better control and accountability (at least, in this price range). For browser access, you need just two things: a copy of Microsoft's Proxy Server, and a modem or ISDN terminal adapter. If you want to provide internet email you'll also need a mail system, such as Exchange. Hosting a web site requires a bit more thought, if only to make sure you're handling the security properly. Indeed, Microsoft recommends that you don't host a web site on the same machine as Proxy Server and I won't be covering that this month. Setting up email using Exchange will be the subject of next month's column.

A proxy server allows any number of machines to access internet resources external to the LAN using only a single public IP address. All client requests destined for the internet are transparently diverted to the proxy server which then re-issues (as opposed to simply routing) the request to the internet. Responses from the target sites are sent back to the originating system.

You will, of course, need an account with an internet service provider (ISP). If



You manage the Proxy Server's two components (Web Proxy and Winsock Proxy) from the same application you use for the rest of IIS, but it's not clear that the WWW service must be running before the Web Proxy can start

you're planning to run a mail service and want your own domain name, make sure the ISP handles SMTP (Simple Mail Transfer Protocol) and can register the name for you. They will also need to offer mail forwarding. This means that the ISP will store your inbound email while you're not connected instead of returning a "host unreachable" indication to the sending system. Demon is one of several who offer these services, and I use them.

## First, a modem...

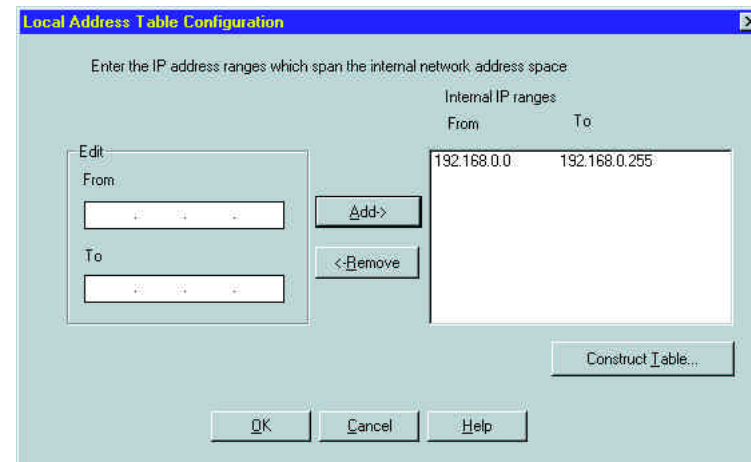
The first task is to connect a modem. Even if you're planning to use an ISDN terminal adapter, you might find it helpful to debug the Dial Up Networking (DUN) connection using a modem. Then create the entry in the DUN phone book on the server that will connect to your ISP. I covered this a few months ago so I won't go into it again here. If you can establish a connection with this new entry and browse a web site from your server, the first phase is complete.

You can download the Proxy Server from Microsoft's FTP site. Unfortunately it's only an evaluation copy but it will last you a couple of months while you assess its

suitability. A licensed copy should cost you around £600 — rather more if you buy it from Microsoft. If you want the evaluation, your journey starts at <http://www.microsoft.com/proxy> with a registration form and a 6Mb download.

The Proxy Server comes in two parts: the server software itself and client software for each workstation. The server software is, in fact, an extension to IIS (the internet server component of NT) and you manage it from the Internet Service Manager applet along with the rest of IIS. The client software is responsible for identifying internet-bound traffic and diverting it to the proxy.

To install the Proxy Server, you will need an NT Server 4.0 system with Service Pack 2 already loaded. The installation is free of surprises as long as you've noted the CD key which you'll need to enter early in the process. (It was "375-1749043" when I last looked.) The only remotely taxing aspect is setting up the local address table. The LAT contains all the IP address ranges used in your local network and is automatically copied regularly to the client PCs. The client software uses this table to determine where it should direct network requests.



I always use one of the IANA (Internet Assigned Numbers Authority) suggested address ranges for private networks of 192.168.0.0 to 192.168.255.255 for all the networks I set up. This means my LAT only needs a single entry. You can build the table yourself or use the Construct Table button to have it attempt to build the LAT for you from information it can glean from your network. The server installation needs to know the name of the DUN entry it should use to start the link and the times during the day that you want to allow auto-dial on demand.

## A matter of protocol

I haven't yet found the need to differentiate between internet protocols: a user is simply given access to the internet. However, you can restrict access by protocol, allowing FTP access but not World Wide Web, for example. You will find it easier to manage and see who can do what if you create a

security group for each type of access you want to control, then admit users to the appropriate groups.

The fun bit is determining who will be allowed to access the internet through the proxy. Your company may have certain business rules on this, but I have found that granting entrance to the necessary security group in exchange for bribes works well.

During the server installation, a network share is created on the server called, rather anonymously, mspclnt. Open this share from each workstation and run the Setup program found within. This installs the client software and takes a few seconds. It also updates Internet Explorer (if it's installed) to direct its requests to the proxy.

That's it. The first authorised user to fire off an internet request will trigger the proxy to autodial and establish a connection. There's an appreciable delay here when using a modem and some clients may time-out, but if the user retries the request it

The local address table must reflect all the addresses used on your private network. In many cases, this may be a single entry

should succeed on the second attempt.

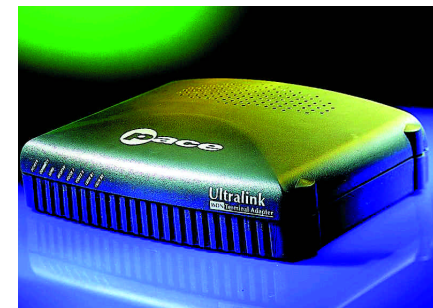
The line will now stay up until the inactivity timer closes it down. This time limit is set in the DUN phonebook and you might want to try different values to keep connection charges down without the line dropping in the middle of an online session. To adjust it, open Dial-Up Networking from My Computer, click on the More button and select Logon Preferences.

A Control Panel applet allows the user to use an alternative server or switch the proxy off altogether, so they're not cut off from internet access through their own modem if they need it occasionally.

## Ah yes, ISDN...

Using the Proxy Server for internet access almost feels like having a permanent connection, inasmuch as you don't have to take any special action to get the line going when you need it. Unfortunately, the time taken to establish a connection and get any data across it reminds you that your knees are firmly planted in modem land.

I needed something faster that wasn't going to provoke shrieks of horror from the Finance Director. I decided to go for an ISDN2 line and a terminal adapter (TA). BT has a number of price options for ISDN lines at the time of writing so you can get one installed for a modest outlay. ISDN TAs have been dropping in price too and I picked the Pace Ultralink which is keenly priced and comes from a reliable stable. This neat little box sits external to the server and connects via a suitable COM port. To be suitable, the port must definitely be buffered and preferably be on a Digi board serial port



The Pace Ultralink is a tidy little ISDN terminal adapter but don't let the picture fool you. This device can stand on its side, too

Assigning internet access permissions is best kept to specific security groups because it's easier to see what privileges a user has been granted by inspecting their group memberships. However, if group membership has wider implications, you can list users individually, too

adapter to relieve the main processor of much interrupt handling. The Pace Ultralink comes with the installation material you need to set it up on NT in a few moments and then you just treat it like a modem.

Connection times with ISDN are very

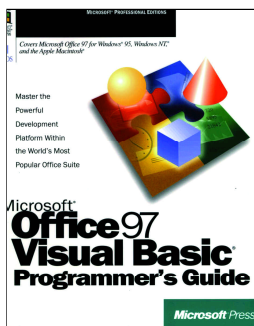
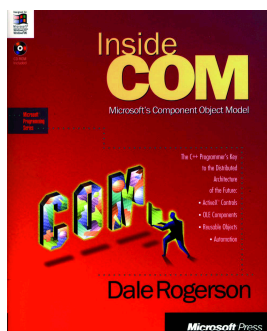
## Windows NT Books

I am indebted, as ever, to Computer Manuals (0121 706 6000) who keep me supplied with books to review.

### Inside COM

**Author** Dale Rogerson  
**Publisher** Microsoft Press  
**Price** £28 (£32.99 inc VAT)  
**Pages** 376  
**Includes** CD-ROM

COM is Microsoft's Component Object Model. It defines the way programs (or, more correctly, components) talk to each other and is the basis of OLE and ActiveX. This book assumes a solid grounding in C++ and develops the principles of the interface from the basics through to automation and beyond. It's a thorough book and the author explains the concepts clearly, although he has a tendency to lapse into patronising fables at the start of chapters. There are plenty of diagrams and code samples which you will also find on the CD. This is an ideal book for newcomers to the subject because of the careful explanations, but more experienced programmers will find it a bit slow.



**Microsoft Office 97 Visual Basic Programmer's Guide**  
**Publisher** Microsoft Press  
**Price** £32.49 (no VAT)  
**Pages** 528

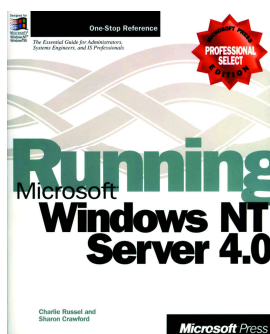
Visual Basic now sits behind all the main components of Microsoft Office. It doesn't really matter whether you like it or not; if you are involved in administering Office or writing the odd macro, you are probably going to need to get to grips with it. Fortunately, the flexibility of the language has improved in recent revisions and the development environment in Office 97 helps a lot, but you are still going to need help with the object models of

the applications. That's where this book comes in. Once it has explained the basic language principles, it goes on to describe the object model and then the object structure of each application. These are taken in turn and then the book goes on to explain programming the Office Assistants, manipulating the drawing layers and programming databases using Data Access Objects. Finally, it covers ActiveX and programming the internet applications. The appendices help with converting old Excel and WordBasic macros. You could probably get by without this book and just the online help files, but life has more worthwhile challenges.

### Running Microsoft Windows NT Server 4.0

**Authors** Charlie Russel and Sharon Crawford  
**Publisher** Microsoft Press  
**Price** £36.99 (no VAT)  
**Pages** 615

I was pleasantly surprised when I started dipping into this book. I was expecting the usual maintenance tasks explained and a list of steps you need to perform to complete them. Well, it's got all that, but it also offers more background and insight than I recall from similar books. The fact that it's an inside job might have something to do with this. It is also a very compact book and covers its subject without spreading itself across yards of shelf space, although it does stick to server issues. You won't find too many topics covered which might also fit in a book on NT Workstation.



much shorter than an analogue line and you don't get that confrontation between Hissing Sid and Zebedee as the modems suss out each other's capability and the quality of the line.

The question now, of course, is do I go for ISDN at home. It's awfully tempting.

## PCW Contacts

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**Computer Manuals** 0121 706 6000





# The main event

The Windows NT event logs keep track of what's happening in the system, but they themselves need regular attention. Dale Strickland-Clark shows you how they work.

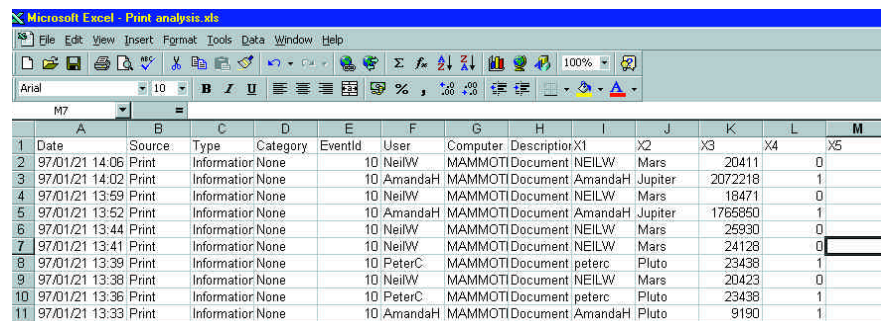
When you want to know what's been happening on your system, the NT event log is the place to turn. It's the central record for notable incidents and can help with problem diagnosis, resource management and capacity planning.

Each NT workstation or server has three event logs: system, security and application. The system log contains information about configuration problems, the state of the services and the use of printers. Application programmers determine what they consider important enough for the application log and administrators control most of what is written to the security log.

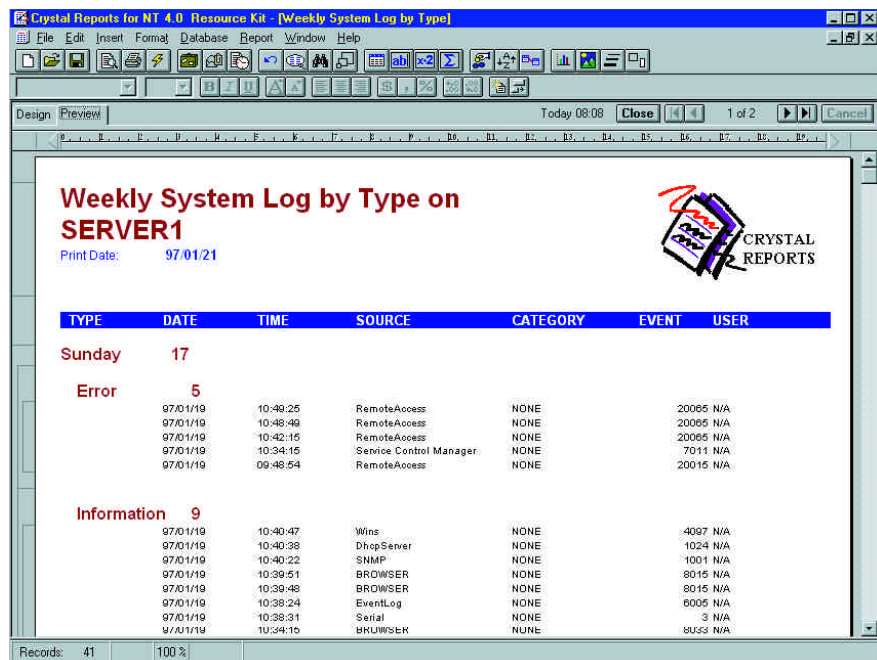
These logs are a valuable source of information concerning what has happened on a system and it's a good idea to archive them daily if you're ever likely to want to examine the historical behaviour of a system.

Records are written to the event log in a format which, in part, is only understood by the application that wrote them. When you view or export the logs, the system calls upon each application to format its own records so you can make sense of them. This is great until you take a raw event log

Once the event log data has been massaged into a tidy comma-delimited format, Excel will quickly turn it into a simple database



1	Date	Source	Type	Category	EventId	User	Computer	Description	X1	X2	X3	X4	X5
2	97/01/21	14:06	Print	Information	None	10	NeilW	MAMMOTT Document	NEILW	Mars	20411	0	
3	97/01/21	14:02	Print	Information	None	10	AmandaH	MAMMOTT Document	AmandaH	Jupiter	2072218	1	
4	97/01/21	13:59	Print	Information	None	10	NeilW	MAMMOTT Document	NEILW	Mars	18471	0	
5	97/01/21	13:52	Print	Information	None	10	AmandaH	MAMMOTT Document	AmandaH	Jupiter	1765850	1	
6	97/01/21	13:44	Print	Information	None	10	NeilW	MAMMOTT Document	NEILW	Mars	25930	0	
7	97/01/21	13:41	Print	Information	None	10	NeilW	MAMMOTT Document	NEILW	Mars	24126	0	
8	97/01/21	13:39	Print	Information	None	10	PeterC	MAMMOTT Document	peterc	Pluto	23436	1	
9	97/01/21	13:38	Print	Information	None	10	NeilW	MAMMOTT Document	NEILW	Mars	20423	0	
10	97/01/21	13:36	Print	Information	None	10	PeterC	MAMMOTT Document	peterc	Pluto	23436	1	
11	97/01/21	13:33	Print	Information	None	10	AmandaH	MAMMOTT Document	AmandaH	Pluto	9190	1	



TYPE	DATE	TIME	SOURCE	CATEGORY	EVENT	USER
<b>Sunday 17</b>						
<b>Error 5</b>						
	97/01/19	10:40:25	RemoteAccess	NONE	20065	N/A
	97/01/19	10:48:49	RemoteAccess	NONE	20065	N/A
	97/01/19	10:42:15	RemoteAccess	NONE	20065	N/A
	97/01/19	10:34:15	Service Control Manager	NONE	7011	N/A
	97/01/19	09:48:54	RemoteAccess	NONE	20015	N/A
<b>Information 9</b>						
	97/01/19	10:40:47	Wins	NONE	4097	N/A
	97/01/19	10:40:38	DhcpServer	NONE	1024	N/A
	97/01/19	10:40:22	SNMP	NONE	1001	N/A
	97/01/19	10:39:51	BROWSER	NONE	8015	N/A
	97/01/19	10:39:48	BROWSER	NONE	8015	N/A
	97/01/19	10:38:24	EventLog	NONE	6005	N/A
	97/01/19	10:38:31	Serial	NONE	3	N/A
	97/01/19	10:34:15	BRUWISBK	NONE	BUSS	N/A

The Crystal Reports bundled in the Server Resource Kit provides exception reporting and basic analysis of event logs

(an .EVT file) and attempt to examine it on another system. If the application that created the records isn't installed, you may find that much information won't make sense. Depending on the network, you may

also find that user IDs are displayed in their internal representation, which is a curious string of digits called a SID. There is a similar danger when attempting to examine an old archived log. If applications have been removed from the system or users deleted, some log entries may reveal less than you'd like.

For these reasons, it's a good idea to consider the information you're likely to want to extract from event logs before choosing your storage strategy. It's also worth watching the size of the event logs you generate. Large logs of tens or even hundreds of megabytes per day on a busy system are easily achievable if you're over-zealous with auditing.

Because of the possibility of event logs

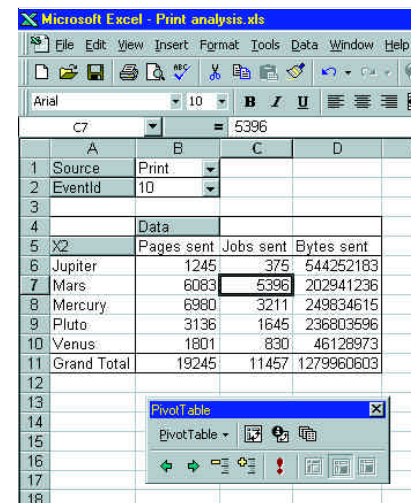
becoming useless over time or losing touch with the applications creating them, long-term storage and most types of analysis are going to depend on a formatted export of the event log. I think there are three main types of uses to which the event log is put. The first is as a problem alert, although it's not really designed for this: serious problems are already written to the console and sent as messages to registered administrators. Second is as a problem diagnosis aid for when something isn't working properly and you need to find the reason. Lastly, as an audit trail, to record who's done what.

As part of a capacity planning exercise, I needed to find out which printers on a network were being most heavily used and by whom. The Event Viewer application that

comes with NT is adequate for viewing raw events but pretty hopeless for analysis. While it will export the logs in a comma-delimited format, you can't automate the process and the resultant file might be described as offering an interesting challenge for analysis.

There is a tool in the NT 4 Resource Kit called DUMPEL that might have helped simplify getting the data out of the logs, but in spite of the help file suggesting otherwise, I couldn't get a comma-delimited file out of it. I'll look at this again when I come to automate the archiving of log records, but for now I was happy to get the data out by hand, using Event Viewer.

The Server version of the Resource Kit includes a copy of Crystal Reports that will read the event logs directly and produce a



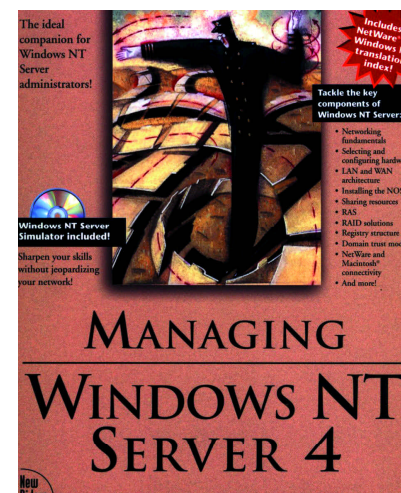
1	Source	Print			
2	EventId	10			
3					
4		Data			
5	X2	Pages sent	Jobs sent	Bytes sent	
6	Jupiter	1245	375	544252183	
7	Mars	6083	5396	202941236	
8	Mercury	6980	3211	249834615	
9	Pluto	3136	1645	236803596	
10	Venus	1801	830	46128973	
11	Grand Total	19245	11457	1279960603	

Excel's PivotTable is an ideal tool for interactive analysis. Here it summarises the use of several printers

## Books

■ **Managing Windows NT Server 4**  
Author: Howard F. Hilliker  
Publisher: New Riders  
Price: £46.99 (incl VAT)

This book bears a striking resemblance to *Inside Windows NT Server 4* (reviewed January 1997) by the same publisher. Many of the subjects covered are similar, and I'm also suspicious of the number "4" in the title. Parts of the text have a distinct NT 3.51 ring to them and there are even screenshots from an NT 3.51 system. Worse, the console command reference at the back of the book mentions none of the extensions introduced in NT 4. Either this is a revised 3.51 book, or it's been a long time in the making. Gripes apart, this is a solid, thorough volume covering most of the issues concerning NT administrators. The CD is a corker, with a vast amount of demonstration NT software plus a free copy of *Inside Windows NT Server* in Acrobat format.



■ **Whiz Bang Web Site F/X**  
Author: Tom Lockwood  
Publisher: Que  
Price: £32.99 (incl VAT)

This book solves one of the great mysteries of the web age: how do you make a background that tiles seamlessly? Also explained is using image maps, creating animated GIFs, working with audio, Java and multimedia. CGI scripts and VRML are explored along the way on the journey to producing appealing web sites.

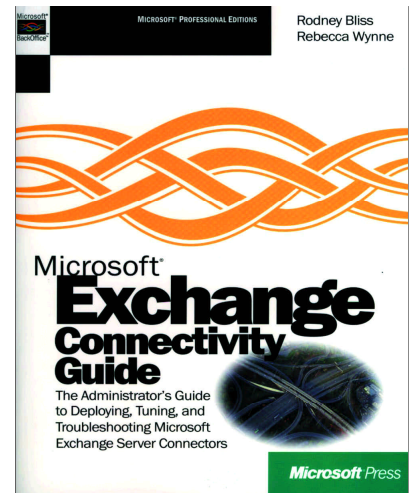
The book adopts the unconventional approach of listing very few of the code samples on its pages, leaving you, instead, to fish them off the CD — which is nicely organised as a web site with links to relevant pages out in the real world.

The author knows his subject well and explains it clearly. This is an ideal companion for someone already familiar with HTML but who wants to be more adventurous.

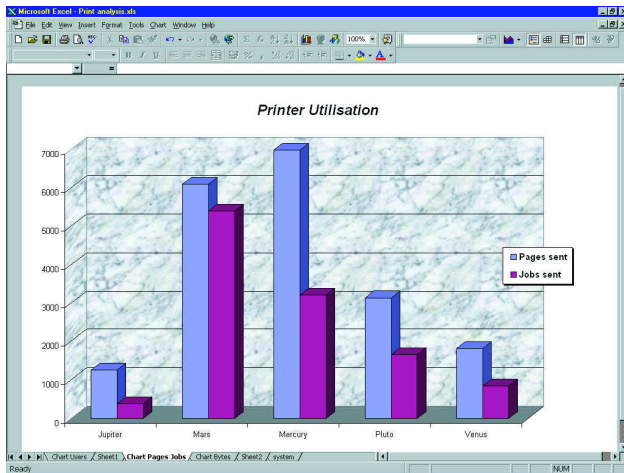
■ **Microsoft Exchange Connectivity Guide**  
Authors: Rodney Bliss, Rebecca Wynne  
Publisher: Microsoft Press  
Price: £27.49 (incl VAT)

The connection possibilities offered by Exchange are many and even the experienced administrator can find themselves with a system that really should be transmitting mail but stubbornly refuses. This book explains the large number of parameters that affect message transfer and fills the very large holes left by the documentation supplied with the software. It assumes little and explains setting up a server to talk to the internet, X400 or MS Mail in networks of varying complexity. All the dialog boxes concerned are shown and each parameter is explained along with possible problems you may encounter and what to do about them.

A very comprehensive and useful reference.







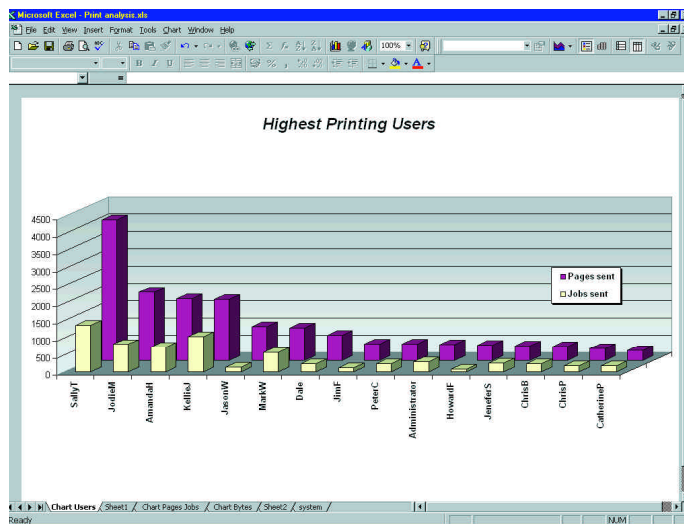
**Left** The poor distribution of workload is now evident. Mercury, an overworked LaserJet 5P, might benefit from swapping places with Venus, a rather swift Lexmark Optra Rt+

**Below** Highlighting high print users might encourage economic printing behaviour. Sadly, it's turned into an ugly scramble for the top position

variety of reports, but in the end I chose Excel to do the analysis backed by a little Perl program to sanitise the data.

I exported the system log from the server into what the Event Viewer program calls a comma-delimited format and ran it through the Perl program, `cleanevent.perl`

(see screenshots, page 266). `Cleanevent` adds a header record, identifying the columns so Excel will treat the data as a database. It merges the date and time fields from the log, it picks up all the trailing description fields that sometimes follow a



record and adds them to the end of the original record, and, finally, it identifies the records relating to printing. From these it picks out the user ID, printer name and print size, placing them in the general-purpose fields, X1 to X4, on the end of the record. If the output of `cleanevent` is written to a .csv file and dropped into Excel, it will automatically be split into individual cells and is immediately ready for analysis.

I called upon a PivotTable (under the Data menu) to do the analysis and finished off with a few charts to help illustrate the load on the printers.

The Perl routine could easily be extended to extract other interesting information, split the logs into smaller record sets or write it to a database for long-term analysis.

## Mouse moment

If you cast your mind back to the January issue, you may recall my request that Santa deliver a new design of pointing device. Well, it wasn't Santa but Microsoft that came up with the goods, and while it's not exactly what I asked for, we're definitely heading in the right direction. I refer, of course, to Microsoft's new Intellimouse. I've only been using it a month or so and already I'm lost at a PC without one. Now, with an ordinary mouse, I find myself scraping uselessly at the little gap between the two buttons and receiving strange looks from uninitiated onlookers. Scrolling has never been so effortless. Nine out of ten points, Microsoft. I'll save the extra one for when someone comes up with a cordless version. (Are you listening, Logitech?)

## PCW Contacts

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# Ways and means

Dale Strickland-Clark delves into the workstation and server versions of the latest Resource Kit for NT. Plus, where have all the drivers gone? There is a distinct lack of support for NT4.

It is certainly a welcome break to work in a DOS-free environment and be relieved of the resource limitations of Windows 3.1. The distinction between high and low memory is a thing of the past and I am happily unconcerned with where a program happens to be located in the memory.

In one respect, however, I find myself looking back longingly at the good old days of one, dominant, PC operating system, and that is device drivers: at least you knew that whatever bit of hardware you bought, it would come equipped with a device driver for DOS. (Whether or not you could get it to work was another matter.)

Hardware manufacturers' lacklustre support for NT4 is becoming a serious irritation. I have just returned a Sony CD writer because there was no NT4 driver (nor any prospect of one for months) as well as a cheap sound card which claimed to be SoundBlaster compatible when it was not. I have also defied Hewlett-Packard's tardy attitude by getting its ScanJet 4P to work on NT4, even though there is still (at the time of writing) no official support.

Having returned the Sony CD writer, and to avoid any more nonsense, I decided to get the replacement from a specialist supplier, CD Revolution, which I hoped would have some expertise in the subject. I was relieved to discover that this is a company which knows its field, knew what I needed, and was sharp enough with its service to have the new device delivered to me by the following day.

The Philips CDD 2600 is now installed and working a treat. The sound card is being replaced by a pukka SoundBlaster and is accompanied by my renewed resolve to never again buy cheap kit.

Hewlett-Packard (HP) is a mystery. My guess is that it is the most successful printer manufacturer of recent years and probably sells more scanners than any other company, yet it has relied on Microsoft to write the NT4 drivers for its printers and is still palming-off ScanJet customers with useless NT 3.51 drivers.

A partial solution to scanning on NT4 is available from HP's web site in the shape of an updated DeskScan package. But DeskScan won't work without a decent ASPI driver (a standard SCSI interface for use by application programs), which HP does not provide. You are expected to raid Adaptec's internet site for that — except HP will not tell you that is what you need do. HP simply points you, unofficially, to a web page written by Guy Melendez, a man who has figured out his own solution and documented it for the rest of us (see [www.windows-nt.com/tipsandinfo/sjonnt.htm](http://www.windows-nt.com/tipsandinfo/sjonnt.htm) if you need similar help).

However, Adaptec writes ASPI drivers as a service to its customers and it would like you to be using one of its cards before installing drivers. The SCSI card which HP includes with its scanner is made by NCR, not Adaptec.

HP tells me that it is working to resolve these issues and it is touching to observe that the recent changes to DeskScan have been made to get it to work better (or even work at all) on NT. But HP's efforts show a distinct lack of urgency.

Peripheral manufacturers know that if your need for their products is pressing enough, you will run Windows 95 instead of NT just to get the driver support. This is all the more true in a corporate environment where there is probably a spare PC knocking about, which you can push into

service as a dedicated scanner, CD writer or whatever system.

Even if you are not running NT at present, make sure the hardware you buy has full NT support so that your future OS options are not restricted. Furthermore, you should pester manufacturers of your existing hardware for NT drivers. Some companies are far too keen to let obsolete models slip out of their minds and off the end of their support schedules in the hope that you will just upgrade the hardware.

## NT4 Resource Kit

The Resource Kit, an invaluable set of additional tools and reference material, accompanies each major release of NT. This time, for NT4, the kit is split into two: Workstation and Server versions, each accompanied by a CD-ROM. The server kit comes as three books presented in a box but the workstation edition, while not noticeably smaller, arrives as a single volume. Presumably, the server edition needs a touch of class.

These kits are worth it for the CDs alone (but do not buy both resource kits just for the CDs; the Workstation CD is only a subset of the server's). There are a good few hours of enjoyable rummaging and discovery to be had, and while some of what you will find has appeared before, there is a lot that is new.

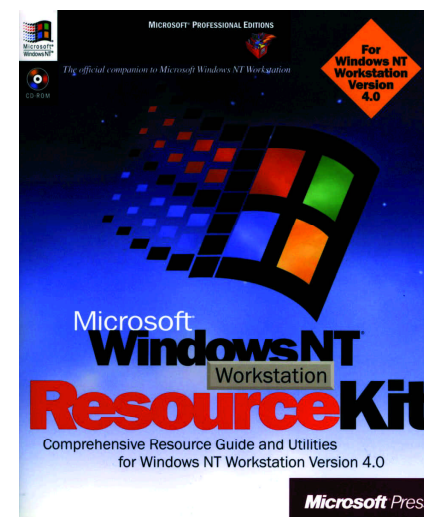
The two types of utility attracted my immediate attention. The first type allows the remote control of another computer on the network, and there are now at least three different ways of achieving that. The second utility provides you with virtual desktops — and this is something I have had to do without since I abandoned the quite wonderful PC Tools Desktop on



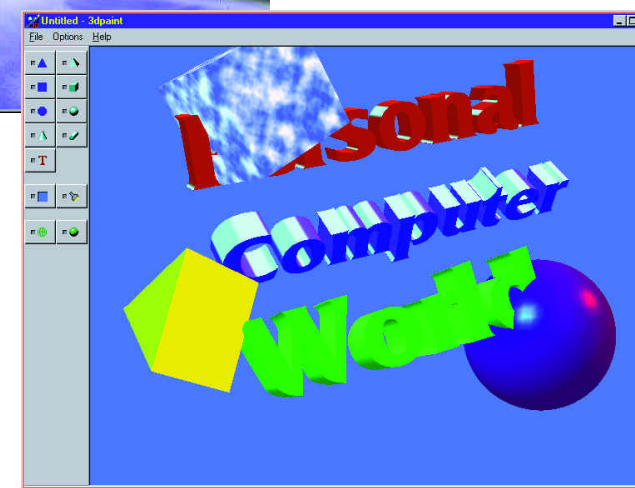
Windows 3.11 in favour of NT, quite some time ago.

Remote control of other PCs on the network, in particular the servers, is essential if you want to avoid traipsing around the building whenever a bit of administration is required. One solution is the Telnet service. Using any Telnet client, simply connect to the server on which the service is running and respond to the traditional TTY-style logon sequence. You are then in a fairly standard console session, although lacking the niceties such as command recall.

Although this approach limits you to console commands, you do have the advantage of connecting from anywhere in the world (given a suitable internet connection, of course) using readily-available client software.

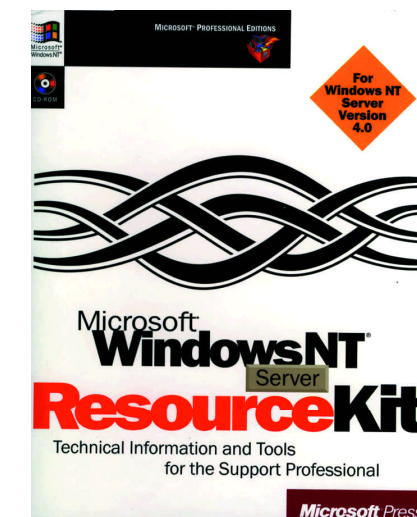


The one fat volume for the workstation Resource Kit might have benefited from being divided into two, purely to avoid damage to the reader. Price: £64.99 (incl. VAT)



Above Tucked away in the Resource Kit is a strange 3D drawing and rendering program. Nice results are achievable with a little patience — evidently, patience is lacking here

Unfortunately, this Telnet service is buggy and crashed whenever I closed the session. And, it does not install using the



The server Resource Kit is in three volumes: Server Resource Guide, Server Networking Guide, and Server Internet Guide. Price: £140.99 (incl. VAT)

Left Installing the Workstation Resource Kit software: the dimmed menu items indicate the bits that only come with the server edition

files provided. You will need to go to the FTP site given in the documentation and get an updated .inf file.

The Remote Command Service is a better alternative for most situations. Again, a service installed on the server handles client requests and returns responses. It will run either a single command or, if none is specified, create an interactive console session. This is a very useful tool. A NET SHARE command executed remotely is the only way I can think of to create a share on

another PC from within a batch file.

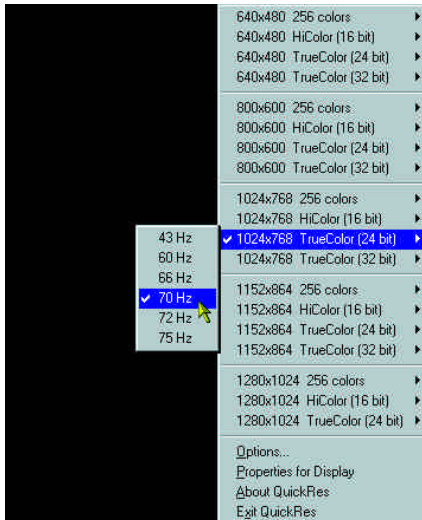
However, neither of these approaches properly deals with the problem of starting windowed applications, which will start quite contentedly yet run completely out of reach and not announce themselves on the host's desktop — you just have to be careful not to start any in the first place.

Multiple (or virtual) desktops are a very nice way to organise your work, keeping appropriate tools together and accessible when you are working on related tasks. To some extent you can meet this requirement with thoughtful use of folders but there is no tidy way to switch from one task to another and back again without a lot of fuss. Multiple desktops should meet that requirement.

In the Resource Kit, there are three attempts to address this need and they are all rather disappointing. Desktops (which also seems to be called "Multidesk") looks the most promising but that is probably because it is the only one that seems to understand NT4.

On initialisation, there is a flurry of activity while it starts another copy of all the programs in your StartUp program group for your new, alternative, desktop. Although this introduced a resource overhead, it did suggest that the two desktops might be properly isolated. This misconception lingered until Exchange tried to tell me that I had a new mail message, whereupon both copies of the Exchange client I had running (one on each desktop) promptly hung. Attempts to kill them and restart just one, with and without Desktops running, failed so I had to reboot.





**Above** First seen in the Windows 95 PowerToys, QuickRes now graces the NT desktop

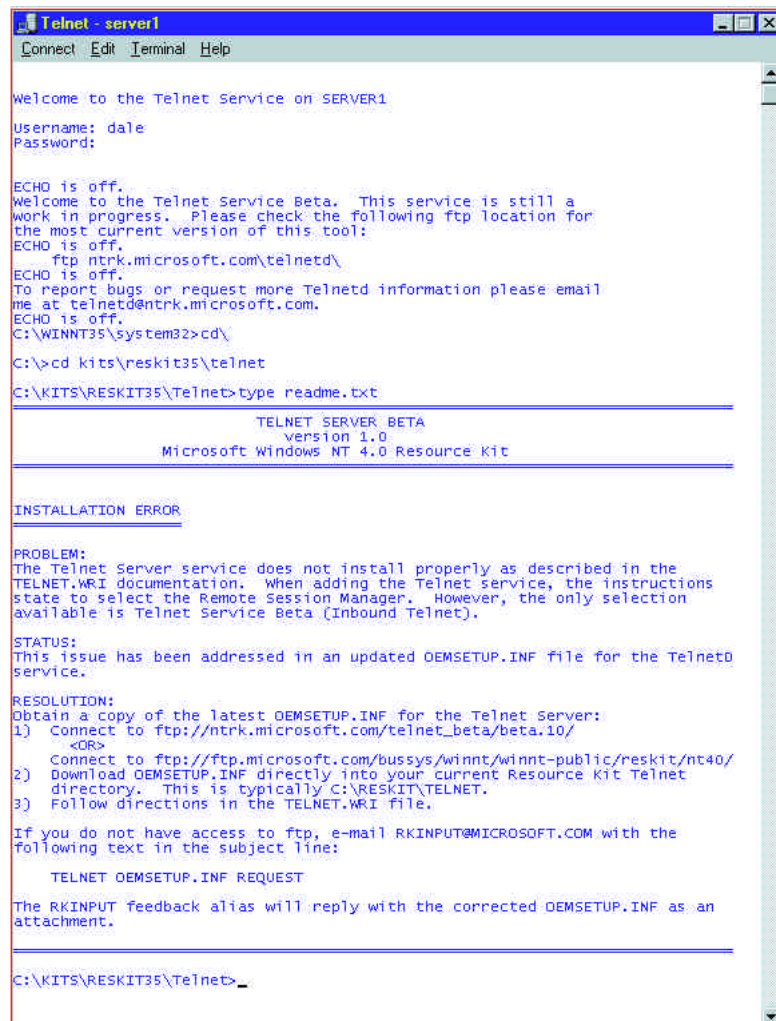
Nevertheless, Desktops continues to tempt me. It is easy to add more desktops and it is simple to use. I might have discovered more about it had the DESKTOPS.WRI file been on the CD like the help file promised, but it was nowhere to be found.

I could not get any sense out of Vdesk. Ctrl-F2 took me to my second desktop, just as it should, but there was nothing there except my wallpaper and no way to start any applications. The documentation shows how to set up the Registry to allow programs to start automatically but it seems like an awful lot of fiddling about — this is obviously a propeller-head's tool. And although it claims to allow the different desktops to log on as different users, which would be very convenient, I was unable to get it working.

There is a broad selection of console utilities that enable you to obtain information about users, groups, disks and security, in convenient forms for piping into further stages of a batch routine, as well as a nice little program called SOON which schedules a command to execute a number of seconds in the future.

SOON is a gift for anybody who likes to write self-retrying routines. For instance, if a batch command finds that it cannot continue for some reason, perhaps because a resource is in use, it can simply reschedule itself to try again later.

There are more performance monitoring and analysing tools than you could ever hope to use, including a version of Crystal Reports for scrutinising the event logs (this



**Left**  
The Telnet service opens the possibility of running a console session on your server from across the world — firewalls and security managers permitting

## Advanced Windows (Third Edition)

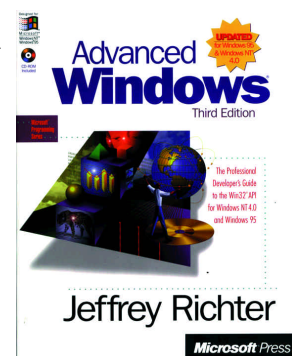
The author visits this subject for the third time, updating it for the latest versions of NT and Windows 95. And, for a change, the title is apt. This is how to program Windows for people who have already been doing it for a while but are now tackling more adventurous projects. The book is over 1,000 pages long and comes with a CD-ROM.

Richter discusses synchronisation, memory management, exception handling and more, having first covered some groundwork in memory organisation, processes and threads. There are clear diagrams and many lengthy examples (too lengthy, really) which illustrate the text.

Some of the subjects are complex, but even though the author has a clear style and explains them well, you should be prepared to start from the beginning if you want to make sense of the remainder of the book.

The CD includes multimedia demos of all the sample programs as well as a nauseating advertisement for Mr. Richter's training services.

**Author** Jeffrey Richter  
**Publisher** Microsoft Press  
**Price** £46.99  
**Available from** Computer Manuals 0121 706 6000



is on the Server CD-ROM only). However, in my opinion, the whole thing is made worthwhile by the overdue appearance of QuickRes. At last we can change our screen resolution and colour depth in a couple of mouse-clicks.

## PCW Contact

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# Cultured Perl

Dale Strickland-Clark extols the virtues of Perl, having decided on it as his batch language of choice. He reopens console windows, and makes some selections from his bookshelf.

Following my first couple of Hands On NT columns, when I covered the mixed delights of the console window and DOSKEY macros, I received a number of emails from people asking how to get the macros to load automatically when the console window is created.

I mentioned at the time that I keep two console sessions running: a small one in the corner of the desktop, and a larger one which spends its time minimised until needed. The larger of the two is started during logon from a shortcut in the StartUp folder. It has the target field set to:

```
%SystemRoot%\system32\cmd.exe /k cmdinit.bat startup
```

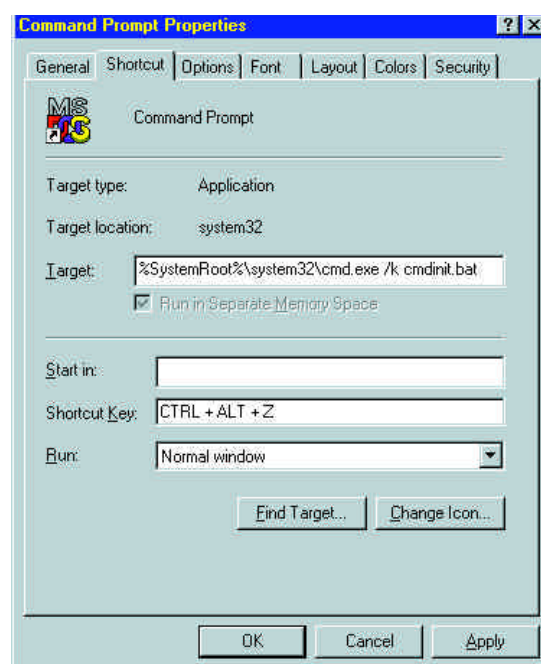
and runs minimised. This console window runs the cmdinit.bat (Fig 1) procedure which opens the second and then waits at the command prompt for something else to do.

It's useful to note that we're starting console windows in two slightly different ways here: one from a shortcut and the other from a Start command. If you adjust the properties of a window started from the shortcut (select the window then press ALT-space, P) the changes can be saved back into the shortcut for subsequent uses. Create additional shortcuts when you need windows with different properties.

On the other hand, console windows started with the Start command have no shortcut, so their properties are stored in the Registry and indexed by the window's initial title. Therefore a console started with:

```
start "Console" cmd.exe
```

can have a different layout to a window started with:



The Target field contains the command and options necessary to start a console window. Use the shortcut key to make it instantly accessible

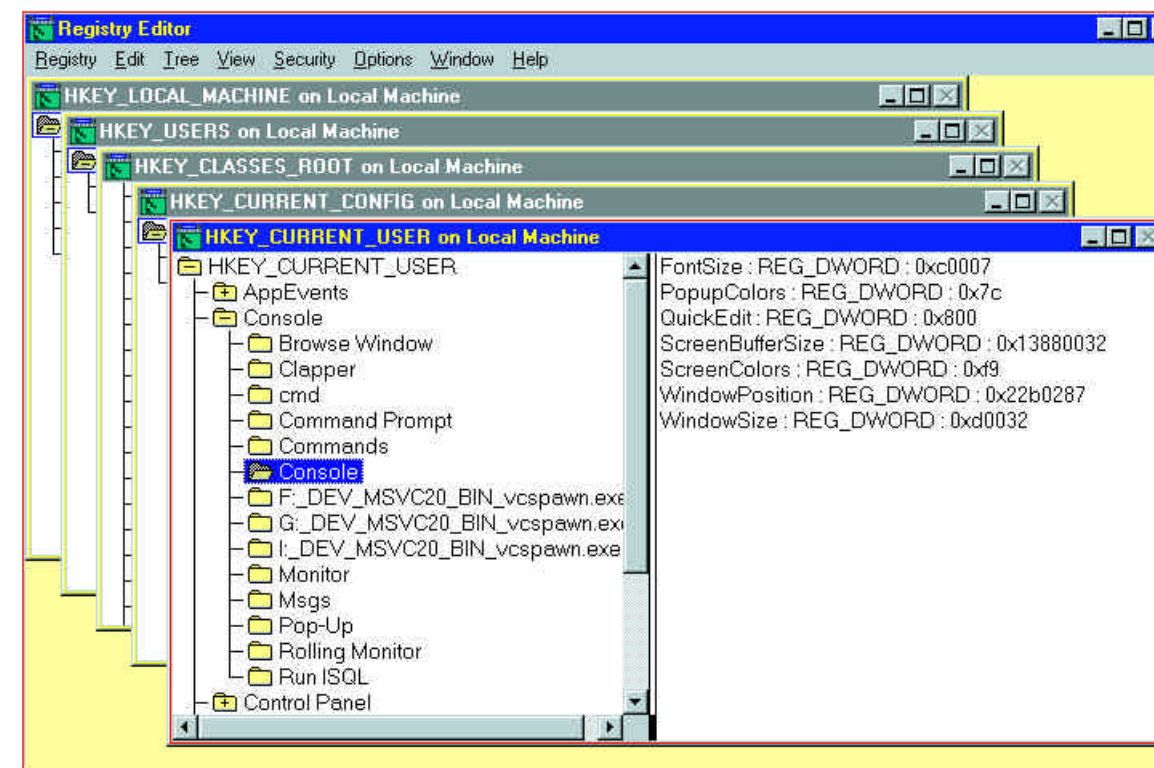
applications, just press the shortcut-key combination and a console window should spring into view.

## Filename completion

While we're revisiting the console window, here's a handy tip that I don't believe Microsoft has documented anywhere so far. (This isn't available on releases prior to NT 4.)

It's all very well having long, descriptive folder and file names but it means you spend half your day typing path names into console commands. Well, no longer — except, don't attempt this if you're uncomfortable about editing the Registry.

Fire-up the Registry editor (type regedt32 into your nearest console window) and switch to the HKEY\_CURRENT\_USER window. Locate the Software key, and within that, the Microsoft key. If there isn't already a sub-key called "Command Processor", create one (Edit/Add Key —



Console windows created with a START command have no shortcut so their properties are stored here in the registry

leave the key class blank). Then, within that key, create a value called "CompletionChar" of type REG\_DWORD and assign it a value of 9. In other words, set

```
HKEY_CURRENT_USER\Software\Microsoft\Command Processor\CompletionChar = REG_DWORD 0x9
```

Once that's saved, start a new console window. The tab key will now assist by completing partially-entered filenames. If the filename offered isn't the one you want, just press tab again. Press shift-tab to go back through the list of offered names. A partial filename is only recognised if it is at the start of the command or preceded by a space.

If you prefer CTRL-key combinations instead of the tab key, replace the 9 in the registry with 1 for CTRL-A, or 2 for CTRL-B and so on (tab is the same as CTRL-I).

## Alternative batch languages

One of the other improvements tucked away in NT 4 is the ability to use alternative batch languages, transparently. The two most popular languages available are probably Rexx (originally from IBM's VM mainframe operating system, subsequently transferred to OS/2) and Perl (a popular Unix shell language much loved by web-site developers). The NT port of Rexx was commissioned by Microsoft to assist users converting from OS/2, and they funded the Perl port to help attract Unix users and capture the web server market.

## Fig 2 SearchPath.perl

# Finds a file in the path and shows the directory in which found.

```
$target = shift;
print "Looking for $target\n";
for (split /;/, $ENV{'PATH'}) {
    print "$_";
    print "\\$target <=====" if (-e "$_\\$target");
    print "\n";
}
```

SearchPath.perl — If you've ever wanted to know from which directory a program is being loaded, this little program searches your path and points to the program's home.

Both languages have their strengths: Rexx has a clean, logical, syntax and good string manipulation, while Perl has extensive string manipulation wrapped in a rich, powerful, but less readily-mastered (some might say bizarre) language.

After years as a dedicated Rexx user, I switched to Perl and it's now my batch language of choice, so I'll show the steps required to set it up:

1. Install the Perl system. The latest can be downloaded from [ftp.perl.hip.com](http://ftp.perl.hip.com) (see [www.perl.hip.com](http://www.perl.hip.com) for more information) and I've included a copy on the cover CD. Simply unzip it into the directory where it is to live and run the install.bat procedure.
2. Choose the extension you're going to use for Perl files (I use .perl but .pl is also popular). Create a new environment variable called PATHTEXT and assign to it the following string:

```
.com;.exe;.bat;.cmd;.perl
```

Use Control Panel -> System -> Environment to do this permanently.

Enter it into the system or user variables depending on your preference. The order of the extensions listed determines the search order. I've just added .perl to the end of the default value but you can juggle it to suit yourself.

3. Register a file type using the FTYPE command:

```
FTYPE perlfile=perl.exe %1 %*
```

4. Associate the file type with the extension by running the ASSOC command:

```
ASSOC .perl=perlfile
```

Note that the FTYPE and ASSOC commands update the Registry and so only need to be run once.

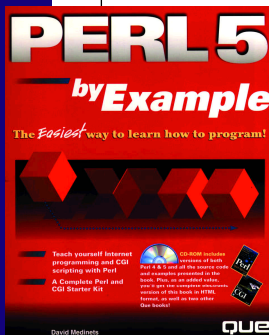
You are now ready to go. Fig 2 is a test program to check your installation and whet your appetite. It scans the directories listed in the search path and shows which contain the file specified as the first parameter.

## Fig 1 Cmdinit.bat

```
@echo off
cd \
doskey /macrofile=c:\batch\macros.txt
prompt $T$H$H$H$H$H$H $P$+$G
if .%1 == .startup start "Console" cmd /k cmdinit.bat
This simple batch file sets the current directory, loads the DOSKEY macros, sets a prompt and finally, if it's been passed the startup parameter, starts the mini console window.
```



## On the bookshelf



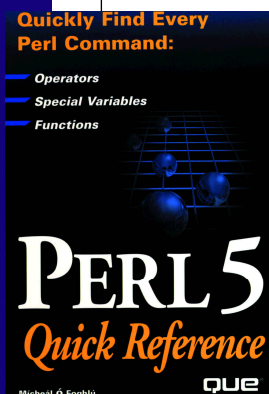
**■ Perl 5 by Example**  
**Author David Medinets**  
**Price £37.49**  
**(incl. CD-ROM)**  
**Publisher Que**

We've been crying out for a good introductory text to Perl 5 and it has arrived. David Medinets gives the novice and experienced programmer a good understanding of Perl

with only an occasional lapse into that irritating, patronising, tone that spoils many similar programming books. He is clear and logical.

This 658-page book is best treated as a course text, being arranged into increasingly complex subjects, each with its own summary and exercises. The final quarter is devoted to web programming and CGI scripts. The index is good enough to allow you to quickly locate a particular topic.

The CD-ROM is a bit of a mystery. Given that Perl is distributed free under the Gnu artistic licence, you might expect to find various versions for different systems on the CD. But no; there are copies of the code samples from the book, plus texts from a couple of other books and a copy of Microsoft's Internet Explorer. There's a copy of MIRC (Internet chat client), too, whose connection with the book's subject-matter is tenuous to say the least.



■ **Perl 5 Quick Reference**  
**Author** Micheal Ó Foghlú  
**Price** £18.49  
**Publisher** Que

If this book does nothing else, it at least helps end the debate about what works on NT's Perl and what doesn't. With each function listed, there is a set of compliance icons indicating whether the feature works on versions 4, 5 or NT: the

implication being that everything works on Unix.

Overall, it's a bit of a mess. There are a number of typographical errors, the section on pattern matching omits any mention of alternation (the use of the bar, "|" symbol to match either of two patterns), although the information can be found at the back of the book.

But if you have this 345-page book, you will use it. It's a handy reference for your bookshelf. It might have been a handy pocket reference had they not been quite so extravagant with space, which is wasted in abundance. But then it wouldn't have looked like eighteen quid's worth. would it?

### Fig 3 ListUser.perl

```
# List all users in the domain along with one selected attribute.
# Subroutine to return an array of all the usernames in the domain
```

```
sub GetUserNames
{
    my $userline = 0;
    map /(\S.{1,19}?)\s\s{1,19}/g, grep {
        if (/^——-/ )
        {
            $userline = 1;
            0
        }
        else
        {
            $userline = 0 if /^The command/;
            $userline
        }
    } qx(net user /domain);
}
```

```
# Retrieve parameter or supply default
$property = shift || "Full name":
```

```
# Define output format for report header
```

[illegible]

```
# Define output format for report body
```

[illegible]

```
# Iterate through all the user names extracting the selected attribute.
```

```
for (GetUserNames)
{
    ($line) = grep (/ $property/i, qx(net user "$_" /domain));
    ($propname, $value) = $line =~ /^(\S.+?)\s{2,}(\S*.)$/;
    write;
}
}
```

ListUser.perl. Lists all the users in your domain with a single specified attribute. The program is rather simple-minded: if you mis-type the attribute name it won't notice; neither will it produce interesting output. The program demonstrates useful techniques, like capturing the output from commands, filtering and extracting information from them and formatting a simple report.

**Fig 3.** ListUser.perl, is a bit more complex, demonstrating the ability of Perl to achieve a lot with few statements. It's a post-processor for NT's NET USER command and displays the value of a single attribute for each user in a domain. The program takes a single parameter which should be enclosed in double quotes if it contains spaces. The parameter is the name, or part of the name, of the attribute to display. For a list of all the accepted attributes, enter:

```
NET USER <your id> /DOMAIN
```

into a console window. If you're not logged on to a domain, remove the option from the command and both uses of the NET

command in the program.

For example, to list the last logon time for each user, the command is

```
listuser "last logon"
```

The `GetUserNames` subroutine is self-contained and can be plucked out for use in another program or transferred to a function library. (Both the Perl programs listed here are included on our cover-mounted CD.)

- PCW Contacts

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**Computer Manuals** 0121 706 6000



# Driller thriller

Oh, the horror: staring at broken end-pins on one of your drives. When it happened to Dale Strickland-Clark, he got down to some soldering and writing of batch routines for backup.

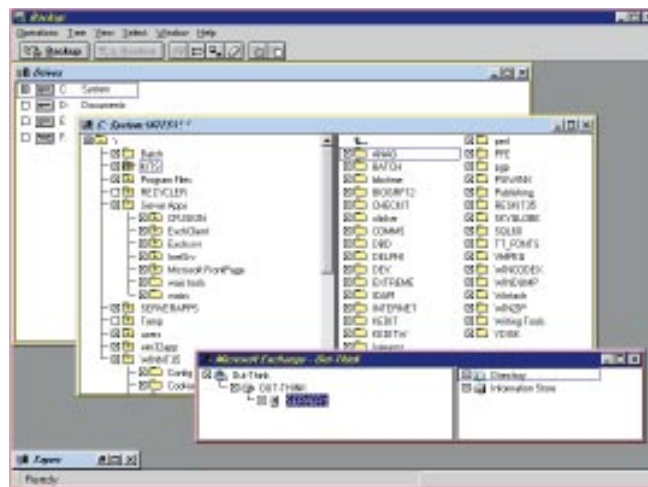
I had a bit of a panic a short while ago. While reassembling my server, having just added a new 2Gb SCSI drive to work alongside the two 1Gb drives already there, I was having some difficulty getting the SCSI cable back into one of the old drives. Just a little bit worried, I decided to pull the drive out and investigate the obstruction. I broke into a cold sweat when I discovered that I'd bent almost flat the two end pins on the drive's SCSI connector. They were so bent, in fact, I knew that if I attempted to straighten them again, they'd break off.

I tried anyway and they broke off, but I gained a little satisfaction from being right. I considered my options. The chances of fixing the pins back on were pretty slim. I did have a backup of the data, and with a new drive installed, I could get away with simply restoring the data onto that drive. However, I had other plans for the new drive, and furthermore, the thought of dumping an expensive bit of kit because two of the cheapest components had broken off bugged me. I decided to try fixing it.

I trimmed away a section of the plastic surround with a tiny circular saw attachment on a modelling drill and exposed the base of the two severed pins. Then, with a small soldering iron, some fine solder and a steady hand, I carefully re-attached the pins to the connector. I can't hope to express the drama of the situation and the relief when, with it all connected together again, my server booted without complaint.

Although I was already fairly conscientious with my backups, this episode brought home the vulnerability of data and the large scope for mislaying it.

Backing up systems is one of those



The standard NTBACKUP that comes in the box with NT is easy to use and provides control over what is backed up down to file level, but only if you run each backup by hand. It's hopeless to automate and won't back up the Registry from other systems over a network. Not recommended for use in production

tedious jobs you postpone at your peril. NTBackup shipped as part of NT is adequate for emergency use, but provides only the barest control over what is backed up and no help with automating the job. Consequently, running the backup is a bit of a chore. The greater the effort required to take a backup, the more likely it is to be skipped on a busy day. I've had a couple of goes at writing batch routines to take some of the pain out of the procedure, but tape cycling was still manual and far too much rubbish was being backed up, taking the data onto a second tape for a full backup.

My backup requirements are modest, with about 10Gb online around the network, the most important slice of that being the 4Gb on the NT Server. Much of the rest is just installed software and it wouldn't be a disaster to have to recreate it from scratch. My Sony DDS tape drive will manage between 6

and 8Gb to a tape, depending on the level of compression achieved.

There are some slight complications, too. Not all the data can be backed up by a simple file-level routine. Send an SQL/Server .DAT file to tape while the database system is running and there's an excellent chance that the data will be unusable. You must at least shut SQL/Server down first. The same applies to Exchange Server and many other server applications.

The example batch routine, BU2.BAT (Fig 1) shows one possible approach to automating a backup procedure using the standard features in NT.

While this routine simplifies running a backup, it doesn't automate it. For this we

Fig 2

```
at 21:00 /every:su "c:\batch\bu2.bat sunday"
at 21:00 /every:m,t,w,t,f "c:\batch\bu2.bat daily"
at 21:00 /every:s "c:\batch\bu2.bat weekly"
```

Fig 1 Automating backup using standard NT

This backup routine uses standard NT commands and none of the new features of NT 4. The Sleep command is found in the resource kit but is optional. The series of Echo commands at the beginning are a handy way of identifying command parameters without introducing case sensitivity and allowing abbreviation of long parameter names. For example, "incremental" can be abbreviated to "inc". A few frequently-used parameter combinations have been given names for convenience, such as "Sunday", "Daily" and "Weekly". This has been implemented by having the batch file simply call itself again with the expanded parameters when one of the combined names is used.

```
@echo off
```

```
echo /daily | find >nul /i "%1" && bu2 incremental 4mm append
echo /sunday | find >nul /i "%1" && bu2 incremental 4mm overwrite
echo /weekly | find >nul /i "%1" && bu2 normal 4mm overwrite
```

```
setlocal
set tape=na
set butype=na
set append=na
```

```
echo /normal | find >nul /i "%1" && set butype=normal
echo /incremental | find >nul /i "%1" && set butype=incremental
echo /differential | find >nul /i "%1" && set butype=differential
```

```
echo /small | find >nul /i "%2" && set tape=1
echo /large | find >nul /i "%2" && set tape=0
echo /4mm | find >nul /i "%2" && set tape=1
echo /qtrinch | find >nul /i "%2" && set tape=0
```

```
echo /append | find >nul /i "%3" && set append=/a
echo /overwrite | find >nul /i "%3" && set append=
```

```
if %tape% == na goto error
if %butype% == na goto error
if .%append% == .na goto error
```

```
Echo Backup type %butype% to %tape% %append%
```

```
Net stop "Allaire Cold Fusion"
Net stop "World Wide Web Publishing Service"
Net stop mssqlserver
```

```
rem -- Link to share on NT workstation
Net use x: \\dale-pc\drive-c
```

```
rem -- Link to share on Windows 95 workstation
Net use y: \\heidi-pc\drive-c password
```

```
ntbackup backup c: d: x: y: /v /b %append% /hc:on /t %butype%
/tape:%tape% /e /l "c:\temp\backup.log"
```

```
Net use x: /delete
Net use y: /delete
```

```
Net start mssqlserver
Sleep 10
Net start "World Wide Web Publishing Service"
Sleep 10
Net start "Allaire Cold Fusion"
```

(continued over...)

can use NT's Schedule service (Fig 2).

These commands entered into a console window will schedule three different types of backup to run at nine o'clock each evening. You then just need to make sure you have the correct tape in the drive each evening.

Before spending too much time attempting to mould NTBACKUP into your ideal backup system, however, it is worth considering the alternatives. There is an



**Top** You control ARCserve from a comprehensive array of buttons, but not all of the rest of the system is as easy to get to grips with. **Above** With ARCserve, you can back up just about anything you can think of. If it's not handled by the standard package, there's probably an optional agent to add support to back it up

extended version of NTBACKUP, called "Backup Exec for Windows NT", from Seagate Software (a company formed from several mergers including Arcadia, the name some people may still associate with this package), and Cheyenne Software has an NT version of its popular NetWare backup package, ARCserve.

ARCserve for NT is a very comprehensive system and there are numerous options to extend its capabilities. In its basic form, it allows flexible control over what is backed up and, with its built-in scheduling, when the backup is run.

But there are some drawbacks. Cheyenne has shunned NT's own tape drivers in favour of its own. This means you have to disable the tape devices to NT, preventing any other standard software accessing them. Re-enabling the tapes requires a reboot of NT. This prevents, for

```

pushd temp
findstr /b /i /l /v /c:"Directory" backup.log >"backup summary.txt"
del backup.old
rename backup.log backup.old
start notepad "backup summary.txt"
nond

goto exit

:error
echo Syntax: bu2 daily ^| sun ^|\ weekly
echo Syntax: bu2 {normal^|incremental^|differential}
    {small^|large^|dmm^|trn^|} {append^|overwrite^}

:exit
endlocal

```

example, using the SQL/Server DUMP command to backup database tables, or using NTBACKUP to write tapes to send to other sites (the latest service pack gives ARCserve the ability to read but not write the Microsoft tape format used by NTBACKUP).

Cheyenne has no plans to change this regime, claiming it is to maximise performance. Having seen ARCserve backing up to a Storage Dimensions MegaFlex TapeArray (four DLT4000 tape units of 40Gb capacity each) at nearly 100 megabytes per minute, I'm not in too much of a hurry to argue. But I wonder if the standard NT drivers would be dramatically slower. I'm hopeful of the chance to find out.

## Books

### Inside Windows NT Server 4

Author Drew Heywood

Publisher New Riders

Price £46.99 (incl VAT)

No matter how well you thought you knew NT, it's a fair bet you'll soon learn something new flicking through these pages. This is a very readable and extremely informative volume, and covers a huge amount of ground all in good detail. It sticks to explaining things that aren't obvious, avoiding the torture of describing each menu item. Complex subjects, such as security, are illustrated sufficiently clearly for you to wonder why they were ever thought complex in the first place.

If you work with NT Server, start clearing two inches of shelf space now.

### Special Edition Using Windows NT Workstation 4.0

Author Paul Sanna et al

Publisher Que

Price £46.99 (incl VAT)

With more or less equal weight given to using WordPad and configuring SNMP, it's difficult to identify the target readership of this book. Whoever buys it is going to have to lug around several chapters for which they have no use. That said, it's a book that will take the novice through to a good degree of competency — given sufficient time. The authors (all thirteen of them) clearly wanted to leave no gaps in the subject matter and they have succeeded, even covering Microsoft Internet Mail and Internet News which are not included in NT as standard.

A very comprehensive reference, but slightly spoiled by pointless and obvious detail.

Inside MAPI

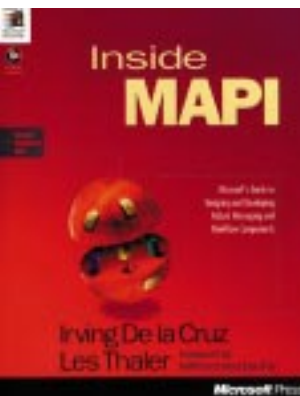
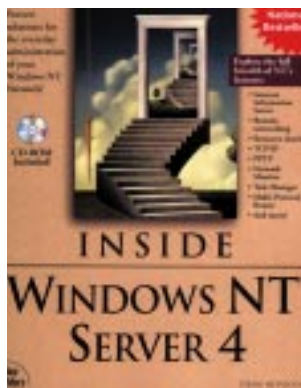
Author Irving De la Cruz, Les Thaler

Publisher Microsoft Press

Price £37.49 (incl VAT)

If you thought MAPI was a simple API to send and receive messages, you haven't looked recently. The MAPI supported by Microsoft Mail and for which a VBX provided an easy interface for Visual Basic, has been renamed Simple MAPI — and for good reason. The MAPI you'll find in NT and used by Exchange is a very much more complex beastie.

This isn't a book for the faint-hearted. You'll need a good grounding in messaging systems, Microsoft's COM architecture and C++ to get much beyond chapter two. This is Microsoft's definitive reference on the subject so there's lots of code samples to help you get through it, and



## Dear Santa...



1. NT has come a long way since its birth, and it might seem a little ungracious to ask for a better user interface so soon after we've already had one, but a) I'd like each folder to remember where I had it on the screen, which view I used and how the icons were arranged; b) I want some MUCH faster ways to get to the folder I'm interested in, both through Explorer and from File Open and Save dialogue boxes; and c) Closer integration between console windows and the desktop. For example, I'd like to be able to quickly make a selected folder the current directory in a console window.
2. 1997 is going to be NT's year, but the take-up is going to be hindered by hardware manufacturers being slow or reluctant to bring out peripheral drivers for NT. The Windows Driver Model will address this problem but that's at least eighteen months away. I'd like to see tape drive, scanner, CD-ROM writer manufacturers and others wake up to the potential and write some native NT drivers.
3. The mouse is an ergonomic disaster. It's too far from the keyboard and it doesn't do enough when you get there. The cable snags on everything and notebook manufacturers have universally failed to emulate it in the space available to them. It's time for a rethink. When the ideal solution is invented, it will be wireless or part of the keyboard, it will have at least a button for each finger so you can do more without returning to the keyboard, and it won't need a square foot of desk space to itself. It should also double as a telephone handset so I can just lift it to my ear when it squeaks and have a shaver attachment for when I get up late. Oh, and there will be NT support for it — first.

## •PCW Contacts

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# Gaining eNTry

Dale Strickland-Clark shows how to get onto the net using the built-in features in Windows NT.

In spite of its booming popularity, getting online to the internet isn't as simple as it could be and many Internet Service Providers (ISPs) haven't helped by offering old or limited software when you sign up. The position is more complicated now that there are 16-bit and 32-bit IP stacks trying to work with 16-bit and 32-bit internet applications. NT doesn't need additional software to talk to the internet. You just need to install the client software, such as a web browser or a mail client, to talk to the services you

want to use. And with NT 4, even these are included. I've received several emails on this subject so I'll attempt to clarify a few points and show how to get online using the features built in to NT.

The IP stacks, such as Trumpet, sometimes distributed by ISPs, are unnecessary on NT and may not work (I've never felt the urge to try). If they do work, they can only hope to provide a limited function. Also, those about which I know anything are 16-bit stacks so will only support 16-bit applications.

NT's own stack is, of course, 32-bit properly supporting 32-bit applications. Sixteen-bit applications will also work thanks to a special layer that translates the API calls but no such reverse translation exists, so running 32-bit applications with a 16-bit stack is a non-starter.

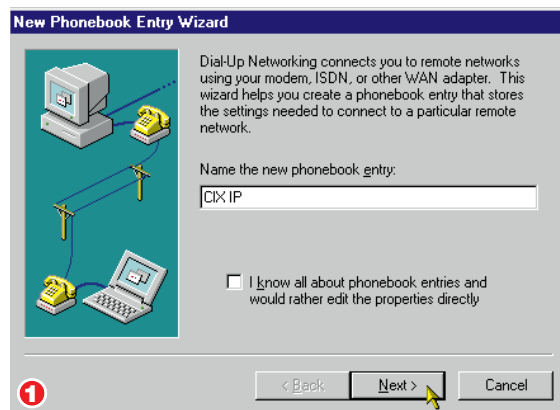
You need to install two key components before NT will talk to the internet through a modem link: the TCP/IP

network protocol and Remote Access Services (RAS). In NT 4, RAS has superficially been renamed Dial-Up Networking (DUN) for consistency with Windows 95 but the old term is still common throughout the system.

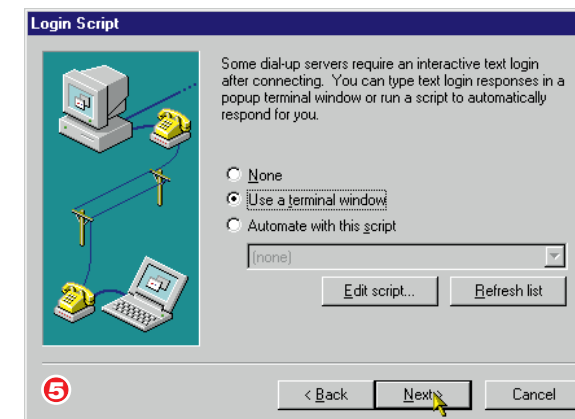
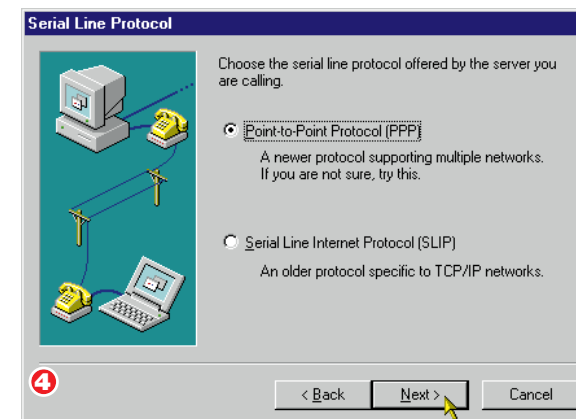
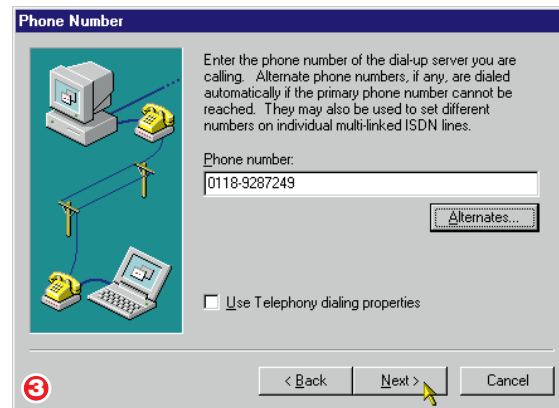
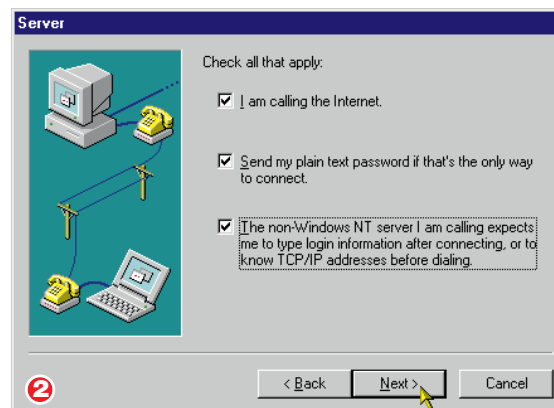
These instructions apply to NT 4 (earlier releases differ slightly) and you'll be required to restart your system a couple of times before you're through. It's a good idea to have a modem installed and verified working before you begin.

We'll start with the TCP/IP protocol which, if not already loaded, is installed from the Networks applet in Control Panel. Select the Protocols tab and, if TCP/IP isn't already listed, click on the Add button. Select the TCP/IP Protocol and click OK. NT will install TCP/IP from the installation disks or CD-ROM.

The questions the system then asks are related to your use of the protocol on a local network and you should safely be able to use the values offered. To install Dial-Up Networking, open My Computer from the desktop and double-click on the Dial-Up Networking icon. If it is not installed, the



**Figs 1-7** Creating a new Dial-Up Networking entry: the New Phonebook Entry Wizard is the simplest way to get the details of your account with your ISP into Dial-Up Networking



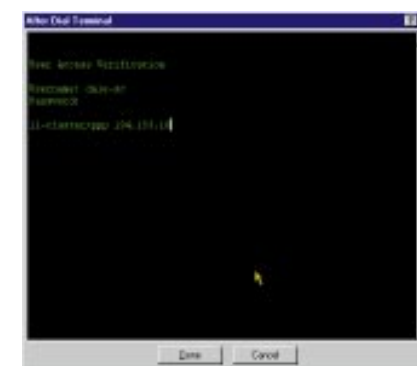
The sequence shown on this and the previous page (Figs 1-7) is an example for Cix IP

system will offer to install it on your behalf.

When you are asked to select and configure the port, click the Configure button and make sure that one of the dial-out options is checked. Some of the questions which will follow concern configuring your system as a Remote Access server: we're not interested in that here, so simply pick the default values. Then, finish the installation and restart the system if necessary.

With these steps complete, you are now ready to enter some internet service providers' details into your phone book. You'll need the logon information supplied by your ISP which may simply be a user ID and password but might also include a set of IP addresses.

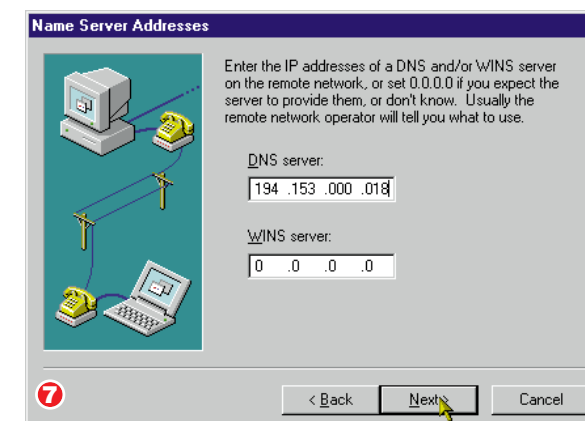
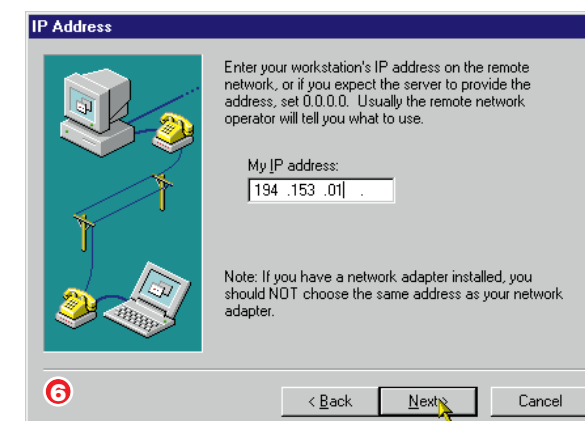
Double-click on the Dial-Up Networking icon in My Computer and you should be greeted by the New Phonebook Entry wizard. Most of the options you choose



**Fig 8 (above)** Terminal mode allows you to complete a login sequence without knowing, in advance, the steps involved

now will depend on data from your information service provider. The sequence shown (Figs 1-7) is an example for Cix IP.

When you get to the point where it asks about the login script, select "Use a terminal window". This allows you to complete the login procedure by keying your details directly into the



## Fig 9 — Dial-up scripts

### [Demon]

```
COMMAND=<cr>
OK=<match>"ogin:"
COMMAND=userid-here<cr>
OK=<match>"word:"
COMMAND=password-here<cr>
OK=<match>"ocol:"
COMMAND=PPP<cr>
OK=<ignore>
```

### [CIX IP]

```
COMMAND=
OK=<match>"name:"
LOOP=<ignore>
COMMAND=userid-here<cr>
OK=<match>"rd:"
LOOP=<ignore>
COMMAND=password-here<cr>
OK=<match>"col:"
```

```
LOOP=<ignore>
COMMAND=password-here<cr>
OK=<match>"ster:"
LOOP=<ignore>
COMMAND=ppp your-IP-address-here<cr>
```

### [Pipex Dial]

```
COMMAND=<cr>
OK=<match>"in:"
LOOP=<ignore>
COMMAND=userid-here<cr>
OK=<match>"rd:"
LOOP=<ignore>
COMMAND=password-here<cr>
OK=<match>"col:"
```

```
LOOP=<ignore>
COMMAND=ppp<cr>
```

### [MSN]

```
COMMAND=
OK=<match>"gin:"
LOOP=<ignore>
COMMAND=MSN/userid-here<cr>
OK=<match>"word:"
LOOP=<ignore>
COMMAND=password-here<cr>
```

### [CompuServe]

```
COMMAND=<cr>
OK=<match>"."
```

```
COMMAND=CIS<cr>
OK=<match>"."
COMMAND=user-number-here
/GO:PPPCONNECT<cr>
OK=<match>"."
COMMAND=password-here<cr>
OK=<ignore>
```

### ■ Note:

1. The IP address required by CIX IP is entered in the usual xxx.xxx.xxx.xxx format.
2. Some systems are case-sensitive. For example, the MSN/ prefix to the MSN userid must be upper case.



host system. Once you are familiar with this last sequence, you can automate it with a script. I know of only one ISP that doesn't require a logon script: UK Online. If you use them, select None for this option.

When the entry is complete, you can attempt to connect by clicking the Dial button. The terminal window will appear once the initial connection has been made. It's worth noting the exact sequence of input and responses used to login for entry into a script.

You need to make sure you can reach a site on the net to confirm that all the details have been correctly entered. Start your browser and pick a URL at random, say [www.pcw.vnu.co.uk](http://www.pcw.vnu.co.uk). If you can't reach the site by name, try entering the IP address

instead: 194.72.64.28. If this works, you have not set up your domain name service (DNS) entries correctly. The parameters for this can be found by clicking on the More button and selecting "Edit entry and modem properties". Select the Server tab and click on TCP/IP settings. Confirm that all the values here match those from your ISP.

### Scripting

You won't have to logon many times before you begin to think about writing a script to speed up the process. In the case of NT 4, the original scripting facility has been joined by a second, more flexible version which, I believe, is the same as that currently available for Windows 95. You should be able to find a document called script.doc in

the \system32\ras directory, off the system root directory, which describes it in sufficient detail. My scripts all pre-date the new language and, as they still work, I've not found a good reason to change them. The old scripts all live in the switch.inf file in the \system32\ras, while the new ones occupy a file each, with an .scp extension.

The table, *Dial-up scripts* (Fig 9), is an extract from my switch.inf file and shows the scripts I use to connect to various services. Although these work for me, I can't guarantee that you'll have any success with them. If you look through the \system32\ras directory, you will find a file called cis.scp. This is a CompuServe script using the new scripting language and which is (more or less) equivalent to mine.

## On the bookshelf

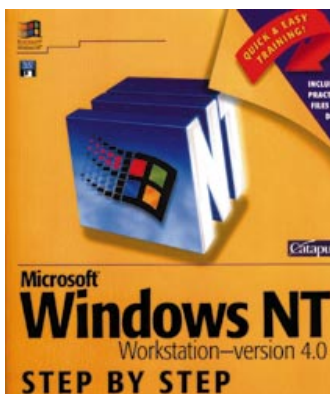
### Windows NT Workstation V4.0 — Step By Step

Apart from winning the prize for the most ridiculous title, this book takes the absolute beginner through the basic steps of getting to know their new NT 4 system. It assumes just two things: one is the ability to hit what you're aiming at on the screen with the mouse; the other is that you can find a handy system administrator when you need one if your PC isn't set up in the way the book expects.

There are illustrations and screen-shots wherever they might help the text and the screen-shots are all clearly labelled (especially early on in the book) to help identify the various parts of a window.

It is ideal for anyone new to, or nervous about, using NT 4 although it seems to be aimed at those with very little computer experience — certainly in a GUI environment. Users with some experience, say with Windows 3.1, can avoid some of the elementary material and dip into the book as they wish.

■ Microsoft Press £27.99 (incl. VAT).



### Visual J++

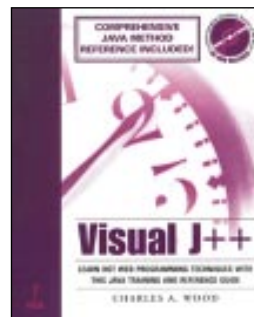
By stating the obvious: "Comments in Visual J++... are easy to implement" and nannying "CAUTION: I really wouldn't disable ToolTips. There pretty useful..." (sic), Charles Wood simply succeeds in irritating the reader who has to skip over his tendency to write whatever comes into his head whether or not it's relevant to the reader. In a book labelled intermediate/advanced you don't expect to read about how to customise your toolbars. That's basic stuff.

There's also a strong impression that this book was made to a size rather than sized to its content. Chapter 13, which lists hundreds of Java methods and accounts for nearly half the book, uses a huge, extravagant and ugly font whereas a much smaller font would have served equally well.

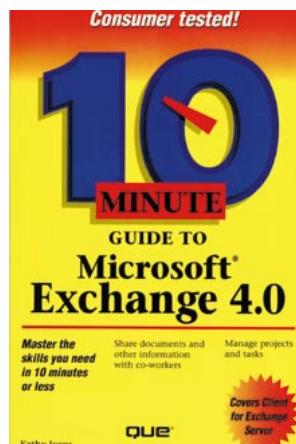
It's a shame because hidden amongst it all is a clear Visual J++ reference book that describes the language and development

environment well enough for a reasonably experienced programmer to pick it up fairly quickly. There's a good book here but it's only half the size of the one you actually buy.

■ Prima £32.99 (incl. VAT)



### 10-Minute Guide to Microsoft Exchange 4.0



There are 24 ten-minute lessons in this book, covering all aspects of using Exchange 4.0 from the client's point of view (as opposed to the server's). It starts logically with understanding how the address lists work before going on to using distribution lists and then creating and sending messages. The more adventurous will enter into the realms of creating public folders, scheduling meetings and managing time with Schedule Plus.

It's all clearly laid out with plenty of examples and screen-shots. Each is described in fine detail, down to the last comment field where, curiously enough, you can enter notes to yourself.

Had the information been presented in a rather less verbose manner, the lessons might have been trimmed by the odd minute, here and there. Nonetheless, a handy reference for the Exchange newcomer.

■ Que £13.99 (incl. VAT)

### PCW Contacts

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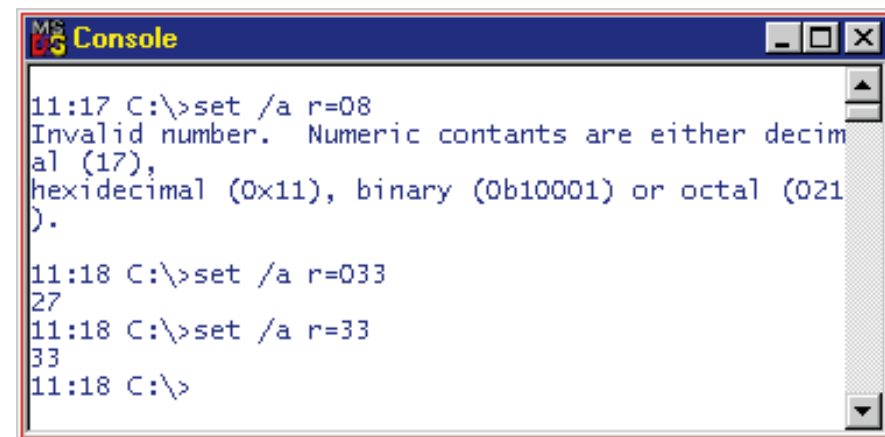
# Ready, get **set**

Dale Strickland-Clark expresses concerns over extended console commands and satisfaction with multiple serial ports. Then he settles down with a good book.

I covered the delights of the console window and NT command prompt last issue, sticking mainly to the functions available in NT prior to 4.0. Thanks to recent work by one of the original NT developers, cranking out code in his spare time, NT 4.0 has been considerably enhanced in this area, with many commands acquiring some very handy extensions. Unfortunately, these extensions have had to be added in such a way as to not interfere with existing batch files, so the syntax, in places, is a little obscure. Nevertheless, I quickly found uses for many of the new features in my growing list of DOSKEY macros and batch files.

You can now count in batch files. Simple arithmetic involving arbitrary expressions is possible, so long as you can make do with integers. The SET command understands arithmetic operators if you follow the command name with the /A switch:

```
set /a count=%count%+1
set /a count=count+1
set /a count+=1
```



The SET command works in hex, octal and binary. The octal notation will generate a lot of fun

## Set arithmetic operators new in NT 4

( )	grouping
* / %	arithmetic operators (% is modulo)
+ -	arithmetic operators
<< >>	logical shift
&	bitwise and
^	bitwise exclusive or
	bitwise or
=	simple assignment
*= /= %= += -=	compound assignment
&= ^=  = <<= >>=	compound assignment
,	expression separator

Table of operators in order of precedence. I can't get parentheses to work at all and have reported it to Microsoft

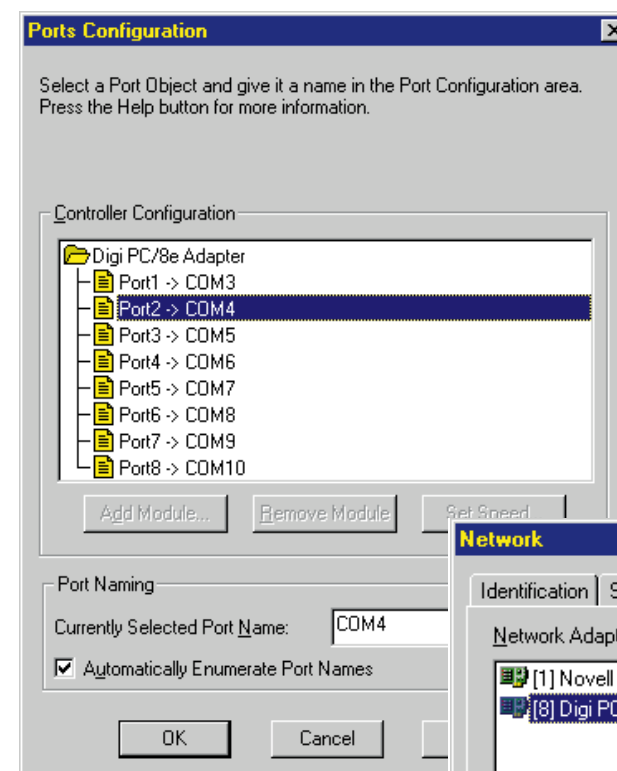
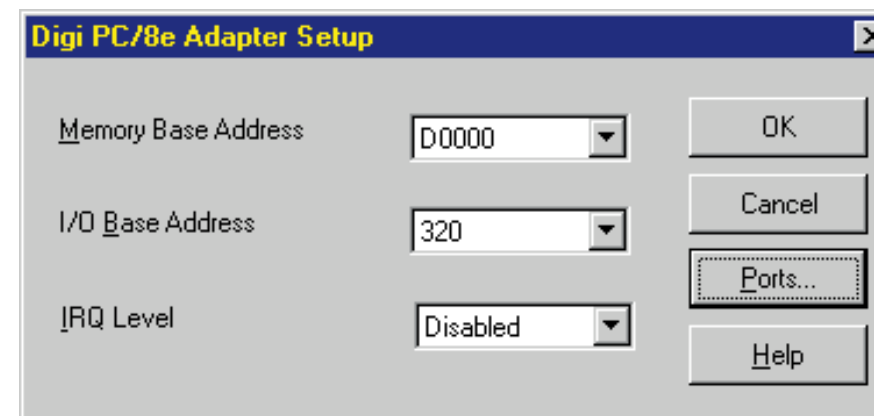
The above are all ways to increment the environment variable, "counter". The second example works because the system assumes that non-numeric strings are environment variables, substituting a value of zero if they don't exist — all of which is very useful in FOR statements. Consider the following command sequence, which should be on one line:

```
(for %i in (*.mid *.wav) do set /a
count=%count%+1) & echo %count%
sound files found.
```

This is intended to count the number of sound files in a directory. The FOR statement executes the command following DO for each file matching the pattern(s) in the parentheses. It might look fine until you realise that all environment variable substitution is performed before any part of the line is executed. Both occurrences of %count% will be substituted for blank (perhaps) before the command is executed.

Removing the "%" from the SET command or using the format from the third example above solves part of the problem. The ECHO command, however, is still not going to work.

If the whole command is executed from within a DOSKEY macro, replacing the "&" character with \$T splits the line into two distinct commands, each sent to the command handler separately. If it's in a batch file, the only solution I can find is to split the command at the "&" into two lines.

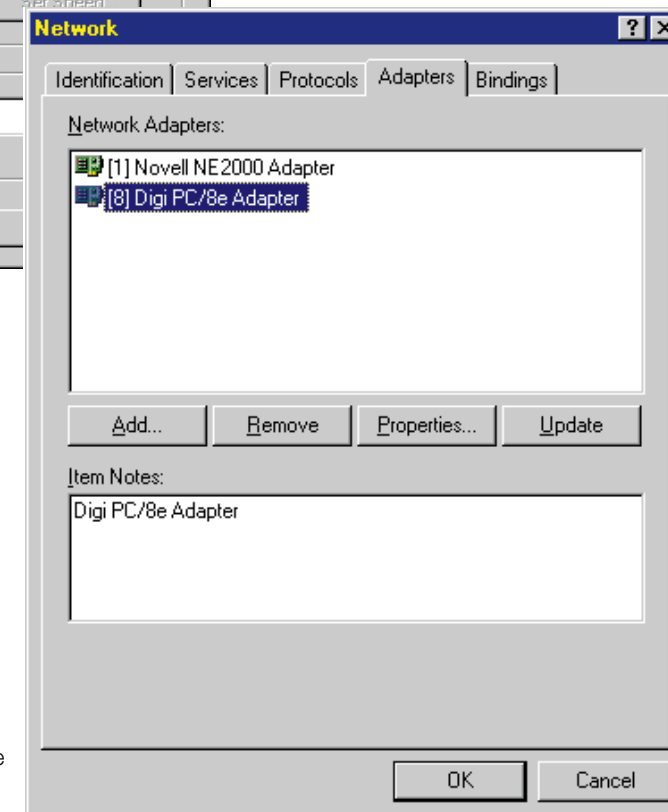


**Above** There's no IRQ to worry about, but you'll need the hardware manual or a good dose of luck to match the DIP switches with the base I/O address  
**Left** You can map any of the Digi's ports to any COM port on NT  
**Below** The drivers for the Digi board are in the Networking section Control Panel

The SET command supports a choice of arithmetic and logical operators plus numbers specified in hex (0x12), octal (012) and binary (0b11). Yes, you read correctly, octal numbers are identified by a leading zero. That means 012 is equal to 10 and 09 is an invalid number.

This is a remarkable cock-up. Given the new ability of a batch file to work with data read from external files or piped from other commands (a new function of the FOR command that I'll look at in a future issue), giving leading zeros the ability to corrupt your data is unwelcome, to say the least. It might have been bearable if there was a simple way of stripping leading zeros from a number, but there isn't.

I have written to Microsoft on this, suggesting a hasty change to use 0Q (zero 'Q') to introduce octal numbers. I'll let you



know how it goes.

See my review of NT 4 in the September PCW for a list of all the console commands that have been

extended. For details of specific commands, enter "HELP command" or "command /?". I'm putting together an HTML document describing all the extensions in detail and ways they can be used. It'll be on the cover CD as soon as it's finished.

## Serial ports

I've long itched to resolve the irritating lack of serial ports on every PC I've used. Two is insufficient — as soon as your mouse and modem are plugged in, you're left with none. I need a minimum of four ports.

Thanks to the loan of an eight-port Digi board by The Telecommunications Management Group, near Leeds, I've had the chance to configure one of my NT systems with ten ports and, I have to say, I'm hooked.

The Digi board is one of a family of products, two of which add eight or 16 ports to a PC on a standard ISA bus expansion board. Expanding the system in this way is very convenient for two reasons. One is that this board doesn't use a single precious IRQ. The other is that the drivers are supplied with NT, making installation as simple as it could be. And I'm sure it would have been simple if I'd been given the

hardware manual with the rest of the bits in the box. Without it, I fumbled around guessing at what the settings might be, but admitted defeat until I tracked down the chap with the manual.

Once I'd jotted down the DIP switch settings over the phone and correctly configured the base I/O address, we were off. I was now able to connect an old battery-powered pocket modem to the new COM3 for use as a dialler. I haven't been able to use the modem on COM2 for this purpose because it isn't connected to the same phone line as my telephone.

As a Psion Series 3a user, all my contact phone numbers are out of convenient reach of my PC, so a quick and dirty dialler was needed. A DOSKEY macro sprung to my aid:

p258 >

```
DOSKEY dial=(echo atdt$* & sleep
5)>com3
```

I love the simplicity of this. The sleep command is necessary to prevent the output stream to COM3 being closed as soon as the echo command is finished. It needs to be long enough for the modem to complete the dialling of the longest number you're likely to enter. Sleep is one of the little utility programs that comes with the NT resource kit reviewed last month. It is available on the internet as part of a monster 7Mb download from <ftp://ftp.microsoft.com/bussys/wint/winntpublic/reskit/nt35/i386/i36.exe> or, extracted for your convenience on this month's cover CD.

While the simplicity appeals to me, the limited function will soon irritate. I need to be able to interrogate my contact database on the Psion and extract entries based on a string search. The second new serial port offers tantalising possibilities to resolve this, because now plugged in here is the serial interface to the Psion Series 3a. The hassle of disconnecting and reconnecting cables meant that it wasn't often connected to a PC — just for the occasional backup. Now, however, I'm making full use of the very serviceable PsiWin software, which runs perfectly happily on NT, and have



Use an extra serial port to connect your Psion and make use of its PsiWin software

consequently rediscovered the flexibility of the Psion. In addition to the Data and Agenda applications upon which I've relied for years, I now find myself rather taken by Andy Clarkson's Plan, a project planning package that mimics and interoperates with Microsoft Project to some extent.

The files from the Series 3a's Data application have their own peculiar format which PsiWin will translate into text or .dbf for you, but unless you have been strict with your use of labels, identifying what's what in an entry isn't easy. The next step

## Books

### Webmaster Expert Solutions

Author Mike Morgan & Jeff Wandling

Publisher Que

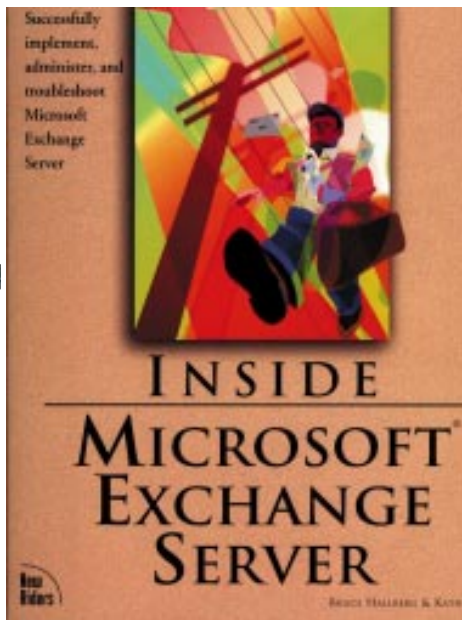
Price £56.49 (incl VAT)

Pages 1140

(Includes CD-ROM)

This is, without doubt, the find of the month. Putting it simply, Morgan and Wandling have produced the definitive reference work for anyone building dynamic websites. Without getting bogged down in the specifics of any browser or any server, this book details all aspects of building a website, from improving performance, building shopping malls and handling security, to creating virtual reality worlds.

There are dozens of code examples in Perl and many complete projects, such as a web-based chat server. But don't go taking any style guidelines from these. If I had to find something to pick holes in, it would be that the authors had based their Perl style on Visual Basic.



### Inside Microsoft Exchange Server

Author Bruce Hallberg & Kathy Ivens

Publisher New Riders

Price £36.99 (plus VAT)

Pages 480

Exchange Server is one of the most complex and configurable pieces of software ever from Microsoft. This is really a book for people who don't get on with the standard manuals (or choose not to buy them) because there doesn't appear to be anything here that you wouldn't find written up by Microsoft. It's a fairly light read with a chatty style, but glosses over some complex issues. For example, I could find no mention of the difficulties you're likely to experience setting up dynamic RAS connection for the Internet Message Transfer Agent.

may need to be a Perl routine to unscramble the Data files and save them in a format suitable for a more helpful dialler, but I'm not ruling out the possibility of having to reorganise all of my Psion data files. More on this in the future.

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# Console yourself

A GUI is great for lots of jobs, but Dale Strickland-Clark suggests that a console window might make you more productive.

Welcome to the first Hands On Windows NT column. Over the coming months I'm going to tease and provoke this operating system into giving up some of its secrets. Armed with a copy of the monstrously-proportioned Windows NT Resource Kit, a stack of MSDN CDs, a web browser and a snorkel, I'm going to wade into the murky depths of NT and pull out anything that vaguely resembles buried treasure.

As a keen advocate of getting the most done with the least effort, I abandoned Program Manager long ago as it was too much hard work, switching to a console

window and a bunch of DOSKEY macros to launch most applications. A console window, sized to 13 lines by 50 columns, is enough to enter most commands, but I keep a second, larger window minimised for longer-running commands and anything that needs more room.

These, along with a short macro called “/” to launch commands in a new window (see the DOSKEY Macros panel) have served me pretty well up to NT4, and I haven't seen much need to change since. In fact, the extended command syntax introduced in NT4 has led me to try and put more and more complex commands on

DOSKEY macros.

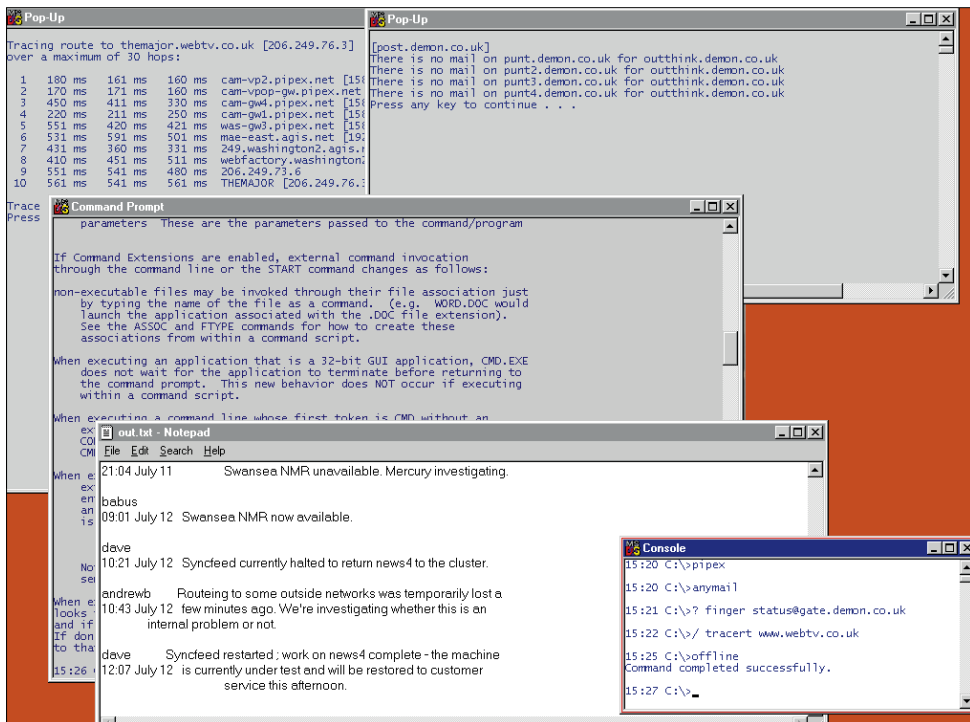
Firstly, let's just clear up one common misunderstanding from which I suffered for too long. The console window is not running a DOS environment. Yes, I know Microsoft chose an icon for the command prompt that screams MSDOS at you. However, that was just to make people feel comfortable that good old, understandable MSDOS was just a double-click away. Frankly, I would have thought that this was more likely to induce panic, but what do I know?

It's only when you attempt to run a DOS program that a virtual machine is created to

simulate the old DOS environment. It's at this point that the system runs the AUTOEXEC.NT batch file found lurking in the \SYSTEM32 sub-directory, off the system root. You can add commands to this file to further prepare the virtual machine for your DOS applications, but unless one of these commands issues messages, you probably won't even know that it's running.

Curiously, the MEM command is one of the few real DOS commands shipped with NT. If you type “MEM /C” at the command prompt, NT will create a virtual machine, run AUTOEXEC.NT which loads a few device drivers, and then run the MEM command. This lists the device drivers just loaded and not much else, and then terminates. The virtual machine is then removed, along with all the device drivers just loaded. What's the point of that?

We'll have a look at the DOS



My essential console window sits in the low right corner of the screen, just out of the way of the Taskbar, and never moves. The other windows pop up and vanish on demand. If I'm expecting a lot of output from a command, I just stick a “/” or a “?” on the front of it and the output appears in another window

## DOSKEY Macros

Here's a selection from my much larger list of DOSKEY macros. Most of these work on either NT 3.51 or 4.0 but there are a few that use NT 4.0 features. Some of these macros simply launch applications, such as “word”. They use the “START” command to prevent the console window from waiting until the application finishes before returning to the prompt. With NT4 this isn't necessary, because the “START” command is implied when launching applications.

```

/=start "Pop-Up" cmd /c cmdinit.bat ^& $* ^& pause
?=start /min cmd /c cmdinit.bat ^& $* ^>c:\temp\out.txt ^& start
notepad c:\temp\out.txt\=start $*
+=start "Pop-Up" cmd /c cmdinit.bat ^& $* ^| more /e ^& pause
acc2=start C:\KITS\MSOFF42\ACCESS\MSACCESS.EXE $*
acc7=start C:\kits\MSOffice\Access\MSACCESS.EXE $*
agent=start /ds:\internet\agent i:\comms\agent\agent.exe $1.ini
ameol=start /max /ds:\ameol I:\COMMS\AMEOL32\AMEOL32.EXE $*
anymail=start "Pop-Up" cmd /c finger outthink@post.demon.co.uk ^&
pause
BulkRename=for %i in ($1) do rename %i $2%i
cixip=start "Msgs" cmd /c rasdial "cix ip" ^&^& start rasmon
convertmacs=for /f "tokens=1,* delims==" %i in ('doskey /macros ^|
findstr "[&|]"') do @echo >batch\conv\%i.bat @%j
cw=start "Console" cmd /k cmdinit.bat
editmacs=Start notepad c:\batch\macros.txt
ex=explorer $*
exr=explorer /e,/root,$*
ext=explorer /e,$*
history=doskey >c:\temp\history.txt /history && start notepad
c:\temp\history.txt
job=explorer "s:\jobs\%" && if exist "s:\jobs\%\tools" explorer
"s:\jobs\%\tools" & if exist "s:\jobs\%\startup" for %i in
("s:\jobs\%\startup\*.*) do %i
loadmacs=doskey /macrofile=c:\batch\macros.txt
offline=rasdial /disconnect && sleep 1 && kill >nul rasmon
qmac=doskey /macros | find "$*"
qmacs=doskey /macros
resume=dir s:\ameol\data\resume\%1.rsm | find /i "$*" & start notepad
s:\ameol\data\resume\%1.rsm
savemacs=doskey /macros | sort >c:\batch\macros.txt
space=for /f "tokens=1-3" %i in ('dir /d c:\ d:\ \\server1\drive-c
\\server1\drive-d \\server1\drive-e ^| find "bytes free"') do @echo %i
%j %j
word=start /max C:\kits\MSOffice\Winword\WINWORD.EXE $*
    
```

environment in a future issue, but meanwhile, back to the console window. The need to keep the mini console window free for entering more commands means that many of the macros use a START command to open a new window. This introduces its own little complication, because the new window vanishes without so much as a puff of smoke as soon as the command has finished. This is thanks to a remarkable bit of inconsistency where DOS windows in Windows 3.1 and Windows 95 have the option of remaining open once the command has terminated. But Windows NT

offers no such sophistication. To overcome this shortcoming, I've got into the habit of adding a PAUSE to the end of most commands that run in a separate window.

Although NT's console language is virtually indistinguishable from that of DOS, it does have a number of useful additions and the list has grown rapidly with NT4. Ignoring the new NT4 stuff for now, the principal extensions are “&” (an ampersand) to separate two commands on the same line, “&&” to separate two commands and execute the second only if the first was successful, and “||” (two vertical bars) to



## Windows NT Resource Kit (3.51)

I've been fortunate enough to get my hands on one of these magnificent works which comprise five stout volumes and a CD-ROM brimming with goodies. The books cover networking, optimisation, messages, the Registry and a whole lot more, and occupy over six inches of shelf-space between them.

■ Volume 1. Deals with the NT architecture and is essential reading for anyone who wants to achieve a sound understanding of what makes NT tick. It also includes a description of each file shipped with NT and an explanation of many of the values stored in the Registry. The knowledge junkie will be able to open this book on just about any page and be instantly absorbed.

■ Volume 2. Crammed with networking information. Identifies the purpose of the networking options that most mortals dare not touch. Its detailed coverage of the RAS SWITCH.INF file to automate logon processing should make the essential connection to your ISP a quicker operation.

■ Volume 3. A book full of system

messages is of dubious value when the accompanying explanation offers little more advice than the original message, but Volume 3 is full of them anyway. There is some help here, yet this volume will still look new long after the other four are ragged from use.

■ Volume 4. If you want to strangle every ounce of throughput from your gasping system, you'll want to be propped up in front of this into the wee small hours. It covers optimisation, and shows how to use the System Monitor to measure performance and identify bottlenecks.

■ Volume 5. A supplement containing additions to the first four volumes.

One or two items from the CD-ROM can be found on the internet but it is, nevertheless, a valuable collection of utilities and general goodies that no serious NT shop should be without. I will be looking in detail at some of this stuff in future months.

*See PCW Contacts for details of Resource Kit version 3.51.*

# Windows NT<sup>™</sup> Resource Guide

The information  
you need to  
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on Windows NT!



# Microsoft<sup>®</sup> WINDOWS NT RESOURCE KIT

*For Windows NT Workstation and Windows NT Server Version 3.51*

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separate two commands with the second, only executing if the first failed.

This is clear enough until you begin stringing long lists of commands together. Consider the following:

```
cd nosuchdir && type missing.txt ||  
echo Can't find directory
```

If the CD command is successful, the file is typed, otherwise the ECHO prints a message. This works as required but perhaps not as expected. Given that the ECHO follows the TYPE command, shouldn't the message be "Can't find file"? In fact, the ECHO executes if either the CD or the TYPE command fails.

It turns out that the real behaviour of "&&" and "||" are linked to the current errorlevel (usually set to non-zero by failing commands), causing the next command to be executed or skipped depending on its value. However, commands that are skipped leave the errorlevel unchanged.

With a bit of imagination, it's possible to take advantage of this in some interesting ways. Here's an example where a string of commands employ a common error handler:

```
cmd1 && cmd2 && cmd3 && cmd4 ||  
echo oh goodness me
```

If any command fails, the remaining are skipped and the ECHO is executed.

More specific error-handling demands the use of a further addition to the original DOS syntax; namely, the use of parentheses to group commands. This example provides specific error messages:

```
cd nosuchdir && (type missing.txt  
|| echo Can't file file) || echo  
Can't find directory
```

It appears that the errorlevel is saved on entering a command group and restored again on exit.

With this groundwork in place, it is possible to string some quite complex command sequences together on a single line or in a single DOSKEY macro. The list of macros shown ranges from simple shorthand to some pretty complex loops that depend on features introduced in NT4, with which I will deal next month.

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