



Illustration by Rod Hunt

# Wired web world



CONNECTING TO THE  
NET AND **BUILDING YOUR**  
**OWN WEB SERVER** IS  
EASIER THAN YOU  
THINK. NIGEL  
WHITFIELD SUGGESTS  
THE BEST WAYS TO TUNE  
IN AND TURN ON.

**T**HE INTERNET IS A USEFUL TOOL FOR BUSINESS, BUT you probably think that a dedicated connection is strictly for the big boys who can afford high-speed links and staff to keep everything running. Fortunately, that's not true at all. If several people in your office spend time accessing the web, or you send lots of email to clients, or you simply want a large web site on which you can run complicated scripts, you may well find that installing a permanent link to the net and building your own web server is the best solution for you. It's also easier and cheaper than you may think.

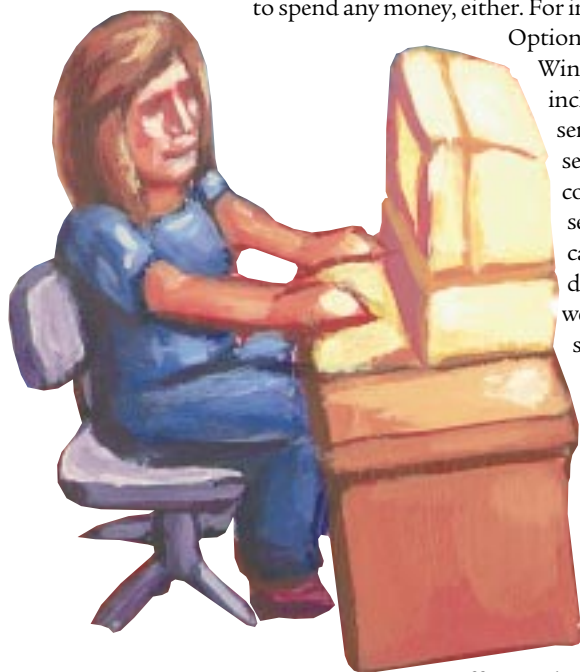
**A permanent connection** to the internet could cost you from £500 a month upwards. Think how much you're already paying for web space, email, and other facilities from your provider, remembering that half an hour's access at daytime rates costs about £1, and you may be surprised at how little more you'll need to pay for unlimited access, 24 hours a day. And, as you'll see, the technical side of getting connected is simpler than ever, too. With operating systems like Windows NT or Unix, linking up to the net, whether it's for email, desktop surfing or publishing web pages, is well within the reach of many people.

## What's involved?

Connecting to the internet isn't as hard as you might think. In fact, you may already have most of the software and hardware that you need. The largest investment is in a server, which can be used to handle email, deliver web pages or cache them for people in your company, giving them faster browsing. The type of computer you need to a large extent depends on the software you need and its requirements. Don't be too carried away with speed: remember that the cheapest permanent net connection only delivers around 8Kb per second; with that sort of bottleneck, a 400MHz Pentium II will be twiddling its thumbs most of the day. For a web server, you'll find disk performance and sheer reliability much more important than processor speed. You'll also need a router which connects your network to the rest of the internet, and the leased line itself. That's simply a dedicated telephone circuit to your internet provider, which usually terminates in a small box, with a socket for your router to connect to. A router will cost you between about £750 and £2,000. And for a small office, with a 64K link to the internet, expect to pay around £1,000 for a router.

**On the software front**, you may find that you don't need to add much more; and unless you





have specialised requirements, you may not need to spend any money, either. For instance, the

Option Pack for Windows NT includes a web server. Unix-based servers often come with a web server, and you can also download a wealth of free software from the net itself. Email is one area where you may need to spend cash, depending on the type of internal mail you're already using; some

office mail systems will

require a gateway to connect you to the internet, which could cost a few hundred pounds. Others may already include the facilities you need.

## Making the right choices

When putting your office online, you'll need to decide on a number of things. What speed connection do you need? What about a router? Should you go for a Windows NT system, or use Unix? The most important thing to consider is the capacity of your line. Providers will come up with lots of figures to help you decide what speed link you need; the basic entry level is 64Kbits per second — the same speed as a single ISDN channel.

The next step up is 128K, but it's a hefty step: unless the actual link can be provided by a cable company, get set for a shock. A British Telecom line will cost around £1,000 to connect for a 64K line, but £6,000 for 128K, because they install a fibre optic link. Other companies, like Cable London, charge the same to install a 128K link as a smaller one, so it may pay to shop around.

**What will a 64k link handle?** In theory, if it were running flat out all month, it could deliver around 20Gb of data. In practice, things are a little different; my own web server, with about 1.5 million requests, delivers 10Gb a month down a 64K line; but at peak times, some people are having to wait. If you expect lots of hits on your web site at the same time, you're going to need a bigger line or people will have to wait longer to see pages appear. You might be put off by the high costs of installing a 128K line or faster, but it's not the only option; some routers can use an ISDN line to increase the capacity at peak periods. The ISDN can also be used as backup should the main link fail.

**Choosing a router** is fairly straightforward; it's largely a question of making sure you use one compatible with your ISP — though consider some features like whether or not it supports people dialling in via ISDN or modems, and if it can handle security for you, allowing access only to "public" machines on your network. Finally, there's choice of Unix or Windows NT for the server. For many, the decision is simple — stick with what you know. But there are other considerations. A Unix-based server isn't as straightforward to configure as the NT alternative, but you'll find most of the software you need on the net — and the server itself may

## When to make the move

There's no hard and fast rule for when you should take the plunge and move away from the dialup connections and web sites hosted with providers that most people rely on. After all, you're unlikely to be able to afford a web server with a link as fast as your provider unless you spend serious money. But there are a number of scenarios where it can make sense to link up.

➤ **A small office** with a 25Mb web site and around 20,000 hits per month, has a mailing list of 1,000 customers who want to be kept up to date with new products. There's also an auto-responder email address for people who have simple enquiries, and a domain name with dialup email to the office network. A typical cost from an internet provider for

this type of service is around £250 per month — about half the cost of a leased line connection. Add the cost of surfing the web during the day, at £2 per hour, and if people in the office spend much time online, a permanent connection could be a real winner, allowing more customer mailing lists and unlimited web space. However, remember that if there

are large files on the web site or it becomes very busy, a 64K line won't be sufficient.

➤ **A design consultancy** wants to put its old work, including multi-megabyte files, on the web for people to see, and to have access to email for sending work to clients. Depending on the cost of web space, an office server may be cost effective — but remember that

large files aren't going to arrive quickly, especially if the site is busy. To create a good impression when people want to download your work, they are probably best kept on an ISP's server, which will be faster. Nevertheless, if a lot of email is sent during the day, with large files, a leased line could be worth it, if the current dialup bills are approaching the cost.

## Some important questions to ask

### ABOUT THE SERVICE PROVIDER

➤ **If you're paying** for a certain bandwidth, is that guaranteed? Are there options, like frame relay, where you just pay for what's used?

➤ **Can the ISP** host mail boxes, or provide a Domain Name Service for you?

➤ **How many IP** addresses will they

allocate? Is that sufficient?

➤ **Is an ISDN** backup option available? If so, can you use your existing ISDN line, or will the ISP insist on installing a new one?

➤ **Can the provider** offer aggregation, where a low-capacity line can be augmented with ISDN during busy periods?

➤ **Will the ISP** supply and configure a router for you?

➤ **Is assistance** with other configurations, such as name servers, offered?

➤ **What backbone** capacity does the provider offer? Are there links direct to Europe as well as the the US?

➤ **Who do they** peer

with? If they don't have agreements with other major providers, you may find UK traffic to your server crossing the Atlantic twice.

### ABOUT A ROUTER

➤ **Can the router** be used with ISDN as well as with a leased line? Will it handle ISDN backup and aggregation?

➤ **If you decide** to

upgrade your line later, will the router handle the capacity, or will you have to buy a new one?

➤ **Can the router** block traffic to or from certain sites, for filtering or security?

➤ **Will it handle** incoming connections via ISDN or modem for people working outside the office?

not need to be as highly specified. The server that I use to deliver 10Gb of web data, and up to 10,000 mail messages a day, isn't a massive powerhouse. It's a Pentium 90 with 64Mb of memory, running SCO Unix, and home to nine virtual web servers. You'll need a higher-specified server to achieve the same performance under Windows, though you'll also have a much simpler system to look after.

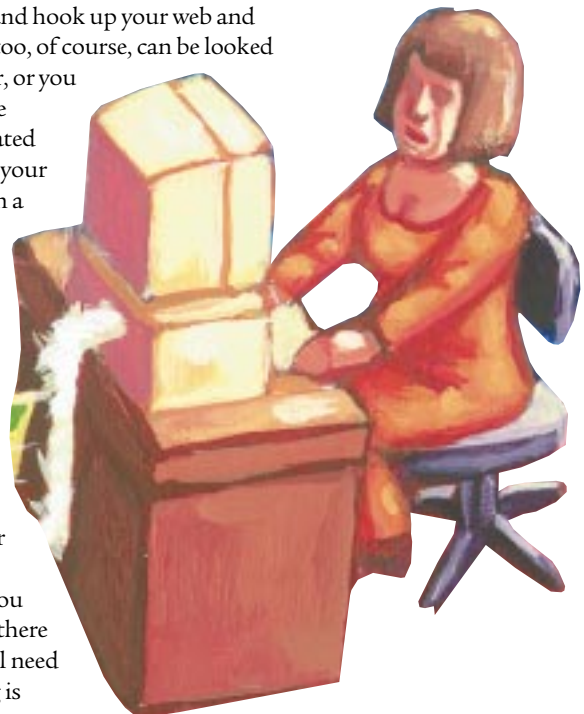
## The role of the ISP

Compared to the cost of a dialup connection, even using ISDN, a leased line to the internet is expensive. And it's not just the cost of the link itself that bumps it up. So what are you paying your ISP for? Connectivity is the main thing, but if you're not confident about some of the technical aspects of running your network, such as configuring name servers, most ISPs will include that in their charges. Some will also provide you with a fully "managed" service where they look after the router, so all you have to do is

plug it in, switch on and hook up your web and email servers. Those too, of course, can be looked after by your provider, or you could let them handle email, while complicated web scripts accessing your order database run on a server in the corner of your office.

## Setting it all up

The box on page 254 shows in detail how to configure the Microsoft Web server to publish your own pages on the internet, but before you can even get that far, there are other things you'll need to consider. Planning is



## Leased Line Providers

The number of internet providers offering leased lines has increased dramatically over the last few years. Many of the companies that are members of LINX (the London Internet Exchange) offer leased lines. A complete list is at [www.linx.net](http://www.linx.net), where you can also check to see which providers exchange traffic with

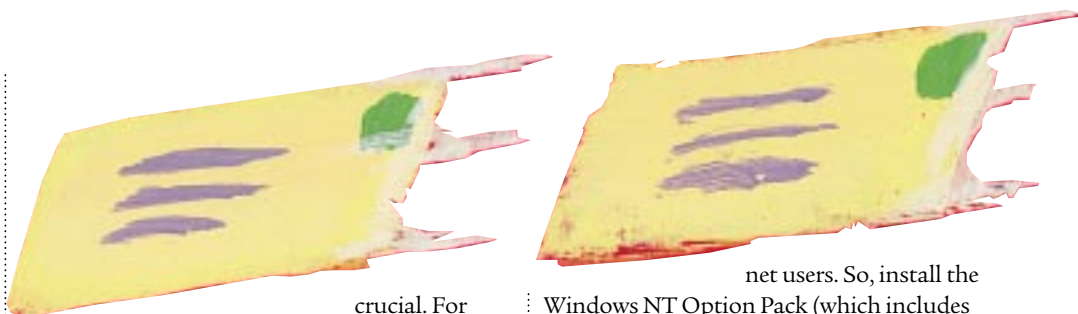
each other. Prices vary, and many providers charge according to distance; expect to pay less in a large town like London than in a rural location. A basic 64K leased line will cost about £1,000 to install, and £600 per month. Some of the best-known providers are listed on page 256 ["PCW Contacts"]. Hard and fast costs

aren't always easy to come up with, but especially for smaller-capacity leased lines, many providers work on a flat rate – though others still base the line charge on the distance in kilometres between the telephone exchanges involved. For higher-capacity links, you're more likely to have to pay per kilometre.

We asked two providers to come up with quotations for two services (below). The first, a 64K line to a village near

Winchester, and the second for a 2Mb link to an office in central London. Prices exclude VAT, and rental figures are per annum.

SUPPLIER	DEMON	UUNET
64K installation	£1,000	£1,000
64K rental	£7,200	£9,500
ISDN backup installation	n/a	£750
ISDN backup rental	n/a	£2,000
2Mb installation	£5,200	£4,200
2Mb rental	£32,490	£15,000



crucial. For example, do you want every computer in your office to have direct access to the internet? Can you even be allocated enough addresses for them all? Some providers will only allocate you a limited number of IP addresses, so you may need to hide some computers behind a firewall — which makes for more complicated configuration, though it does make systems safer from hackers.

**You'll also need to check** other security issues, like installing all the latest patches and updates for bugs in systems like Windows 95 and Windows NT: miss out on some updates, and your systems can easily be crashed by malicious

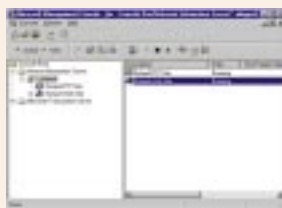
net users. So, install the Windows NT Option Pack (which includes Service Pack 3, as well as the web server) and the service packs for Windows 95. If you've opted for a Unix system, check with the vendor for information about common problems including the "ping of death", "out of band data" and web server security holes — all ways of crashing or gaining unauthorised access to systems on the internet. Check other issues, like systems with file sharing enabled via TCP/IP and no passwords — easy to do with Windows 95, and potentially disastrous. Decide too how you want to handle email, web sites and an intranet. Will some services be best handled by the ISP? For a small office, for example, having your email stored on the ISP's POP mail server will save you having to

## Configuring a web server using Windows NT

At its simplest, setting up a web server in your office can be very straightforward. Arrange the line, have your service provider configure a router for you to plug into it, and ask them to give you a list of the internet addresses you've been allocated. Decide which

addresses are for the web server, mail server and other essential systems, and configure them all. Plug in the router, connect it to your network, and switch on. Your PCs should be able to browse the web; setting up the web server requires a little more work. Here, we've

used Internet Information Server for Windows NT 4; you can download it from the Microsoft web site as part of the NT 4 option pack. You may want to wait until you have your link to the net functioning — the pack is around 27Mb to download.



◀ **During installation** you'll be asked to enter some basic information, including

choosing a directory for your web pages. You can change everything later. This screen shows the Internet Service Manager, which is the simplest way to configure your system. You'll find it in the NT Option Pack group on your Start menu. It's the easiest way to stop and start services like the web and ftp servers.

▶ **Right click on the Default Web Site** and choose 'Properties'. You'll see a screen like this. You can



choose to limit the number of connections to your web server, and the type of log file you want. By clicking on the Advanced button, you can make the server respond only to certain IP addresses — use that feature if you want more than one web server on the same computer. For example, you might have intranet.yourfirm.co.uk and www.yourfirm.co.uk set up. By allocating each a distinct IP address, you can have them both on the same PC.

▶ **The Documents tab is used** to control what happens when someone misses the name off the end of a URL. Here we've added index.html to the list of defaults, which means that if someone requests www.yourfirm.co.uk,



they'll see the file [www.yourfirm.co.uk/index.html](http://www.yourfirm.co.uk/index.html), or [www.yourfirm.co.uk/Default.htm](http://www.yourfirm.co.uk/Default.htm).

▶ **The Custom Errors tab** allows

you to set up the error messages returned by the server. By altering this option you could, for example, direct people to a site map page, or a search system if they request a file that doesn't exist.



**When you've finished** making changes, the Internet Service Manager will save them all, and you're ready to publish your web site.



install software yourself, but you may lose the ability to run mailing lists, or to add useful aliases for services like "sales" and "accounts". You'll also need to register a domain name, and allocate names to all the systems that can be accessed from the rest of the internet. And decide if you really want to configure each PC automatically,

configure all the systems in a small office, including a web server, ftp site and email server, in just a couple of days.

## Conclusion

It might seem that there's a lot to think about; but connecting your LAN to the internet isn't as technical or complicated as it seems — and a good service provider will help you with most of the really tricky aspects of the system. Nevertheless, if you really want to achieve the potential that's opened up by having a web server sitting in a corner of the room, and a direct link from every desktop to the internet, then you'll need to invest time in planning and choosing the right equipment. There are dozens of internet providers who will be able to supply you with a link, with differing options, prices and levels of service. The cheapest may not be the best — especially if it means you have to spend time dealing with technical details that would be best left to someone else. So, think what you want, shop around, and find out the best solution for your needs. Whether you want a plug-and-play solution, or complete control over everything that happens, there's one sure thing about building your own web server and connecting your office to the internet — you'll wonder why you didn't do it sooner.

## PCW CONTACTS

**Btnet** 0345 585110 [www.bt.net](http://www.bt.net)

**Demon Internet** 0181 371 1250 [www.demon.net](http://www.demon.net)

**INSnet** 0181 239 5004 [www.insnet.net](http://www.insnet.net)

**PSInet** 01223 577577 [www.uk.psi.net](http://www.uk.psi.net)

**Unnet** 0500 567000 [www.uk.uu.net](http://www.uk.uu.net)



or to have a server do it for you using DHCP — the Dynamic Host Configuration Protocol — which will save visiting every system when you want to make changes, but also means every PC may have a different address each time it's turned on.

**Don't forget to consider** the more mundane things, like power supply, too. If you want to make sure your site is always available, invest in a UPS, and make sure it's powerful enough to run the server, router and the Network Termination Unit that sits on the end of the leased line. All this might sound like a lot of work, and it can be, but if you plan carefully you should be able to

## A month in the life of a server

Just how much can you do with an entry-level 64K line? Here are the figures for my own server's web traffic, in addition to which, it delivers up to 10,000 email messages each day, from a number of mailing lists.

➤ **The server** is a Compaq Prosignia 300, 90MHz Pentium with 96Mb of memory; memory and disk are more important than raw speed, with the bottleneck of my 64K line. The server runs

SCO Internet FastStart and hosts nine different web sites.

➤ **The router** I use is a ShivaIntegrator 150 which offers ISDN backup, aggregation, and supports leased lines up to 256K.

(The following figures are for July 1998)

● Total number of http requests received: 1.69 million

● Total number of bytes transferred: 9.96Gb

➤ **The maximum** capacity of a 64K line is

approximately 20Gb per month, suggesting that only 50% of the link is used. In fact, the peak hourly figure reaches 71.1%, or 19.5Mb — and that's not the end of the story. During heavy peaks, the router uses an ISDN line when the leased line reaches 95% capacity, giving 128K of bandwidth. At present, the average time using ISDN is about one hour a day, suggesting that for practical purposes, the limit of a 64K link is

fast being approached. If you want this sort of flexibility, though, you'll have to hunt for providers who offer it, or choose a service that bills you by the amount of data transferred over a higher capacity link.

➤ **When you look** at the logs from your own web server, it's important to analyse them by time of day and look at the peaks — otherwise you could fall into the trap of thinking you have plenty of spare

capacity, when you're actually close to the limit. But for many people, a 64K line could turn out to be a very cost-effective way to get on the net. You really don't need to spend a fortune on hardware and software.

**Compaq**  
0845 270 4222  
[www.compaq.co.uk](http://www.compaq.co.uk)  
**SCO** 01923 816344  
[www.sco.com](http://www.sco.com)  
**Shiva** 0131 561 4200  
[www.shiva.com](http://www.shiva.com)