Share option

Hot wires

FOR SMALL BUSINESSES, A RESOURCE SHARED IS A RESOURCE DOUBLED. DAVE MITCHELL TAKES YOU THROUGH THE BASICS OF SETTING UP A NETWORK.

Contents

Many small businesses are realising that IT can bring that all-important edge, and that a computer network can play a key role in keeping the company ahead of the competition. Although many will have a number of employees with a PC on their desk, they will have no means of sharing information and resources.

In this environment, the only sharing likely to occur is via 'sneakernet' — copying a file onto a floppy disk, walking over to a colleague's desk and handing it to them — which is time-consuming and unproductive. Sharing resources like files, printers and modems across a network can increase productivity and bring big savings.

This month, we show you how to network a small office of between two and five users, with the aim of sharing files, printers and internet access. We'll look at the various technologies and options available so you can make the right choices. Most small companies will be on a tight budget, so low-cost solutions will be a priority.

Many PC users with limited technical knowledge still view networking as a 'no go' area. Nothing could be further from the truth, however, as a network of the size we'll be looking at is relatively simple to install and configure. All you need is a reasonable familiarity with Windows, and to be confident about installing new hardware in your PC.

☛ Buddy can you share a PC?

Before covering the more conventional methods of networking, we'll look at a relatively new and simple method of PC sharing. SharedWare from Business Presentations and Buddy from Eurotech allow two users to work on the same PC simultaneously. Both kits consist of an ISA card with a graphics chipset, connected via a five-metre cable to a small module with mouse, keyboard and monitor ports. Users are unaware of each other, and can run any application and access any hardware that has been made available to them; although, as the software on the host system is now being shared, extra software licences may be needed to stay within the law.

Despite feeble graphics — unimpressive even at 800 x 600 resolution — both products are a simple solution to PC sharing and could prove useful to those on a strict budget. Business Presentations told us that many schools are taking an interest in SharedWare.

However, neither product addresses our requirement for connecting multiple users into a coherent workgroup. The two main types of network environment we need to look at are client/server and peer-to-peer, and each has a specific use.

Illustration by Mike Bambury

☛ How does your network work?

A client/server network has all shared information, applications and hardware residing on a central computer, or server. This dedicated system will also be running network operating system (NOS) software that is designed specifically for this environment. Users, or clients, log in to the server and access the various services that they have permission to use.

A peer-to-peer network does not have a dedicated server. There's no centralisation, and users can decide what they want to make available to other users.

A client/server environment is more appropriate for larger businesses: it offers some very powerful features, and the centralisation of services makes it easier to manage. But decent, purpose-built servers can be comparatively expensive, and both Windows NT Server and Novell NetWare require a considerable amount of technical knowledge to understand and use.

A peer-to-peer environment will be the best choice for our featured network as it requires only small investment in extra hardware, and Windows 95 and 98 already have software support built-in. It's fine for up to ten users, although management will be more difficult as each user can individually control what resources they make available to their colleagues.

Now that we've decided on the best environment, we'll look at the hardware needed to connect everyone together. The first thing to decide on is the type of network cabling, as this will determine other purchases. The cheapest is Thin Ethernet, or 10Base2, which uses 50-ohm, co-axial cable. Although it's the cheapest option, 10Base2 is losing favour, as it's not overly flexible and a single break anywhere in the cable will take your whole network down. Furthermore, it's getting hard to find network cards with only 10Base2

connectors fitted, and 10Base2/10BaseT 'combo' cards are more expensive.

The preferred connection method for our network is 10BaseT, which has a speed of 10Mbits/sec. It's a baseband interface — meaning it only has a single transmission channel — and uses twisted pair UTP (the U stands for unshielded) cabling, and RJ-45 plugs. As with 10Base2, the maximum cable length is 185 metres. It's around the same price as Thin Ethernet but it does require an extra device called a repeater or hub, to which all PCs (and other devices, such as printers) are connected.

The hub architecture has two big advantages: a cable failure only knocks out the device at the the end of that cable; and adding extra devices is a breeze — you just plug them into the hub.

Although our network currently has a maximum of five PCs and, say, one printer, we'll be buying a hub with more than six ports as we want room for future expansion. A good starting point would be an eight-port hub which leaves us with at least two spare sockets for adding extra users or other network devices. Many manufacturers now have low-cost networking products specifically for small businesses and you'll find a round-up of these on page 139 of the February 1999 issue of *PCW*. A typical example is Nortel Networks' NetGear hubs: the eight-port version costs less than £40.

☛ Ready, willing and cable

Don't try to cut corners by using cheap Category 3 cable. It will work but, if you decide at a later stage to move up to Fast Ethernet, you'll have to replace it, so it's best to save time and money in the long term by installing only Category 5 data-grade cabling. Network cable doesn't take too kindly to being trodden on or flattened under trolley wheels, so keep it out of harm's way around the edge of your office, or protect it with a specialised plastic ramp.

Each PC will require a network card and we've covered this area specifically in this month's *Hands On Networks* column [*p243*]. Also known as a LAN (Local Area Network) adapter, this provides the interface between the PC and the network. As we've chosen 10BaseT
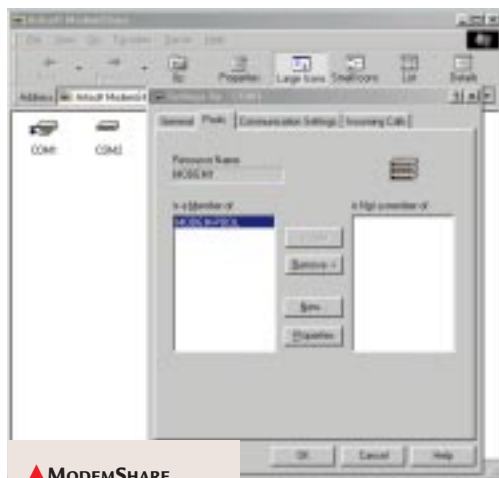

▲ BUDDY IS A SIMPLE METHOD OF SHARING A SINGLE PC BETWEEN TWO USERS
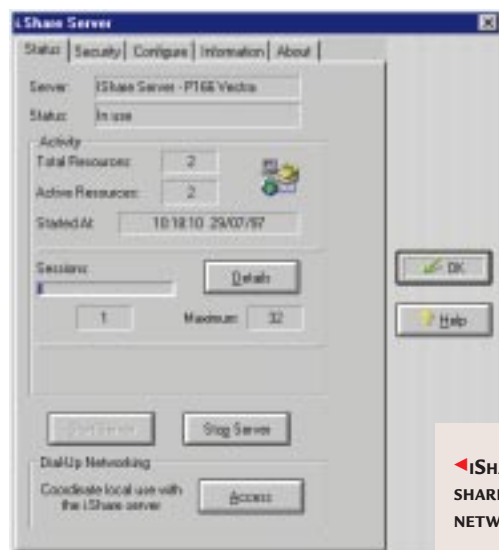
◄ iSHARE IS A SOFTWARE SOLUTION FOR SHARING A SINGLE MODEM OVER THE NETWORK FOR INTERNET ACCESS ONLY

Share option

▲ MODEMSHARE MAKES A MODEM AVAILABLE TO ALL USERS FOR FAX ROUTING AND INTERNET ACCESS

cabling, you'll need to use network cards with an RJ-45 socket. If you can afford it and your PCs have the correct expansion slots, opt for PCI cards as they support Plug and Play and will be easier to install. Go for a known brand name too, as you'll be less likely to experience problems, support will be readily available, and the more popular cards already have software drivers embedded in Windows 95/98. Manufacturers such as 3Com, Intel, D-Link, SMC and Accton spring to mind. If someone offers you a box of old, unbranded ISA network cards, just say no.

If you're buying new PCs, ensure that network cards are installed as part of the deal. You may be offered dual-speed cards that run at either 10Mbits/sec or 100Mbits/sec. These are an unnecessary expense unless you're moving very large files or using video-based applications, but they will save you time and money if you later decide to upgrade the network to Fast Ethernet.

☞ **From prints to internet king**
Although our network allows printers and hard-disk resources to be shared, we still want internet access. With no built-in support in Windows 95/98, we need to look at third-party products and a good example is iShare from ArtiSoft. It requires a single modem, an internet dial-up account and one PC to act as a modem server, and allows clients to use their browser or email package as if they were directly connected to the internet. At £92 inc VAT for a three-user licence, iShare is a far more cost-effective method of providing internet access than putting a modem on every desk.

Another alternative from ArtiSoft is ModemShare32, which takes shared access a stage further by working with all online applications and allowing users to send and receive faxes at their desktop. It too requires a PC to act as a modem server, and costs £151 inc VAT for a single-modem licence or £222 inc VAT if you want to share two modems on the network.

Small businesses have so much to gain from networking that really, it makes good sense to use it. It's not too difficult to set up, and won't cost a great deal. In fact, many vendors are now offering cheap network starter kits so you can get connected straight from one box. These include a hub, cables and network cards, and you'll find a round-up of three such products on page 140 of the February 1999 issue of *PCW*.

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The great outdoors: a single device does the trick

Some of the biggest savings can be made when connecting networked users to the outside world. Why use multiple phone lines, fax machines, modems and internet accounts when a single device attached to the network can provide all of these functions at a greatly reduced cost?

Another advantage is that management is a lot easier, as you can oversee everything from a single point. Unsupervised internet access can be a big problem, not just in terms of cost but also productivity, so it pays to be able to control it rigidly.

We've already looked at a couple of software options for modem sharing, but there are plenty of other alternatives. Instead of using one of your PCs to act as a modem server, you could attach a dedicated device to the network. Take Intel's Internet Station (£366 inc VAT), for example. This little box of tricks has a 9-pin serial port for attaching an external modem or ISDN terminal adapter and a couple of slots for Type II PC Card modems. It also has its own 10BaseT port so it can be connected directly to a hub.

Whenever a user fires up a browser or email package, the Internet Station automatically contacts the ISP and sets up an internet connection. It only does this when it sees an IP address that it knows is not on the local network. Management and configuration are carried out over the network using a standard web browser.

Nexland's ISB 200E [*reviewed in PCW, July 1999, page 96*] is a similar but, at £246.75 inc VAT, substantially cheaper alternative.

Multifunction devices are also becoming popular, as they combine more than one network service at substantially reduced costs. D-Link's DP-802 brings together a print server and router for only £170 inc VAT. And in last month's *Comms Hardware Group Test*, we looked at four ISDN routers, three of which came with an Ethernet hub.

How to network **a small office**

Here we'll run through a step-by-step guide to setting up our choice of network using a 10BaseT Ethernet hub and configuring PCs running Windows 98. The first task is to decide on the best location for the hub. It needs to be near a power supply and, ideally, in a centralised location in the office where it's easy to access but keeps the network cable from being underfoot. Apart from that, the main work will be carried out at each PC.
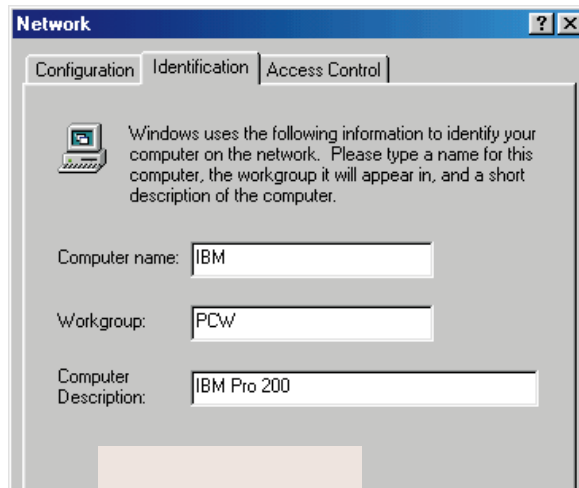
1 Install the network card
Shut down the PC, disconnect it from the power supply and remove the cover. Locate a suitable free expansion slot, fit the card, secure it firmly and replace the cover. Plug in the network cable and connect the other end to the hub.

2 Driver installation
Turn on the PC, and Windows 98 will detect the new hardware. If you chose a well-known brand of network card, Windows 98 should automatically load the best driver. If not, load the supplied driver disk and point Windows 98 to its location. Some other network files will need to be copied from the Windows 98 CD-ROM, so make sure you have this to hand during the installation. After restarting, the Network Neighbourhood icon will appear on your desktop and you will also be asked to provide a network user name and password. The password is optional, although if you do forget it, you'll still be able to use your PC but you won't have any network access.

3 Identify the PC
Each PC must have a unique computer name that identifies it to other users. If you tie this in

Network — Identification tab

Configuration | Identification | Access Control

Windows uses the following information to identify your computer on the network. Please type a name for this computer, the workgroup it will appear in, and a short description of the computer.

Computer name: IBM
Workgroup: PCW
Computer Description: IBM Pro 200

▲ **HERE YOU CAN TELL OTHER USERS ABOUT YOUR PC AND SELECT THE WORKGROUP IT WILL JOIN**

with the computer description, it is then clear to other users whose PC it is and what purpose it serves. The Workgroup name specifies which group of users it belongs to, so make sure that all networked PCs are using exactly the same workgroup name. Choose Settings/Control Panel/Network and enter this information from the Identification tab.

4 Provide a network address
Windows 98 defaults to installing the TCP/IP network protocol and requires a unique address to identify each PC. It also assumes that this address will be provided by a special system on the network called a DHCP (Dynamic Host Configuration Protocol) server. Since we haven't included one of these in our system, we need to provide static addresses to each PC. The TCP/IP address comprises four numbers, each between 0 and 255. The regulatory authorities that control their use on the internet have set aside three blocks that are specifically for local use only and are as follows:
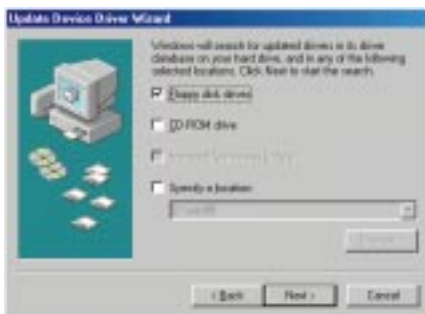
▲ **IF THE NETWORK CARD DRIVERS ARE NOT INCLUDED IN WINDOWS 98, YOU'LL NEED TO TELL IT WHERE TO LOOK FOR THEM**

▲ **LOADING THE DRIVERS FROM THE DISK SUPPLIED WITH THE NETWORK CARD**

▲ **THE CARD IS SUCCESSFULLY INSTALLED**

If you don't want to make the entire disk available, choose individual folders from Windows Explorer. To access a networked hard disk, open the Network Neighbourhood and select an available PC to view its resources. You can set a permanent connection by right-clicking on a resource and using the Map Network Drive option.

To make a printer available on the network, select the Printer Properties on the PC it is connected to. Select the Sharing tab, provide meaningful names and add a password if required. To access the printer from another PC, choose Settings/Printers and use the Add Printer Wizard. Select the Network printer option and browse the network. After choosing the printer from the Browse for Printer window, Windows 98 will load the drivers for it.

In our example, the drivers were automatically copied across the network from the PC hosting the printer but you can use the driver disk that came with the printer. ☐

▲DON'T WORRY ABOUT THE SUBNET MASK: WINDOWS 98 WILL FILL IT IN FOR YOU BASED ON THE IP ADDRESS YOU PROVIDE

```
10.0.0.0    − 10.255.255.255
172.16.0.0  − 172.31.255.255
192.168.0.0 − 192.168.255.255
```

Choose one of these three ranges, go to Network/Configuration/network component TCP/IP -> 'network card name'/Properties. Click on 'Specify an IP address' and enter your choice. Make sure that the first three numbers are the same for all PCs. For example, if your first PC is given an address of 10.10.10.1, make sure all other PCs use the format 10.10.10.x.

Don't worry about providing the sub-net mask address as Windows 98 will be able to automatically fill this in. Just make sure it's exactly the same for all PCs.

▼ CHOOSE WHETHER TO SHARE YOUR FILES AND PRINTERS FROM HERE

If you feel this is too much hassle, install the NetBEUI protocol which doesn't need network addresses and is loaded by selecting Network/Configuration/Add/Protocol/Microsoft/NetBEUI. But, if you're planning on providing some form of internet access, you will need TCP/IP installed.
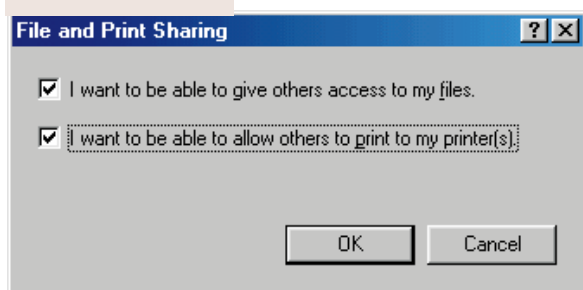
▼ YOU CAN MAKE YOUR ENTIRE HARD DISK AVAILABLE TO OTHER USERS AND PROTECT IT WITH PASSWORDS FOR DIFFERENT TYPES OF ACCESS

5 **Sharing resources**
Select Network /Configuration/File and Print Sharing, and tick the resources you want to make available. If you don't choose at least one, your PC will not appear as a network resource to other users. After re-booting, select the type of shared access you want to allow from the hard-disk Properties window. You can choose read-only access, full access, or make other users provide passwords first.

▲SHARE YOUR OWN PRINTER WITH OTHER USERS AND CONTROL ACCESS WITH A PASSWORD

▲USE THE ADD PRINTER WIZARD TO INSTALL A NETWORKED PRINTER

▶BROWSE THE NETWORK TO FIND SHARED PRINTERS ON OTHER NETWORKED PCs