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PC Tech

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Sharing Internet access has become a prime motivator for installing home networks. Fortunately, the setup is a lot easier than it once was.

PC TECH

By Bruce Brown

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Here's an increasingly common scenario: You finally get a cable modem or DSL to connect to the Internet in your home, and suddenly everyone in your family demands equal access. If money's no object, you can sign up for additional cable modems or DSL connections, but there's a better way to bring full-speed Web connectivity to each PC in your house: Set up a home network.

Low-priced but increasingly powerful network starter kits are making it easier than ever to network two or more PCs in your home. In this tutorial, we'll cover the basics of setting up a home network. We'll use an up-to-date home networking starter kit, a mixture of new and old PCs, and a printer.

Shared Internet access is the main reason many people network the PCs in their homes, a topic so important that modem sharing, including making the connections and setting up the software, will be the subject of a separate tutorial in an upcoming issue.

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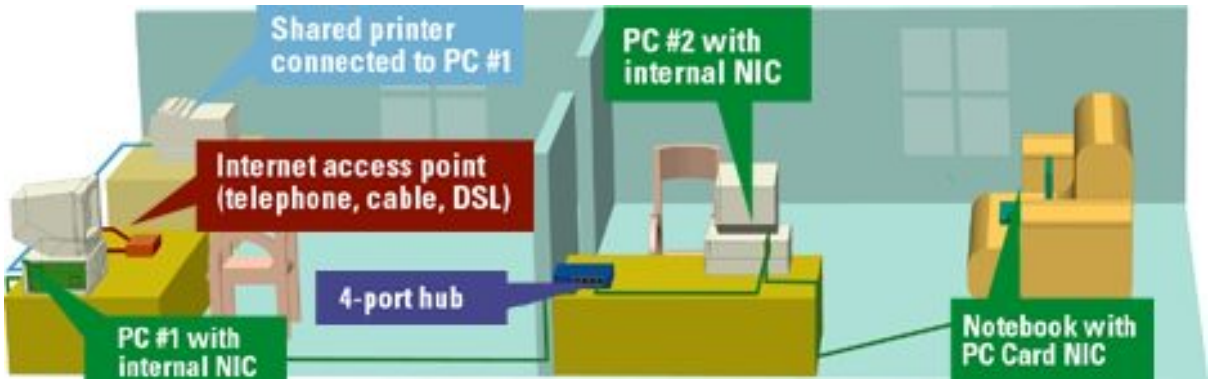
Home Network Connections: On a home network that uses Ethernet, each PC or laptop is connected through a network interface card (NIC) to a hub. Internet access, printers, and hard disks attached to any of the PCs can be shared by any of the other PCs onthe network.



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Although shared Internet access is the monster home networking motivator, other good reasons still count. Networked PCs make file sharing convenient, let you use one printer from all your networked computers, add security by facilitating backups, and provide a playground for network-enabled games. Each of the traditional reasons to network can be argued against easily, but when added to the undeniable advantages of shared Internet access, the combined force is making this a huge year for home networking.

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Which Flavor? We'll Take Vanilla

We chose wired Fast Ethernet technology for our home network example. Despite a broadening selection of home networking technologies that use existing phone lines, AC power lines, or no wires at all, Fast Ethernet is still the smart choice because of its high speed, reliability, relative low cost, and the ability to add more devices easily without significant performance degradation. If you can't connect your PCs with cables conveniently (or at all), the no-new-wires or wireless technologies are a good choice. But as long as you can "pull cable," it behooves you to do so.

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To demonstrate a home network setup, we looked to Netgear (www.netgearinc.com). We chose a Netgear DB104 Network Starter Kit ($130 street), which includes two PCI 10/100 Fast Ethernet network interface cards (NICs), driver software, and cables, as well as the Netgear DS104 hub, which automatically switches each of its four ports between 10-Mbps Ethernet and 100-Mbps Fast Ethernet, depending on the speed of the device connected. For further expansion, you can also uplink the hub to another hub.

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Both cards in the kit support 100-Mbps throughput, but using a switching hub gives you the flexibility to add PCs (extra PCI NICs cost $25 each) or printers with 10-Mbps connections to your network. The dual-speed nature of the Netgear DB104 kit also means that if anyone in your household brings home a notebook PC, the physical connection should be easy. (Note that if your notebook is configured for an office network, switching to a home network at night may not be a trivial undertaking. Check with your IT support people for a configuration cheat sheet to make network switching easier.)

We used the Netgear DB104 Network Starter Kit to set up a Windows 98 peer-to-peer network populated by a Micron Millennia 400 desktop PC, an NEC PowerMate 2166M desktop, and a Dell Inspiron notebook. To connect the notebook to the network, we used a Netgear FA 410TXC 10/100 PCMCIA card adapter ($85). After adding cards to the three PCs and connecting to the hubs, we configured each of the systems to share hard disk contents with other users on the network and print to a shared printer, an Epson Stylus Color 600, which was attached to the NEC desktop.

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Step 1: Plan First, Play Later

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If you plan ahead, you can save time setting up your network and making sure that it is more convenient. Assuming that you will be networking only a few computers and maybe a printer or two, decide ahead of time where the computers, printers, and hub will be located and how you'll place the cables. If you'll be sharing Internet access as well, be sure that at least one of the PCs is near a phone jack or cable or DSL drop.

If all of the PCs and peripherals will be in one room, which actually does happen fairly often in home networks, you may be able to run all the cables behind the PCs and avoid having to go under carpeting, through walls, or (worst case) between floors. If running the cables is going to be difficult, look for help from a company that installs home security systems and is experienced in getting wires into multiple locations without creating an unsightly mess.

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Step 2: Get Ready to Interface

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Once you've planned the layout of your home network, it's time to install the network interface cards (NICs). There are external parallel port and USB Ethernet NICs that don't require you to open the PC, but Fast Ethernet NICs are currently available only as internal adapter cards (usually using a PCI bus) or in PCMCIA (PC Card) format for use with notebook computers. There's no magic to installing an internal NIC in a PC, but be sure to ground yourself to prevent injury or damage. Seat the card firmly in an available, appropriate interface slot, and screw the card bracket into the PC case so it won't work itself loose. You should always turn off the power to your PC before removing the computer cover and inserting or extracting expansion boards. Many notebooks, however, let you insert PC Cards with the power on.

After you insert the NIC, you need to load the drivers. With desktop PCs you will likely be prompted for the driver software (usually provided on floppy disk) the next time you turn on the PC (see **Figure 1**). If you insert a new NIC into a running notebook, you'll likely be asked for the driver immediately. Most network starter kit vendors now present basic information for network setup and configuration on a foldout quick-start poster or booklet.

A likely but minor irritant in the process is that Windows 98 will ask for your operating-system disk several times during the NIC installation process, even if the same files have already been installed. You'll also be prompted to restart the computer at least once. When driver installation is complete, click on Start | Settings | Control Panel, and run the System app. From the Device Manager tab choose Network adapters and look for the NIC in the displayed list. If there is no red arrow or yellow exclamation point on the icon for your card, it has been correctly installed.

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Step 3: Go Configure

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After a NIC has been installed, the next step is to configure your PC and the network card to communicate with your network. You start this process by clicking Start | Settings | Control Panel | Network, which pops up the Windows 98 Network screen. It offers three menu tabs: Configuration, Identification, and Access Control. You have to repeat the following tasks for each PC containing a NIC.

The Configuration window (see **Figure 2**) displays the network components that have been installed on your PC, including clients, adapters, protocols, and services. A typical configuration will list Client for Microsoft Networks and Client for NetWare Networks before a number of adapters. In addition to your NIC, other adapters will likely include a generic Windows 98 Dial-Up Adapter and possibly one or more adapters for non-TAPI compliant online services, such as an AOL Adapter.

Two protocols, IPX/SPX and TCP/IP, will also likely be installed, with a separate item for each protocol for each of the installed adapters. The last item in the list should be a service identified as File and printer sharing for Microsoft Networks. If the file- and printer-sharing service or any of the above clients or protocols is not installed, the next step is to install each missing item. Click on the Add button, select the network component type, and choose the specific component from the displayed list.

For simple peer-to-peer networking, you should not have to change any TCP/IP settings. You can check the settings by highlighting the TCP/IP protocol listing for your NIC and then clicking on the Properties button. Note that if you install modem-sharing software or if you are bringing home a notebook configured to run on an office network, you will most likely be making changes to these windows.

Back at the Network applet's Configuration tab, you should click on the File and Print Sharing button and then check the boxes that let others access your files and use your printers. At this stage you're not actually selecting a drive or printer to share, but be aware that when you connect to the Internet with file sharing turned on, there is the potential for unauthorized access to your files. To counter this problem, modem-sharing software usually includes firewall protection preventing outsiders from accessing your shared drives.

At this stage it's likely that you've restarted your PC after software prompts at least once or twice as Windows 98 registers the new network components you've selected. Remember to keep your Windows 98 CD-ROM disk handy.

Before leaving the Network properties dialog, the last task required is to set your PC's identification. Click on the Identification tab (see **Figure 3**). You do not need to fill in the Computer Description field, but you should use a unique Computer name for each PC and the same Workgroup name for all of the PCs on your network. If you don't use the same Workgroup name, your networked PCs won't be able to communicate.

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After the NICs are properly installed and configured, the next step is to connect each card to the network hub via a single cable. For Fast Ethernet you'll most likely use Category 5 twisted-pair cable with an RJ-45 connector (it looks like a large telephone plug). Category 3 twisted pair cabling uses the same type of connector and is less expensive than Category 5 but is rated only for regular Ethernet networks (and yes, you'll probably find it won't work at 100 Mbps). Any PC can be up to 328 feet (100 meters) from the hub, but most likely you'll use shorter cables. If you need extra cables, you can expect to pay $5 to $30 depending on the length. Buy cable from known companies, such as Belkin Components, Cables to Go, and Compucable: Quality matters a great deal, so don't buy a bargain with an unfamiliar brand name.

The hub itself doesn't require software or configuration, but it does need to be powered by an AC adapter. The only change you might make to a hub is if you connect it (now or later) to another hub, in which case you may need to flip a switch that converts one of the normal PC ports on the hub to an uplink port. Some hubs have a separate, special-purpose uplink port.

When you connect PC network cards to a hub, assuming everything is powered on, indicator lights will show the connection and often, as with the Netgear hub, indicate the maximum connection speed (either 10 Mbps or 100 Mbps). Other lights may indicate link integrity and activity for each connection. The Netgear hub adds a series of lights that display overall network bandwidth utilization.

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After you've installed the NICs, configured your network settings, and connected the PCs to your hub, the last step in setting up a basic home network is to select drives and printers to share on the network. Note that if you did not enable File and Print Sharing in the Network applet on any PC on your network, you will not be able to share drives in or printers attached to that PC.

To share a drive or a folder on a drive, right-click on the drive or folder in the My Computer window or as it appears in Windows Explorer. Select Sharing... and enter a name that's unique on that computer (see **Figure 4**). For example, three PCs on a network could each have a shared drive identified as DriveC. Descriptive names are a lot more helpful when searching on a network; for example, BillsDellC is more helpful than plain DriveC.

After naming a drive or folder, you can select the type of access you want to grant users on the network (read-only, full, or password-dependent), and you can assign passwords. After you click Apply or OK, the drive or folder will shortly be available to users on your network. To access files in a shared drive or folder from another computer, you can click on Network Neighborhood either from the Windows Desktop or in Windows Explorer. A list of computers currently installed and running on your network will appear (see **Figure 5**). Through these you can select, open, copy, move, and delete files and folders on shared drives just as if the data were on your own PC.

To share a printer, you first open My Computer or click on Start | Settings | Printers and then right-click on the printer and select Sharing (see **Figure 6**). Select Shared As, name the printer, and click Apply or OK to complete the process. You can't immediately print on a shared printer from a networked PC, however; first the desired printer must be installed on each PC that will use it, a task made relatively easy with the Windows Printer Wizard. Select Start | Settings | Printers and click on the Add Printers button to start the wizard. When you are prompted for the method of printer attachment, select Network printer and click on Browse in the next screen to choose from the printers defined as shared on your network.

In most cases, the required printer drivers will copy to the remote PC to complete installation, although some printers, particularly those that use monitoring software, may require you to run the original printer software on your PC to complete the process. After a printer is marked for sharing and installed on a network PC, someone using that PC can choose the printer, and even set it as the default printer.

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When your network installation and configuration tasks are complete and the cables securely connected, you're finally ready to share files, play network games, use all the printers on the network for the jobs for which each is best suited, install modem-sharing software, and even protect your data by copying vital files to PCs on the network.

Network setup still isn't simple, but it's much easier than in previous years. The good news is that although installing and configuring the first NIC may take from 30 minutes to an hour if you're extremely thorough and insist on checking everything, once you gain confidence, installing another NIC will take you just a few minutes.

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