Solving problems

Frustrated because your PC can't make a connection? Keep losing a link? We explain how to diagnose and fix many of the most common home networking problems

Running a home network is an excellent way to help you get more from your PCs, but it's not always easy. To get your systems communicating you could have to reconfigure your hardware, install and set up **drivers**, and perhaps even tweak Windows. None of these steps are difficult, but if you miss one, or sometimes even follow the instructions in a slightly different order, then your PCs will stubbornly refuse to talk to each other. And often there won't be any immediately obvious reason why this might be.

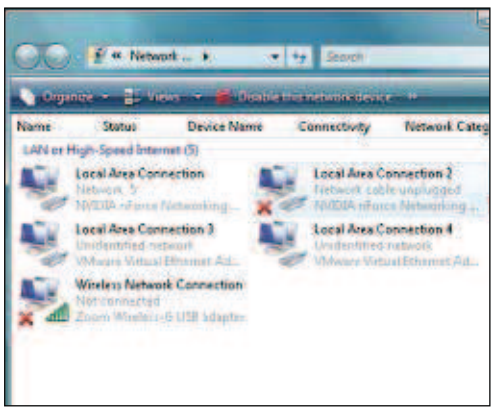
If you're at work and something goes wrong with the system, you can simply phone the network administrator and get him or her to fix it. But at home, you *are* the network administrator, which can be both daunting and exasperating, depending on your technical skill level and confidence with computers.

Before you tear your hair out in frustration, however, have a read of this feature. In it, we will provide you with some useful strategies for tackling network problems, as well as solutions to many of the issues you're likely to encounter.

Logical approach

You've set up your network, you're sure you've followed the instructions properly, so why isn't it working? The temptation is to rush in, change every setting you can see and try again. That's a natural reaction, but also a very bad idea. If you make five tweaks all at once, for example, then one of those may well fix the problem you're having. But there's a good chance that one of the others will break something else, so your network still won't be running properly.

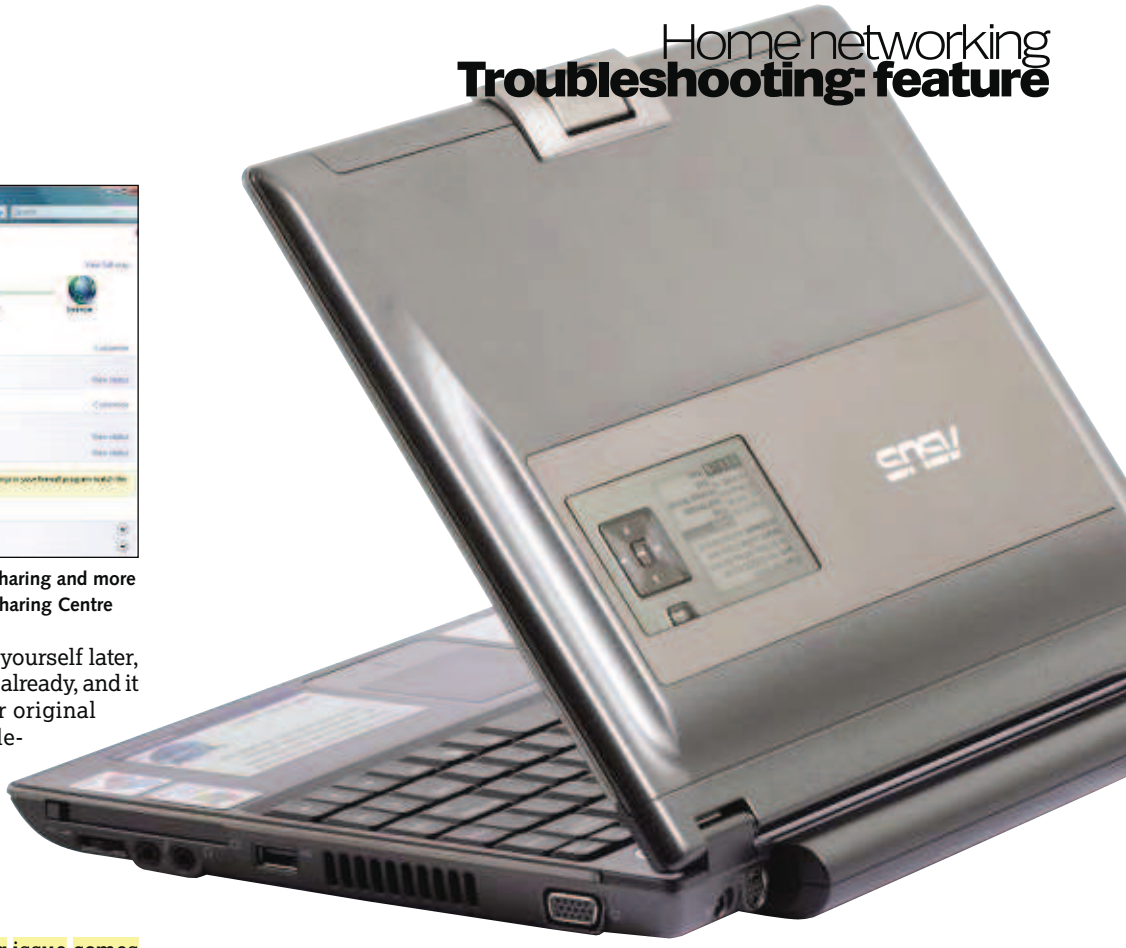
If you run into networking problems, then, it's a much better idea to work slowly, systematically, and only change one setting at a time. It may seem a hassle at the time, but this patient approach will pay off, and you'll solve problems more quickly in the long run. It's also sensible to make notes of whatever settings you've changed.



▲ Windows Network Connections dialogue box will often warn you if a network cable has been unplugged

▲Windows Vista file, printer and media sharing and more are all controlled from the Network and Sharing Centre

That will save you from repeating yourself later, making tweaks that you've applied already, and it also makes it easy to restore your original settings later. Network troubleshooting isn't just about tweaking values in dialogue boxes, of course. In fact, the first place to look for problems should be somewhere else altogether.



▲Be careful when handling your laptop. It's often easy to turn off wireless networking by mistake

Can't communicate

The most fundamental networking issue comes when your PCs can't communicate with each other at all. Even though you've connected everything up, they still behave like standalone, disconnected systems.

If you've only just installed, plugged in or reconfigured some network hardware, then this isn't unusual. **Reboot** your system(s) and try again. If this still doesn't help, then make sure you're trying only a simple network test. Go to Start > My Computer (in Windows Vista, go to Start > Computer and press the ALT button on your keyboard), click Tools > Map Network Drive > Browse and check whether your other networked PC pops up. Be patient; it might take a few minutes. Also, check to see if all your PCs can get onto the internet.

If these basic tests fail, it's wise to check your current network status with Windows. Open the Network Connections **applet**. Click Start, type **Run** if you have Windows XP, type **ncpa.cpl** and press Enter on your keyboard. Look for the **icon** representing your network adaptor and check its status. There are several possible options. If Windows says your network status is 'Unplugged', then you may have a cable problem. Check to see if your PC is connected to your **router**, or another PC, properly. A light should appear when the connector is plugged in to show you're making a good connection.

PCs with **wireless** adaptors might show a status of 'Not connected', which also means the adaptor can't reach your network. Do you have the right security settings? If you've enabled **WPA** on a router but have implemented no security on a wireless adaptor, say, then you'll run into problems. Try turning security off on all your wireless devices, just briefly, and see if that helps.

A status of 'Limited or no connectivity' could mean there's a router problem, or an issue with your internet connection. A status of 'Disabled' suggests the network adaptor has been turned off. Right-click it and select 'Enable'. If the status reads Connected, then Windows seems to think everything is well. You may still have problems reaching the internet through a router, though. Check that it's configured correctly for your ISP; perhaps restart the router and let it connect again.

If the problem still isn't clear, then you can always right-click the network adaptor and choose Repair (XP) or Diagnose (Vista). Windows XP applies a few limited tricks here, then tries to connect to the network again: it might work, but don't bet on it. Windows Vista, however, is much smarter and can make some genuinely useful suggestions, so follow any instructions it provides carefully. Don't worry if Windows can't resolve the problems, though – there's plenty more you can do for yourself. ▶

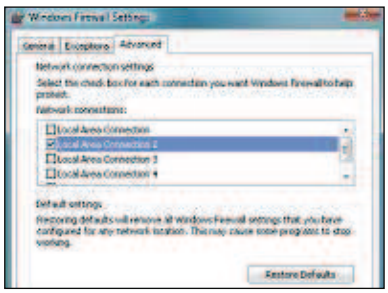
Protect and serve

Firewalls offer essential protection online, where they'll block incoming connections from **hackers** trying to break into your system. But sometimes they can also block connections to and from other PCs in your home network, preventing you from accessing them or sharing files.

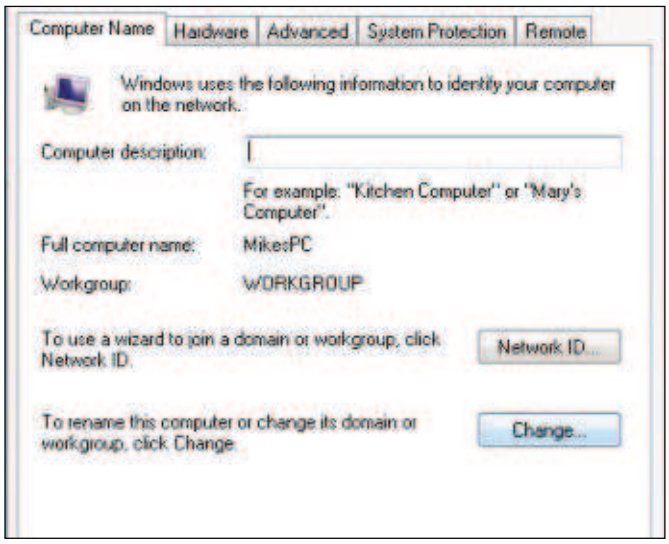
To test for this kind of problem, first disconnect from the internet, then turn off your firewall (click Control Panel > Security > Security Centre to disable the Windows Firewall). Antivirus and other security tools sometimes include firewall-type functionality, so disable those, too.

If your network now runs properly then you're close to success. Enable each security program until you find the culprit, then look for configuration options that will ensure it doesn't block the network in future.

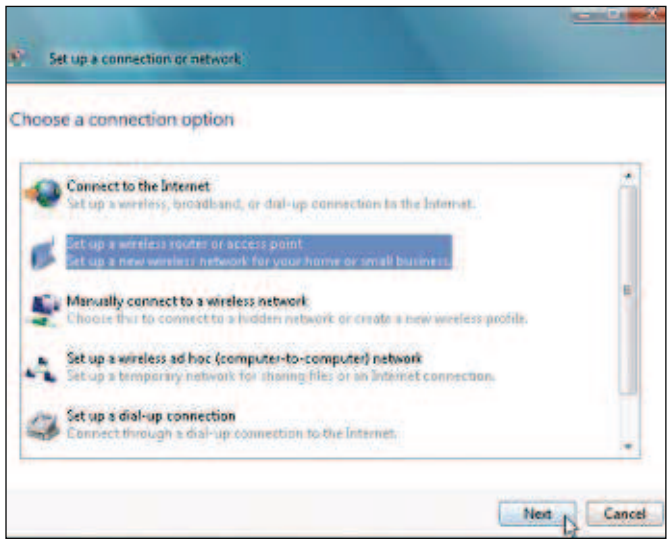
The Windows firewall won't allow file and printer sharing unless it's explicitly enabled, for instance. And other firewalls usually have the ability to define a trusted 'local network' range of IP addresses that won't be blocked. Enter the relevant details here and your network should start working.



▲ Minimise network problems by using a firewall only on internet connections



▲ Browsing your network is easier if every PC is part of the same workgroup



▲ Vista and XP provide wizards that can help you set up a network connection

Hardware problems

Your network problem could be a simple hardware issue. Is your router turned on? Have you accidentally switched wireless networking off on your laptop? Are all cables or wireless adaptors plugged in correctly, and into the right ports?

Most networking kit has one or more status lights that can provide clues. A light should appear when you plug a network cable into the back of your PC, for instance, to show it's making a good connection. Wireless adaptors and routers usually also have lights that change colour, are steady, or flash at different rates to let you know what's going on. Check the documentation to see if your hardware is trying to tell you something.

Think about where you're plugging in the network hardware, too. If you connect a wireless adaptor into an external **USB hub**, for example, it may not receive enough power. Plug it into a port on the back of your PC and you're less likely to have problems. Wired network ports can fail, too, both on PCs and in routers or hubs. Try your network cable in a different port.

If you've borrowed a network cable from somewhere then it's also worth considering whether you have the right type. If you're connecting a computer to a router or hub, then you'll need a patch cable; connect two computers together directly and you should use a crossover cable. Many network devices work with both types, but this isn't guaranteed, so take a closer look at the cable itself. Most have 'crossover' or 'patch' printed on them to help avoid mistakes.

By now you may have prodded, poked, plugged and unplugged various devices. Reboot, then try your system again. Any better? If not, then move on to the most common form of problem – configuration issues.

Tweak your settings

Start up most networked PCs and they'll be assigned an **IP address**, which is then used to help them communicate with other systems. If the IP address isn't correct, then you'll probably have problems – so that's the best place to start checking your network configuration.

Click Start > All Programs > Accessories > Command Prompt, then at the command line type **ipconfig/all** and press Enter on your keyboard for a list of information on your network adaptors. Pick your network adaptor and make a note of its IP (or IPv4) address and subnet mask. On our test system these were 192.168.1.2 and 255.255.255.0, respectively.

Now for every number that reads 255 in your subnet mask, take the matching IP address number to form the network base address: in our case a subnet mask of 255.255.255.0 means we use the first three numbers only to give us a base address of 192.168.1. Yours may be different – 192.168.50 or 10.0.0, perhaps. It generally doesn't matter as long as all your PCs have the same network base address and subnet mask.

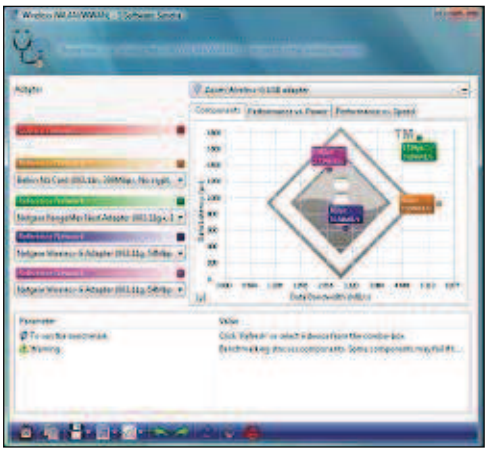
One common problem you might uncover here is that just one PC has a network base address beginning 169, completely different to the others. 169 addresses are used when your PC hasn't been able to reach your router, or otherwise

Speed trap

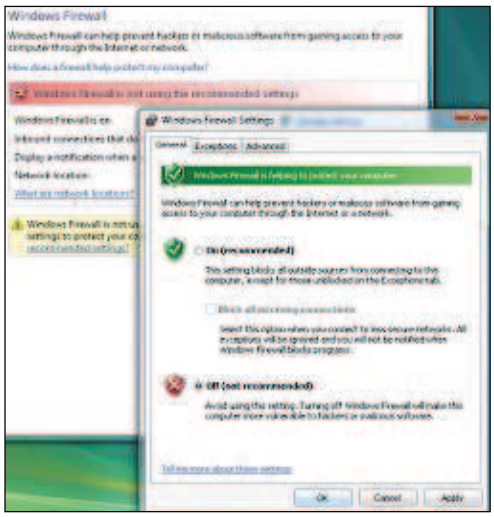
Most network kit proudly advertises its maximum speed in huge numbers on the box, so it can be disappointing if you find your 108**Mbit/sec** wireless network can't even reach half that figure. But this doesn't necessarily mean you have a problem.

In reality the advertised figures are only a theoretical maximum. Networks also have to transmit lots of supporting information to help with reliability and security, reducing the bandwidth available for your data. Most wireless devices will achieve less than half their maximum speed in real life, for instance, even if the signal only has to travel a few feet. It's a similar story with wired networks.

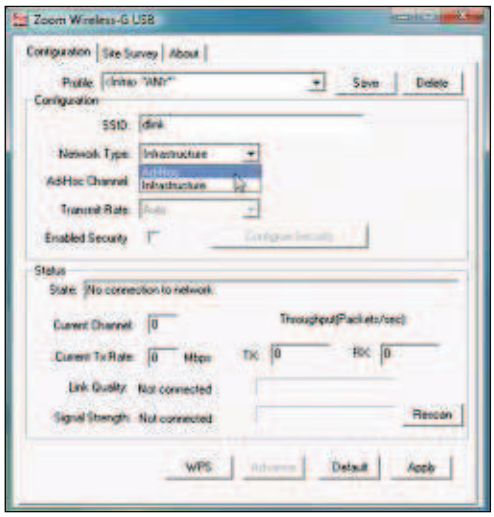
Speeds will also fall if a slower adaptor connects to your network (a 54Mbit/sec adaptor with a 108Mbit/sec router, say), if there's interference and the network must frequently resend data, or if your wireless systems are some distance apart. At 200 feet apart, for example, you'll be lucky to achieve 10% of the maximum speed.



▲ Sisoft Sandra (www.sisoftware.co.uk) has a handy tool for measuring the speed of your network



▲ Having network problems? Firewalls are a common culprit. Disable yours briefly to see if that helps at all



▲ Choose a wireless network for your driver: use Ad-Hoc to communicate with a PC; Infrastructure for a router

obtain an address from your network, and so has generated one itself. That means the issue probably lies with this system.

If your problem involves a wireless adaptor then make sure it has **WEP**/WPA security set up properly, as with your wireless router. Also, confirm that your adaptor software is using the right network mode: 'Ad-Hoc' if you're connecting to another PC; or 'Infrastructure' if you're connecting to a router or access point. Each device must use the same **SSID** (Service Set Identifier) and channel number.

If this is a wired connection, then check the cable from that system again, perhaps swapping it with something that is working. And make sure your PC or router is configured to assign IP addresses correctly, too (see the workshop over the page for details on this).

File sharing

Once you have established if your network hardware is working correctly, then turn your considerations towards the software you're running and your Windows configuration. Most of these problems are caused by a poorly configured firewall, so start there (see box, page 79).

Windows Vista can classify a network as 'Public', which lets you get online but prevents you from browsing other networked systems (and they can't browse you, either). This is perfect on a laptop that you'll take to wireless **hotspots**, as you don't want snoopers nearby to be able to access your system. But apply the same Public setting on a PC at home and your network probably won't run properly.

To check your Vista settings, click Control Panel > 'View network status and tasks' to open the Network and Sharing Centre. Windows will display next to every network whether it's set to Private or Public. Click Customize to change this, or scroll down to the Sharing and Discovery section to see and change your current network settings. If you would like to see other PCs on the network and share their files, say, make sure 'Network discovery' and 'File sharing' are on.

File sharing and Network discovery work best when all your PCs are a part of the same workgroup, and this applies to all versions of Windows. To check this, right-click My Computer (or 'Computer' if you're using Vista) and select Properties > Advanced System Settings > Computer Name. Make sure all the PCs on your network have a unique computer name, but share the same workgroup, rebooting the system if you make any change.

Getting your networked PCs to communicate and share resources isn't always the end of the story. Wireless networks in particular can suffer from connection problems that reduce speed to a crawl, or make the connection drop intermittently.

If your systems are far apart, then that could be the problem. Experiment with different positions for your router and PCs, if possible, and look for any change. Check our workshop on improving wireless range (see page 82) and our further network troubleshooting tips on page 86.

You may also be able to boost performance by installing new drivers for your network adaptors. Pay a visit to the manufacturer's website, choose your product and take a look at what's available. Upgrading your router's **firmware** can also help (check the configuration menu for an Update option), but you should only try this once you've exhausted all other possibilities, as it can cause other problems. For example, if the upgrade process fails – the router loses power part-way through, say – then you could be left with a useless plastic brick.

When all else fails

If even new drivers and firmware don't solve your network connection, communication or file-sharing problems, it's time to get help. If you think the issues relate to your hardware then check the manufacturer's support site for useful articles, or type the model name into Google and see what comes up. When it's more likely to be a Windows problem, then click Start > Help > Troubleshooting for advice, or visit Microsoft's Windows Help site (**windowshelp.microsoft.com**).

And if you really don't know what's going wrong, then try describing your problem at the Tech Support Forum (**www.techsupportforum.com**), Broadband Reports (**www.dslreports.com/forum/sharing**) or Wi-Fi Planet (**forums.wi-fiplanet.com**). The chances are someone has experienced the same issue before and will know exactly how it can be fixed.

Jargon buster

Applet Small utility program within Windows, such as Calculator.

Driver A program that allows Windows to communicate with a peripheral device.

Firewall Software or hardware that prevents unauthorised access to a computer over a network.

Firmware Basic software stored on a device (such as a graphics card) that controls its basic operation.

Hackers People who break into other people's computers and networks, often in an attempt to steal sensitive information.

Hotspot A public area covered by a wireless network. Some are free to use; others require users to pay by the hour or day.

Icon A small image used by Windows to identify a file or application.

IP address An identifying number of a computer attached to a network.

Mbits/sec Megabits per second. A measure of data transfer speed.

Reboot To restart a computer, normally by using the 'Restart' option on the Start menu.

Router A device used to connect more than one computer together and/or to the internet as an alternative to a modem.

SSID A name used to identify a wireless network.

USB hub An external or built-in device with several USB ports. It serves as a relay station, allowing you to add multiple devices.

WEP Systems that protect data over wireless networks.

Wireless The ability to connect devices, or connecting to the internet, without the use of cables.

WPA A secure form of protection for wireless networks.

For more Jargon Buster definitions see page 97 or visit www.computeractive.co.uk