



# Set up a network

From networking basics to advanced setups, here's your guide to connecting to the web or other PCs with Ubuntu.



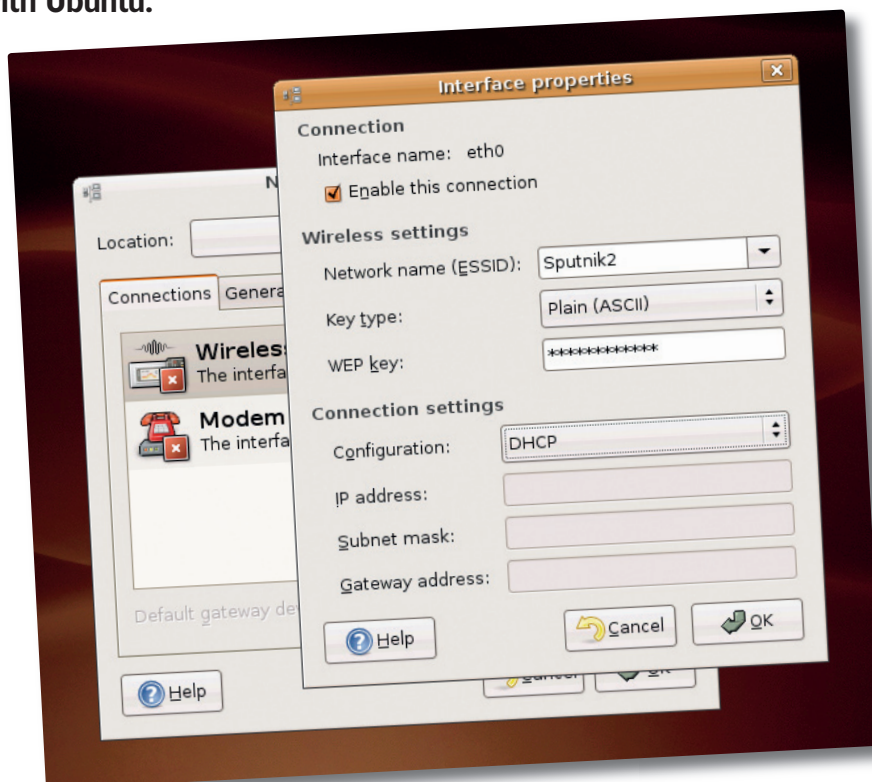
IF YOU'VE never configured a network connection before – don't panic! There really isn't all that much to it. It only starts to get difficult when you have very specific requirements, or your hardware isn't standard. For the vast majority of users, configuring a network connection with Ubuntu will be as painless as sending an email, but if you do experience any problems, we're going to give you enough background information over the next four pages that even a beginner should be able to make a connection. Just take it a step at a time.

Working on a network enables you to use the internet or set up a local area network (LAN), where you can link to other PCs together for shared access to files and printers.

It used to be the case that even for computer veterans, correctly configuring a PC to work on a network could be tricky. There were just too many things that could go wrong, and trying to solve the typical glut of problems often meant that if you didn't start out an expert, you'd finish as one!

### THROUGH THE ETHERNET

Things have changed, and many Linux users won't even need to touch their network setup. If your internet connection uses an Ethernet cable, you



Using the Network configuration panel you can create different portfolios for different locations, such as wireless settings for home and away.

“These pages will be useful if you want to try more advanced networking, such as creating your own home network or sharing an internet connection with other machines.”





should find that your connection will already work. Ethernet cables are typically used in an office environment to connect all the computers together, but they're increasingly common for broadband connections. The Ethernet connection will be between your computer and either a broadband cable modem or an ADSL modem. Ubuntu will have recognised your network interface and configured your connection at installation time. If you have one of these connections and you can't access the internet, the problem is likely to be with your modem. You should find that connecting to the modem's configuration web page (found in the modem manual) will allow you to start the internet connection, or see where the problem is.

If your internet connection doesn't use an Ethernet connection, or your LAN connection hasn't configured itself automatically, you will need to manually intervene. But these pages are also going to be useful if you want to try more advanced networking, such as creating your own home network or sharing an internet connection with other machines on your network. We'll cover how to manually get your network connection working, how to perform a few diagnostic tests if things go wrong, and even how to share your files with other users of the network. Wireless networks are also becoming increasingly popular, and they can be added and configured in just the same way as with other networks. Read on to see how – thanks to Ubuntu, this is all easily attainable.

## SETTING UP

Network connections are created and edited from the Network Settings window. Like other configuration settings in Ubuntu, this can be found under the System > Administration menu and you'll need to enter your password for it to display.

Any network connections that were detected will be listed. If the device was correctly identified and configured, a line of text beneath the interface will give its status as active. Other interfaces, such as an internal modem, will appear as not configured. To the right of the list are three buttons for probing the selected device's properties, activating a device and deactivating a device. This is because you may use your computer in different circumstances, especially if it's portable. Perhaps you'll use an Ethernet connection at home and a wireless or modem



**All your networking needs are catered for within the Network Settings window.**

## ABOUT WINMODEMS

Winmodems are designed primarily to work only with Microsoft Windows. This is because the actual hardware contained within a Winmodem is nothing more than a re-programmable chip, and does very little without being directly

controlled by a driver. Much of the functionality is therefore part of the software held within the driver, and this is exclusive to each Winmodem manufacturer. Attempts have been made to bring driver support for Winmodems to

Linux – these attempts have had mixed amounts of success depending on the modem. To check compatibility, you need to visit the constantly updated Linux Winmodem website at <http://linmodems.org>.

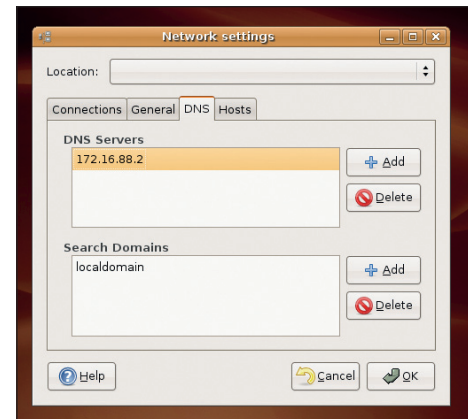
connection while travelling. Using the drop-down location field at the top of the window makes it possible to assign different connection setups to different locations. This means you can easily switch between configurations from the Network Settings configuration window. When you click on the location bar for the first time, it will ask if you want to create a new location. You might want to call this Home and configure it to use your broadband connection. If you are using a laptop, you would then be able to create another location for when you are travelling.

Activating and deactivating devices gives you more control over how your computer connects to the network. The other option on the first page is called the Default Gateway Device, which has a drop-down list to the right. This list will contain abbreviated forms of the interfaces listed above – eth0 for Ethernet, ppp0 for a modem connection and wifi0 for wireless. Selecting an interface as the default gateway will simply route all the network requests through this device first. If you want to share your internet connection with other computers on the network, this should be set to the device that's connected to the internet so that you can browse the web. This will also mean that other computers that are connected to yours will be redirected to the internet connection.

## DNS EXPLAINED

There are three other pages to the Network Settings window. The first is called General, and lets you define a hostname and a domain name for your computer. This isn't all that important for home users; it just means you can create your own name for your machine by changing the default hostname of 'Ubuntu'. The domain name is mostly used for offices that run their own internal network, and would usually be set to the department name.

The second page is called DNS. This holds a list of servers that your machine will use to find internet addresses. As you may know, computers on a network actually find one another using a numerical address a little like a telephone number (it's called an IP address), but they're not so easy for humans to read and remember. For this reason, we use a text-based name that is translated to a number by the dynamic name server – or DNS for short. For example, you might type 'www.bbc.com' into your browser, but behind the scenes your computer will contact the DNS, tell it that you're looking for [www.bbc.com](http://www.bbc.com), and the DNS will return an IP address. In this case it would be 212.58.224.36, but



**The DNS is automatically configured when a working network connection is detected.**

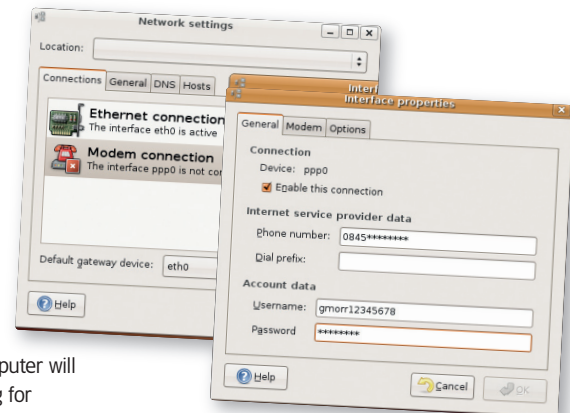
the number can change while the name stays the same – hence the 'dynamic' part.

The final page of the Network Settings window should now make more sense, because here you can enter some of the more common IP addresses for your local network and assign to them your own names. This is useful for when you need to access other machines on a LAN, but would rather do so using a name than a number. Just click on Add, and then enter the IP address of the computer, followed by one or more aliases you'd like to use for this machine. Now whenever you want to access the machine from your computer, you only need to enter the alias, rather than the IP address.

That's enough background information on Linux networking. Let's now make a connection.

## A MODEM CONNECTION

Even in the age of broadband, the faithful old modem is still the way a lot of people connect to the



**Modems are the easiest devices to configure.**



## NETWORK CONFIGURATION

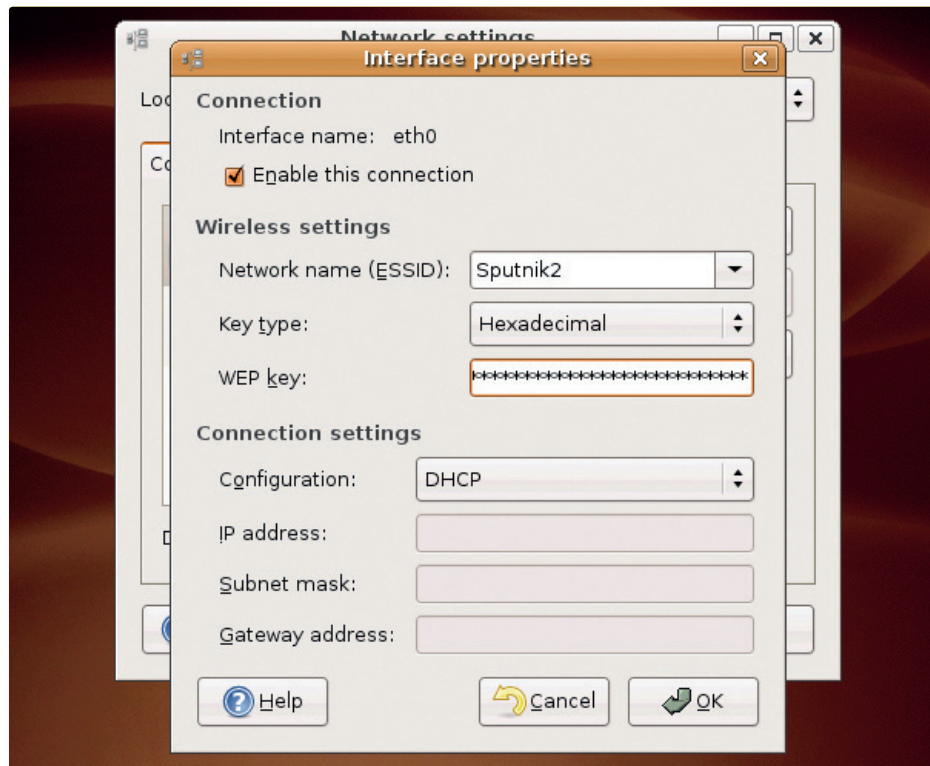
⇒ internet. As long as you've got an external device plugged into your computer's serial interface, you shouldn't have any problems.

But internal devices and those that are bundled with certain laptops can cause a few problems (see the Winmodems box, on page 65, for an explanation). Because a modem connected to the serial port can't be detected automatically, Ubuntu makes the assumption that you've got a modem, but haven't configured it yet. This is why there will already be a 'modem connection' listed in the Network Settings window.

To configure the modem connection, just click on the Properties button. This will open a window where you can enter the telephone number of your internet provider, along with space for the username and password you need to make a connection. You will also need to click on the Enable The Connection tick-box. There are two other pages: Modem and Options. Select Modem first. This is where we specify how your modem is connected to the computer. You can normally click on Autodetect, and Ubuntu will be able to work out where the modem is located – it's usually `/dev/modem`. However, you can manually

set which serial port your modem is connected to from the drop-down menu. The location `/dev/ttyS0` equates to the first serial port, and `/dev/ttyS1` the second. For any modern telephone system, leave the dial type as 'tone' – the alternative 'pulse' is far less common. The only other option is for changing the dialling volume. Raising this will just mean you can hear the modem dial your internet provider and make a connection, which is useful if you don't think you're getting through to another computer.

Finally, the Options page lets you fine-tune a couple of settings, and can be left as it is. When you're satisfied, select OK to save the settings. Now to make a connection using your modem, simply make sure the modem connection is selected in the Network Settings window and press the Activate button. You're ready to go.



Location switching + wireless networking = flexible networking system.

## A WIRELESS CONNECTION

There are two things that can happen when you install Ubuntu on to a computer with a wireless network card. You might find that the hardware is detected automatically, and appears in the Network Settings list. Or, unfortunately, you might find that it isn't recognised at all, and as a result doesn't appear in the list. If your card is recognised, that means Ubuntu has been able to find a driver for your device and the only thing left to do is configure it with your wireless network settings. If your card doesn't appear, don't worry – take a look at the Solving Problematic Wireless Cards box, below.

Select your wireless card, and click on the Properties box. This presents a window where you need to enter all your wireless network properties. At the top of the page is a tick-box to enable the connection, and underneath this is a field for entering the name of your wireless access point, otherwise known as the ESSID. Getting this right is essential, as Ubuntu will use the name to connect to the correct device.

## SOLVING PROBLEMATIC WIRELESS CARDS

The reason why some wireless cards aren't recognised on Linux is that the cards' manufacturers haven't provided enough information for Linux developers to be able to write their own driver to make it work. But there is a rather clever solution using a tool called *Ndiswrapper*. This is a piece of software that actually wraps around the Windows driver for your card, and translates all the connection information into a format that Linux can use. The only problem is that it needs to be downloaded from the internet – so you need some way to connect your machine with the wireless card to the internet before you can get wireless networking.

We'll use *Synaptic Package Manager* to install *Ndiswrapper*, and we also need to add one of Ubuntu's repositories called Universe. Universe is a server on the internet that holds all the packages that don't fit on to the Ubuntu CD, and is

a great way of getting extra software. Start up the *Synaptic Package Manager* (select it from the System > Administration menu), click on Settings > Repositories and choose the 'Ubuntu 6.06 Dapper Drake (binary) Community maintained Universe' channel by clicking on the tick-box. Close the window and click on Reload. *Synaptic* will then download a list of all the packages held on the Universe server.

To install the *Ndiswrapper* packages, click on Search, then type *ndisgtk*. Make sure you select the package by clicking on the tick-box to the left. Follow the same procedure for another package called *ndiswrapper-utils*. Clicking on Apply will then install what we need.

After the packages have been downloaded, there will be a new entry in the System > Administration menu called Windows Wireless Drivers. Selecting this will open a small window with a large

Install New Driver button. Now here's the tricky part. You will need to get a copy of your wireless card's Windows driver. If Ubuntu is sharing the hard drive with a Windows installation, you should be able to use the files installed on Windows. Otherwise you're going to need to download the driver from your card's manufacturer, and uncompress the download so that you can get at the files it contains. This is usually just a case of clicking on the download and extracting the contents to a different location.

Once you've either downloaded or located the Windows drivers for your device, you need to locate a file ending with '.inf'. This is the file Ubuntu needs to install the Windows driver. Next, select our new Windows Wireless Drivers entry from the System > Administration menu. This will open the driver installation window, and you should click on the Install New Drivers button. From the

small window that appears, click on Location and point the file requester that opens in the direction of your Windows '.inf' file. You will find that Ubuntu adds the device into the Wireless Network Drivers window, as well as the Network Settings window we've been using in the main body of the text, which can be quickly opened from here by clicking on the Configure Network button.

Problem solved! Refer to the main text on how to make a connection to a wireless network.



Windows wireless drivers can work with Ubuntu, but you must locate the '.inf' file.





## HOWTO... SHARE FILES ACROSS YOUR NETWORK

One of the most useful things you can achieve with your own local network is sharing files with other users. There are several ways to do it, but in Linux one method has proved the most popular. It's called *Samba*, and can attribute its popularity to the fact that it's compatible with almost all Linux machines, as well as Windows machines.

This is because *Samba* is an excellent and open implementation of Microsoft's networking system, and even enables you to share printers along with your files. In fact, it's a good reason for using Linux in the first place. *Samba* allows users to access their home directory from any computer on the network, as long as they share the same username and password on each computer.

A *Samba* client will already be installed on your system, but to share

your files with other computers on your network you need to install the server component. You can accomplish this by selecting the *Synaptic Package Manager* from the System > Administration menu, and searching for a package called *samba*. Select this and click on the Apply button to install it.

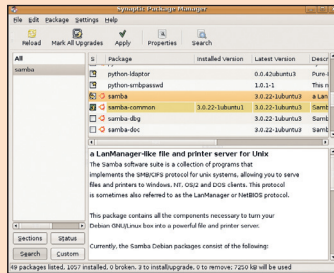
After the installation has finished, you will find a new System > Administration menu entry called Shared Folder Settings. Clicking on this will open a window where you can add and remove your own shared directories – these are called shares in *Samba* speak. To share your home directory, just click on the button to the right of Path and select your username from the drop-down list.

Other locations that make sensible shares are listed, and it's possible to add your own location if you can't find one to suit your needs. Available printers connected to your machine will also be listed. The button underneath the Path will read SMB, which is shorthand for *Samba*. This option is here because it's possible to install other file sharing protocols alongside *Samba*. The Network File System is often a second choice.

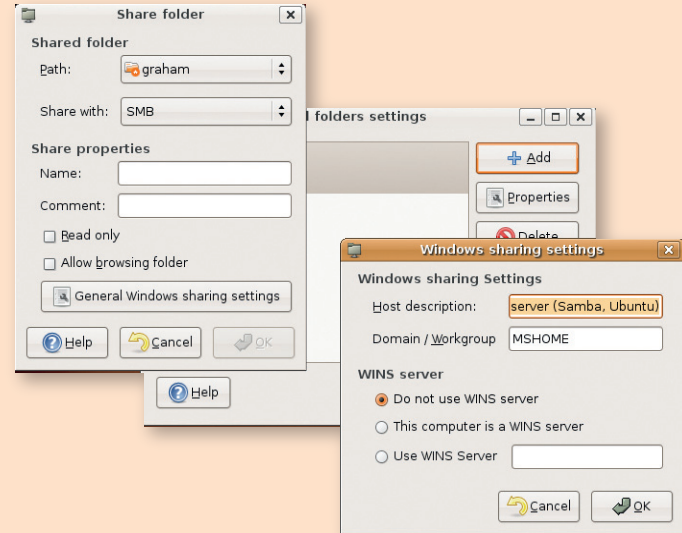
You then need to create a user for the share. This is what users of your local network will see when they're browsing the network from Windows and other Linux machines. You don't need to set a

comment for a share, but it can help if you need to describe what the share is for. Finally, the two remaining options are Read Only and Allow Browsing. Read Only is very important if you don't want other users to overwrite or delete your files, which is great for sharing valuable photos for example. Without Allow Browsing selected, a user will need to

know the exact location of your *Samba* share, and this does offer a certain degree of security. When this option is set, in contrast, anyone who accesses the network would be able to see your share – whether they knew it was there beforehand or not. Click on OK to start the *Samba* server, and let other network users get access to your files.



You will need to install the *Samba* server to share directories.

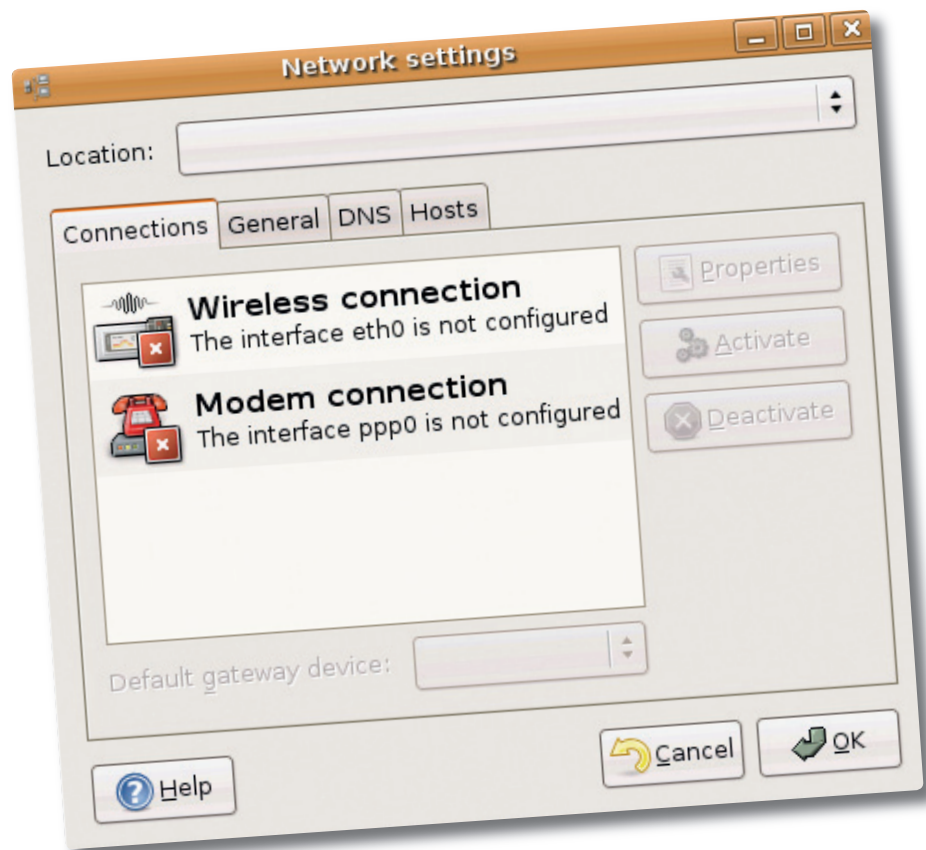


Sharing files locally with *Samba* is very simple, but if Windows users are having trouble, make sure the Domain/Workgroup is the same in Ubuntu's General Windows Sharing Settings and Windows Network Neighbourhood. Find out more about *Samba* at [www.samba.org](http://www.samba.org).

Beneath this are two fields where you enter the secure key for accessing the network. If your access point doesn't use a key, you can leave both of these fields blank, but that's a considerable security risk. Instead, we highly recommend you set up a key on your router and enter the details. You'll need to use a WEP-based key, and Ubuntu will automatically calculate the size. Unfortunately, it's not possible to configure the more secure WPA mechanism from Ubuntu at this time. You shouldn't need to enter any other information – just make sure that Configuration is set to DHCP and Ubuntu will be able to work out the rest automatically. Click on OK, and Ubuntu will connect to your wireless network. ●



After you change a configuration setting, the network will be restarted.



When you first open the Network Settings window, any network device that has been recognised will appear as deactivated until manually configured.