



# A beginner's guide to Linux

**Welcome to Linux! With your Ubuntu cover CDs and the guides in this Special, you are ready to explore a brand new way of computing – and it will be a cheap, rewarding and addictive journey.**



### What is Linux?

Linux is a collection of software that goes to make up what's called an operating system (OS). The operating system is the software that controls the hardware of your computer directly, and provides a platform for applications and other software to be written. If you like, it is a layer between the hardware (the physical components of the computer, like the processor, disk drives and so on), and the software applications you want to run on it. Mac OS X and Windows are other examples of operating systems.

### If I already have an operating system, why should I use Linux?

Because Linux is special. Unlike Mac OS X, Windows, OS/2, HP-UX or most other operating systems, the

whole idea of Linux is that it is free and open to use and develop for. Linux gives you a chance to try out the wealth of open source software that has been developed for it, which covers everything from office tools and games to highly specific applications for science, business and industry. You don't even have to stop using Windows – you can run Linux as well.

### Does that mean I can have more than one operating system?

Yes and no. A normal computer can only run one operating system at a time. This doesn't mean that you can't have the ability to choose between running different operating systems. In a setup known as dual booting, you can select at startup time which operating system you want to run. This is currently the most common way that people start using Linux.

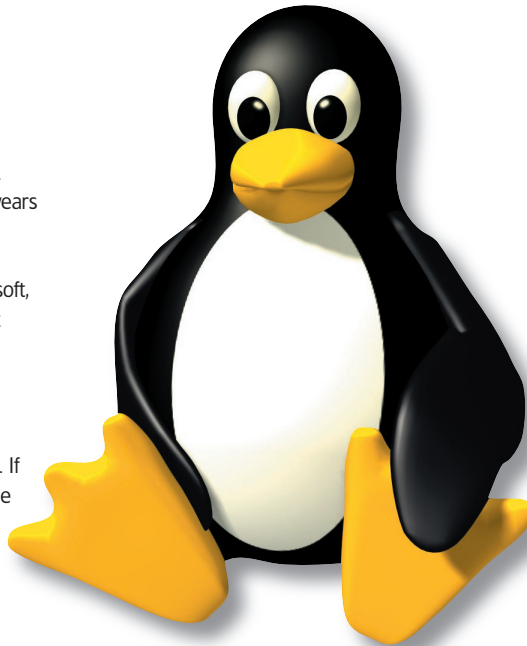




## If Linux is so good, why do most people run Windows?

Well, mostly because of the effective monopoly Microsoft has gained over the computer industry. Microsoft has been so successful in the last 30 years that most people think of a computer as a PC running Windows. Because virtually every PC manufacturer in the world has a deal with Microsoft, Windows is pre-installed (and paid for) and most people don't even think about looking for alternatives to it.

There are other reasons. Because software is created for a particular operating system, many applications exist that will only work on Windows. If you have a specific requirement, a back catalogue of files or just a lot of experience with a particular application, these can be strong reasons to use Windows – but they shouldn't stop you from trying Linux too!



of the GPL licence and community development of software, a great number of applications can be included with every distribution.

## Where did Linux come from?

Linux has its roots in Unix, an operating system almost as old as computers themselves. Back in 1991, Finnish student Linus Torvalds wanted to be able to run Unix at home as well as on campus, but there was no version of Unix that would work on PC hardware. So he decided to write it himself.

## Why is this penguin here?

Tux is the official mascot of Linux. The most used version was originally drawn by Larry Ewing, programmer and artist. Why a penguin? Linus Torvalds was bitten by one on a trip to the zoo...

## Did Linus write all the software for Linux?

Oh no, he just started writing the Linux kernel. As time went on, and because his work was published under the GPL for others to look at, it became a group effort, as other programmers contributed code. Linus used other existing code to actually run an operating system.

“The overwhelming majority of Linux software is free, in the intellectual sense as well as having no cost.”

## So if I use Linux I won't be able to run all my software?

In most cases you'll need to install new Linux applications. However, you may find that there is a Linux version of the software that you want to use. Some companies do release Linux versions of their products.

There is also a lot of functionally identical software for Linux. For example, *OpenOffice.org* has about 80–90% of the features in *Microsoft Office*, and can read and write the same documents.

Finally, there are emulators for the Windows environment that run under Linux. Software such as *Wine* allows you to run a number of applications under Linux, and commercial support is available for some applications through *CrossOver Office*.

been compiled and made to work together. All this is then put on a CD or DVD with some form of installer. The software will include the real basics of the OS – the kernel, system utilities and so on – and a huge number of applications.

Ubuntu is a distribution, as are Mandriva, Debian, SUSE, Fedora Core and others... there are more than 300 distros in active development. That doesn't mean that there are 100 completely different operating systems – most of the software contained in a distribution is the same, or at least comes from a common source. Because of the widespread use

## Back up a second – what is the kernel?

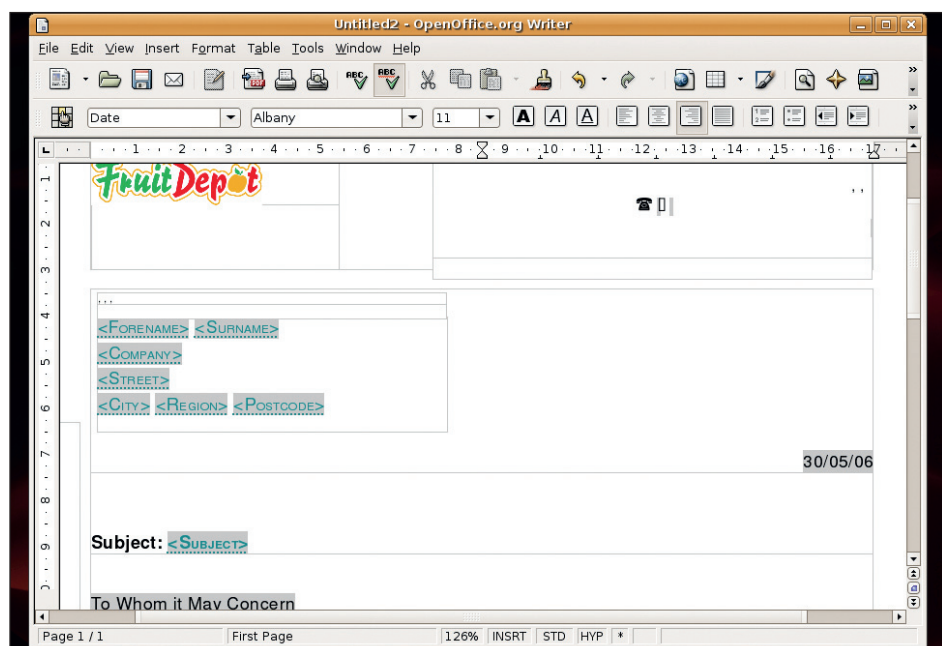
The kernel is the brain of the operating system. This is the core code that gets executed when the computer starts up, and deals with how the system communicates with the hardware. The rest of the operating system just attaches on to this. Initially Linus ported a programming environment and, crucially, the *GCC* code compiler, which let him put existing software into the new environment.

## Where do I buy Linux applications?

Most of the time you won't need to. The overwhelming majority of software developed on Linux is free, in the sense of being intellectually free as well as having no cost. You'll often find that it's published under the GNU General Public License, or GPL, which helps to maintain the 'freedom' of the software. Great programs like the *Gimp* image processing tool and the *Scribus* DTP package are available to you free of charge.

## Who makes Linux?

It could be a large business, a lone programmer or a worldwide community project. Many of them work on what are known as distributions, or distros. A Linux distribution is a collection of software that has



The Linux office suite *OpenOffice.org* is easy for people who are used to *Microsoft Office* to pick up, and is one of the most popular pieces of open source software. Find out more on page 24.



### → OK, so where did all the rest of the Linux software magically appear from?

Well, the reason why Linux was able to write Linux at all is that there was already a platform established by the GNU Project. The GNU Project (GNU stands for GNU's Not Unix, in a typical self-referencing acronym) was started to create free software (free as in free speech) and is also based on Unix-like ideas. The GNU Project was started in 1984 by Richard Stallman, who had the idea that software for computers ought to be free for people to tinker with. This meant giving people the source code for software so they could easily change it if they wanted. Most crucially for the future of Linux, Stallman also conceived the idea of copyleft and the GPL, and defined the terms of reference for 'free software' (see *Free As In Freedom* box, below right).

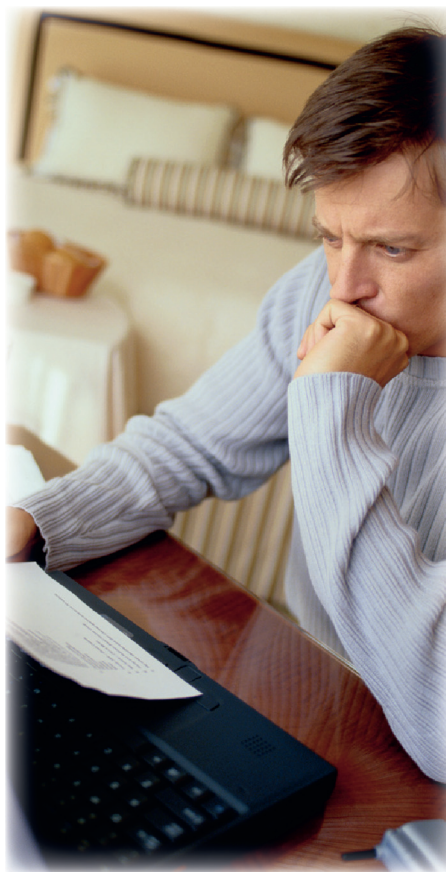
Linux happened at the right time for GNU as well. The GNU project had a load of useful tools, including the compiler (crucial for developing code), but did not have a kernel to actually run on any hardware. So what we call 'Linux' is really a combination of Linus's kernel and the GNU tools, and many people refer to it as GNU/Linux.

Obviously, it now includes a lot of other open source software too.

### What is open source?

There are other people interested in creating 'free' software, and other licences commonly used to develop under. In actual fact, the software licences became rather confusing. Some people found the GPL too restrictive for example, because it requires derivative software (that is, other projects based on the work) to also use the GPL. Some people felt that it was better to allow anyone to do whatever they want with any derivative software.

In any case, a lot of licences meant a lot of confusion. The Open Source Initiative was set up to clarify which licences



conform to the commonly agreed definition of 'free'. The term 'open source' was just a way of describing software produced under these free licences.

### Er, all this licence stuff seems confusing. Do I need to know about it?

Well, not strictly. The vast majority of Linux software is covered by the GPL. Other licences do exist, but for general home use of your software, you don't really need to know the differences.

### Is there any commercial software for Linux?

Yes, plenty. Just because you use Linux doesn't mean you can't pay for software if you want to! Commercial software on Linux tends to fall into two categories: software intended primarily for servers or business users, such as Oracle and DB2 database software; and software for individuals. There are commercial games, and plenty of specific niche software, such as CAD tools, 3D software and so on.

### What hardware do I need?

Linux will run on practically every computer and computing device made. It can be made to work on everything from an iPod to an IBM S390 mainframe.

## FREE AS IN FREEDOM

'Free software' is a matter of liberty, not price. To understand the concept, you should think of 'free' as in free speech, not as in free beer.

Free software is a matter of the users' freedom to run, copy, distribute, study, change and improve the software. More precisely, it refers to four kinds of freedom, for the users of the software:

- The freedom to run the program, for any purpose (freedom 0).
- The freedom to study how the program works, and adapt it to your needs (freedom 1). Access to the source code is a precondition for this.
- The freedom to redistribute copies so you can help your neighbour (freedom 2).
- The freedom to improve the program, and release your improvements to the public, so that the whole community benefits (freedom 3). Access to the source code is a precondition for this.

A program is free software if users have all of these freedoms. Thus, you should be free to redistribute copies, either with or without modifications, either *gratis* or charging a fee for distribution, to anyone anywhere. Being free to do these things means (among other things) that you do not have to ask or pay for permission.

You should also have the freedom to make modifications and use them privately in your own work or play, without even mentioning that they exist. If you do publish your changes, you should not be required to notify anyone in particular, or in any particular way.

You can see the full definition, as well as a declaration of the GNU philosophy, at the project's website ([www.gnu.org/philosophy/free-sw.html](http://www.gnu.org/philosophy/free-sw.html)).







Rest assured, if you have something that calls itself a computer, it can run Linux. The discs with this guide are designed to run on standard PC x86 hardware – Pentium processors and up. Although you could install this on a lowly, five-year-old Pentium computer, we really recommend something a little more modern, otherwise you will have trouble with the speed of the desktop display.

In terms of other hardware, you are only likely to run into problems with very new components. That's because the manufacturers often don't make drivers for Linux, and it takes a while for the open source developers to create them.

## Can I run Linux on my Mac?

Yes, but not with the software included with this magazine. There are plenty of distributions for 'older' Mac machines that run on the PPC processor – including a PPC version of Ubuntu. The new Intel-based Macs don't have any specific distros – yet!

## So it's hard to set up and use?

You would think so, wouldn't you? But actually, it isn't much harder than installing Windows. And using Linux on the desktop is really quite straightforward. Most people's troubles stem from the fact that they know Windows applications so well and expect all the Linux software to be exactly the same. That isn't going to happen, but interestingly these days open source projects are becoming so familiar on Windows (take *Firefox* for example) that some software may be more familiar than you might think!

```

graham@localhost:~
File Edit View Terminal Tabs Help
-rw-rw-r-- 1 graham graham 17988 Mar 2 21:38 p52_01.png
-rw----- 1 graham graham 2124 Mar 2 21:38 .recently-used
drwx----- 2 graham graham 4096 Mar 2 20:54 .ssh
-rwxrwx--- 1 graham graham 17072128 Mar 2 21:10 test.avi
drwxrwxr-x 2 graham graham 4096 Mar 2 21:48 .themes
drwx----- 4 graham graham 4096 Mar 2 20:55 .thumbnails
drwx----- 2 graham graham 4096 Mar 2 20:06 .Trash
drwxr-xr-x 2 graham graham 4096 Feb 24 00:17 .wapi
-rw----- 1 graham graham 66 Mar 2 22:11 .Xauthority
[graham@localhost ~]$ ls -l
total 17020
-rw----- 1 graham graham 0 Feb 26 20:50 backup.tar
drwxr-xr-x 2 graham graham 4096 Mar 2 20:06 Desktop
drwxrwxr-x 2 graham graham 4096 Mar 2 20:58 ogg
-rw-rw-r-- 1 graham graham 41025 Feb 27 01:26 p19_01.png
-rw-rw-r-- 1 graham graham 24126 Mar 2 20:12 p19_03.png
-rw-rw-r-- 1 graham graham 41934 Mar 2 20:38 p20_02.png
-rw-rw-r-- 1 graham graham 25795 Mar 2 21:19 p50_01.png
-rw-rw-r-- 1 graham graham 33686 Mar 2 21:22 p50_02.png
-rw-rw-r-- 1 graham graham 41188 Mar 2 21:34 p51_01.png
-rw-rw-r-- 1 graham graham 25487 Mar 2 21:33 p51_02.png
    
```

This the command line. If you're interested in computing, Linux is the perfect place to learn.

## Don't I have to compile software to run Linux?

Not if you don't want to. Most open source software is initially made available as source code. This is then compiled to make binary code which can actually be run on a specific platform (the source code on Linux is the same, whatever processor or platform is used). Often, this code will then be made into packages for various distributions. The packaging of the files means they should work seamlessly on the specific distro. So, if you wait for distro packages for your software, you'll never have to compile it!

## Is there a command line?

Linux does have a command line as well as a graphical desktop. At times it can be very useful, but it does pay to be a bit more cautious when

business support, companies such as Red Hat and Novell can provide practically every level of support you might need.

The Linux community is also very helpful. If you have a problem there are plenty of places you can go to for help, as long as you adopt the right attitude. Later in this guide there is a help section for common queries, and resources pages that will point you in the direction of some ways to solve difficulties you might have.

## Isn't Linux just another thing for geeks to get excited about? Surely when it becomes less trendy, it will disappear...

That seems unlikely. Linux is the fastest-growing operating system – more and more people are using

“Rest assured, Linux will run on practically every computer ever made, from an iPod to an IBM mainframe.”

using it – a few mistyped commands could lose you some vital data.

## Who can I complain to when things don't work?

Well, that's one of the downsides of it being free. All GPL software contains a clause about having no warranty. This is necessary, because if the authors are putting in the time and effort to create the software, they don't want people suing them if it goes wrong.

However, you shouldn't think that you can't get support for Linux. Many of the companies making distributions will sell boxed copies with limited customer support. If you want to pay for

it every day, and that's been the case for the last 15 years. In some parts of the world it is taking off a lot faster even than it is in Europe. China and South America are big growth areas for Linux, and because of the community nature of Linux, all those extra users can only mean better software and faster progress down the line.

## And if I don't like it?

There's no real problem in deleting the Linux software and removing the bootloader if you want to get your computer back to how it was before, but we honestly don't think it will come to that – you may find yourself spending more time with Linux than you expected. ●

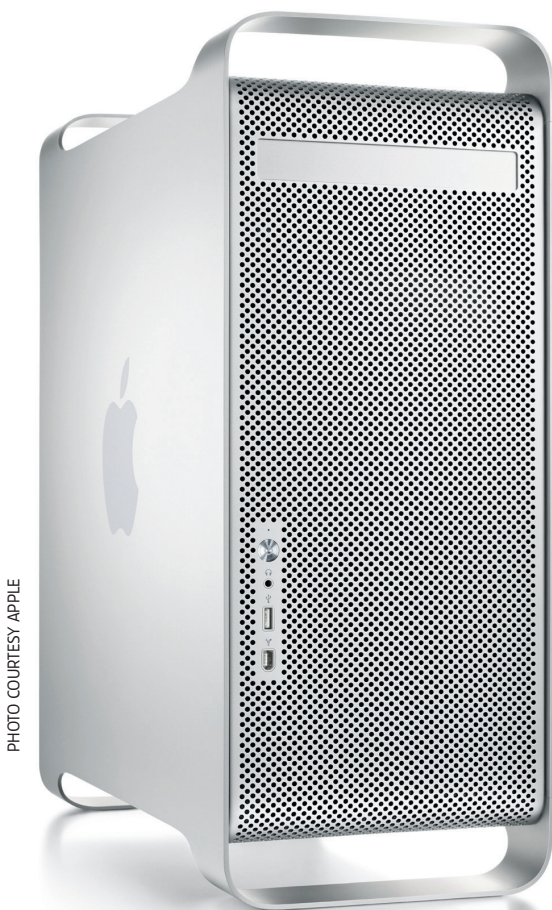


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