# Linux Distributions

## *by Andy Pepperdine*

## Introduction

There are now in excess of 300 possible "versions" of what is commonly called *Linux* for people to download and freely use. To be precise, the term *Linux* applies properly only to the central core of the operating system. It is the part that is necessary for any work at all to be done, but it does not include any of the applications that are visible to the ordinary user, like web browsers.

The combination of a Linux kernel, and a selection of appropriate applications is called a *distribution*, commonly abbreviated to *distro*. The groups of people who put together a distro have an idea of what type of user they are aiming for, and what type of hardware they will be running it on. Since Linux is suitable for a very wide range of systems, it means that there are a great many distros, each with their own characteristics. This paper is to describe the commonest ones that are suitable for desktop or laptop use.

## Types of distro

The easiest way to categorise a distro is by the method it uses to keep itself up to date. Almost all of them sue some form of *package* management. A package is a selection of libraries, files, and programs that form a unit that can be swapped out for a new version when needed. An application will be contained in a package. This package will need other lower-level packages in order to operate, and these dependencies will be noted and managed by the distro's package management system. There are two main types, which can be referred to by the type of file that contains a package, or by the name of the first distributor to use that type of file. The differences are not great, and the principles are the same.

Beginners will most often come across packages contained in files of type *.deb* so called because they originated in the Debian group and was created for the benefit of developers and individual users. The other sort is the Redhat package management system using files of type *.rpm* and which originated in the commercial world.

You will come across Debian based systems more often that Redhat based ones, but the differences are minor compared to the common applications they all contain. If your PC is a standard Intel based machine, then in practice, these two types of packages can be interchanged by use of a suitable package converter tool. Whereas that was useful to know in the past, it is now rare that a package you will need will not be available in the distro itself.

There are some particular distros that use their own systems of packaging up applications, and others even more specialised that do not use such a system, but ask that the user compile and create every application and library by themselves. This latter gives the most fine grained control of what the system contains, but is only for those who know what they are doing.

Each distro has its own form of support, usually some form of mailing list, or forum where questions can be asked and answers received. As with all FOSS, the people answering will be volunteers, but since Google can find all the comments, a suitably crafted question to Google will almost always find the answer to your query without you having to register on the forums and lists.

## Debian based distros

There are many distros based on the Debian distro, which is now 20 years old. The idea of creating packages to manage each application and install them as and when they were required, was first proposed and implemented by the Debian distro remarkably soon after Linux first saw the light of day. The package manager is known as APT (Advanced Package Tool) and has an easy to use graphical interface called Synaptic. All distros that base themselves on Debian have this at the centre of their management of the systems, and pass updates through to this system for installation when you want to.

## Debian

Debian is one of the very oldest distros for Linux and its packages. It now contains nearly 30,000 packages, and all of it is free. They concentrate on ensuring maximum security and stability, and are careful when releasing new ones. The distro is controlled (if that is the word) by a loose collection of individuals. It is not beholden to any commercial organisation, and tries hard to make sure that officially it does not contain non-free code such as proprietary drivers. Most of the discussions around content is often to do with the licensing of proposed additions to the system, so it is among the safest distros for long term use.

However, the downside is that your particular hardware may not be supported well because of the need for special drivers that are not released with a suitable license.

The home page: http://www.debian.org/ and a good description of the history is at https://en.wikipedia.org/wiki/Debian where it is pointed out that Debian created a social contract in their operating procedures to try to ensure that in future the product will always remain freely available.

## Ubuntu

Ubuntu was started by funding from the South African billionaire Mark Shuttleworth because he wanted to put something back into the system that had provided with him with the software by which his fortune had been made. His idea was to make an easy to install system that could be used to attract lots of ordinary people, non-engineers, to use Linux on their systems. The result has been his drive to improve the desktop and ease of use, and to a large extent, I believe, that it is his work that has resulted in the present desktop systems instead of the almost complete, quirky systems that preceded him. He has made efforts to ensure that things were finished and supported many sites, forums, and big reporting mechanisms that have improved the overall response to problems over the last several years.

He took the Debian as his base, but in order to reach as wide a range of people as possible, he added more packages to support more hardware and to allow less free code to be used in things like codecs for video and audio players. Of late, he has been pushing more towards supporting more modern graphics cards, and that has led to Ubuntu becoming less popular for older hardware. His ambitions have changed, and my interpretation is now that he would like to make superior modern desktop machines and what he needs is to find some PC manufacturers who would install Ubuntu from scratch instead of Windows on new PCs. He has so far had only very limited success.

However, the need for the latest graphics hardware means that Ubuntu cannot be recommended as highly as before for older equipment.

The home page is at: http://www.ubuntu.com/

Mark Shuttleworth's company is at: http://www.canonical.com/

### Xubuntu

One of the difficulties with the full Ubuntu release is its demands for recent graphics to run one of the recommended window managers. Xubuntu is a co-operative effort that tries to address that by using Ubuntu as a base, and using a smaller desktop system, saving both RAM and computing power, at the cost of some of the more flashy and eye-catching effects on the most up to date machines. Xubuntu does not need so much resource and is suitable for older machines.

Since it is based on Ubuntu, it has access to all the packages that Ubuntu has, but the default position is to use Xfce as its window manager.

The home page is at : http://xubuntu.org/

### Lubuntu

Lubuntu is another distro that addresses the resource issue with Ubuntu on older hardware, and this time uses a different, but also lightweight, window manager, LXDE. It seems slightly more widespread than Xubuntu, but the features are comparable.

The home page is at: http://lubuntu.net/

### Mint

Mint was started to address a different problem with Ubuntu. Because of licensing issues with software that can play certain types of audio and video files, preventing some applications being shipped in certain parts of the world, Ubuntu had separated the troublesome packages onto different servers, and then allowed users to access those should they wish to use those applications.

Mint took the line that any modern PC must be able to play these files be default out of the box, and so incorporated more of the questionable packages directly into its system, and installed them at the start.

They have recently taken objection to the way that Ubuntu is drifting away from the historical format for window managers, and has attempted to create a desktop system that anyone would recognise from Windows. Their use of an unsupported version of the Gnome desktop manager has raised comments about whether they will eventually have to change. That would be a shame, but it is a risk that you should be aware of if you really like the old style windows.

It also has a version that will run Xfce by default.

The home page is at: http://linuxmint.com/

### Peppermint

This may not be everyone. Peppermint is based on Lubuntu, but is designed to be used with web-based applications, and as a consequence is very light on resources and is suitable for netbooks and other mobile devices where you want ot do everything in the cloud. For example, uses Chrome as its default browser, Gmail for the mail system, and Google docs access fo the office applications. Other packages can be installed, but the default is fast and useful for small devices.

The home page is at: http://peppermintos.com/

## *Antix*

Antix is a derivative of Mepis which is based on Debian. Mepis was aimed at keeping up to date and providing the new user with everything they wanted. But Antix is interesting because they took the line that there are still a lot of old machines out there that could be put to use. It comes with the simplest of applications for the basic jobs, but all the usual applications can be installed if you want them. The result is that it can be run on a 266MHz PentiumII with 128KB RAM, and is worth considering for older hardware.

It does need some care at the beginning after installation to add whatever you consider essential, but after that it is very similar to other Debian based systems.

The home page is at: http://antix.mepis.org/index.php?title=Main_Page

## *Bodhi*

Bodhi has been making great progress in the last year or so, and is well worth a look if you are slightly adventurous. It uses a different underlying graphics engine, called Enlightenment, from the other distros mentioned here. What had been some issues with unsupported features in the past are getting ironed out, and recent reviews, like this one: http://distrowatch.com/weekly.php?issue=20120917#feature appear to imply that it is usable, but read the review as there are some things that you ought to do to get a good system after you have installed it. Some things you might expect, may not be installed, and you will have to install packages to get them.

Since it is based on Ubuntu, there are plenty of packages available, and it might make good use of less capable graphics cards.

The home page is at: http://www.bodhilinux.com/index.php

## *Redhat based distros*

Redhat is a company started in order to exploit Linux and free software in general in the commercial world by providing support to other companies for their IT requirements and in-house networks. Beginning from nothing in the mid-90s it now turns over $1Bn per year. Their approach to packages is slightly different and uses a different package manager, but the results are essentially the same. However, you cannot access Ubuntu repositories from a Redhat based system nor vice versa. The mechanisms are incompatible.

As Redhat concentrate on what is needed from a commercial point of view, the free software community has established some independent distros based on Redhat but have added more packages and taken different lines in their strategies for the future. However, the changes made in the community feed back into Redhat systems and the two seem to be working together very well.

I think it is true to say that at the moment, the graphical interfaces to the package manager (rpm) are less developed than the equivalents on the Debian distributions, although I suspect this may be a matter of familiarity in practice.

## *Redhat*

The Redhat distro itself is available for download, but there is little support, as the Redhat business

model is to charge for that support. The code is free, but the ancillary items are not. It is included here as it is the base of more free versions that are worth considering for the private desk top.

The home page is at: https://www.redhat.com/

### *Fedora*

The community surrounding Redhat has its own distro, free to use, and with free support. This is called Fedora, and the relationship between the two is generally good. Because it is based on a commercial product, some of the things may seem a little different from what an individual might expect, but it is a very stable system. If you want a system to act as a server, then their experience in the commercial world may give you more confidence, and the support may be better for that type of activity.

They supply all the usual window managers, so you can tailor it to look as you want.

The home page is at: https://fedoraproject.org/

### *Mageia*

Mageia is a relatively recent development. It has a somewhat tortured history starting from Redhat and based in France, culminating in a break up of what was then called Mandriva, a commercial operation. It is now a better focused organisation with the aim of creating a good broadly usable distro and freely available, and by most accounts has a promising future in its current form. The basic structure is like any other Linux, but the set of packages you get on installation may not be what you want if you are used to one of the Debian based distros. But that can be corrected easily once you become used to the package manager.

The home page is at: http://www.mageia.org/en/

### *PCLinuxOS*

PCLinuxOS is an independent distro, but started out from Mandrake, from the Redhat line. It has diverged a lot since and now uses a variation of the Synaptic package manager, although it is still listed as using rpm-style packages. Whether that causes any difficulties, I do not know. When I last tried it it was very US-centric and without good foreign language support, so for European use you may wish to try before you commit to it. However, its reputation is growing as a solidly constructed stable release. The home page is at: http://www.pclinuxos.com/

### *Other distros*

There are now so many distros that it is impossible to list them all. Most have been developed from others and then diverged to make their own way, becoming quickly independent. Others follow their precursors and keep in step with them.

### *Slackware*

No list of Linux distros would be complete without mention of Slackware, the elder statesman of the free Linux distros. It is the oldest one still operating, and with the same person leading it. This continuity has attracted many serious and dedicated users across the globe. But it is primarily for engineers who know what they are doing. It is the one they go to to get a system built exactly to

match their requirements, and to do development of both Linux applications and to interact with other hardware. It is not for the faint-hearted, but recent releases are very much easier than earlier ones to install, now having acquired some more familiar graphical interfaces. Before, they supplied only a command line and the rest was up to the user. Consequently it can be thought of as the purest of the distros, and can be tailored to include only genuinely free software. There are no pre-packaged applications in the way you might expect, but only files that you can download and then make yourself by compiling and linking the source code directly. In this way the applications are created to suit your installation exactly.

The home page is at: http://www.slackware.com/

I included it here as it is the ultimate base of so many others that are in use and separate development now. Over the years, Slackware has probably done more to broadcast Linux to more places and more environments than any other distribution.

## OpenSuse

The commercial development of Linux, based on Slackware was the idea of German firm Suse, and was started even earlier than Redhat. However, they did not get the legal structures so clear, and made less competent business decisions in the early days, so was not quite so successful.

OpenSUSE is a German distro related on the Suse commercial Linux system in much the same way as Fedora is associated with Redhat. However, it has not been as smooth as the Redhat experience and may have contributed to its lower popularity. But a few years ago, major changes took place in the governance of the development of the free version, and it is now making its way up the popularity polls.

The home page is at: http://www.opensuse.org/en/

## Puppy

Puppy is an Australian independent development, which uses its own package management system, with the filetype of .pet. It is aimed at small PCs, like netbooks, based on the Intel architecture, and so uses small applications which generally have a restricted set of features. It is not suitable for desktops unless you want to do only the simplest things and in the simplest way. It is missing many applications that are now thought of as essential in a desk machine. But as a way to get the last out of small hardware it has its place, and is remarkably popular. The latest version takes its source code from the Slackware repositories.

The home page is at: http://www.puppylinux.com/

## Gentoo

Gentoo is another ancient distro that has worn very well. But it is definitely for engineers and people who want to know exactly how everything works. There is no package management in the sense you may know it, since all software is compiled from source code. The installation proceeds from creating a minimal environment in which you start by building a suitable Linux kernel for you machine and then going on from there. The documentation seems to be excellent.

If you want to learn the details of how it all works, then this is the one to use, but expect to spend a lot of time learning. The home page is at: http://www.gentoo.org/

## *Conclusion*

There are so many distros to choose from that a good start would be to talk to someone who has experience and then try one to see how it goes. With familiarity will come confidence and then you may feel that you can try other systems that might be more suitable.

News about distros, their releases, and brief descriptions can be found at http://distrowatch.com/

But the question: Which one do I choose? is one that only you can answer, but I would say that the key question you need to ask is what you intend to use the system for? What applications do you need to do the job? Then you can search for a distro that supplies those by default, or at least give good support for them. This is particularly important if you want to do audio-video work, as then you will need all the relevant codecs, and the strictly Free distros will not supply them for licensing reasons. They are usually available in Europe by means of adding other packages or repositories, but you must be prepared to adapt the installation to your requirements.