

# Mastering Modern Linux

## Introduction

## About the Textbook

- *Mastering Modern Linux* by Paul S. Wang
- Textbook website: [mml.sofpower.com](http://mml.sofpower.com)—full-color figures, appendices, links to resources, information updates
- Code examples for download (see page 353)
- See *Setting Up Your Own Linux for Learning* (an appendix)

# What is Linux?

- Linux is a free, open-source, community-supported operating system.
- Both free and commercial *distributions* are available.
- Linux is fast, reliable, and secure.
- Linux supports both desktop computers and server hosts. It is a dominant player in the server market.

## A Brief History of Linux

- Linus Torvalds released version 1.0 of the Linux Kernel (1994)
- Later, the GNU open-source software movement would also make many contributions to Linux.
- Richard Stallman: “When you are talking about Linux as a OS, you should refer to it as GNU/Linux. Linux is just the kernel. All the tools that make Linux an OS has been contributed by GNU movement and hence the name GNU/Linux.”
- Today, Linux is a prime example of the success of open-source, community-developed software. Linux is used on servers, desktop computers, laptops, and netbooks.
- Many *distributions* of Linux exist. Linux also contributed to the development of new systems such as Google Chrome and Android, among others.

# Linux Versions

- Ubuntu
- Red Hat Enterprise Linux
- CentOS
- Fedora
- openSUSE
- Debian
- Mint
- Raspbian



“Ubuntu” means “humanity” in Zulu. Ubuntu Linux started as a version of the popular Debian GNU/Linux. All versions of Ubuntu Linux are free, and there is no charge for mailing a CD to you. Ubuntu supports the GNOME Desktop environment, while another version, *Kubuntu*, uses the KDE Desktop. Ubuntu is easy to install and very user friendly, which has quickly made it the most popular version of Linux. Ubuntu is sponsored by the U.K.-based Canonical Ltd., owned by South African entrepreneur Mark Shuttleworth.



The original *Red Hat Linux* started in 1994 and was discontinued by Red Hat Inc. in 2004. The company now focuses on *Red Hat Enterprise Linux* (RHEL) for business environments and on *Fedora* as a community-supported software project for home, personal, and educational use.



RHEL largely consists of free and open-source software, but the executables are made available only to paying subscribers. CentOS (Community ENTerprise Operating System) is a completely free version of RHEL (minus the Red Hat logos) made available to users as new versions of RHEL are released.





Fedora is a leading-edge Linux distribution where new features and improvements are tested before being included in RHEL/CentOS. Fedora makes frequent software updates and is tightly integrated with the GNOME user environment.



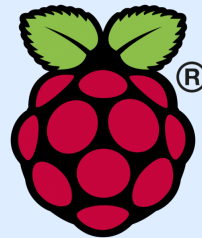
openSUSE is a major retail Linux distribution supported worldwide by Novell (now part of Micro Focus). Novell acquired the SuSE Linux (a German translation of the original *Slackware Linux*) in 2004. In the following year, Novell decided to make the SUSE Professional series more open as a community-developed, open-source software and to rename it *openSUSE*.



Debian Linux consists entirely of free and open-source software. Its primary form, Debian GNU/Linux, is a popular and influential Linux distribution. Debian is known for an abundance of options. Recent releases include over 26,000 software packages for all major computer architectures. Ubuntu is a derivative of Debian.



Linux Mint, a newcomer, is a reliable and popular desktop distribution. It adopts a conservative approach to software updates and is based on Debian and Ubuntu.



Based on Debian, Raspbian is Linux optimized for the Raspberry Pi, a credit-card-sized computer for education as well as practical uses.

## The UNIX/Linux Philosophy: *Small is Beautiful*

- Keep programs small—Write a program to do one well-defined task; do it efficiently, and do it well.
- Avoid verbosity—Perform no unessential output from any programs; use short names for commands and command options.
- Make programs modular—Build small, independent, and self-sufficient program parts, with each serving a specific function. These program parts can be combined flexibly to form larger programs. This principle is reflected in the small kernel (core of the operating system) cooperating with a large set of small commands which work well together.

- Compose programs through interfaces—Write programs that are easy to interface with other programs. The famous UNIX pipe, which interfaces the output of a program to the input of another, is a primary example of this philosophy.

# Linux Features

- *Multi-user and multi-processing*
- *Graphical user interface*
- *Package management*
- *Shells*
- *Hierarchical file system*
- *File access control*
- *Compatible file, device, and inter-process I/O*
- *Concurrent processes*
- *Networking and Web Hosting*
- *Utilities*

# Linux System Organization

