Understanding The Linux Kernel Third Edition

Mastering Linux Kernel Development
IA-64 Linux Kernel
Linux Device Drivers
Talking Directly to the Kernel and C Library
UNIX Internals
Develop customized drivers for embedded Linux
Essential System Administration
A Top-down Approach for X86 and PowerPC Architectures
Kernel Projects for Linux
Linux in a Nutshell
Linux Pocket Guide
A kernel developer's reference manual
Explore Linux system programming interfaces, theory, and practice
What Every Superuser Should Know
Tools and Techniques for Linux and Unix Administration
Attacking the Core
Professional Linux Kernel Architecture
A Beginners Guide to Linux Internals
A comprehensive guide to kernel internals, writing kernel modules, and kernel synchronization
Linux Internals
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Programming the 80386
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Design and Implementation
Understanding the Linux Kernel

KARTER SANTANA

Mastering Linux Kernel Development "O'Reilly Media, Inc."
To thoroughly understand what makes Linux tick and why it's so efficient, you need to delve deep into the heart of the operating system--into the Linux kernel itself. The kernel is Linux--in the case of the Linux operating system, it's the only bit of software to which the term "Linux" applies. The kernel handles all the requests or completed I/O operations and determines which programs will share its processing time, and in what order. Responsible for the sophisticated memory management of the whole system, the Linux kernel is the force behind the legendary Linux efficiency. The new edition of Understanding the Linux Kernel takes you on a guided tour through the most significant data structures, many algorithms, and programming tricks used in the kernel. Probing beyond the superficial features, the authors offer valuable insights to people who want to know how things really work inside their machine. Relevant segments of code are dissected and discussed line by line. The book covers more than just the functioning of the code, it explains the theoretical underpinnings for why Linux does things the way it does. The new edition of the book has been updated to cover version 2.4 of the kernel, which is quite different from version 2.2: the virtual memory system is entirely new, support for multiprocessor systems is improved, and whole new classes of hardware devices have been added. The authors explore each new feature in detail. Other topics in the book include: Memory management including file buffering, process swapping, and Direct memory Access (DMA) The Virtual Filesystem and the Second Extended Filesystem Process creation and scheduling Signals, interrupts, and the essential interfaces to device drivers Timing Synchronization in the kernel Interprocess Communication (IPC) Program execution Understanding the Linux Kernel, Second Edition will acquaint you with all the inner workings of Linux, but is more than just an academic exercise. You'll learn what conditions bring out Linux's best performance, and you'll see how it meets the challenge of providing good system response during process scheduling, file access, and memory management in a wide variety of environments. If knowledge is power, then this book will help you make the most of your Linux system.
IA-64 Linux Kernel CreateSpace
Provides information on writing a driver in Linux, covering such topics as character devices, network interfaces, driver debugging, concurrency, and interrupts.
Linux Device Drivers Addison-Wesley Professional
Apps! Websites! Rubber Ducks! Naked Ninjas! This book has everything. If you want to get started in user experience design (UX), you've come to the right place: 100 self-contained lessons that cover the whole spectrum of fundamentals. Forget dry, technical material. This book—based on the wildly popular UX Crash Course from Joel Marsh’s blog The Hipper Element—is laced with the author's snarky brand of humor, and teaches UX in a simple, practical way. Becoming a professional doesn’t have to be boring. Follow the real-life UX process from start-to-finish and apply the skills as you learn, or refresh your memory before the next meeting. UX for Beginners is perfect for non-designers who want to become designers, managers who teach UX, and programmers, salespeople, or marketers who want to learn more. Start from scratch: the fundamentals of UX Research the weird and wonderful things users do The process and science of making anything user-friendly Use size, color, and layout to help and influence users Plan and create wireframes Make your designs feel engaging and persuasive Measure how your design works in the real world Find out what a UX designer does all day
Talking Directly to the Kernel and C Library John Wiley & Sons
"Linux internals simplified" is a book which discusses the basics of Linux kernel internals in a code driven approach. It picks the major subsystems of the kernel which are important, and tries to simplify its internal working and data structures. As such, this book is aimed at engineers who wish to start learning about the Linux kernel.This book starts with the basic steps to acquire the Linux kernel code. It then shows ways of customizing the build options and lastly kernel compilation. Next it looks at a number of hacking tools which will help one to debug and trace in a live Linux system. Practical examples of ftrace, kprobes and crash tool are discussed. These tools are useful in trying to understand the way the Linux system works. Chapter 3 discusses the details of a running process in a Linux system. It touches topics such as address spaces of a running process, user and kernel spaces, system calls, Linux process descriptor, Linux process creation, and so on. This chapter builds a foundation of a program in execution in the Linux system.Once the reader knows about the running processes, chapter 4 discusses about the Linux process scheduling subsystem. This chapter discusses different data structures and code paths of the Linux scheduler, which controls the scheduling of processes in the Linux system. Chapter 5 discusses Interrupts, which play a significant role in the Linux operating system. The chapter discusses edge and level triggered interrupts, interrupt handlers and their registration, shared interrupt handlers, and so on. It also shows the ftrace of the do_irq function.Chapter 6 discusses the signal subsystem. It starts with a little introduction of the design of the signal subsystem. It then traces the code execution of delivering and handling of signals in the Linux kernel. The chapter then discusses signal overloading and how it is performed, while exploring the kernel code which handles this. Chapter 7 covers Linux synchronization primitives, and why they are needed. It shows the detailed implementation of primitives like atomic variables, spinlocks, semaphores and mutexes in the Linux kernel.Chapter 8 discusses various ways of Linux kernel memory allocation. It discusses Buddy allocator, Resource map allocator and Slab allocator. It discusses various APIs used for these allocators (alloc_page/s, kmem_cache_alloc, kmalloc etc.). It also discusses how user space malloc results in memory allocation in the Linux kernel.Chapter 9 discusses the Linux dynamic modules, Linux character driver framework, internal functions which are used while creating a character driver, UDEV events and IOCTL interface. It also discusses Linux device model. It discusses example of bus, device and device_driver components. It illustrates device model when used in PCI BUS. Chapter 10 covers the subsystem related to block IOs. It starts with an introduction of filesystem and its purpose. It then traces the path an IO takes, right from the "write()" system call, to the moment it gets written to the disk. The chapter covers basic data structures and design elements while going down the IO stack.

UNIX Internals Packt Publishing Ltd
Linux® is being adopted by an increasing number of embedded systems developers, who have been won over by its sophisticated scheduling and networking, its cost-free license, its open development model, and the support offered by rich and powerful programming tools. While there is a great deal of hype surrounding the use of Linux in embedded systems, there is not a lot of practical information. Building Embedded Linux Systems is the first in-depth, hard-core guide to putting together an embedded system based on the Linux kernel. This indispensable book features arcane and previously undocumented procedures for: Building your own GNU development toolchain Using an efficient embedded development framework Selecting, configuring, building, and installing a target-specific kernel Creating a complete target root filesystem Setting up, manipulating, and using solid-state storage devices Installing and configuring a bootloader for the target Cross-compiling a slew of utilities and packages Debugging your embedded system using a plethora of tools and techniques Details are provided for various target architectures and hardware configurations, including a thorough review of Linux's support for embedded hardware. All explanations rely on the use of open source and free software packages. By presenting how to build the operating system components from pristine sources and how to find more documentation or help, this book greatly simplifies the task of keeping complete control over one's embedded operating system, whether it be for technical or sound financial reasons.Author Karim Yaghmour, a well-known designer and speaker who is responsible for the Linux Trace Toolkit, starts by discussing the strengths and weaknesses of Linux as an embedded operating system. Licensing issues are included, followed by a discussion of the basics of building embedded Linux systems. The configuration, setup, and use of over forty different open source and free software packages commonly used in embedded Linux systems are also covered. uClibc, BusyBox, U-Boot, OpenSSH, thttpd, tftp, strace, and gdb are among the packages discussed.
Develop customized drivers for embedded Linux CreateSpace
Linux Kernel Networking takes you on a guided in-depth tour of the current Linux networking implementation and the theory behind it. Linux kernel networking is a complex topic, so the book won't burden you with topics not directly related to networking. This book will also not overload you with cumbersome line-by-line code walkthroughs not directly related to what you're searching for; you'll find just what you need, with in-depth explanations in each chapter and a quick reference at the end of each chapter. Linux Kernel Networking is the only up-to-date reference guide to understanding how networking is implemented, and it will be indispensable in years to come since so many devices now use Linux or operating systems based on Linux, like Android, and since Linux is so prevalent in the data center arena, including Linux-based virtualization technologies like Xen and KVM.
Essential System Administration "O'Reilly Media, Inc."
"This book is organized around three concepts fundamental to OS construction: virtualization (of CPU and memory), concurrency (locks and condition variables), and persistence (disks, RAIDS, and file systems"--Back cover.
A Top-down Approach for X86 and PowerPC Architectures Prentice Hall
Furnishing in-depth coverage of Linux source-code internals, this high-level handbook explains how the Linux system operating system works and how to use it with various programming applications, discussing the various Linux versions, performance and tuning issues, kernel programming, troubleshooting details, and other important topics. Original. (Intermediate)
Kernel Projects for Linux Computing McGraw-Hill
Linux Kernel Module Programming Guide is for people who want to write kernel modules. It takes a hands-on approach starting with writing a small "hello, world" program, and quickly moves from there. Far from a boring text on programming, Linux Kernel Module Programming Guide has a lively style that entertains while it educates. An excellent guide for anyone wishing to get started on kernel module programming. *** Money raised from the sale of this book supports the development of free software and documentation.
Linux in a Nutshell Sybex
Master the techniques needed to build great, efficient embedded devices on Linux About This Book Discover how to build and configure reliable embedded Linux devices This book has been updated to include Linux 4.9 and Yocto Project 2.2 (Morty) This comprehensive guide covers the remote update of devices in the field and power management Who This Book Is For If you are an engineer who wishes to understand and use Linux in embedded devices, this book is for you. It is also for Linux developers and system programmers who are familiar with embedded systems and want to learn and program the best in class devices. It is appropriate for students studying embedded techniques, for developers implementing embedded Linux devices, and engineers supporting existing Linux devices. What You Will Learn Evaluate the Board Support Packages offered by most manufacturers of a system on chip or embedded module Use Buildroot and the Yocto Project to create embedded Linux systems quickly and efficiently Update IoT devices in the field without compromising security Reduce the power budget of devices to make batteries last longer Interact with the hardware without having to write kernel device drivers Debug devices remotely using GDB, and see how to measure the performance of the systems using powerful tools such as perk, ftrace, and valgrind Find out how to configure Linux as a real-time operating system In Detail Embedded Linux runs many of the devices we use every day, from smart TVs to WiFi routers, test equipment to industrial controllers - all of them have Linux at their heart. Linux is a core technology in the implementation of the inter-connected world of the Internet of Things. The comprehensive guide shows you the technologies and techniques required to build Linux into embedded systems. You will begin by learning about the fundamental elements that underpin all embedded Linux projects: the toolchain, the bootloader, the kernel, and the root filesystem. You'll see how to create each of these elements from scratch, and how to automate the process using Buildroot and the Yocto Project. Moving on, you'll find out how to implement an effective storage strategy for flash memory chips, and how to install updates to the device remotely once it is deployed. You'll also get to know the key aspects of writing code for embedded Linux, such as how to access hardware from applications, the implications of writing multi-threaded code, and techniques to manage memory in an efficient way. The final chapters show you how to debug your code, both in applications and in the Linux kernel, and how to profile the system so that you can look out for performance bottlenecks. By the end of the book, you will have a complete overview of the steps required to create a successful embedded Linux system. Style and approach This book is an easy-to-follow and pragmatic guide with in-depth

analysis of the implementation of embedded devices. It follows the life cycle of a project from inception through to completion, at each stage giving both the theory that underlies the topic and practical step-by-step walkthroughs of an example implementation.

Linux Pocket Guide Packt Publishing Ltd

Find an introduction to the architecture, concepts and algorithms of the Linux kernel in Professional Linux Kernel Architecture, a guide to the kernel sources and large number of connections among subsystems. Find an introduction to the relevant structures and functions exported by the kernel to userland, understand the theoretical and conceptual aspects of the Linux kernel and Unix derivatives, and gain a deeper understanding of the kernel. Learn how to reduce the vast amount of information contained in the kernel sources and obtain the skills necessary to understand the kernel sources.

A kernel developer's reference manual "O'Reilly Media, Inc."

Unlike some operating systems, Linux doesn’t try to hide the important bits from you—it gives you full control of your computer. But to truly master Linux, you need to understand its internals, like how the system boots, how networking works, and what the kernel actually does. In this completely revised second edition of the perennial best seller How Linux Works, author Brian Ward makes the concepts behind Linux internals accessible to anyone curious about the inner workings of the operating system. Inside, you’ll find the kind of knowledge that normally comes from years of experience doing things the hard way. You’ll learn: –How Linux boots, from boot loaders to init implementations (systemd, Upstart, and System V) –How the kernel manages devices, device drivers, and processes –How networking, interfaces, firewalls, and servers work –How development tools work and relate to shared libraries –How to write effective shell scripts You’ll also explore the kernel and examine key system tasks inside user space, including system calls, input and output, and filesystems. With its combination of background, theory, real-world examples, and patient explanations, How Linux Works will teach you what you need to know to solve pesky problems and take control of your operating system.

Explore Linux system programming interfaces, theory, and practice Apress

This book is a beginner's guide for fast learning Linux commands which are frequently used by Linux administrators or beginners. The book covers all essential Linux commands as well as their operations, examples and explanations. It also includes Linux Helping commands, symbols, shortcut keys, run levels and Vi commands. From this book, you can easily learn: How to run all essential Linux commands. How to copy, move, and delete files and directories. How to create, remove, and manage users and groups. How to access Linux server, and use SSH commands. How to operate the run levels and change the run levels. How to navigate at the command line by helping commands. How to compare files, find out a file, manipulate file contents. How to start a job, stop a job and schedule a job. How to manage permissions, ownership of files, directories. How to connect across network, communicate with network. How to transfer files over network, send network messages And much more skill..... There is a long chart containing all common Linux commands in this book, which can give you a great help in your job or study. You can learn all essential Linux commands quickly.

What Every Superuser Should Know "O'Reilly Media, Inc."

Offers a comprehensive view of the underpinnings of the Linux kernel on the Intel x86 and the Power PC.

Tools and Techniques for Linux and Unix Administration Packt Publishing Ltd

Essential System Administration,3rd Edition is the definitive guide for Unix system administration, covering all the fundamental and essential tasks required to run such divergent Unix systems as AIX, FreeBSD, HP-UX, Linux, Solaris, Tru64 and more. Essential System Administration provides a clear, concise, practical guide to the real-world issues that anyone responsible for a Unix system faces daily.The new edition of this indispensable reference has been fully updated for all the latest operating systems. Even more importantly, it has been extensively revised and expanded to consider the current system administrative topics that administrators need most. Essential System Administration,3rd Edition covers: DHCP, USB devices, the latest automation tools, SNMP and network management, LDAP, PAM, and recent security tools and techniques.Essential System Administration is comprehensive. But what has made this book the guide system administrators turn to over and over again is not just the sheer volume of valuable information it provides, but the clear, useful way the information is presented. It discusses the underlying higher-level concepts, but it also provides the details of the procedures needed to carry them out. It is not organized around the features of the Unix operating system, but around the various facets of a system administrator's job. It describes all the usual administrative tools that Unix provides, but it also shows how to use them intelligently and efficiently.Whether you use a standalone Unix system, routinely provide administrative support for a larger shared system, or just want an understanding of basic administrative functions, Essential System Administration is for you. This comprehensive and invaluable book combines the author's years of practical experience with technical expertise to help you manage Unix systems as productively and painlessly as possible.

Attacking the Core Prentice-Hall PTR

With Kernel Projects for Linux, Professor Gary Nutt provides a series of 12 lab exercises that illustrate how to implement core operating system concepts in the increasingly popular Linux environment. The makeup of the manual allows readers to learn concepts on a modern operating system—Linux—while at the same time viewing the source code. This hands-on manual complements any core OS book by demonstrating how theoretical concepts are realized in Linux.Part I presents an overview of the Linux design, offering some insight into such topics as runtime organization and process, file, and device management. Part II consists of a graduated set of exercises where readers move from inspecting various aspects of the operating systems's internals to developing their own functions and data structures for the Linux kernel.This book is designed for programmers who need to learn the fundamentals of operating systems on a modern OS. The progressively harder exercises allow them to learn concepts in a hands-on setting.

Professional Linux Kernel Architecture "O'Reilly Media, Inc."

UNIX, UNIX LINUX & UNIX TCL/TK. Write software that makes the most effective use of the Linux system, including the kernel and core system libraries. The majority of both Unix and Linux code is still written at the system level, and this book helps you focus on everything above the kernel, where applications such as Apache, bash, cp, vim, Emacs, gcc, gdb, glibc, ls, mv, and X exist. Written primarily for engineers looking to program at the low level, this updated edition of Linux

System Programming gives you an understanding of core internals that makes for better code, no matter where it appears in the stack. -- Provided by publisher.
"O'Reilly Media, Inc."
This is an expert guide to the 2.6 Linux Kernel's most important component: the Virtual Memory Manager.
A Beginners Guide to Linux Internals Prentice Hall Professional
Learn how to write high-quality kernel module code, solve common Linux kernel programming issues, and understand the fundamentals of Linux kernel internals Key Features Discover how to write kernel code using the Loadable Kernel Module framework Explore industry-grade techniques to perform efficient memory allocation and data synchronization within the kernel Understand the essentials of key internals topics such as kernel architecture, memory management, CPU scheduling, and kernel synchronization Book Description Linux Kernel Programming is a comprehensive introduction for those new to Linux kernel and module development. This easy-to-follow guide will have you up and running with writing kernel code in next-to-no time. This book uses the latest 5.4 Long-Term Support (LTS) Linux kernel, which will be maintained from November 2019 through to December 2025. By working with the 5.4 LTS kernel throughout the book, you can be confident that your knowledge will continue to be valid for years to come. This Linux book begins by showing you how to build the kernel from the source. Next, you'll learn how to write your first kernel module using the powerful Loadable Kernel Module (LKM) framework. The book then covers key kernel internals topics including Linux kernel architecture, memory management, and CPU scheduling. Next, you'll delve into the fairly complex topic of concurrency within the kernel, understand the issues it can cause, and learn how they can be addressed with various locking technologies (mutexes, spinlocks, atomic, and refcount operators). You'll also benefit from more advanced material on cache effects, a primer on lock-free techniques within the kernel, deadlock avoidance (with lockdep), and kernel lock debugging techniques. By the end of this kernel book, you'll have a detailed understanding of the fundamentals of writing Linux kernel module code for real-world projects and products. What you will learn Write high-quality modular kernel code (LKM framework) for 5.x kernels Configure and build a kernel from source Explore the Linux kernel architecture Get to grips with key internals regarding memory management within the kernel Understand and work with various dynamic kernel memory alloc/dealloc APIs Discover key internals aspects regarding CPU scheduling within the kernel Gain an understanding of kernel concurrency issues Find out how to work with key kernel synchronization primitives Who this book is for This book is for Linux programmers beginning to find their way with Linux kernel development. Linux kernel and driver developers looking to overcome frequent and common kernel development issues, as well as understand kernel internals, will benefit from this book. A basic understanding of Linux CLI and C programming is required.
A comprehensive guide to kernel internals, writing kernel modules, and kernel synchronization
"O'Reilly Media, Inc."
Since the introduction of Linix version 1.2 in March 1995, a worldwide community has evolved from programmers who were attracted by the reliability and flexibility of this completely free operating system. Now at version 2.0, Linux is no longer simply the operating system of choice for hackers, but is being successfully employed in commercial software development, by Internet providers and in research and teaching. This book is written for anybody who wants to learn more about Linux. It explains the inner mechanisms of Linux from process scheduling to memory management and file systems, and will tell you all you need to know about the structure of the kernel, the heart of the Linux operating system. This New Edition: has been thoroughly updated throughout to cover Linux 2.0 shows you how the Linux operating system actually works so that you can start to program the Linux kernel for yourself introduces the kernel sources and describes basic algorithms and data structures, such as scheduling and task structure helps you to understand file systems, networking, and how systems boot The accompanying CD-ROM contains Slackware distribution 3.1 together with its complete source code, the Linux kernel sources up to version 2.0.27, the PC speaker driver, and a wealth of documentation. 0201331438B04062001

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