

Essential Linux Device Drivers



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Essential Linux Device Drivers Sreekrishnan Venkateswaran, 2008-03-27 Probably the most wide ranging and complete Linux device driver book I've read Alan Cox Linux Guru and Key Kernel Developer Very comprehensive and detailed covering almost every single Linux device driver type Theodore Ts'o First Linux Kernel Developer in North America and Chief Platform Strategist of the Linux Foundation The Most Practical Guide to Writing Linux Device Drivers Linux now offers an exceptionally robust environment for driver development with today's kernels what once required years of development time can be accomplished in days In this practical example driven book one of the world's most experienced Linux driver developers systematically demonstrates how to develop reliable Linux drivers for virtually any device Essential Linux Device Drivers is for any programmer with a working knowledge of operating systems and C including programmers who have never written drivers before Sreekrishnan Venkateswaran focuses on the essentials bringing together all the concepts and techniques you need while avoiding topics that only matter in highly specialized situations Venkateswaran begins by reviewing the Linux 2.6 kernel capabilities that are most relevant to driver developers He introduces simple device classes then turns to serial buses such as I2C and SPI external buses such as PCMCIA PCI and USB video audio block network and wireless device drivers user space drivers and drivers for embedded Linux one of today's fastest growing areas of Linux development For each Venkateswaran explains the technology inspects relevant kernel source files and walks through developing a complete example Addresses drivers discussed in no other book including drivers for I2C video sound PCMCIA and different types of flash memory Demystifies essential kernel services and facilities including kernel threads and helper interfaces Teaches polling asynchronous notification and I/O control Introduces the Inter Integrated Circuit Protocol for embedded Linux drivers Covers multimedia device drivers using the Linux Video subsystem and Linux Audio framework Shows how Linux implements support for wireless technologies such as Bluetooth Infrared WiFi and cellular networking Describes the entire driver development lifecycle through debugging and maintenance Includes reference appendixes covering Linux assembly BIOS calls and Seq files

Essential Linux Device Drivers Venkateswaran, 1900 This is the eBook version of the printed book If the print book includes a CD ROM this content is not included within the eBook version The Most Practical Guide to Writing Linux Device Drivers Linux now offers an exceptionally robust environment for driver development with today's kernels what once required years of development time can now be accomplished in days In this practical example driven book one of the world's most experienced Linux driver developers systematically demonstrates how to develop reliable Linux drivers for virtually any device Essential Linux Device Drivers

Essential Linux Device Drivers Sreekrishnan Venkateswaran, 2008

Easy Linux Device Driver, Second Edition Mahesh Sambhaji Jadhav, 2014-03-13 Easy Linux Device Driver First Step Towards Device Driver Programming Easy Linux Device Driver book is an easy and friendly way of learning device driver programming Book contains all latest programs along with output screen screenshots

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Linux Kernel Programming Part 2 - Char Device Drivers and Kernel Synchronization Kaiwan N Billimoria, 2021-03-19 Discover how to write high quality character driver code interface with userspace work with chip memory and gain an in depth understanding of working with hardware interrupts and kernel synchronization Key FeaturesDelve into hardware interrupt handling threaded IRQs tasklets softirqs and understand which to use whenExplore powerful techniques to perform user kernel interfacing peripheral I/O and use kernel mechanismsWork with key kernel synchronization primitives to solve kernel concurrency issuesBook Description Linux Kernel Programming Part 2 Char Device Drivers and Kernel Synchronization is an ideal companion guide to the Linux Kernel Programming book This book provides a comprehensive introduction for those new to Linux device driver development and will have you up and running with writing

misc class character device driver code on the 5.4 LTS Linux kernel in next to no time You'll begin by learning how to write a simple and complete misc class character driver before interfacing your driver with user mode processes via procfs sysfs debugfs netlink sockets and ioctl You'll then find out how to work with hardware I/O memory The book covers working with hardware interrupts in depth and helps you understand interrupt request IRQ allocation threaded IRQ handlers tasklets and softirqs You'll also explore the practical usage of useful kernel mechanisms setting up delays timers kernel threads and workqueues Finally you'll discover how to deal with the complexity of kernel synchronization with locking technologies mutexes spinlocks and atomic refcount operators including more advanced topics such as cache effects a primer on lock free techniques deadlock avoidance with lockdep and kernel lock debugging techniques By the end of this Linux kernel book you'll have learned the fundamentals of writing Linux character device driver code for real world projects and products What you will learn

- Get to grips with the basics of the modern Linux Device Model LDM
- Write a simple yet complete misc class character device driver
- Perform user kernel interfacing using popular methods
- Understand and handle hardware interrupts confidently
- Perform I/O on peripheral hardware chip memory
- Explore kernel APIs to work with delays timers kthreads and workqueues
- Understand kernel concurrency issues
- Work with key kernel synchronization primitives and discover how to detect and avoid deadlock

Who this book is for An understanding of the topics covered in the Linux Kernel Programming book is highly recommended to make the most of this book This book is for Linux programmers beginning to find their way with device driver development Linux device driver developers looking to overcome frequent and common kernel driver development issues as well as perform common driver tasks such as user kernel interfaces performing peripheral I/O handling hardware interrupts and dealing with concurrency will benefit from this book A basic understanding of Linux kernel internals and common APIs kernel module development and C programming is required

Mastering Embedded Linux Development Frank Vasquez, Chris Simmonds, 2025-05-27 Written by Frank Vasquez an embedded Linux expert this new edition enables you to harness the full potential of Linux to create versatile and robust embedded solutions All formats include a free PDF and an invitation to the Embedded System Professionals community Key Features Learn how to develop and configure reliable embedded Linux devices Discover the latest enhancements in Linux 6.6 and the Yocto Project 5.0 codename Scarthgap Explore different ways to debug and profile your code in both user space and the Linux kernel Purchase of the print or Kindle book includes a free PDF eBook Book Description Mastering Embedded Linux Development is designed to be both a learning resource and a reference for your embedded Linux projects In this fourth edition you'll learn the fundamental elements that underpin all embedded Linux projects the toolchain the bootloader the kernel and the root filesystem First you will download and install a pre-built toolchain After that you will cross compile each of the remaining three elements from scratch and learn to automate the process using Buildroot and the Yocto Project The book progresses with coverage of over the air software updates and rapid prototyping with add-on boards Two new chapters tackle modern

development practices including Python packaging and deploying containerized applications These are followed by a chapter on writing multithreaded code and another on techniques to manage memory efficiently The final chapters demonstrate how to debug your code whether it resides in user space or in the Linux kernel itself In addition to GNU debugger GDB the book also covers the different tracers and profilers that are available for Linux so that you can quickly pinpoint any performance bottlenecks in your system By the end of this book you will be able to create efficient and secure embedded devices with Linux that will delight your users What you will learn Cross compile embedded Linux images with Buildroot and Yocto Enable Wi Fi and Bluetooth connectivity with a Yocto board support package Update IoT devices securely in the field with Mender or balena Prototype peripheral additions by connecting add on boards reading schematics and coding test programs Deploy containerized software applications on edge devices with Docker Debug devices remotely using GDB and measure the performance of systems using tools like perf and ply Who this book is for If you are a systems software engineer or system administrator who wants to learn how to apply Linux to embedded devices then this book is for you The book is also for embedded software engineers accustomed to programming low power microcontrollers and will help them make the leap to a high speed system on chips that can run Linux Anyone who develops hardware for Linux will find something useful in this book But before you get started you will need a solid grasp of the POSIX standard C programming and shell scripting

Professional Linux Kernel Architecture Wolfgang Mauerer,2010-03-11 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

Mastering Embedded Linux Programming Chris Simmonds,2017-06-30 Learn to confidently develop debug and deploy robust embedded Linux systems with hands on examples using BeagleBone and QEMU Key Features Step by step guide from toolchain setup to real time programming with hands on implementation Practical insights on kernel configuration device drivers and memory management Covers hardware integration using BeagleBone Black and virtual environments via QEMU Book DescriptionEmbedded 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 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 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 `perf` `ftrace` and `valgrind` Who this book is for This book is for embedded engineers Linux developers and computer science students looking to build real world embedded systems It suits readers who are familiar with basic Linux use and want to deepen their skills in kernel configuration debugging and device integration

[Linux Device Driver Development](#) John Madieu, 2022-04-21 Get up to speed with the most important concepts in driver development and focus on common embedded system requirements such as memory management interrupt management and locking mechanisms Key Features Write feature rich and customized Linux device drivers for any character SPI and I2C device Develop a deep understanding of locking primitives IRQ management memory management DMA and so on Gain practical experience in the embedded side of Linux using GPIO IIO and input subsystems Book Description Linux is by far the most used kernel on embedded systems Thanks to its subsystems the Linux kernel supports almost all of the application fields in the industrial world This updated second edition of Linux Device Driver Development is a comprehensive introduction to the Linux kernel world and the different subsystems that it is made of and will be useful for embedded developers from any discipline You ll learn how to configure tailor and build the Linux kernel Filled with real world examples the book covers each of the most used subsystems in the embedded domains such as GPIO direct memory access interrupt management and I2C SPI device drivers This book will show you how Linux abstracts each device from a hardware point of view and how a device is bound to its driver s You ll also see how interrupts are propagated in the system as the book covers the interrupt processing mechanisms in depth and describes every kernel structure and API involved This new edition also addresses how not to write device drivers using user space libraries for GPIO clients I2C and SPI drivers By the end of this Linux book you ll be able to write device drivers for most of the embedded devices out there What you will learn Download configure build and tailor the Linux kernel Describe the hardware using a device tree Write feature rich platform drivers and leverage I2C and SPI buses Get the most out of the new concurrency managed workqueue infrastructure Understand the Linux kernel timekeeping mechanism and use time related APIs Use the regmap framework to factor the code and make it generic Offload CPU for memory copies using DMA Interact with the real world using GPIO IIO and input subsystems Who this

book is for This Linux OS book is for embedded system and embedded Linux enthusiasts developers who want to get started with Linux kernel development and leverage its subsystems Electronic hackers and hobbyists interested in Linux kernel development as well as anyone looking to interact with the platform using GPIO IIO and input subsystems will also find this book useful

Android System Programming Roger Ye, 2017-05-31 Build customize and debug your own Android system

Key Features Master Android system level programming by integrating customizing and extending popular open source projects Use Android emulators to explore the true potential of your hardware Master key debugging techniques to create a hassle free development environment

Book Description Android system programming involves both hardware and software knowledge to work on system level programming The developers need to use various techniques to debug the different components in the target devices With all the challenges you usually have a deep learning curve to master relevant knowledge in this area This book will not only give you the key knowledge you need to understand Android system programming but will also prepare you as you get hands on with projects and gain debugging skills that you can use in your future projects You will start by exploring the basic setup of AOSP and building and testing an emulator image In the first project you will learn how to customize and extend the Android emulator Then you ll move on to the real challenge building your own Android system on VirtualBox You ll see how to debug the init process resolve the bootloader issue and enable various hardware interfaces When you have a complete system you will learn how to patch and upgrade it through recovery Throughout the book you will get to know useful tips on how to integrate and reuse existing open source projects such as LineageOS CyanogenMod Android x86 Xposed and GApps in your own system What you will learn Set up the Android development environment and organize source code repositories Get acquainted with the Android system architecture Build the Android emulator from the AOSP source tree Find out how to enable WiFi in the Android emulator Debug the boot up process using a customized Ramdisk Port your Android system to a new platform using VirtualBox Find out what recovery is and see how to enable it in the AOSP build Prepare and test OTA packages

Who this book is for This book is for Android system programmers and developers who want to use Android and create indigenous projects with it You should know the important points about the operating system and the C C programming language

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