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# Yocto For Raspberry Pi

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Raspberry Pi Technology  
 10th International Conference, ICCI 2018, Bristol, UK, September 5-7, 2018, Proceedings, Part I  
 Develop high performance applications for embedded systems with C++ and Qt 5  
 Linux Kernel Programming  
 Simple and Practical Techniques for Writing Better Code  
 Using Web Technologies to Build Connected Devices  
 Using Yocto Project with BeagleBone Black  
 Learning Embedded Linux Using the Yocto Project  
 Practical recipes to help you leverage the power of Yocto to build exciting Linux-based systems, 2nd Edition  
 Porting, Extending, and Customizing  
 CMake Cookbook  
 Embedded Linux Development Using Yocto Project Cookbook  
 Embedded Linux Projects Using Yocto Project Cookbook  
 GNU/Linux Rapid Embedded Programming  
 Learn to Develop Linux Embedded Drivers with Kernel 4.9 LTS  
 Mastering Embedded Linux Programming  
 The Car Hacker's Handbook  
 Mastering Linux Device Driver Development  
 Yocto Project Development Manual  
 Yocto for Raspberry Pi IoT (物联网)  
 Open-Source Electronics Platforms  
 The Art of Readable Code  
 Create fast and reliable embedded solutions with Linux 5.4 and the Yocto Project 3.1 (Dunfell)  
 Computational Collective Intelligence  
 Write custom device drivers to support computer peripherals in Linux operating systems  
 Expert C++  
 2020 Fourth World Conference on Smart Trends in Systems, Security and Sustainability (WorldS4)  
 A Practical Real-World Approach  
 Embedded Linux Development with Yocto Project  
 Embedded Linux Systems with the Yocto Project  
 Exploring Raspberry Pi  
 Building, testing, and packaging modular software with modern CMake  
 Learn to leverage the power of Yocto Project to build efficient Linux-based products  
 Yocto for Raspberry Pi  
 VHDL for Logic Synthesis  
 Build apps for Android, iOS, and Raspberry Pi with C++ and Qt  
 Embedded Software for the IoT  
 Open-Source Electronics Platforms  
 Interfacing to the Real World with Embedded Linux  
 Linux Kernel in a Nutshell

Yocto For Raspberry Pi

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## MIGUEL DILLON

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*Raspberry Pi Technology* Packt Publishing Ltd  
 Making VHDL a simple and easy-to-use hardware description language. Many engineers encountering VHDL (very high speed integrated circuits hardware description language) for the first time can feel overwhelmed by it. This book bridges the gap between the VHDL language and the hardware that results from logic synthesis with clear organisation, progressing from the basics of combinational logic, types, and operators; through special structures such as tristate buses, register banks and memories, to advanced themes such as developing your own packages, writing test benches and using the full range of synthesis types. This third edition has been substantially rewritten to include the new VHDL-2008 features that enable synthesis of fixed-point and floating-point hardware. Extensively updated throughout to reflect modern logic synthesis usage, it also contains a complete case study to demonstrate the updated features. Features to this edition include: a common VHDL subset

which will work across a range of different synthesis systems, targeting a very wide range of technologies a design style that results in long design lifetimes, maximum design reuse and easy technology retargeting a new chapter on a large scale design example based on a digital filter from design objective and design process, to testing strategy and test benches a chapter on writing test benches, with everything needed to implement a test-based design strategy extensive coverage of data path design, including integer, fixed-point and floating-point arithmetic, logic circuits, shifters, tristate buses, RAMs, ROMs, state machines, and decoders Focused specifically on logic synthesis, this book is for professional hardware engineers using VHDL for logic synthesis, and digital systems designers new to VHDL but familiar with digital systems. It offers all the knowledge and tools needed to use VHDL for logic synthesis. Organised in themed chapters and with a comprehensive index, this complete reference will also benefit postgraduate students following courses on microelectronics or VLSI/ semiconductors and digital design.

*10th International Conference, ICCI 2018, Bristol, UK, September 5-7, 2018, Proceedings, Part I* MDPI

In-depth instruction and practical techniques for building with the BeagleBone embedded Linux platform Exploring BeagleBone is a hands-on guide to bringing gadgets, gizmos, and robots to life using the popular BeagleBone embedded Linux platform. Comprehensive content and deep detail provide more than just a BeagleBone instruction manual—you'll also learn the underlying engineering techniques that will allow you to create your own projects. The book begins with a foundational primer on essential skills, and then gradually moves into communication, control, and advanced applications using C/C++, allowing you to learn at your own pace. In addition, the book's companion website features instructional videos, source code, discussion forums, and more, to ensure that you have everything you need. The BeagleBone's small size, high performance, low cost, and extreme adaptability have made it a favorite development platform, and the Linux software base allows for complex yet flexible functionality. The BeagleBone has applications in smart buildings, robot control, environmental sensing, to name a few; and, expansion boards and peripherals dramatically increase the possibilities. Exploring BeagleBone provides a reader-friendly guide to the device, including a crash course in computer engineering. While following step by step, you can: Get up to speed on embedded Linux, electronics, and programming Master interfacing electronic circuits, buses and modules, with practical examples Explore the Internet-connected BeagleBone and the BeagleBone with a display Apply the BeagleBone to sensing applications, including video and sound Explore the BeagleBone's Programmable Real-Time Controllers Hands-on learning helps ensure that your new skills stay with you, allowing you to design with electronics, modules, or peripherals even beyond the BeagleBone. Insightful guidance and online peer support help you transition from beginner to expert as you master the techniques presented in Exploring BeagleBone, the practical handbook for the popular computing platform.

*Develop high performance applications for embedded systems with C++ and Qt 5* Packt Publishing Ltd

Build Complete Embedded Linux Systems Quickly and Reliably Developers are increasingly integrating Linux into their embedded systems: It supports virtually all hardware architectures and many peripherals, scales well, offers full source code, and requires no royalties. The Yocto Project makes it much easier to customize Linux for embedded systems. If you're a developer with working knowledge of Linux, Embedded Linux Systems with the Yocto Project™ will help you make the most of it. An indispensable companion to the official documentation, this guide starts by offering a solid grounding in the embedded Linux landscape and the challenges of creating custom distributions for embedded systems. You'll master the Yocto Project's toolbox hands-on, by working through the entire development lifecycle with a variety of real-life examples that you can incorporate into your own projects. Author Rudolf Streif offers deep insight into Yocto Project's build system and engine, and addresses advanced topics ranging from board support to compliance management. You'll learn how to Overcome key challenges of creating custom embedded distributions Jumpstart and iterate OS stack builds with the OpenEmbedded Build System Master build workflow, architecture, and the BitBake Build Engine Quickly troubleshoot build problems Customize new distros with built-in blueprints or from scratch Use BitBake recipes to create new software packages Build kernels, set configurations, and apply patches Support diverse CPU architectures and systems Create Board Support Packages (BSP) for hardware-specific adaptations Provide Application Development Toolkits (ADT) for round-trip development Remotely run and debug applications on actual hardware targets Ensure open-source license compliance Scale

team-based projects with Toaster, Build History, Source Mirrors, and Autobuilder

**Linux Kernel Programming** "O'Reilly Media, Inc."

The open source nature of Linux has always intrigued embedded engineers, and the latest kernel releases have provided new features enabling more robust functionality for embedded applications. Enhanced real-time performance, easier porting to new architectures, support for microcontrollers and an improved I/O system give embedded engineers even more reasons to love Linux! However, the rapid evolution of the Linux world can result in an eternal search for new information sources that will help embedded programmers to keep up! This completely updated second edition of noted author Doug Abbott's respected introduction to embedded Linux brings readers up-to-speed on all the latest developments. This practical, hands-on guide covers the many issues of special concern to Linux users in the embedded space, taking into account their specific needs and constraints. You'll find updated information on: • The GNU toolchain • Configuring and building the kernel • BlueCat Linux • Debugging on the target • Kernel Modules • Devices Drivers • Embedded Networking • Real-time programming tips and techniques • The RTAI environment • And much more The accompanying CD-ROM contains all the source code from the book's examples, helpful software and other resources to help you get up to speed quickly. This is still the reference you'll reach for again and again! \* 100+ pages of new material adds depth and breadth to the 2003 embedded bestseller. \* Covers new Linux kernel 2.6 and the recent major OS release, Fedora. \* Gives the engineer a guide to working with popular and cost-efficient open-source code.

**Simple and Practical Techniques for Writing Better Code** Springer

As programmers, we've all seen source code that's so ugly and buggy it makes our brain ache. Over the past five years, authors Dustin Boswell and Trevor Foucher have analyzed hundreds of examples of "bad code" (much of it their own) to determine why they're bad and how they could be improved. Their conclusion? You need to write code that minimizes the time it would take someone else to understand it—even if that someone else is you. This book focuses on basic principles and practical techniques you can apply every time you write code. Using easy-to-digest code examples from different languages, each chapter dives into a different aspect of coding, and demonstrates how you can make your code easy to understand. Simplify naming, commenting, and formatting with tips that apply to every line of code Refine your program's loops, logic, and variables to reduce complexity and confusion Attack problems at the function level, such as reorganizing blocks of code to do one task at a time Write effective test code that is thorough and concise—as well as readable "Being aware of how the code you create affects those who look at it later is an important part of developing software. The authors did a great job in taking you through the different aspects of this challenge, explaining the details with instructive examples." —Michael Hunger, passionate Software Developer

**Using Web Technologies to Build Connected Devices** Yocto for Raspberry Pi

Up-to-the-Minute, Complete Guidance for Developing Embedded Solutions with Linux Linux has emerged as today's #1 operating system for embedded products. Christopher Hallinan's Embedded Linux Primer has proven itself as the definitive real-world guide to building efficient, high-value, embedded systems with Linux. Now, Hallinan has thoroughly updated this highly praised book for the newest Linux kernels, capabilities, tools, and hardware support, including advanced multicore processors. Drawing on more than a decade of embedded Linux experience, Hallinan


helps you rapidly climb the learning curve, whether you're moving from legacy environments or you're new to embedded programming. Hallinan addresses today's most important development challenges and demonstrates how to solve the problems you're most likely to encounter. You'll learn how to build a modern, efficient embedded Linux development environment, and then utilize it as productively as possible. Hallinan offers up-to-date guidance on everything from kernel configuration and initialization to bootloaders, device drivers to file systems, and BusyBox utilities to real-time configuration and system analysis. This edition adds entirely new chapters on UDEV, USB, and open source build systems. Tour the typical embedded system and development environment and understand its concepts and components. Understand the Linux kernel and userspace initialization processes. Preview bootloaders, with specific emphasis on U-Boot. Configure the Memory Technology Devices (MTD) subsystem to interface with flash (and other) memory devices. Make the most of BusyBox and latest open source development tools. Learn from expanded and updated coverage of kernel debugging. Build and analyze real-time systems with Linux. Learn to configure device files and driver loading with UDEV. Walk through detailed coverage of the USB subsystem. Introduces the latest open source embedded Linux build systems. Reference appendices include U-Boot and BusyBox commands.

**Using Yocto Project with BeagleBone Black** Packt Publishing Ltd

Explore Qt framework and APIs for building cross-platform applications for mobile devices, embedded systems, and IoT Key Features Build cross-platform applications and deploy them across mobile and connected devices Design 2D and 3D UIs for embedded systems using Yocto and Qt Creator Build machine to machine automation solution using QtSensors, QtMQTT, and QtWebSockets Book Description Qt is a world-class framework, helping you to develop rich graphical user interfaces (GUIs) and multi-platform applications that run on all major desktop platforms and most mobile or embedded platforms. The framework helps you connect the dots across platforms and between online and physical experience. This book will help you leverage the fully-featured Qt framework and its modular cross-platform library classes and intuitive APIs to develop applications for mobile, IoT, and industrial embedded systems. Considerations such as screen size, device orientation changes, and small memory will be discussed. We will focus on various core aspects of embedded and mobile systems, such as connectivity, networking, and sensors; there is no IoT without sensors. You will learn how to quickly design a flexible, fast, and responsive UI that looks great. Going further, you will implement different elements in a matter of minutes and synchronize the UI elements with the 3D assets with high precision. You will learn how to create high-performance embedded systems with 3D/2D user interfaces, and deploy and test on your target hardware. The book will explore several new features, including Qt for WebAssembly. At the end of this book, you will learn about creating a full software stack for embedded Linux systems using Yocto and Boot to Qt for Device Creation. What you will learn Explore the latest features of Qt, such as preview for Qt for Python and Qt for WebAssembly Create fluid UIs with a dynamic layout for different sized screens Deploy embedded applications on Linux systems using Yocto Design Qt APIs for building applications for embedded and mobile devices Utilize connectivity for networked and machine automated applications Discover effective techniques to apply graphical effects using Qt Quick apps Who this book is for The book is ideal for mobile developers, embedded systems engineers and enthusiasts who are interested in building cross-platform

applications with Qt. Prior knowledge of C++ is required.

**Learning Embedded Linux Using the Yocto Project MDPI** Provides information on writing a driver in Linux, covering such topics as character devices, network interfaces, driver debugging, concurrency, and interrupts.

[Practical recipes to help you leverage the power of Yocto to build exciting Linux-based systems, 2nd Edition](#) 

**LINUX DRIVER DEVELOPMENT FOR EMBEDDED PROCESSORS - SECOND EDITION** - The flexibility of Linux embedded, the availability of powerful, energy efficient processors designed for embedded computing and the low cost of new processors are encouraging many industrial companies to come up with new developments based on embedded processors. Current engineers have in their hands powerful tools for developing applications previously unimagined, but they need to understand the countless features that Linux offers today. This book will teach you how to develop device drivers for Device Tree Linux embedded systems. You will learn how to write different types of Linux drivers, as well as the appropriate APIs (Application Program Interfaces) and methods to interface with kernel and user spaces. This is a book is meant to be practical, but also provides an important theoretical base. More than twenty drivers are written and ported to three different processors. You can choose between NXP i.MX7D, Microchip SAMA5D2 and Broadcom BCM2837 processors to develop and test the drivers, whose implementation is described in detail in the practical lab sections of the book. Before you start reading, I encourage you to acquire any of these processor boards whenever you have access to some GPIOs, and at least one SPI and I2C controllers. The hardware configurations of the different evaluation boards used to develop the drivers are explained in detail throughout this book; one of the boards used to implement the drivers is the famous Raspberry PI 3 Model B board. You will learn how to develop drivers, from the simplest ones that do not interact with any external hardware, to drivers that manage different kind of devices: accelerometers, DACs, ADCs, RGB LEDs, Multi-Display LED controllers, I/O expanders, and Buttons. You will also develop DMA drivers, drivers that manage interrupts, and drivers that write/read on the internal registers of the processor to control external devices. To ease the development of some of these drivers, you will use different types of Frameworks: Miscellaneous framework, LED framework, UIO framework, Input framework and the IIO industrial one. This second edition has been updated to the v4.9 LTS kernel. Recently, all the drivers have been ported to the new Microchip SAMA5D27-SOM1 (SAMA5D27 System On Module) using kernel 4.14 LTS and included in the GitHub repository of this book; these drivers have been tested in the ATSAMA5D27-SOM1-EK1 evaluation platform; the ATSAMA5D27-SOM1-EK1 practice lab settings are not described throughout the text of this book, but in a practice labs user guide that can be downloaded from the book's GitHub.

**Porting, Extending, and Customizing** "O'Reilly Media, Inc."

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.

*CMake Cookbook* Packt Publishing Ltd

Modern cars are more computerized than ever. Infotainment and navigation systems, Wi-Fi, automatic software updates, and other innovations aim to make driving more convenient. But vehicle technologies haven't kept pace with today's more hostile security environment, leaving millions vulnerable to attack. The *Car Hacker's Handbook* will give you a deeper understanding of the computer systems and embedded software in modern vehicles. It begins by examining vulnerabilities and providing detailed explanations of communications over the CAN bus and between devices and systems. Then, once you have an understanding of a vehicle's communication network, you'll learn how to intercept data and perform specific hacks to track vehicles, unlock doors, glitch engines, flood communication, and more. With a focus on low-cost, open source hacking tools such as Metasploit, Wireshark, Kayak, can-utils, and ChipWhisperer, *The Car Hacker's Handbook* will show you how to:

- Build an accurate threat model for your vehicle
- Reverse engineer the CAN bus to fake engine signals
- Exploit vulnerabilities in diagnostic and data-logging systems
- Hack the ECU and other firmware and embedded systems
- Feed exploits through infotainment and vehicle-to-vehicle communication systems
- Override factory settings with performance-tuning techniques
- Build physical and virtual test benches to try out exploits safely

If you're curious about automotive security and have the urge to hack a two-ton computer, make *The Car Hacker's Handbook* your first stop.

#### **Embedded Linux Development Using Yocto Project Cookbook** Packt Publishing Ltd

Design and architect real-world scalable C++ applications by exploring advanced techniques in low-level programming, object-oriented programming (OOP), the Standard Template Library (STL), metaprogramming, and concurrency

Key Features  
 Design professional-grade, maintainable apps by learning advanced

concepts such as functional programming, templates, and networking  
 Apply design patterns and best practices to solve real-world problems  
 Improve the performance of your projects by designing concurrent data structures and algorithms

Book Description  
 C++ has evolved over the years and the latest release - C++20 - is now available. Since C++11, C++ has been constantly enhancing the language feature set. With the new version, you'll explore an array of features such as concepts, modules, ranges, and coroutines. This book will be your guide to learning the intricacies of the language, techniques, C++ tools, and the new features introduced in C++20, while also helping you apply these when building modern and resilient software. You'll start by exploring the latest features of C++, and then move on to advanced techniques such as multithreading, concurrency, debugging, monitoring, and high-performance programming. The book will delve into object-oriented programming principles and the C++ Standard Template Library, and even show you how to create custom templates. After this, you'll learn about different approaches such as test-driven development (TDD), behavior-driven development (BDD), and domain-driven design (DDD), before taking a look at the coding best practices and design patterns essential for building professional-grade applications. Toward the end of the book, you will gain useful insights into the recent C++ advancements in AI and machine learning. By the end of this C++ programming book, you'll have gained expertise in real-world application development, including the process of designing complex software. What you will learn

Understand memory management and low-level programming in C++ to write secure and stable applications  
 Discover the latest C++20 features such as modules, concepts, ranges, and coroutines  
 Understand debugging and testing techniques and reduce issues in your programs  
 Design and implement GUI applications using Qt5  
 Use multithreading and concurrency to make your programs run faster  
 Develop high-end games by using the object-oriented capabilities of C++  
 Explore AI and machine learning concepts with C++

Who this book is for  
 This C++ book is for experienced C++ developers who are looking to take their knowledge to the next level and perfect their skills in building professional-grade applications.

#### *Embedded Linux Projects Using Yocto Project Cookbook* Prentice Hall

Optimize and boost your Linux-based system with Yocto Project and increase its reliability and robustness efficiently and cost-effectively. About This Book  
 Optimize your Yocto Project tools to develop efficient Linux-based projects  
 Practical approach to learning Linux development using Yocto Project  
 Demonstrates concepts in a practical and easy-to-understand way  
 Who This Book Is For  
 If you are an embedded Linux developer with a basic knowledge of Yocto Project and want to broaden your knowledge with examples of embedded development, then this book is for you. This book is also for professionals who want to find new insights into working methodologies for Linux development. What You Will Learn  
 Understand the basic concepts involved in Poky workflows along with configuring and preparing the Poky build environment. Configure a build server and customize images using Toaster. Generate images and fit packages into created images using BitBake. Support the development process by setting up and using Package feeds. Debug Yocto Project by configuring Poky. Build an image for the BeagleBone Black, RaspberryPi 3, and Wandboard, and boot it from an SD card. In Detail  
 Yocto Project is turning out to be the best integration framework for creating reliable embedded Linux projects. It has the edge over other frameworks because of its features such as less development time and improved reliability and robustness.

Embedded Linux Development using Yocto Project starts with an in-depth explanation of all Yocto Project tools, to help you perform different Linux-based tasks. The book then moves on to in-depth explanations of Poky and BitBake. It also includes some practical use cases for building a Linux subsystem project using Yocto Project tools available for embedded Linux. The book also covers topics such as SDK, recipetool, and others. By the end of the book, you will have learned how to generate and run an image for real hardware boards and will have gained hands-on experience at building efficient Linux systems using Yocto Project. Style and approach A clear, concise, and straightforward book that will enable you to use and implement the latest features of Yocto Project.

[GNU/Linux Rapid Embedded Programming](#) John Wiley & Sons

If you are an embedded developer learning about embedded Linux with some experience with the Yocto project, this book is the ideal way to become proficient and broaden your knowledge with examples that are immediately applicable to your embedded developments. Experienced embedded Yocto developers will find new insight into working methodologies and ARM specific development competence.

[Learn to Develop Linux Embedded Drivers with Kernel 4.9 LTS](#)

John Wiley & Sons

Expand Raspberry Pi capabilities with fundamental engineering principles Exploring Raspberry Pi is the innovators guide to bringing Raspberry Pi to life. This book favors engineering principles over a 'recipe' approach to give you the skills you need to design and build your own projects. You'll understand the fundamental principles in a way that transfers to any type of electronics, electronic modules, or external peripherals, using a "learning by doing" approach that caters to both beginners and experts. The book begins with basic Linux and programming skills, and helps you stock your inventory with common parts and supplies. Next, you'll learn how to make parts work together to achieve the goals of your project, no matter what type of components you use. The companion website provides a full repository that structures all of the code and scripts, along with links to video tutorials and supplementary content that takes you deeper into your project. The Raspberry Pi's most famous feature is its adaptability. It can be used for thousands of electronic applications, and using the Linux OS expands the functionality even more. This book helps you get the most from your Raspberry Pi, but it also gives you the fundamental engineering skills you need to incorporate any electronics into any project. Develop the Linux and programming skills you need to build basic applications Build your inventory of parts so you can always "make it work" Understand interfacing, controlling, and communicating with almost any component Explore advanced applications with video, audio, real-world interactions, and more Be free to adapt and create with Exploring Raspberry Pi.

[Mastering Embedded Linux Programming](#) Springer Nature

Based upon the authors' experience in designing and deploying an embedded Linux system with a variety of applications, Embedded Linux System Design and Development contains a full embedded Linux system development roadmap for systems architects and software programmers. Explaining the issues that arise out of the use of Linux in embedded systems, the book facilitates movement to embedded Linux from traditional real-time operating systems, and describes the system design model containing embedded Linux. This book delivers practical solutions for writing, debugging, and profiling applications and drivers in embedded Linux, and for understanding Linux BSP architecture. It enables you to understand: various drivers such as serial, I2C and USB gadgets; uClinux architecture and its programming model; and the embedded Linux graphics subsystem. The text also

promotes learning of methods to reduce system boot time, optimize memory and storage, and find memory leaks and corruption in applications. This volume benefits IT managers in planning to choose an embedded Linux distribution and in creating a roadmap for OS transition. It also describes the application of the Linux licensing model in commercial products.

[The Car Hacker's Handbook](#) Packt Publishing Ltd

The Yocto Project produces tools and processes that enable the creation of Linux distributions for embedded software, independent of the architecture. BeagleBone Black is a platform that allows users to perform installation and customizations to their liking, quickly and easily. Starting with a basic introduction to Yocto Project's build system, this book will take you through the setup and deployment steps for Yocto Project. You will develop an understanding of BitBake, learn how to create a basic recipe, and explore the different types of Yocto Project recipe elements. Moving on, you will be able to customize existing recipes in layers and create a home surveillance solution using your webcam, as well as creating other advanced projects using BeagleBone Black and Yocto Project. By the end of the book, you will have all the necessary skills, exposure, and experience to complete projects based on Yocto Project and BeagleBone Black.

[Mastering Linux Device Driver Development](#) Packt Publishing Ltd

Master the art of developing customized device drivers for your embedded Linux systems Key Features Stay up to date with the Linux PCI, ASoC, and V4L2 subsystems and write device drivers for them Get to grips with the Linux kernel power management infrastructure Adopt a practical approach to customizing your Linux environment using best practices Book Description Linux is one of the fastest-growing operating systems around the world, and in the last few years, the Linux kernel has evolved significantly to support a wide variety of embedded devices with its improved subsystems and a range of new features. With this book, you'll find out how you can enhance your skills to write custom device drivers for your Linux operating system. Mastering Linux Device Driver Development provides complete coverage of kernel topics, including video and audio frameworks, that usually go unaddressed. You'll work with some of the most complex and impactful Linux kernel frameworks, such as PCI, ALSA for SoC, and Video4Linux2, and discover expert tips and best practices along the way. In addition to this, you'll understand how to make the most of frameworks such as NVMEM and Watchdog. Once you've got to grips with Linux kernel helpers, you'll advance to working with special device types such as Multi-Function Devices (MFD) followed by video and audio device drivers. By the end of this book, you'll be able to write feature-rich device drivers and integrate them with some of the most complex Linux kernel frameworks, including V4L2 and ALSA for SoC. What you will learn Explore and adopt Linux kernel helpers for locking, work deferral, and interrupt management Understand the Regmap subsystem to manage memory accesses and work with the IRQ subsystem Get to grips with the PCI subsystem and write reliable drivers for PCI devices Write full multimedia device drivers using ALSA SoC and the V4L2 framework Build power-aware device drivers using the kernel power management framework Find out how to get the most out of miscellaneous kernel subsystems such as NVMEM and Watchdog Who this book is for This book is for embedded developers, Linux system engineers, and system programmers who want to explore Linux kernel frameworks and subsystems. C programming skills and a basic understanding of driver development are necessary to get started with this book. [Yocto Project Development Manual](#) Packt Publishing Ltd Harness the power of Linux to create versatile and robust embedded solutions Key Features Learn how to develop and configure robust embedded Linux devices Explore the new

features of Linux 5.4 and the Yocto Project 3.1 (Dunfell) Discover different ways to debug and profile your code in both user space and the Linux kernel Book Description Embedded Linux runs many of the devices we use every day. From smart TVs and Wi-Fi routers to test equipment and industrial controllers, all of them have Linux at their heart. The Linux OS is one of the foundational technologies comprising the core of the Internet of Things (IoT). This book starts by breaking down the fundamental elements that underpin all embedded Linux projects: the toolchain, the bootloader, the kernel, and the root filesystem. After that, you will learn how to create each of these elements from scratch and automate the process using Buildroot and the Yocto Project. As you progress, the book explains how to implement an effective storage strategy for flash memory chips and install updates to a device remotely once it's deployed. You'll also learn about the key aspects of writing code for embedded Linux, such as how to access hardware from apps, the implications of writing multi-threaded code, and techniques to manage memory in an efficient way. The final chapters demonstrate how to debug your code, whether it resides in apps or in the Linux kernel itself. You'll also cover 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 Linux book, you'll be able to create efficient and secure embedded devices using Linux. What you will learn Use Buildroot and the Yocto Project to create embedded Linux systems Troubleshoot BitBake build failures and streamline your Yocto development workflow Update IoT devices securely in the field using Mender or balena Prototype peripheral additions by reading schematics, modifying device trees, soldering breakout boards, and probing pins with a logic analyzer Interact with hardware without having to write kernel device drivers Divide your system up into services supervised by BusyBox runit Debug devices remotely using GDB and measure the performance of systems using tools such as perf, ftrace, eBPF, and Callgrind Who this book is for If you're a systems software engineer or system administrator who wants to learn Linux implementation on embedded devices, then this book is for you. Embedded systems engineers accustomed to programming for low-power microcontrollers can use this book to help make the leap to high-speed systems on chips that can run Linux. Anyone responsible for developing new hardware that needs to

run Linux will also find this book useful. Basic working knowledge of the POSIX standard, C programming, and shell scripting is assumed.

Yocto for Raspberry Pi IoT Packt Publishing Ltd  
Over 79 hands-on recipes for professional embedded Linux developers to optimize and boost their Yocto Project know-how  
Key Features Optimize your Yocto setup to speed up development and debug build issues Use what is quickly becoming the standard embedded Linux product builder framework—the Yocto Project Recipe-based implementation of best practices to optimize your Linux system Book Description The Yocto Project has become the de facto distribution build framework for reliable and robust embedded systems with a reduced time to market. You'll get started by working on a build system where you set up Yocto, create a build directory, and learn how to debug it. Then, you'll explore everything about the BSP layer, from creating a custom layer to debugging device tree issues. In addition to this, you'll learn how to add a new software layer, packages, data, scripts, and configuration files to your system. You will then cover topics based on application development, such as using the Software Development Kit and how to use the Yocto project in various development environments. Toward the end, you will learn how to debug, trace, and profile a running system. This second edition has been updated to include new content based on the latest Yocto release. What you will learn Optimize your Yocto Project setup to speed up development and debug build issues Use Docker containers to build Yocto Project-based systems Take advantage of the user-friendly Toaster web interface to the Yocto Project build system Build and debug the Linux kernel and its device trees Customize your root filesystem with already-supported and new Yocto packages Optimize your production systems by reducing the size of both the Linux kernel and root filesystems Explore the mechanisms to increase the root filesystem security Understand the open source licensing requirements and how to comply with them when cohabiting with proprietary programs Create recipes, and build and run applications in C, C++, Python, Node.js, and Java Who this book is for If you are an embedded Linux developer with the basic knowledge of Yocto Project, this book is an ideal way to broaden your knowledge with recipes for embedded development.

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