

## Intel Linux Nvme Driver

Get up to speed on the latest Ethernet capabilities for building and maintaining networks for everything from homes and offices to data centers and server machine rooms. This thoroughly revised, comprehensive guide covers a wide range of Ethernet technologies, from basic operation to network management, based on the authors' many years of field experience. When should you upgrade to higher speed Ethernet? How do you use switches to build larger networks? How do you troubleshoot the system? This book provides the answers. If you're looking to build a scalable network with Ethernet to satisfy greater bandwidth and market requirements, this book is indeed the definitive guide. Examine the most widely used media systems, as well as advanced 40 and 100 gigabit Ethernet Learn about Ethernet's four basic elements and the IEEE standards Explore full-duplex Ethernet, Power over Ethernet, and Energy Efficient Ethernet Understand structured cabling systems and the components you need to build your Ethernet system Use Ethernet switches to expand and improve network design Delve into Ethernet performance, from specific channels to the entire network Get troubleshooting techniques for problems common to twisted-pair and fiber optic systems

Solid State Drives (SSDs) are gaining momentum in enterprise and client applications, replacing Hard Disk Drives (HDDs) by offering higher performance and lower power. In the enterprise, developers of data center server and storage systems have seen CPU performance growing exponentially for the past two decades, while HDD performance has improved linearly for the same period. Additionally, multi-core CPU designs and virtualization have increased randomness of storage I/Os. These trends have shifted performance bottlenecks to enterprise storage systems. Business critical applications such as online transaction processing, financial data processing and database mining are increasingly limited by storage performance. In client applications, small mobile platforms are leaving little room for batteries while demanding long life out of them. Therefore, reducing both idle and active power consumption has become critical. Additionally, client storage systems are in need of significant performance improvement as well as supporting small robust form factors. Ultimately, client systems are optimizing for best performance/power ratio as well as performance/cost ratio. SSDs promise to address both enterprise and client storage requirements by drastically improving performance while at the same time reducing power. Inside Solid State Drives walks the reader through all the main topics related to SSDs: from NAND Flash to memory controller (hardware and software), from I/O interfaces (PCIe/SAS/SATA) to reliability, from error correction codes (BCH and LDPC) to encryption, from Flash signal processing to hybrid storage. We hope you enjoy this tour inside Solid State Drives. The superabundance of data that is created by today's businesses is making storage a strategic investment priority for companies of all sizes. As storage takes precedence, the following major initiatives emerge: Flatten and converge your network: IBM® takes an open, standards-based approach to implement the latest advances in the flat, converged data center network designs of today. IBM Storage solutions enable clients to deploy a high-speed, low-latency Unified Fabric Architecture. Optimize and automate virtualization: Advanced virtualization awareness reduces the cost and complexity of deploying physical and virtual data center infrastructure. Simplify management: IBM

data center networks are easy to deploy, maintain, scale, and virtualize, delivering the foundation of consolidated operations for dynamic infrastructure management. Storage is no longer an afterthought. Too much is at stake. Companies are searching for more ways to efficiently manage expanding volumes of data, and to make that data accessible throughout the enterprise. This demand is propelling the move of storage into the network. Also, the increasing complexity of managing large numbers of storage devices and vast amounts of data is driving greater business value into software and services. With current estimates of the amount of data to be managed and made available increasing at 60% each year, this outlook is where a storage area network (SAN) enters the arena. SANs are the leading storage infrastructure for the global economy of today. SANs offer simplified storage management, scalability, flexibility, and availability; and improved data access, movement, and backup. Welcome to the cognitive era. The smarter data center with the improved economics of IT can be achieved by connecting servers and storage with a high-speed and intelligent network fabric. A smarter data center that hosts IBM Storage solutions can provide an environment that is smarter, faster, greener, open, and easy to manage. This IBM® Redbooks® publication provides an introduction to SAN and Ethernet networking, and how these networks help to achieve a smarter data center. This book is intended for people who are not very familiar with IT, or who are just starting out in the IT world. Build a seamless, flexible, full-service datacenter solution Microsoft Windows Server 2016 Hyper-V is the IT administrator's guide to this rising datacenter solution. Hyper-V has already surpassed VMWare in datacenter management, identity service for multiple devices, and more; this book shows you how to harness the power of this hypervisor to simplify the infrastructure, reduce costs, improve productivity, and better manage system resources. From a tour of the technology through architecture, deployment, and integration of System Center, Microsoft Azure, and Microsoft Azure Stack, the discussion illustrates the skills you need to create a complete solution for optimum enterprise management. Coverage includes Windows Azure capabilities for virtual machines, managing a hybrid cloud, IaaS, storage capabilities, PowerShell, and more, with practical real-world guidance from a leading authority in the field. Hyper-V has recently undergone improvements in scalability and features that have positioned it as an ideal solution in the Small/Medium Business and Enterprise markets. This book shows you how to exploit these new capabilities to build a robust data solution for your organization. Discover the capabilities of Microsoft Hyper-V Architect a Hyper-V datacenter solution Plan and manage a deployment or migration Integrate complementary technologies for full scalability Data is everywhere—on desktops, laptops, phones, and multiple operating systems, accessed through email, text messages, web searches, online services, and more. All of this data must be stored, accessible, updated, backed up, secured, managed, sorted, and analyzed—sometimes instantly. Hyper-V is the rising star in the virtualization space, and Microsoft Windows Server 2016 Hyper-V shows you how to turn greater capabilities into better datacenter solutions.

This book contains the practical labs corresponding to the "Linux Kernel and Driver Development: Training Handouts" book from Bootlin. Get your hands on an embedded board based on an ARM processor (the Beagle Bone Black board), and apply what you learned: write a Device Tree to declare devices connected to your board, configure pin

multiplexing, and implement drivers for I2C and serial devices. You will learn how to manage multiple devices with the same driver, to access and write hardware registers, to allocate memory, to register and manage interrupts, as well as how to debug your code and interpret the kernel error messages. You will also keep an eye on the board and CPU datasheets so that you will always understand the values that you feed to the kernel.

This IBM® Redbooks® publication provides advice and technical information about optimizing and tuning application code to run on systems that are based on the IBM POWER7® and POWER7+™ processors. This advice is drawn from application optimization efforts across many different types of code that runs under the IBM AIX® and Linux operating systems, focusing on the more pervasive performance opportunities that are identified, and how to capitalize on them. The technical information was developed by a set of domain experts at IBM. The focus of this book is to gather the right technical information, and lay out simple guidance for optimizing code performance on the IBM POWER7 and POWER7+ systems that run the AIX or Linux operating systems. This book contains a large amount of straightforward performance optimization that can be performed with minimal effort and without previous experience or in-depth knowledge. This optimization work can: Improve the performance of the application that is being optimized for the POWER7 system Carry over improvements to systems that are based on related processor chips Improve performance on other platforms The audience of this book is those personnel who are responsible for performing migration and implementation activities on IBM POWER7-based servers, which includes system administrators, system architects, network administrators, information architects, and database administrators (DBAs). Used in laptop and desktop computers, low-end servers, and mobile devices, Serial ATA (Advance Technology Attachment), or SATA, is the pervasive disk storage technology in use today. SATA has also penetrated the enterprise computing environment by adding hardware components for fail-over, extending command processing capabilities, and increasing de

This IBM® Redpaper™ publication is a comprehensive guide that covers the IBM Power Systems™ LC921 and LC922 (9006-12P and 9006-22P) servers that use the current IBM POWER9™ processor-based technology and supports Linux operating systems (OSes). The objective of this paper is to introduce the offerings and their capacities and available features. These new Linux scale-out systems provide differentiated performance, scalability, and low acquisition cost, and include the following features: Superior throughput and performance for high-value Linux workloads. Low acquisition cost through system optimization (industry-standard memory and industry-standard three-year warranty). Rich I/O options in the system unit. There are 12 large form factor (LFF)/small form factor (SFF) bays for 12 SAS/SATA hard disk drives (HDDs) or solid-state drives (SSDs), and four bays that are available for Non-Volatile Memory Express (NVMe) Gen3 adapters. Includes Trusted Platform Module (TPM) 2.0 Nuvoton NPCT650ABAWX through I2C (for secure boot and trusted boot). Integrated MicroSemi PM8069 SAS/SATA 16-port Internal Storage Controller Peripheral Component Interconnect Express (PCIe) 3.0 x8 with RAID 0, 1, 5, and 10 support (no write cache). Integrated Intel XL710 Quad Port 10 GBase-T PCIe 3.0 x8 UIO built-in local area network (LAN) (one shared management port). Dedicated

1 Gb Intelligent Platform Management Interface (IPMI) port. This publication is for professionals who want to acquire a better understanding of IBM Power Systems products. The intended audience includes: Clients Sales and marketing professionals Technical support professionals IBM Business Partners Independent software vendors (ISVs)

Implement and manage your software-defined, massively scalable storage system About This Book Explore Ceph's architecture in order to achieve scalability and high availability Learn to utilize Ceph efficiently with the help of practical examples Successfully implement Ceph clusters to scale-out storage solutions along with outstanding data protection Who This Book Is For A basic knowledge of GNU/Linux, and storage systems, and server components is assumed. If you have no experience of software-defined storage solutions and Ceph, but are eager to learn about them, this is the book for you. What You Will Learn The limitations of existing systems and why you should use Ceph as a storage solution Familiarity with Ceph's architecture, components, and services Instant deployment and testing of Ceph within a Vagrant and VirtualBox environment Ceph operations including maintenance, monitoring, and troubleshooting Storage provisioning of Ceph's block, object, and filesystem services Integrate Ceph with OpenStack Advanced topics including erasure coding, CRUSH maps, and performance tuning Best practices for your Ceph clusters In Detail Learning Ceph, Second Edition will give you all the skills you need to plan, deploy, and effectively manage your Ceph cluster. You will begin with the first module, where you will be introduced to Ceph use cases, its architecture, and core projects. In the next module, you will learn to set up a test cluster, using Ceph clusters and hardware selection. After you have learned to use Ceph clusters, the next module will teach you how to monitor cluster health, improve performance, and troubleshoot any issues that arise. In the last module, you will learn to integrate Ceph with other tools such as OpenStack, Glance, Manila, Swift, and Cinder. By the end of the book you will have learned to use Ceph effectively for your data storage requirements. Style and approach This step-by-step guide, including use cases and examples, not only helps you to easily use Ceph but also demonstrates how you can use it to solve any of your server or drive storage issues.

Nwely updated to include new calls and techniques introduced in Versions 2.2 and 2.4 of the Linux kernel, a definitive resource for those who want to support computer peripherals under the Linux operating system explains how to write a driver for a broad spectrum of devices, including character devices, network interfaces, and block devices. Original. (Intermediate) This IBM® Redpaper™ publication describes the adapter-based virtualization capabilities that are being deployed in high-end IBM POWER7+™ processor-based servers. Peripheral Component Interconnect Express (PCIe) single root I/O virtualization (SR-IOV) is a virtualization technology on IBM Power Systems servers. SR-IOV allows multiple logical partitions (LPARs) to share a PCIe adapter with little or no run time involvement of a hypervisor or other virtualization intermediary. SR-IOV does not replace the existing virtualization capabilities that are offered as part of the IBM PowerVM® offerings. Rather, SR-IOV compliments them with additional capabilities. This paper describes many aspects of the SR-IOV technology, including: A comparison of SR-IOV with standard virtualization technology Overall benefits of SR-IOV Architectural overview of SR-IOV Planning requirements SR-IOV deployment models that use standard I/O virtualization Configuring the adapter for dedicated or shared modes Tips for maintaining and troubleshooting your system Scenarios for configuring your system This paper is directed to clients, IBM Business Partners, and system administrators who are involved with planning, deploying, configuring, and maintaining key virtualization technologies.

The world's most successful banks run on IBM®, and increasingly IBM LinuxONE. Temenos, the global leader in banking software, has worked alongside IBM for many years on banking

deployments of all sizes. This book marks an important milestone in that partnership. Temenos on IBM LinuxONE Best Practices Guide shows financial organizations how they can combine the power and flexibility of the Temenos solution with the IBM platform that is purpose built for the digital revolution.

This IBM® Redpaper™ publication is a comprehensive guide that covers the IBM Power System AC922 server (8335-GTG and 8335-GTW models). The Power AC922 server is the next generation of the IBM Power processor-based systems, which are designed for deep learning and artificial intelligence (AI), high-performance analytics, and high-performance computing (HPC). This paper introduces the major innovative Power AC922 server features and their relevant functions: Powerful IBM POWER9™ processors that offer 16 cores at 2.6 GHz with 3.09 GHz turbo performance or 20 cores at 2.0 GHz with 2.87 GHz turbo for the 8335-GTG Eighteen cores at 2.98 GHz with 3.26 GHz turbo performance or 22 at 2.78 GHz cores with 3.07 GHz turbo for the 8335-GTW IBM Coherent Accelerator Processor Interface (CAPI) 2.0, IBM OpenCAPITM, and second-generation NVIDIA NVLink technology for exceptional processor-to-accelerator intercommunication Up to six dedicated NVIDIA Tesla V100 GPUs This publication is for professionals who want to acquire a better understanding of IBM Power Systems™ products and is intended for the following audiences: Clients Sales and marketing professionals Technical support professionals IBM Business Partners Independent software vendors (ISVs) This paper expands the set of IBM Power Systems documentation by providing a desktop reference that offers a detailed technical description of the Power AC922 server. This paper does not replace the current marketing materials and configuration tools. It is intended as an extra source of information that, together with existing sources, can be used to enhance your knowledge of IBM server solutions.

This book is written for students or professionals who quickly want to learn Linux Kernel programming and device driver development. Each chapter in this book is associated with code samples and code commentary so that the readers may quickly un.

Data Plane Development Kit (DPDK) A Software Optimization Guide to the User Space-Based Network Applications CRC Press

This open access book constitutes the refereed proceedings of the 6th Asian Supercomputing Conference, SCFA 2020, which was planned to be held in February 2020, but unfortunately, the physical conference was cancelled due to the COVID-19 pandemic. The 8 full papers presented in this book were carefully reviewed and selected from 22 submissions. They cover a range of topics including file systems, memory hierarchy, HPC cloud platform, container image configuration workflow, large-scale applications, and scheduling.

IBM® FlashSystem 9100 combines the performance of flash and Non-Volatile Memory Express (NVMe) with the reliability and innovation of IBM FlashCore® technology and the rich features of IBM Spectrum™ Virtualize — all in a powerful 2U storage system. Providing intensive data driven multi-cloud storage capacity, FlashSystem 9100 is deeply integrated with the software-defined capabilities of IBM Spectrum Storage™, which allows you to easily add the multi-cloud solutions that best support your business. In this IBM Redbooks® publication, we discuss the product's features and planning steps, architecture, installation, configuration, and hints and tips.

This book provides an overview of modern boot firmware, including the Unified Extensible Firmware Interface (UEFI) and its associated EFI Developer Kit II (EDKII) firmware. The authors have each made significant contributions to developments in these areas. The reader will learn to use the latest developments in UEFI on modern hardware, including open source firmware and open hardware designs. The book begins with an exploration of interfaces exposed to higher-level software and operating systems, and commences to the left of the boot timeline, describing the flow of typical

systems, beginning with the machine restart event. Software engineers working with UEFI will benefit greatly from this book, while specific sections of the book address topics relevant for a general audience: system architects, pre-operating-system application developers, operating system vendors (loader, kernel), independent hardware vendors (such as for plug-in adapters), and developers of end-user applications. As a secondary audience, project technical leaders or managers may be interested in this book to get a feel for what their engineers are doing. The reader will find:

- An overview of UEFI and underlying Platform Initialization (PI) specifications
- How to create UEFI applications and drivers
- Workflow to design the firmware solution for a modern platform
- Advanced usages of UEFI firmware for security and manageability

This IBM® Redpaper™ publication provides a broad understanding of a new architecture of the IBM Power System E980 (9080-M9S) server that supports IBM AIX®, IBM i, and Linux operating systems (OSes). The objective of this paper is to introduce the major innovative Power E980 offerings and relevant functions: The IBM POWER9™ processor, which is available at frequencies of 3.55 - 4.0 GHz. Significantly strengthened cores and larger caches. Supports up to 64 TB memory. Integrated I/O subsystem and hot-pluggable Peripheral Component Interconnect Express (PCIe) Gen4 slots, double the bandwidth of Gen3 I/O slots. Supports EXP12SX and ESP24SX external disk drawers, which have 12 Gb SAS interfaces and double the existing EXP24S drawer bandwidth. New IBM EnergyScale™ technology offers new variable processor frequency modes that provide a significant performance boost beyond the static nominal frequency. This publication is for professionals who want to acquire a better understanding of IBM Power Systems™ products. The intended audience includes the following roles: Clients Sales and marketing professionals Technical support professionals IBM Business Partners Independent software vendors (ISVs) This paper expands the current set of IBM Power Systems documentation by providing a desktop reference that offers a detailed technical description of the Power E980 server. This paper does not replace the current marketing materials and configuration tools. It is intended as an extra source of information that, together with existing sources, can be used to enhance your knowledge of IBM server solutions.

Master the fundamental concepts of computer operating systems with Tomsho's GUIDE TO OPERATING SYSTEMS, 6th Edition. An excellent resource for training across different operating systems, this practical text equips you with key theory and technical information as you work with today's most popular operating systems, including Windows, macOS and Linux platforms. You will learn how general operating systems are organized and function as well as gain hands-on experience with OS installation, upgrading and configuration. Processors, file systems, networking, virtualization, security, device management, storage, OS maintenance and troubleshooting are explored in detail. Content also covers Windows 10 and earlier Windows client OSs, Windows Server 2019 and earlier Windows server OSs, Fedora Linux, and macOS Mojave and earlier. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

This IBM® Redpaper™ publication gives a broad understanding of a new architecture of the IBM Power System E950 (9040-MR9) server that supports IBM AIX®, and Linux

operating systems. The objective of this paper is to introduce the major innovative Power E950 offerings and relevant functions: The IBM POWER9™ processor, which is available at frequencies of 2.8 - 3.4 GHz. Significantly strengthened cores and larger caches. Supports up to 16 TB of memory, which is four times more than the IBM POWER8® processor-based IBM Power System E850 server. Integrated I/O subsystem and hot-pluggable Peripheral Component Interconnect Express (PCIe) Gen4 slots, which have double the bandwidth of Gen3 I/O slots. Supports EXP12SX and ESP24SX external disk drawers, which have 12 Gb Serial Attached SCSI (SAS) interfaces and support Active Optical Cables (AOCs) for greater distances and less cable bulk. New IBM EnergyScale™ technology offers new variable processor frequency modes that provide a significant performance boost beyond the static nominal frequency. This publication is for professionals who want to acquire a better understanding of IBM Power Systems™ products. The intended audience includes the following roles: Clients Sales and marketing professionals Technical support professionals IBM Business Partners Independent software vendors (ISVs) This paper expands the current set of Power Systems documentation by providing a desktop reference that offers a detailed technical description of the Power E950 server. This paper does not replace the current marketing materials and configuration tools. It is intended as an extra source of information that, together with existing sources, can be used to enhance your knowledge of IBM server solutions.

This IBM® Redbooks® Product Guide publication describes the IBM FlashSystem® 9200 solution, which is a comprehensive, all-flash, and NVMe-enabled enterprise storage solution that delivers the full capabilities of IBM FlashCore® technology. In addition, it provides a rich set of software-defined storage (SDS) features, including data reduction and de-duplication, dynamic tiering, thin-provisioning, snapshots, cloning, replication, data copy services, and IBM HyperSwap® for high availability (HA). Scale-out and scale-up configurations further enhance capacity and throughput for better availability.

Along with servers and networking infrastructure, networked storage is one of the fundamental components of a modern data center. Because storage networking has evolved over the past two decades, the industry has settled on the basic storage networking technologies. These technologies are Fibre Channel (FC) storage area networks (SANs), Internet Small Computer System Interface (iSCSI)-based Ethernet attachment, and Ethernet-based network-attached storage (NAS). Today, lossless, low-latency, high-speed FC SANs are viewed as the high-performance option for networked storage. iSCSI and NAS are viewed as lower cost, lower performance technologies. The advent of the 100 Gbps Ethernet and Data Center Bridging (DCB) standards for lossless Ethernet give Ethernet technology many of the desirable characteristics that make FC the preferred storage networking technology. These characteristics include comparable speed, low latency, and lossless behavior. Coupled with an ongoing industry drive toward better asset utilization and lower total cost of ownership, these advances open the door for organizations to consider consolidating and converging their networked storage infrastructures with their Ethernet data networks. Fibre Channel over Ethernet (FCoE) is one approach to this convergence, but 10-Gbps-enabled iSCSI also offers compelling options for many organizations with the hope that their performance can now rival that of FC. This IBM® Redbooks® publication is written for

experienced systems, storage, and network administrators who want to integrate the IBM System Networking and Storage technology successfully into new and existing networks. This book provides an overview of today's options for storage networking convergence. It reviews the technology background for each of these options and then examines detailed scenarios for them by using IBM and IBM Business Partner convergence products.

Break down the misconceptions of the Internet of Things by examining the different security building blocks available in Intel Architecture (IA) based IoT platforms. This open access book reviews the threat pyramid, secure boot, chain of trust, and the SW stack leading up to defense-in-depth. The IoT presents unique challenges in implementing security and Intel has both CPU and Isolated Security Engine capabilities to simplify it. This book explores the challenges to secure these devices to make them immune to different threats originating from within and outside the network. The requirements and robustness rules to protect the assets vary greatly and there is no single blanket solution approach to implement security. Demystifying Internet of Things Security provides clarity to industry professionals and provides an overview of different security solutions. What You'll Learn Secure devices, immunizing them against different threats originating from inside and outside the network. Gather an overview of the different security building blocks available in Intel Architecture (IA) based IoT platforms. Understand the threat pyramid, secure boot, chain of trust, and the software stack leading up to defense-in-depth. Who This Book Is For Strategists, developers, architects, and managers in the embedded and Internet of Things (IoT) space trying to understand and implement the security in the IoT devices/platforms.

This IBM® Redbooks® Product Guide publication describes the IBM FlashSystem® 7200 solution, which is a comprehensive, all-flash, and NVMe-enabled enterprise storage solution that delivers the full capabilities of IBM FlashCore® technology. In addition, it provides a rich set of software-defined storage (SDS) features, including data reduction and de-duplication, dynamic tiering, thin-provisioning, snapshots, cloning, replication, data copy services, and IBM HyperSwap® for high availability (HA). Scale-out and scale-up configurations further enhance capacity and throughput for better availability.

A resilient storage network is an environment where data is always available for the needs of the business. This book explains the components, as well as how to design and implement a resilient storage network for workgroup, departmental, and enterprise environments. Storage networks are an enabling capability combining technology and best practices to provide the foundation to support information technology systems and applications. Storage networks can be of various sizes, shapes, and technologies. This book shows you how to implement a resilient storage network infrastructure using different technologies including ATM, DWDM, FCIP, Fibre Channel, FICON, iFCP, InfiniBand, IP, iSCSI, Life Cycle Management, NAS, Object Based Storage, RAID, RDMA, Remote Mirroring, Replication, SAN, SCSI, SMI-S, SONET/SDH, Storage Services, Tape, Virtualization, and Volume Managers. \*Important information is clarified and put into context to separate myths and realities \*Covers storage networking technologies (hardware, software, networks) and practices \*Numerous tips and recommendations allow the reader to quickly understand best practices \*Checklists, templates and examples show potential solutions

Embedded Firmware Solutions is the perfect introduction and daily-use field guide--for the thousands of firmware designers, hardware engineers, architects, managers, and developers--to Intel's new firmware direction (including Quark coverage), showing how to integrate Intel® Architecture designs into their plans. Featuring hands-on examples and exercises using Open Source codebases, like Coreboot and EFI Development Kit (tianocore) and Chromebook, this is the first book that combines a timely and thorough overview of firmware solutions for the rapidly evolving embedded ecosystem with in-depth coverage of requirements and optimization.

Beginning and experienced programmers will use this comprehensive guide to persistent memory programming. You will understand how persistent memory brings together several new software/hardware requirements, and offers great promise for better performance and faster application startup times—a huge leap forward in byte-addressable capacity compared with current DRAM offerings. This revolutionary new technology gives applications significant performance and capacity improvements over existing technologies. It requires a new way of thinking and developing, which makes this highly disruptive to the IT/computing industry. The full spectrum of industry sectors that will benefit from this technology include, but are not limited to, in-memory and traditional databases, AI, analytics, HPC, virtualization, and big data. Programming Persistent Memory describes the technology and why it is exciting the industry. It covers the operating system and hardware requirements as well as how to create development environments using emulated or real persistent memory hardware. The book explains fundamental concepts; provides an introduction to persistent memory programming APIs for C, C++, JavaScript, and other languages; discusses RMDA with persistent memory; reviews security features; and presents many examples. Source code and examples that you can run on your own systems are included. What You'll Learn Understand what persistent memory is, what it does, and the value it brings to the industry Become familiar with the operating system and hardware requirements to use persistent memory Know the fundamentals of persistent memory programming: why it is different from current programming methods, and what developers need to keep in mind when programming for persistence Look at persistent memory application development by example using the Persistent Memory Development Kit (PMDK) Design and optimize data structures for persistent memory Study how real-world applications are modified to leverage persistent memory Utilize the tools available for persistent memory programming, application performance profiling, and debugging Who This Book Is For C, C++, Java, and Python developers, but will also be useful to software, cloud, and hardware architects across a broad spectrum of sectors, including cloud service providers, independent software vendors, high performance compute, artificial intelligence, data analytics, big data, etc.

HANDS-ON MICROSOFT WINDOWS SERVER 2016 is the perfect resource for learning Windows Server 2016 from the ground up. Designed to build a foundation in basic server administration, this book requires no previous server experience. It covers all of the critical Windows Server 2016 features, including the advantages unique to this new server operating system. Readers learn how to choose the right server edition for their needs. They also learn to install, configure, customize, manage, and troubleshoot today's servers most effectively. If the reader is new to server administration, this book provides the background and knowledge needed to manage servers on small to large

networks. If the reader is an experienced server administrator, this book provides a fast way to get up to speed on new Windows Server 2016 administration. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

This IBM® Redbooks® publication focuses on gathering the correct technical information, and laying out simple guidance for optimizing code performance on IBM POWER8® processor-based systems that run the IBM AIX®, IBM i, or Linux operating systems. There is straightforward performance optimization that can be performed with a minimum of effort and without extensive previous experience or in-depth knowledge. The POWER8 processor contains many new and important performance features, such as support for eight hardware threads in each core and support for transactional memory. The POWER8 processor is a strict superset of the IBM POWER7+™ processor, and so all of the performance features of the POWER7+ processor, such as multiple page sizes, also appear in the POWER8 processor. Much of the technical information and guidance for optimizing performance on POWER8 processors that is presented in this guide also applies to POWER7+ and earlier processors, except where the guide explicitly indicates that a feature is new in the POWER8 processor. This guide strives to focus on optimizations that tend to be positive across a broad set of IBM POWER® processor chips and systems. Specific guidance is given for the POWER8 processor; however, the general guidance is applicable to the IBM POWER7+, IBM POWER7®, IBM POWER6®, IBM POWER5, and even to earlier processors. This guide is directed at personnel who are responsible for performing migration and implementation activities on POWER8 processor-based systems. This includes system administrators, system architects, network administrators, information architects, and database administrators (DBAs).

This book brings together the insights and practical experience of some of the most experienced Data Plane Development Kit (DPDK) technical experts, detailing the trend of DPDK, data packet processing, hardware acceleration, packet processing and virtualization, as well as the practical application of DPDK in the fields of SDN, NFV, and network storage. The book also devotes many chunks to exploring various core software algorithms, the advanced optimization methods adopted in DPDK, detailed practical experience, and the guides on how to use DPDK.

Provides a solid foundation for those considering a career in IT—covers the objectives of the new Linux Essentials Exam 010-160 v1.6 Linux is a secure, reliable, open source alternative to costly operating systems such as Microsoft Windows. As large organizations worldwide continue to add Linux servers, the need for IT professionals skilled in Linux continues to grow. The LPI Linux Essentials Study Guide is a valuable resource for anyone preparing to take the new Linux Essentials Exam—the entry-level certification from The Linux Professional Institute (LPI) which validates knowledge of Linux concepts and applications. Written by recognized experts on Linux and open source technologies, this accessible, user-friendly guide covers desktop skills, the command line, directories and files, networks, scripting, security, users and permissions, and much more. Clear, concise chapters provide numerous hands-on tutorials, real-world examples, color illustrations, and practical end-of-chapter exercises and review questions. An ideal introduction for those new to Linux or considering a career in IT, this guide helps readers: Learn the operation and components of Linux

desktops and servers Understand open source software, licensing, and applications  
Configure networks, security, cloud services, storage, and devices Create users and groups and set permissions and ownership Use the command line and build automation scripts LPI Linux Essentials Study Guide: Exam 010 v1.6 is perfect for anyone beginning a career in IT, newcomers to Linux, students in computer courses, and system administrators working with other operating systems wanting to learn more about Linux and other open source solutions.

This book constitutes the refereed post-conference proceedings of the 5th Russian Supercomputing Days, RuSCDays 2019, held in Moscow, Russia, in September 2019. The 60 revised full papers presented were carefully reviewed and selected from 127 submissions. The papers are organized in the following topical sections: parallel algorithms; supercomputer simulation; HPC, BigData, AI: architectures, technologies, tools; and distributed and cloud computing. This book focuses on the core question of the necessary architectural support provided by hardware to efficiently run virtual machines, and of the corresponding design of the hypervisors that run them. Virtualization is still possible when the instruction set architecture lacks such support, but the hypervisor remains more complex and must rely on additional techniques. Despite the focus on architectural support in current architectures, some historical perspective is necessary to appropriately frame the problem. The first half of the book provides the historical perspective of the theoretical framework developed four decades ago by Popek and Goldberg. It also describes earlier systems that enabled virtualization despite the lack of architectural support in hardware. As is often the case, theory defines a necessary—but not sufficient—set of features, and modern architectures are the result of the combination of the theoretical framework with insights derived from practical systems. The second half of the book describes state-of-the-art support for virtualization in both x86-64 and ARM processors. This book includes an in-depth description of the CPU, memory, and I/O virtualization of these two processor architectures, as well as case studies on the Linux/KVM, VMware, and Xen hypervisors. It concludes with a performance comparison of virtualization on current-generation x86- and ARM-based systems across multiple hypervisors.

Provides information on writing a driver in Linux, covering such topics as character devices, network interfaces, driver debugging, concurrency, and interrupts.

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.

Storage Systems: Organization, Performance, Coding, Reliability and Their Data Processing covers the coding, reliability and performance of popular RAID organizations: RAID1 mirrored disks, RAID5/6/7 1/2/3-disk failure tolerant - 1/2/3DFT arrays. Readers will learn about the storage of files, SQL and NoSQL databases on disk and SSD to achieve higher efficiency. As data compression, deduplication and encryption techniques for storage systems have led to new technologies, startups and techniques to save power in storage and server systems, the book discusses Fast Array of Wimpy Nodes (FAWN) at CMU, RAMCloud at Stanford, and key-value flash Lightstore at MIT, along with several storage proposals. Finally, storage technologies from punched cards up to ash memories and beyond are discussed, along with the data placement and the scheduling of magnetic disks. Provides readers with an in-depth understanding of the architecture and operation of computer storage systems Includes descriptions of various RAID levels, their coding, organization, performance and reliability Covers techniques for efficient and secure data storage through data compression, deduplication and encryption Presents readers with an in-depth understanding of the storage of files and SQL and NoSQL databases Provides a definitive resource for those who want to support computer peripherals under the Linux operating system, explaining how to write a driver for a broad spectrum of devices, including character devices, network interfaces, and block devices. Original. (Intermediate).

The Green and Virtual Data Center sets aside the political aspects of what is or is not considered green to instead focus on the opportunities for organizations that want to sustain environmentally-friendly economical growth. If you are willing to believe that IT infrastructure resources deployed in a highly virtualized manner can be combined with other technologies to achieve simplified and cost-effective delivery of services in a green, profitable manner, this book is for you. Savvy industry veteran Greg Schulz provides real-world insight, addressing best practices, server, software, storage, networking, and facilities issues concerning any current or next-generation virtual data center that relies on underlying physical infrastructures. Coverage includes: Energy and data footprint reduction Cloud-based storage and computing Intelligent and adaptive power management Server, storage, and networking virtualization Tiered servers and storage, network, and data centers Energy avoidance and energy efficiency Many current and emerging technologies can enable a green and efficient virtual data center to support and sustain business growth with a reasonable return on investment. This book presents virtually all critical IT technologies and techniques to discuss the interdependencies that need to be supported to enable a dynamic, energy-efficient, economical, and environmentally-friendly green IT data center. This is a path that every organization must ultimately follow. Take a tour of the Green and Virtual Data Center website. CRC Press is pleased to announce that The Green and Virtual Data Center has been added to Intel Corporation's Recommended Reading List. Intel's Recommended Reading program provides technical professionals a simple and handy reference list of what to read to stay abreast of new technologies. Dozens of industry technologists, corporate fellows, and engineers have helped by suggesting books and reviewing the list. This is the most comprehensive reading list available for professional computer developers. This IBM® Redbooks® Product Guide publication describes the IBM FlashSystem® 5200 solution, which is a next-generation IBM FlashSystem control enclosure. It is an NVMe end-to-end platform that is targeted at the entry and midrange market and delivers the full capabilities of IBM FlashCore® technology. It also provides a rich set of software-defined storage (SDS) features that are delivered by IBM Spectrum® Virtualize, including the following features: Data reduction and deduplication Dynamic tiering Thin provisioning Snapshots Cloning Replication Data copy services Transparent Cloud Tiering IBM HyperSwap® including 3-site replication for high availability (HA) Scale-out and scale-up configurations further enhance capacity and throughput for better availability. The IBM FlashSystem 5200 is a high-performance storage solution that is based on a revolutionary 1U form factor. It consists of 12 NVMe Flash Devices in a 1U storage enclosure drawer with full redundant canister components and no single point of failure. It is designed for businesses of all sizes, including small, remote, branch offices and regional clients. It is a smarter, self-optimizing solution that requires less management, which enables organizations to overcome their storage challenges. Flash has come of age and

price point reductions mean that lower parts of the storage market are seeing the value of moving over to flash and NVMe--based solutions. The IBM FlashSystem 5200 advances this transition by providing incredibly dense tiers of flash in a more affordable package. With the benefit of IBM FlashCore Module compression and new QLC flash-based technology becoming available, a compelling argument exists to move away from Nearline SAS storage and on to NVMe. With the release of IBM FlashSystem 5200 Software V8.4, extra functions and features are available, including support for new Distributed RAID1 (DRAID1) features, GUI enhancements, Redirect-on-write for Data Reduction Pool (DRP) snapshots, and 3-site replication capabilities. This book is aimed at pre-sales and post-sales technical support and marketing and storage administrators.

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