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PCI-X System Architecture IBM Redbooks
 Mac OS X was released in March 2001, but many components, such as Mach and BSD, are considerably older. Understanding the design, implementation, and workings of Mac OS X requires examination of several technologies that differ in their age, origins, philosophies, and roles. Mac OS X Internals: A Systems Approach is the first book that dissects the internals of the system, presenting a detailed picture that grows incrementally as you read. For example, you will learn the roles of the firmware, the bootloader, the Mach and BSD kernel components (including the process, virtual memory, IPC, and file system layers), the object-oriented I/O Kit

driver framework, user libraries, and other core pieces of software. You will learn how these pieces connect and work internally, where they originated, and how they evolved. The book also covers several key areas of the Intel-based Macintosh computers. A solid understanding of system internals is immensely useful in design, development, and debugging for programmers of various skill levels. System programmers can use the book as a reference and to construct a better picture of how the core system works. Application programmers can gain a deeper understanding of how their applications interact with the system. System administrators and power users can use the book to harness the power of the rich environment offered by Mac OS X. Finally, members of the Windows, Linux, BSD, and other Unix communities will find

the book valuable in comparing and contrasting Mac OS X with their respective systems. Mac OS X Internals focuses on the technical aspects of OS X and is so full of extremely useful information and programming examples that it will definitely become a mandatory tool for every Mac OS X programmer.

Inside Solid State Drives (SSDs)

Addison-Wesley Professional
 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.

IBM Power System S822 Technical Overview and Introduction John Wiley & Sons

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.

IBM Power System E980: Technical Overview and Introduction Addison-Wesley Professional

This book introduces simulation tools and strategies for complex systems of solid-state-drives (SSDs) which consist of a flash multi-core microcontroller plus NAND flash memories. It provides a broad overview of the most popular simulation tools, with special focus on open source solutions. VSSIM, NANDFlashSim and DiskSim are benchmarked against performances of real SSDs under different traffic workloads. PROs and CONs of each simulator are analyzed, and it is clearly indicated which kind of answers each of them can give and at a what price. It is explained, that speed and precision do not go hand in hand, and it is important to understand when to simulate what, and with which tool. Being able to simulate SSD's performances is mandatory to meet time-to-market, together with product cost and quality. Over the last few years the authors developed an advanced simulator named "SSDEXplorer" which has been used to evaluate multiple phenomena with great accuracy, from QoS (Quality Of Service) to Read Retry, from LDPC Soft Information to power, from Flash aging to FTL. SSD simulators are also addressed in a broader context in this book, i.e. the analysis of what happens when SSDs are connected to the OS (Operating System) and to the end-user application (for example, a database search). The authors walk the reader through the full simulation flow of a real system-level by combining SSD Explorer with the QEMU virtual platform. The reader will be impressed by the level of know-how and the combination of models that such simulations are asking for.

Mac OS X Internals IBM Redbooks

As the demand for digital communication networks has increased, so have the challenges in network component design. To meet ever-escalating performance, flexibility, and economy requirements, the networking industry has opted to build products around network processors. These new chips range from task-specific

processors, such as classification and encryption engines, to more general-purpose packet or communications processors. Programmable yet application-specific, their designs are tailored to efficiently implement communications applications such as routing, protocol analysis, voice and data convergence, firewalls, VPNs, and QoS. Network processor design is an emerging field with issues and opportunities both numerous and formidable. To help meet this challenge, the editors of this volume created the first Workshop on Network Processors, a forum for scientists and engineers from academia and industry to discuss their latest research in the architecture, design, programming, and use of these devices. In addition to including the results of the Workshop in this volume, the editors also present specially commissioned material from practicing designers, who discuss their companies' latest network processors. Network Processor Design: Issues and Practices is an essential reference on network processors for graduate students, researchers, and practicing designers. * Includes contributions from major academic and industrial research labs including Aachen University of Technology; Cisco Systems; Infineon Technologies; Intel Corp.; North Carolina State University; Swiss Federal Institute of Technology; University of California, Berkeley; University of Dortmund; University of Washington; and Washington University. * Examines the latest network processors from Agere Systems, Cisco, IBM, Intel, Motorola, Sierra Inc., and TranSwitch.

Implementation of a PCI-Express Based System Architecture for an Adaptive Computer System IBM Redbooks

See MIPS Run, Second Edition, is not only a thorough update of the first edition, it is also a marriage of the best-known RISC architecture--MIPS--with the best-known open-source OS--Linux. The first part of the book begins with MIPS design principles and then describes the MIPS instruction set and programmers' resources. It uses the MIPS32 standard as a baseline (the 1st edition used the R3000) from which to compare all other versions of the architecture and assumes that MIPS64 is the main option. The second part is a significant change from the first edition. It provides concrete examples of operating system low level code, by using Linux as the example operating system. It describes how Linux is built on the foundations the MIPS hardware provides and summarizes the Linux application environment, describing

the libraries, kernel device-drivers and CPU-specific code. It then digs deep into application code and library support, protection and memory management, interrupts in the Linux kernel and multiprocessor Linux. Sweetman has revised his best-selling MIPS bible for MIPS programmers, embedded systems designers, developers and programmers, who need an in-depth understanding of the MIPS architecture and specific guidance for writing software for MIPS-based systems, which are increasingly Linux-based. Completely new material offers the best explanation available on how Linux runs on real hardware. Provides a complete, updated and easy-to-use guide to the MIPS instruction set using the MIPS32 standard as the baseline architecture with the MIPS64 as the main option. Retains the same engaging writing style that made the first edition so readable, reflecting the authors 20+ years experience in designing systems based on the MIPS architecture.

An Information Technology Approach

IBM Redbooks

This book outlines a set of issues that are critical to all of parallel architecture--communication latency, communication bandwidth, and coordination of cooperative work (across modern designs). It describes the set of techniques available in hardware and in software to address each issues and explore how the various techniques interact.

Detection of Intrusions and Malware, and Vulnerability Assessment Morgan Kaufmann

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)

Solid-State-Drives (SSDs) Modeling Gulf Professional Publishing

Containing over 300 entries in an A-Z format, the Encyclopedia of Parallel Computing provides easy, intuitive access to relevant information for professionals and researchers seeking access to any aspect within the broad field of parallel computing. Topics for this comprehensive reference were selected, written, and peer-reviewed by an international pool of distinguished researchers in the field. The Encyclopedia is broad in scope, covering machine organization, programming languages, algorithms, and applications. Within each area, concepts, designs, and specific implementations are presented. The highly-structured essays in this work comprise synonyms, a definition and discussion of the topic, bibliographies, and links to related literature. Extensive cross-references to other entries within the Encyclopedia support efficient, user-friendly searches for immediate access to useful information. Key concepts presented in the Encyclopedia of Parallel Computing include; laws and metrics; specific numerical and non-numerical algorithms; asynchronous algorithms; libraries of subroutines; benchmark suites; applications; sequential consistency and cache coherency; machine classes such as clusters, shared-memory multiprocessors, special-purpose machines and dataflow machines; specific machines such as Cray supercomputers, IBM's cell processor and Intel's multicore machines; race detection and auto parallelization; parallel programming languages, synchronization primitives, collective operations, message passing libraries, checkpointing, and operating systems. Topics covered: Speedup, Efficiency, Isoefficiency, Redundancy, Amdahls law, Computer Architecture Concepts, Parallel Machine Designs, Benchmarks, Parallel Programming

concepts & design, Algorithms, Parallel applications. This authoritative reference will be published in two formats: print and online. The online edition features hyperlinks to cross-references and to additional significant research. Related Subjects: supercomputing, high-performance computing, distributed computing

Network Processor Design Springer
PCI Express System Architecture Addison-Wesley Professional

A Quantitative Approach Springer Science & Business Media

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.

IBM Power Systems LC921 and LC922: Technical Overview and Introduction IBM Redbooks

Not a new version - included warning for self signed X509 certificates - see section 5.2 This IBM® Redbooks® publication

describes the concepts, architecture, and implementation of the IBM XIV® Storage System. The XIV Storage System is a scalable enterprise storage system that is based on a grid array of hardware components. It can attach to both Fibre Channel Protocol (FCP) and IP network Small Computer System Interface (iSCSI) capable hosts. This system is a good fit for clients who want to be able to grow capacity without managing multiple tiers of storage. The XIV Storage System is suited for mixed or random access workloads, including online transaction processing, video streamings, images, email, and emerging workload areas, such as Web 2.0 and cloud storage. The focus of this edition is on the XIV Gen3 running Version 11.5.x of the XIV system software, which brings enhanced value for the XIV Storage System in cloud environments. It offers multitenancy support, VMware vCloud Suite integration, more discrete performance classes, and RESTful API enhancements that expand cloud automation integration. Version 11.5 introduces support for three-site mirroring to provide high availability and disaster recovery. It also enables capacity planning through the Hyper-Scale Manager, mobile push notifications for real-time alerts, and enhanced security. Version 11.5.1 supports 6TB drives and VMware vSphere Virtual Volumes (VVOL). In the first few chapters of this book, we describe many of the unique and powerful concepts that form the basis of the XIV Storage System logical and physical architecture. We explain how the system eliminates direct dependencies between the hardware elements and the software that governs the system. In subsequent chapters, we explain the planning and preparation tasks that are required to deploy the system in your environment by using the intuitive yet powerful XIV Storage Manager GUI or the XIV command-line interface. We also describe the performance characteristics of the XIV Storage System and present options for alerting and monitoring, including enhanced secure remote support. This book is for IT professionals who want an understanding of the XIV Storage System. It is also for readers who need detailed advice on how to configure and use the system.

SAS Storage Architecture Addison-Wesley Professional

This IBM® Redbooks® publication describes the features and functions the latest member of the IBM Z® platform, the IBM z15™ (machine type 8561). It includes information about the IBM z15 processor design, I/O innovations, security features, and supported operating

systems. The z15 is a state-of-the-art data and transaction system that delivers advanced capabilities, which are vital to any digital transformation. The z15 is designed for enhanced modularity, which is in an industry standard footprint. This system excels at the following tasks: Making use of multicloud integration services Securing data with pervasive encryption Accelerating digital transformation with agile service delivery Transforming a transactional platform into a data powerhouse Getting more out of the platform with IT Operational Analytics Accelerating digital transformation with agile service delivery Revolutionizing business processes Blending open source and Z technologies This book explains how this system uses new innovations and traditional Z strengths to satisfy growing demand for cloud, analytics, and open source technologies. With the z15 as the base, applications can run in a trusted, reliable, and secure environment that improves operations and lessens business risk.

HyperTransport System Architecture Addison-Wesley Professional

This IBM® Redpaper™ publication is a comprehensive guide covering the IBM Power 720 and Power 740 servers that support IBM AIX®, IBM i, and Linux operating systems. The goal of this paper is to introduce the innovative Power 720 and Power 740 offerings and their major functions: The IBM POWER7+™ processor is available at frequencies of 3.6 GHz, and 4.2 GHz. The larger IBM POWER7+ Level 3 cache provides greater bandwidth, capacity, and reliability. The 4-port 10/100/1000 Base-TX Ethernet PCI Express adapter is included in base configuration and installed in a PCIe Gen2 x4 slot. The integrated SAS/SATA controller for HDD, SSD, tape, and DVD supports built-in hardware RAID 0, 1, and 10. New IBM PowerVM® V2.2.2 features, such as 20 LPARs per core. The improved IBM Active Memory™ Expansion technology provides more usable memory than is physically installed in the system. High-performance SSD drawer. Professionals who want to acquire a better understanding of IBM Power Systems™ products can benefit from reading this paper. 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 720 and Power 740 systems. This paper does not replace the latest marketing materials and configuration tools. It is intended as an additional source of information that, together with existing sources, can be used to enhance your knowledge of IBM

server solutions.

USB 3.0 Technology IBM Redbooks

Can a system be considered truly reliable if it isn't fundamentally secure? Or can it be considered secure if it's unreliable? Security is crucial to the design and operation of scalable systems in production, as it plays an important part in product quality, performance, and availability. In this book, experts from Google share best practices to help your organization design scalable and reliable systems that are fundamentally secure. Two previous O'Reilly books from Google—*Site Reliability Engineering* and *The Site Reliability Workbook*—demonstrated how and why a commitment to the entire service lifecycle enables organizations to successfully build, deploy, monitor, and maintain software systems. In this latest guide, the authors offer insights into system design, implementation, and maintenance from practitioners who specialize in security and reliability. They also discuss how building and adopting their recommended best practices requires a culture that's supportive of such change. You'll learn about secure and reliable systems through: Design strategies Recommendations for coding, testing, and debugging practices Strategies to prepare for, respond to, and recover from incidents Cultural best practices that help teams across your organization collaborate effectively

See MIPS Run Springer

This book highlights the complex issues, tasks and skills that must be mastered by an IP designer, in order to design an optimized and robust digital circuit to solve a problem. The techniques and methodologies described can serve as a bridge between specifications that are known to the designer and RTL code that is final outcome, reducing significantly the time it takes to convert initial ideas and concepts into right-first-time silicon. Coverage focuses on real problems rather than theoretical concepts, with an emphasis on design techniques across various aspects of chip-design.

PCI Express System Architecture Springer Science & Business Media

System on Chip Interfaces for Low Power Design provides a top-down understanding of interfaces available to SoC developers, not only the underlying protocols and architecture of each, but also how they interact and the tradeoffs involved. The book offers a common context to help understand the variety of available interfaces and make sense of technology from different vendors aligned with multiple standards. With particular

emphasis on power as a factor, the authors explain how each interface performs in various usage scenarios and discuss their advantages and disadvantages. Readers learn to make educated decisions on what interfaces to use when designing systems and gain insight for innovating new/custom interfaces for a subsystem and their potential impact. Provides a top-down guide to SoC interfaces for memory, multimedia, sensors, display, and communication. Explores the underlying protocols and architecture of each interface with multiple examples. Guides through competing standards and explains how different interfaces might interact or interfere with each other. Explains challenges in system design, validation, debugging and their impact on development.

Digital Design and Computer Architecture, RISC-V Edition Mindshare Press

This IBM® Redpaper™ publication gives an overview and technical introduction to IBM Power Systems™ RAID solutions. The book is organized to start with an introduction to Redundant Array of Independent Disks (RAID), and various RAID levels with their benefits. A brief comparison of Direct Attached Storage (DAS) and networked storage systems such as SAN / NAS is provided with a focus on emerging applications that typically use the DAS model over networked storage models. The book focuses on IBM Power Systems I/O architecture and

various SAS RAID adapters that are supported in IBM POWER8™ processor-based systems. A detailed description of the SAS adapters, along with their feature comparison tables, is included in Chapter 3, "RAID adapters for IBM Power Systems" on page 45. The book is aimed at readers who have the responsibility of configuring IBM Power Systems for individual solution requirements. This audience includes IT Architects, IBM Technical Sales Teams, IBM Business Partner Solution Architects and Technical Sales teams, and systems administrators who need to understand the SAS RAID hardware and RAID software solutions supported in POWER8 processor-based systems.

Simulation Tools & Strategies Pearson Education India

This book constitutes the refereed post-proceedings of the 9th International Conference on Detection of Intrusions and Malware, and Vulnerability Assessment, DIMVA 2012, held in Heraklion, Crete, Greece, in July 2012. The 10 revised full papers presented together with 4 short papers were carefully reviewed and selected from 44 submissions. The papers are organized in topical sections on malware, mobile security, secure design, and intrusion detection systems (IDS).

Universal Serial Bus System Architecture Elsevier

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 OpenCAPI™, 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.

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