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Titolo	Energy Efficient Servers [[electronic resource] ] : Blueprints for Data Center Optimization // by Corey Gough, Ian Steiner, Winston Saunders
Pubbl/distr/stampa	Springer Nature, 2015 Berkeley, CA : , : Apress : , : Imprint : Apress, , 2015
ISBN	1-4302-6638-4
Edizione	[1st ed. 2015.]
Descrizione fisica	1 online resource (347 p.)
Collana	The Expert's Voice in Enterprise Computing and Power Management
Disciplina	004 004.6 005.7
Soggetti	Computer input-output equipment Computer organization Computers Hardware and Maker Computer Systems Organization and Communication Networks Information Systems and Communication Service
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	"The IT professional's operational handbook"--Cover. Includes index.
Nota di contenuto	Contents at a Glance; Chapter 1: Why Data Center Efficiency Matters; An Industry's Call to Action; Data Center Infrastructure Energy Use; Energy Proportional Server Efficiency; Regulatory Environment; Measuring Energy Efficiency; SPECPower; High Performance Computing Efficiency; Energy Efficiency and Cost; Summary; Chapter 2: CPU Power Management; Server CPU Architecture/Design; CPU Architecture Building Blocks; Threads, Cores, and Modules; Caches and the Cache Hierarchy; Dies and Packages; On-die Fabrics and the Uncore; Power Control Unit; External Communication; Thermal Design CPU Design Building BlocksDigital Synchronous Logic and Clocks; SRAM and eDRAM; I/O; Intel Server Processors; Introduction to Power; CPU Power Breakdown; Logic Power; I/O Power; Frequency, Voltage, and Temperature Interactions; Power-Saving Techniques; Turn It Off; Turn It Down; Power-Saving Strategies; Race to Idle vs. Slow Down; CPU

Power and Performance States; C-States; Thread C-States; Core C-States; Core C0; Core C1 and C1e; Core C3; Core C6; Core C7 (and up); C-State Demotion; Package C-States; Module C-States; P-States; Per Socket P-States; Per Core P-States; Uncore Frequency Scaling TurboTurbo Architecture; Power/Thermal Limits; Thermal Protection; Electrical Protection; C-States and Turbo; Fused Turbo Frequencies; T-States; S-States and G-States; S0i x; Running Average Power Limit (RAPL); IMON and Digital Power Meter; Linpack Example; DRAM (Memory) RAPL; CPU Thermal Management; Prochot; CPU Power Management Summary; Summary; Chapter 3: Memory and I/O Power Management; System Memory; Memory Architecture Basics; Devices and Ranks; Memory Error Correction (ECC); Memory Capacity; Device Power Characteristics; DDR3 vs. DDR4; RDIMMs, UDIMMs, SODIMMs, and LRDIMMs  
Memory Channel Interleave and Imbalanced Memory  
ConfigurationsPower and Performance States; CKE Power Savings; Self-Refresh; Voltage/Frequency; DDR Thermal Management; Monitoring Temperature; Memory Throttling; CPU DDRIO; Workload Behavior; Memory Reliability Features; CPU I/Os; CPU Interconnect; Link Power States; PCIe; Link Power States; Link Frequency/Voltage; Link Width; Hot Add; D-states; Summary; Chapter 4: Platform Power Management; Platform Overview; Common Platform Components; Integration; CPU Integration; Chipset Integration; Microservers and Server SoCs; Platform Manageability  
CPU SocketsNode Controllers; Memory Risers and Memory Buffer Chips; Server Chipsets; PCH and Platform Power Management; PCH Power Management; PCIe in Chipsets; PCH Thermal Management; Networking; Ambient Temperature, TDP, and Thermal Management; Attached Media; LAN Power Management Features; Media Speed; Energy Efficient Ethernet; Wake on LAN; Active State Power Management (ASPM); Interrupt Moderation; USB; Link Power States; Link Frequency/Voltage; Storage; Storage Servers and Power Management; HDDs and SDDs; SATA and SAS Drive Power Management; Frequency/Voltage; NVMe Drive Power Management  
Power Delivery

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## Sommario/riassunto

Energy Efficient Servers: Blueprints for Data Center Optimization introduces engineers and IT professionals to the power management technologies and techniques used in energy efficient servers. The book includes a deep examination of different features used in processors, memory, interconnects, I/O devices, and other platform components. It outlines the power and performance impact of these features and the role firmware and software play in initialization and control. Using examples from cloud, HPC, and enterprise environments, the book demonstrates how various power management technologies are utilized across a range of server utilization. It teaches the reader how to monitor, analyze, and optimize their environment to best suit their needs. It shares optimization techniques used by data center administrators and system optimization experts at the world's most advanced data centers.

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