

54 6 Implement A Raid Solution

5.4 6 Implement a RAID Solution: Optimizing Data Availability and Performance

Data is the lifeblood of modern businesses. From critical financial records to customer interactions and operational data, ensuring its safekeeping and efficient access is paramount. RAID (Redundant Array of Independent Disks) solutions offer a powerful way to enhance data availability and performance by combining multiple hard drives into a single logical unit. This article dives deep into the world of RAID implementations, exploring the benefits, potential drawbacks, and practical considerations for successful deployment.

to RAID Solutions

RAID technology leverages the power of multiple hard drives to provide improved performance, fault tolerance, and data security. By mirroring data across multiple drives or implementing complex striping schemes, RAID enhances the overall reliability and speed of data access compared to using individual drives. However, implementing a RAID solution is more than just plugging in drives. Understanding the different RAID levels and their specific characteristics is crucial for making an informed decision.

Understanding RAID Levels and Their Implications

RAID levels dictate how data is distributed and protected across multiple drives. Some common RAID levels include:

RAID 0 (Striping): Data is striped across multiple drives, maximizing performance but offering no redundancy. A failure of a single drive results in data loss.

RAID 1 (Mirroring): Data is mirrored across multiple drives, providing excellent redundancy. A failure of a single drive does not compromise data access.

RAID 5 (Striping with Parity): Data is striped across drives, and parity information is calculated and distributed, offering both performance and redundancy. A single drive failure is recoverable.

RAID 6 (Striping with Dual Parity): Similar to RAID 5, but employs dual parity, enhancing fault tolerance by allowing the recovery of data even after the failure of two drives.

The choice of RAID level depends heavily on the specific needs of the organization. A high-performance environment might prioritize RAID 0, while a data center emphasizing high

reliability might favor RAID 1 or RAID 6.

Advantages of Implementing a RAID Solution

Enhanced Data Availability: RAID solutions, especially RAID 1 and RAID 5/6, significantly reduce the risk of data loss due to drive failures. Data remains accessible even in the event of a drive malfunction.

Improved Performance: RAID 0 can provide dramatic improvements in data read and write speeds, ideal for applications demanding high throughput.

Increased Storage Capacity: RAID 0 can potentially increase the overall storage capacity when compared to a single drive.

Data Redundancy: RAID 1, 5, and 6 offer essential data redundancy, preventing the devastating loss of crucial information in the event of a drive failure.

Reduced Business Downtime: RAID solutions reduce the possibility of system outages due to hardware failures, allowing for continuous operation.

(Figure 1: Comparison of RAID Levels) Insert a table/chart visualizing the differences in performance, redundancy, and cost for each RAID level.

Potential Drawbacks and Considerations

Increased Complexity: Implementing RAID solutions involves more complex configuration and management compared to basic storage setups.

Cost: The initial investment in multiple drives and potentially specialized hardware can be higher.

Performance Overhead: RAID 1 and 5/6 operations can have some overhead compared to RAID 0 due to parity calculations or data mirroring.

Maintenance Requirements: Regular monitoring and maintenance of RAID arrays are crucial to prevent potential issues.

Case Studies: Successful RAID Implementations

Case Study 1: A financial institution used RAID 1 to protect crucial account data, experiencing zero data loss after a drive failure.

Case Study 2: A media company employed RAID 5 to increase storage capacity and improve video editing workflows, significantly reducing project turnaround times.

Actionable Insights for Implementing RAID

1. **Define Specific Needs:** Clearly identify the crucial data and the required level of availability and performance.

2. Assess Data Storage Capacity: Estimate the required storage capacity for the future.
3. Choose the Appropriate RAID Level: Select the RAID level that aligns with your data recovery needs and performance requirements.
4. Implement and Configure Properly: Follow a well-defined implementation plan, ensuring proper configuration and testing.
5. Establish Monitoring and Backup Strategies: Implement monitoring tools to identify potential issues proactively and maintain regular data backups.

5 Advanced FAQs

1. How does RAID handle drive replacement in a RAID array?
2. What are the implications of using different drive types within a RAID array?
3. What are the best practices for RAID array maintenance and health monitoring?
4. How does RAID affect the speed of file transfers?
5. How can you optimize performance for specific RAID levels given different workload demands?

Conclusion

Implementing a RAID solution can dramatically enhance data availability and performance, protecting your business-critical data from disaster and enabling efficient operations. Careful planning, a thorough understanding of RAID levels, and appropriate maintenance procedures are essential for maximizing the benefits of this robust technology. By tailoring your RAID implementation to your specific needs and industry requirements, you can optimize your data infrastructure for long-term success.

5.4.6 Implement a Raid Solution: Maximizing Data Availability and Security

Data is the lifeblood of modern organizations. Protecting it from catastrophic failures is paramount. This article delves into implementing a RAID (Redundant Array of Independent Disks) solution, exploring the various levels, benefits, and challenges. We'll provide actionable advice to help you choose the optimal RAID solution for your specific needs and ensure your data remains readily available and secure.

Understanding the Importance of RAID

Without RAID, a single hard drive failure can render critical data inaccessible, leading to significant financial losses, operational disruptions, and reputational damage. According to a study by [insert reputable data loss study source, e.g., IDC], businesses lose an average of [insert statistic, e.g., \$500,000] per incident due to data breaches and downtime. Implementing RAID mitigates this risk by distributing data across multiple drives, enabling data redundancy and faster read/write speeds.

Level Selection: Tailoring RAID to Your Needs

The choice of RAID level depends heavily on your priorities: performance, data redundancy, and cost.

RAID 0 (Striped): Maximizes performance by striping data across multiple drives. Offers no data redundancy, meaning a single drive failure results in data loss. Suitable for applications demanding speed, like video editing or gaming servers, but not for mission-critical systems.

RAID 1 (Mirrored): Creates an exact copy of the data on a second set of drives. Offers excellent redundancy as data is available on two drives. Performance is usually slower than RAID 0 due to the write operations requiring writing to two drives. Suitable for critical applications and high-availability environments where data loss is unacceptable.

RAID 5 (Striped with Parity): A balance of performance and redundancy. Data is striped across multiple drives, with parity information distributed across the drives. A single drive failure is recoverable, but performance degrades when a drive fails.

RAID 6 (Dual Parity): Offers higher redundancy compared to RAID 5, as it uses two independent parity calculations. It allows for two simultaneous drive failures without data loss. This translates to unparalleled data protection, making it ideal for mission-critical applications and high-value data.

RAID 10 (Mirrored Stripes): Combines RAID 1 and RAID 0. It mirrors the data and stripes it across multiple drives. Offers superior performance and redundancy, making it a strong contender for high-performance, highly-available solutions.

Expert Opinion: Choosing the Right RAID Level

"The optimal RAID level depends on your specific needs," says [Expert Name, Title, Affiliation]. "Consider factors like the value of your data, the criticality of the application, and your budget. For organizations with mission-critical data, RAID 6 is often the most suitable solution due to its high redundancy," notes [Expert Name].

Real-World Example: A Bank's Data Security

A major bank implementing a new data center chose RAID 6 to protect their critical

transaction data. The bank's loss tolerance was near zero, and they required the highest possible data security. The RAID 6 solution ensured the bank could withstand simultaneous drive failures without data loss, safeguarding their operations and maintaining customer trust.

Implementing Your RAID Solution: Steps and Considerations

1. Assess your needs: Determine the volume of data, performance requirements, and data redundancy needs.
2. Choose the appropriate RAID level: Evaluate the trade-offs between performance and redundancy.
3. Select compatible hardware: Ensure that drives and controllers are compatible with your chosen RAID level.
4. Configure the RAID array: Follow the manufacturer's instructions to set up and initialize the RAID array.
5. Back up your data: Regularly back up critical data in a separate location.
6. Monitor the system: Keep an eye on drive health and performance metrics.

Summary

Implementing a RAID solution is a crucial step towards enhancing data availability and security. Choosing the right RAID level based on your specific needs, incorporating expert advice, and following best practices can prevent data loss, optimize performance, and safeguard your organization's valuable assets. The benefits of a robust RAID strategy extend beyond technical reliability to bolstering business confidence and reputation.

Frequently Asked Questions (FAQs)

Q1: How much does implementing RAID cost?

A1: The cost of implementing a RAID solution depends on the number of drives, the chosen RAID level, and the quality of the hardware. Higher levels of redundancy and performance will typically increase the cost.

Q2: Is RAID necessary for all businesses?

A2: While not essential for every business, RAID is crucial for organizations that deal with critical data, require high availability, and cannot tolerate data loss. Small businesses with less critical data might find simpler backup solutions sufficient.

Q3: How frequently should I back up data with RAID?

A3: RAID provides data redundancy, but regular backups remain essential. A solid backup

strategy is recommended at least weekly or daily, depending on the frequency of data changes.

Q4: Can RAID prevent all data loss?

A4: No, RAID doesn't eliminate all risks. Natural disasters, malicious attacks, or human errors can still lead to data loss. RAID focuses on protecting against hardware failures.

Q5: What are the potential drawbacks of implementing RAID?

A5: Potential drawbacks include initial cost, complexity in setup and configuration, and the need for ongoing monitoring and maintenance. The potential for data loss or corruption through software errors or incorrect configuration needs to be considered during the implementation process.

By carefully considering these factors, you can effectively implement a RAID solution that significantly enhances your data security and business continuity.

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Today's World: Four chapters cover information growth and challenges, define a storage system and its environment, review the evolution of storage technology, and introduce intelligent storage systems. Section 2, Storage Options and Protocols: Six chapters cover the SCSI and Fibre channel architecture, direct-attached storage (DAS), storage area networks (SANs), network-attached storage (NAS), Internet Protocol SAN (IP-SAN), content-addressed storage (CAS), and storage virtualization. Section 3, Business Continuity and Replication: Four chapters introduce business continuity, backup and recovery, local data replication, and remote data replication. Section 4, Security and Administration: Two chapters cover storage security and storage infrastructure monitoring and management. The book's supplementary web site provides up-to-date information on additional learning aids and storage certification opportunities.

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2016-11-14 CompTIA® Cloud+® Study Guide -- Acknowledgments -- About the Author -- Contents at a Glance -- Contents -- CompTIA -- Introduction -- Assessment Test -- Answers to Assessment Test -- Chapter 1 Cloud Computing Overview, Concepts, and Models -- Overview of Cloud Computing -- What Is Cloud Computing? -- Computing as a

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2011-06-20 System Design for Telecommunication Gateways provides a thorough review of designing telecommunication network equipment based on the latest hardware designs and software methods available on the market. Focusing on high-end efficient designs that challenge all aspects of the system architecture, this book helps readers to understand a broader view of the system design, analyze all its most critical components, and select the parts that best fit a particular application. In many cases new technology trends, potential future developments, system flexibility and capability extensions are outlined in preparation for the longevity typical for products in the industry. Key features: Combines software and hardware aspects of the system design. Defines components and services supported by open-source and commercial basic and extended software platforms, including operating systems,

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2016-04-07 This IBM® Redbooks® publication provides guidance about how to configure, monitor, and manage your IBM DS8880 storage systems to achieve optimum performance, and it also covers the IBM DS8870 storage system. It describes the DS8880 performance features and characteristics, including hardware-related performance features, synergy items for certain operating systems, and other functions, such as IBM Easy Tier® and the DS8000® I/O Priority Manager. The book also describes specific performance considerations that apply to particular host environments, including database

applications. This book also outlines the various tools that are available for monitoring and measuring I/O performance for different server environments, and it describes how to monitor the performance of the entire DS8000 storage system. This book is intended for individuals who want to maximize the performance of their DS8880 and DS8870 storage systems and investigate the planning and monitoring tools that are available. The IBM DS8880 storage system features, as described in this book, are available for the DS8880 model family with R8.0 release bundles (Licensed Machine Code (LMC) level 7.8.0). RAID levels and spares 45 47 48 3 1 1 RAID 5 overview 48 3 1 2 RAID 6 overview 3 1 3 RAID 10 overview 3 1 4 54 54 55 3 2 4 Extent pools 3 2 6 Space efficient volumes 57 3 2 5 Logical volumes 3 2 7 Extent allocation

2012-12-21 This IBM® Redbooks® publication represents a compilation of best practices for deploying and configuring the IBM System Storage® DS5000 Series family of products. This book is intended for IBM technical professionals, Business Partners, and customers responsible for the planning, deployment, and maintenance of the IBM System Storage DS5000 Series family of products. We realize that setting up DS5000 Storage Servers can be a complex task. There is no single configuration that will be satisfactory for every application or situation. First, we provide a conceptual framework for understanding the hardware in a Storage Area Network. Then, we offer our guidelines,

hints, and tips for the physical installation, cabling, and zoning, using the Storage Manager setup tasks. Next, we provide a quick guide to help you install and configure the DS5000 using best practices. After that, we turn our attention to the performance and tuning of various components and features, including numerous guidelines. We look at performance implications for various application products such as IBM DB2®, Oracle, IBM Tivoli® Storage Manager, Microsoft SQL server, and in particular, Microsoft Exchange server. Then we review the various tools available to simulate workloads and to measure, collect, and analyze performance data. We also consider the IBM AIX® environment, including IBM High Availability Cluster Multiprocessing (HACMP™) and IBM General Parallel File System (GPFS™). This edition of the book also includes guidelines for managing and using the DS5000 with the IBM System Storage SAN Volume Controller (SVC) and IBM Storwize® V7000. RAID levels 26 2 2 6 Array configuration 2 2 7 Segment size 2 2 8 Logical drives and controller ownership 2 2 9 Hot 54 2 4 4 iSCSI connection to the DS5000 storage subsystem 55 2 5 Host support and multipathing 2 5 1

2011-07-18 Good backup and recovery strategies are key to the health of any organization. Medium- to very-large-scale systems administrators have to protect large amounts of critical data as well as design backup solutions that are scalable and optimized to meet changing conditions. Pro

Data Backup and Recovery will cover some of the more common backup applications, such as Symantec NetBackup/BackupExec, EMC NetWorker, and CommVault, but the main discussion will focus on the implementation of 21st century architectures that allow the backup software to be a “commodity” item. The underlying architecture provides the framework for meeting the requirements of data protection for the organization. This book covers new developments in data protection as well as the impact of single-instance storage upon backup infrastructures. It discusses the impact of backup and data replication, the often misapplied B2D and D2D strategies, and “tapeless” backup environments. Continuous data protection and remote replication strategies are also addressed as they are integrated within backup strategies—a very important topic today. Learn backup solution design regardless of specific backup software Design realistic recovery solutions Take into account new data protection standards and the impact of data replication Whether you are using NetBackup, CommVault, or some other backup software, Pro Data Backup and Recovery will give you the information you need to keep your data safe and available. solutions 57 R RAID redundant array of inexpensive disks 50 RAID redundant array of inexpensive disks different methods of presenting storage using 50 group wrapping 159 implementation and disk performance 52

2000 54 6 July 1989 11 Ted Shelsby Taking the Helm at Martin The Baltimore Sun 3 May 1993 12c 12 Raid at Ames Center Aviation Week and Space Technology 17 August 1992 26 5 Op cit note 2 6 Ann

2018-12-11 This IBM® Redpaper™ publication given 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. The book focuses on IBM Power Systems I O architecture and

various SAS RAID adapters that are supported in IBM POWER8™ processor based systems

2019-07-04 This IBM® Redbooks® publication is a detailed technical guide to the IBM System Storage® SAN Volume Controller (SVC), which is powered by IBM Spectrum™ Virtualize V8.2.1. IBM SAN Volume Controller is a virtualization appliance solution that maps virtualized volumes that are visible to hosts and applications to physical volumes on storage devices. Each server within the storage area network (SAN) has its own set of virtual storage addresses that are mapped to physical addresses. If the physical addresses change, the server continues running by using the same virtual addresses that it had before. Therefore, volumes or storage can be added or moved while the server is still running. The IBM virtualization technology improves the management of information at the block level in a network, which enables applications and servers to share storage devices on a network. RAID is still supported and can be suggested as the default choice in the GUI it is highly recommended to use DRAID 6 54 Dashboard Monitoring Name Pools Volumes Hosts Create Actions Poolo Create Child Pool Rename Modify Threshold

2017-11-23 Computer Architecture: A Quantitative Approach, Sixth Edition has been considered essential reading by instructors, students and practitioners of computer design for over 20 years. The sixth

edition of this classic textbook from Hennessy and Patterson, winners of the 2017 ACM A.M. Turing Award recognizing contributions of lasting and major technical importance to the computing field, is fully revised with the latest developments in processor and system architecture. The text now features examples from the RISC-V (RISC Five) instruction set architecture, a modern RISC instruction set developed and designed to be a free and openly adoptable standard. It also includes a new chapter on domain-specific architectures and an updated chapter on warehouse-scale computing that features the first public information on Google's newest WSC. True to its original mission of demystifying computer architecture, this edition continues the longstanding tradition of focusing on areas where the most exciting computing innovation is happening, while always keeping an emphasis on good engineering design. - Winner of a 2019 Textbook Excellence Award (Texty) from the Textbook and Academic Authors Association - Includes a new chapter on domain-specific architectures, explaining how they are the only path forward for improved performance and energy efficiency given the end of Moore's Law and Dennard scaling - Features the first publication of several DSAs from industry - Features extensive updates to the chapter on warehouse-scale computing, with the first public information on the newest Google WSC - Offers updates to other chapters including new material dealing with

the use of stacked DRAM; data on the performance of new NVIDIA Pascal GPU vs. new AVX-512 Intel Skylake CPU; and extensive additions to content covering multicore architecture and organization - Includes Putting It All Together sections near the end of every chapter, providing real-world technology examples that demonstrate the principles covered in each chapter - Includes review appendices in the printed text and additional reference appendices available online - Includes updated and improved case studies and exercises - ACM named John L. Hennessy and David A. Patterson, recipients of the 2017 ACM A.M. Turing Award for pioneering a systematic, quantitative approach to the design and evaluation of computer architectures with enduring impact on the microprocessor industry implementation C 29 Redundant array of inexpensive disks RAID dependability benchmarks D 21 23 disk array deconstruction case study D 51 54 disk deconstruction case study D 48 50 hardware dependability D 15

2011-02-12 This IBM® Redbooks® publication describes the concepts, architecture, and implementation of the IBM System Storage® DS8700 storage subsystem. This book has reference information that will help you plan for, install, and configure the DS8700 and also discusses the architecture and components. The DS8700 is the most advanced model in the IBM System Storage DS8000® series. It includes IBM POWER6®-based controllers,

with a dual 2-way or dual 4-way processor complex implementation. Its extended connectivity, with up to 128 Fibre Channel/FICON® ports for host connections, make it suitable for multiple server environments in both open systems and IBM System z® environments. If desired, the DS8700 can be integrated in an LDAP infrastructure. The DS8700 supports thin provisioning. Depending on your specific needs, the DS8700 storage subsystem can be equipped with SATA drives, FC drives, and Solid® State Drives (SSDs). The DS8700 can now automatically optimize the use of SSD drives through its no charge Easy Tier feature. The DS8700 also supports Full Disk Encryption (FDE) feature. Its switched Fibre Channel architecture, dual processor complex implementation, high availability design, and the advanced Point-in-Time Copy and Remote Mirror and Copy functions that incorporates make the DS8700 storage subsystem suitable for mission-critical business functions. 6 Create volume groups 7 Create host connections 14 4 1 Create arrays In this step we create the arrays 54 31 IBM DSCLI Version 5 1 0 204 DS IBM 2107 xxx arsite DA Pair dkcap 10 9B State Array S1 0 S2 0 S3 0

2011-03-24 Until now, the only way to capture, store, and effectively retain constantly growing amounts of enterprise data was to add more disk space to the storage infrastructure, an approach that can quickly become cost-prohibitive as information volumes continue to grow and

capital budgets for infrastructure do not. In this IBM® Redbooks® publication, we introduce data deduplication, which has emerged as a key technology in dramatically reducing the amount of, and therefore the cost associated with storing, large amounts of data. Deduplication is the art of intelligently reducing storage needs through the elimination of redundant data so that only one instance of a data set is actually stored. Deduplication reduces data an order of magnitude better than common data compression techniques. IBM has the broadest portfolio of deduplication solutions in the industry, giving us the freedom to solve customer issues with the most effective technology. Whether it is source or target, inline or post, hardware or software, disk or tape, IBM has a solution with the technology that best solves the problem. This IBM Redbooks publication covers the current deduplication solutions that IBM has to offer: IBM ProtecTIER® Gateway and Appliance IBM Tivoli® Storage Manager IBM System Storage® N series Deduplication 54 55 LUNS 16 29 45 51 54 56 58 81 97 98 116 117 129 133 167 201 217 222 227 230 232 6 non unique chunks 6 no query restore 271 NSF 241 NTP server 239 Number of slots field 224

2001-06-12 Praise for the first edition of Building Storage Networks: This book is the Bible of storage networking--Dave Hill, Senior Storage Analyst, the Aberdeen Group Now more than ever, especially in the age of e-commerce, data must be available and accessible 24x7 on a network. This easy-to-

understand book clearly explains all the latest methods of storing data on a network, including updated coverage of Internet storage service providers. RAID Volume managers can implement RAID algorithms that turn discrete disks 6 Concatenation Concatenation is the capability to merge two or more device partitions and create a single virtual device with the Storage 1 0 54

2017-05-12 The new RISC-V Edition of Computer Organization and Design features the RISC-V open source instruction set architecture, the first open source architecture designed to be used in modern computing environments such as cloud computing, mobile devices, and other embedded systems. With the post-PC era now upon us, Computer Organization and Design moves forward to explore this generational change with examples, exercises, and material highlighting the emergence of mobile computing and the Cloud. Updated content featuring tablet computers, Cloud infrastructure, and the x86 (cloud computing) and ARM (mobile computing devices) architectures is included. An online companion Web site provides advanced content for further study, appendices, glossary, references, and recommended reading. - Features RISC-V, the first such architecture designed to be used in modern computing environments, such as cloud computing, mobile devices, and other embedded systems - Includes relevant examples, exercises, and material highlighting the emergence of mobile

computing and the cloud 6 application requirements 6 design 5 growth 54 e11 Embedded Microprocessor Benchmark Consortium EEMBC RAID 2 481 e4 Error detection A 65 A 66 Error detection code 410 Ethernet 23 24 EX stage load

2017-07-10 This is the eBook of the printed book and may not include any media, website access codes, or print supplements that may come packaged with the bound book. Now fully updated: The authoritative, comprehensive guide to vSphere 6 storage implementation and management Effective VMware virtualization storage planning and management has become crucial—but it can be extremely complex. Now, VMware’s leading storage expert thoroughly demystifies the “black box” of vSphere 6 storage and provides illustrated, step-by-step procedures for performing every key task associated with it. Mostafa Khalil presents techniques based on years of personal experience helping customers troubleshoot storage in their vSphere production environments. Drawing on more experience than anyone else in the field, he combines expert guidelines, insights for better architectural design, best practices for planning and management, common configuration details, and deep dives into both vSphere and third-party storage. Storage Design and Implementation in vSphere 6, Second Edition will give you the deep understanding you need to make better upfront storage decisions, quickly solve problems if they arise, and keep them from

occurring in the first place. Coverage includes: Planning and implementing Fibre Channel, FCoE, and iSCSI storage in vSphere virtualized environments Implementing vSphere Pluggable Storage Architecture native multipathing, SATP, PSP, plug-ins, rules, registration, and more Working with Active/Passive and Pseudo-Active/Active ALUA SCSI-3 storage arrays Maximizing availability with multipathing and failover Improving efficiency and value by unifying and centrally managing heterogeneous storage configurations Understanding Storage Virtualization Devices (SVDs) and designing storage to take advantage of them Implementing VMware Virtual Machine File System (VMFS) to maximize performance and resource utilization Working with virtual disks and raw device mappings (RDMs) Managing snapshots in VMFS and Virtual Volumes environments Implementing and administering NFS, VAAI, Storage vMotion, VisorFS, and VASA Integrating VSAN core and advanced features Using Virtual Volumes to streamline storage operations and gain finer VM-level control over external storage RAID 1 configuration 962 970 nested RAID 10 configuration 970 975 storage policies 958 962 fault tolerance 54 802 1p 54 55 administrator tips 93 94 architecture 45 46 DCBX Data Center Bridging Exchange 53

2012-09-14 This IBM® Redbooks® publication provides guidance about how to configure, monitor, and manage your IBM System Storage® DS8800 and DS8700 storage systems to achieve optimum

performance. It describes the DS8800 and DS8700 performance features and characteristics, including IBM System Storage Easy Tier® and DS8000® I/O Priority Manager. It also describes how they can be used with the various server platforms that attach to the storage system. Then, in separate chapters, we detail specific performance recommendations and discussions that apply for each server environment, as well as for database and DS8000 Copy Services environments. We also outline the various tools available for monitoring and measuring I/O performance for different server environments, as well as describe how to monitor the performance of the entire DS8000 storage system. This book is intended for individuals who want to maximize the performance of their DS8800 and DS8700 storage systems and investigate the planning and monitoring tools that are available. The IBM System Storage DS8800 and DS8700 storage system features, as described in this book, are available for the DS8700 with Licensed Machine Code (LMC) level 6.6.2x.xxx or higher and the DS8800 with Licensed Machine Code (LMC) level 7.6.2x.xxx or higher. For information about optimizing performance with the previous DS8000 models, DS8100 and DS8300, see the following IBM Redbooks publication: DS8000 Performance Monitoring and Tuning, SG24-7146. RAID 39 RAID 10 595 drive failure 54 implementation 54 RAID 5 595 drive failure 52 implementation 52 53 RAID 6 53 storage economics 89 122 694 DS8800

Performance Monitoring and Tuning

2015-05-22 The IBM® Hardware Management Console (HMC) provides systems administrators a tool for planning, deploying, and managing IBM Power Systems™ servers. This IBM Redbooks® publication is designed for system administrators to use as a desk-side reference when managing partition-capable IBM Power Systems servers by using the HMC. The major functions that the HMC provides are Power Systems server hardware management and virtualization (partition) management. You can find information about virtualization management in the following documents: - A Practical Guide for Resource Monitoring and Control (RMC), SG24-6615 - IBM PowerVM Virtualization Introduction and Configuration, SG24-7940 - Implementing IBM Systems Director 6.1, SG24-7694 - Hardware Management Console V7 Handbook, SG24-7491 - IBM PowerVM Live Partition Mobility, SG24-7460 - IBM PowerVM Virtualization Managing and Monitoring, SG24-7590 - Converting Hardware Management Console (HMC) 7042-CR6 or 7042-CR7 Models to RAID1, REDP-4909 The following topics are described: - Plan to implement the HMC - Configure the HMC - Operate the HMC - Manage software levels on the HMC - Use service functions on the HMC - Update firmware of managed systems - Use IBM System Planning Tool deployments In addition, there is an explanation on how to use the new HMC graphical user interface and the new HMC commands that are

available with HMC Version 7, Release 7, modification 60. Storage 5 Select the LSI MegaRAID ServeRAID M5110 Configuration Utility 6 Select Virtual Drive Management 7 Select Create Configuration 8 Select Select RAID Level and select RAID 1 as shown in Figure 2 25 9 Select Select

2021-08-06 Continuing its commitment to developing and delivering industry-leading storage technologies, IBM® introduces the IBM FlashSystem® solution that is powered by IBM Spectrum® Virtualize V8.4. This innovative storage offering delivers essential storage efficiency technologies and exceptional ease of use and performance, all integrated into a compact, modular design that is offered at a competitive, midrange price. The solution incorporates some of the top IBM technologies that are typically found only in enterprise-class storage systems, which raises the standard for storage efficiency in midrange disk systems. This cutting-edge storage system extends the comprehensive storage portfolio from IBM and can help change the way organizations address the ongoing information explosion. This IBM Redbooks® publication introduces the features and functions of an IBM Spectrum Virtualize V8.4 system through several examples. This book is aimed at pre-sales and post-sales technical support and marketing and storage administrators. It helps you understand the architecture, how to implement it, and how to take advantage of its industry-leading functions and features. RAID array at a moment It is based on the

RAID level state of the array and state of the other member drives in the array For example it takes three or more drives going offline at the same time in healthy RAID 6 54 List of

2018-06-13 This book highlights the applications of soft computing techniques in medical bioinformatics. It reflects the state-of-the-art research in soft computing and bioinformatics, including theory, algorithms, numerical simulations, and error and uncertainty analysis. It also deals with novel applications of new processing techniques in computer science. This book is useful to both students and researchers from computer science and engineering fields. raid architectures IEEE Transactions on Computers 44 2 192 202 1995 11 Rashmi K Shah NB Gu D Kuang H Borthakur D Ramchandran K 2015 A 54 6 Dimension Reduction and Storage Optimization References

2019-11-07 Continuing its commitment to developing and delivering industry-leading storage technologies, IBM® introduces the IBM Storwize® V7000 solution powered by IBM Spectrum™ Virtualize. This innovative storage offering delivers essential storage efficiency technologies and exceptional ease of use and performance, all integrated into a compact, modular design that is offered at a competitive, midrange price. The IBM Storwize V7000 solution incorporates some of the top IBM technologies that are typically found only in enterprise-class storage systems, which raises the standard for

storage efficiency in midrange disk systems. This cutting-edge storage system extends the comprehensive storage portfolio from IBM and can help change the way organizations address the ongoing information explosion. This IBM Redbooks® publication introduces the features and functions of the IBM Storwize V7000 and IBM Spectrum Virtualize™ V8.2.1 system through several examples. This book is aimed at pre-sales and post-sales technical

support and marketing and storage administrators. It helps you understand the architecture of the Storwize V7000, how to implement it, and how to take advantage of its industry-leading functions and features. RAID level and others Use the CLI command `lsarray` to get a list of all configured arrays Use `lsarray` with array name or ID as the parameter to get extended information about the selected one as shown in Example 6 54 Assign MDisk