

# Ibm Ds4700 Configuration Guide

Exploiting IBM PowerHA SystemMirror V6.1 for AIX Enterprise Edition  
IBM System Storage Business Continuity: Part 2 Solutions Guide  
Power Systems Enterprise Servers with PowerVM Virtualization and RAS  
IBM Information Infrastructure Solutions Handbook  
IBM Midrange System Storage Implementation and Best Practices Guide  
Deploying PowerHA Solution with AIX HyperSwap  
IBM System Storage DCS3700 Introduction and Implementation Guide  
SAN Volume Controller IBM System Storage b-type Multiprotocol Routing: An Introduction and Implementation  
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IBM System Storage DS Storage Manager Copy Services Guide  
IBM Spectrum Virtualize and SAN Volume Controller Enhanced Stretched Cluster with VMware  
IBM Power Systems SR-IOV: Technical Overview and Introduction  
Certification Guide Series  
IBM Power Systems LC921 and LC922: Technical Overview and Introduction  
High Performance Computing on Vector Systems 2005  
IBM Data Center Networking: Planning for Virtualization and Cloud

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ComputingIBM Power 550 Technical OverviewA Guide to the IBM Clustered Network File SystemIBM XIV Storage SystemImplementing the IBM General Parallel File System (GPFS) in a Cross Platform EnvironmentHarnessing the Power of ProtecTIER and Tivoli Storage ManagerIBM Systems Director 6.3 Best PracticesIBM System Storage Solutions HandbookIBM PowerVM Best PracticesSAN Multiprotocol Routing: An Introduction and ImplementationGuide to IBM PowerHA SystemMirror for AIX Version 7.1.3IBM System Storage DS3000Data Migration to IBM Disk Storage SystemsIBM SAN Solution Design Best Practices for VMware vSphere ESXiImplementing the IBM Storwize V3500ILM Library

### **Exploiting IBM PowerHA SystemMirror V6.1 for AIX Enterprise Edition**

The rapid spread and adoption of production storage area networks (SANs) has fueled the need for multiprotocol routers. The routers provide improved scalability, security, and manageability by enabling devices in separate SAN fabrics to communicate without merging fabrics into a single, large SAN fabric. This capability enables clients to initially deploy separate SAN solutions at the departmental and data center levels. Then, clients can consolidate these separate solutions into large enterprise SAN solutions as their experience and requirements grow and change. Alternatively, multiprotocol routers can help to connect existing enterprise SANs for a variety of reasons. For instance, the introduction of Small

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Computer System Interface over IP (iSCSI) provides for the connection of low-end, low-cost hosts to enterprise SANs. The use of an Internet Protocol (IP) in the Fibre Channel (FC) environment provides for resource consolidation and disaster recovery planning over long distances. And the use of FC-FC routing services provides connectivity between two or more fabrics without having to merge them into a single SAN. This IBM® Redbooks® publication targets storage network administrators, system designers, architects, and IT professionals who sell, design, or administer SANs. It introduces you to products, concepts, and technology in the IBM System Storage™ SAN Routing portfolio, which is based on Brocade products and technology. This book shows the features of these products and examples of how you can deploy and use them.

### **IBM System Storage Business Continuity: Part 2 Solutions Guide**

The IBM XIV® Storage System has a rich set of copy functions suited for various data protection scenarios that enable you to enhance your business continuance, disaster recovery, data migration, and online backup solutions. These functions allow point-in-time copies, known as snapshots and full volume copies, and also include remote copy capabilities in either synchronous or asynchronous mode. A three-site mirroring function is now available to further improve availability and disaster recovery capabilities. These functions are included in the XIV software and all their features are available at no

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extra charge. The various copy functions are reviewed in separate chapters, which include detailed information about usage and practical illustrations. The book also illustrates the use of IBM® Tivoli® Storage Productivity Center for Replication to manage XIV Copy Services. This IBM Redbooks® publication is intended for anyone who needs a detailed and practical understanding of the XIV copy functions.

### **Power Systems Enterprise Servers with PowerVM Virtualization and RAS**

This IBM® Redbooks® publication describes the new IBM i Midrange External Storage solutions available for IBM POWER™ Systems POWER6™ servers with IBM i being a client of IBM Virtual I/O Server (VIOS). It introduces the VIOS virtualization concepts and IBM DS Midrange External Storage Systems architecture of the supported models DS3400, DS4700, DS4800, and DS5000, discusses planning and sizing for IBM i Midrange External Storage, and provides detailed implementation procedures including IBM DS Midrange Storage Copy Services. Finally, it provides monitoring, maintenance, and troubleshooting hints for the triumvirate of IBM i, VIOS, and IBM DS Midrange External Storage. The information provided by this book will help customers, business partners, and IBM service professionals with planning and implementing IBM i Midrange External Storage solutions.

### **IBM Information Infrastructure Solutions Handbook**

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The IBM® System Storage® Solutions Handbook helps you solve your current and future data storage business requirements. It helps you achieve enhanced storage efficiency by design to allow managed cost, capacity of growth, greater mobility, and stronger control over storage performance and management. It describes the most current IBM storage products, including the IBM Spectrum™ family, IBM FlashSystem®, disk, and tape, as well as virtualized solutions such as IBM Storage Cloud. This IBM Redbooks® publication provides overviews and information about the most current IBM System Storage products. It shows how IBM delivers the right mix of products for nearly every aspect of business continuance and business efficiency. IBM storage products can help you store, safeguard, retrieve, and share your data. This book is intended as a reference for basic and comprehensive information about the IBM Storage products portfolio. It provides a starting point for establishing your own enterprise storage environment. This book describes the IBM Storage products as of March, 2016.

### **IBM Midrange System Storage Implementation and Best Practices Guide**

The Clustered Network File System (CNFS) is a capability based on IBM® General Parallel File System (GPFSTM) running on Linux® which, when combined with System x® servers or BladeCenter® Servers, IBM TotalStorage® Disk Systems, and Storage Area Networks (SAN) components, provides a scalable file services environment. This capability enables

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customers to run a General Parallel File System (GPFS) data-serving cluster in which some or all of the nodes actively export the file system using NFS. This IBM Redpaper™ publication shows how Cluster NFS file services are delivered and supported today through the configurable order process of the IBM Intelligent Cluster. The audience for this paper includes executive and consultant decision makers and technical administrators who want to know how to implement this solution.

### **Deploying PowerHA Solution with AIX HyperSwap**

This IBM® Redbooks® publication consolidates, in one document, detailed descriptions of the hardware configurations and options offered as part of the IBM Midrange System Storage™ servers, which include the IBM System Storage DS4000® and DS5000 families of products. This edition covers updates and additional functions available with the IBM System Storage DS® Storage Manager Version 10.60 (firmware level 7.60). This book presents the concepts and functions used in planning and managing the storage servers, such as multipathing and path failover. The book offers a step-by-step guide to using the Storage Manager to create arrays, logical drives, and other basic (as well as advanced) management tasks. This publication also contains practical information about diagnostics and troubleshooting, and includes practical examples of how to use scripts and the command-line interface. This publication is intended for customers, IBM Business Partners, and

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IBM technical professionals who want to learn more about the capabilities and advanced functions of the DS4000 series of storage servers with Storage Manager Software V10.60. It also targets those who have a DS4000 and DS5000 storage subsystem and need detailed advice about how to configure it.

## **IBM System Storage DCS3700 Introduction and Implementation Guide**

The purpose of this IBM® Redbooks® publication is to provide customers with guidance and recommendations for how and when to use the IBM System Storage® Copy Services premium features. The topics discussed in this publication apply to the IBM System Storage DS® models DS3000, DS4000®, and DS5000 running the firmware v7.70, and IBM System Storage DS Storage Manager v10.70. Customers in today's IT world are finding a major need to ensure a good archive of their data and a requirement to create these archives with minimal interruptions. The IBM Midrange System Storage helps to fulfill these requirements by offering three copy services premium features: IBM FlashCopy® VolumeCopy Enhanced Remote Mirroring (ERM) This publication specifically addresses the copy services premium features and can be used in conjunction with the following IBM DS System Storage books: IBM System Storage DS4000 and Storage Manager V10.30, SG24-7010 IBM System Storage DS3000: Introduction and Implementation Guide, SG24-7065 IBM System Storage DS3500: Introduction and Implementation Guide, SG24-7914 IBM Midrange

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System Storage Hardware Guide, SG24-7676 IBM Midrange System Storage Implementation and Best Practices Guide, SG24-6363

## **SAN Volume Controller**

This IBM® Redbooks® publication describes the IBM storage area network (SAN) and IBM Spectrum™ Virtualize, and SAN Volume Controller Enhanced Stretched Cluster configuration when combined with VMware. It describe guidelines, settings, and implementation steps necessary to achieve a satisfactory implementation. Business continuity and continuous availability of applications are among the top requirements for many organizations today. Advances in virtualization, storage, and networking make enhanced business continuity possible. Information technology solutions can now be designed to manage both planned and unplanned outages, and to take advantage of the flexibility, efficient use of resources, and cost savings that cloud computing offers. The IBM Enhanced Stretched Cluster design offers significant functions for maintaining business continuity in a VMware environment. You can dynamically move applications across data centers without interruption to those applications. The live application mobility across data centers relies on these products and technologies: IBM Spectrum Virtualize and SAN Volume Controller Enhanced Stretched Cluster Solution VMware Metro vMotion for live migration of virtual machines A Layer 2 IP Network and storage networking infrastructure for high-performance traffic management Data center

interconnection

## **IBM System Storage b-type Multiprotocol Routing: An Introduction and Implementation**

An information infrastructure is comprised of software, servers, storage, and networks, integrated and optimized to deliver timely, secure, and trusted information throughout the organization and to its clients and partners. With the explosive growth in data and information—coupled with demands for projects with rapid ROI—IT infrastructures and storage administrators are reaching a breaking point. IBM® can help with the changes needed to manage information availability, security, and regulatory and compliance requirements on a tighter budget. And because the health of any business often depends on its ability to take advantage of information in real time, a sound, intelligent information infrastructure becomes critical to supporting new growth initiatives. IBM offers an innovative approach to help you manage information growth more effectively and mitigate risks with a dynamic infrastructure that efficiently and securely stores and protects information, and optimizes information access. You can control, protect, manage, and gain new intelligence from your information with the IBM leading-edge Information Infrastructure products, services and integrated solutions, supported by world-class expertise and access to top experts from around the world. This IBM Redbooks® publication provides an overview of the IBM Information Infrastructure

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solutions that are designed to help you manage the information explosion and address challenges of information compliance, availability, retention, and security. This will lead your company toward improved productivity, service delivery, and reduced risk, while streamlining costs.

## **IBM XIV Storage System Business Continuity Functions**

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

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administrators who are involved with planning, deploying, configuring, and maintaining key virtualization technologies.

### **IBM System Storage DS5000 Series Hardware Guide**

This IBM® Redbooks® publication provides a documented deployment model for IBM GPFS™ in a cross-platform environment with IBM Power Systems™, Linux, and Windows servers. With IBM GPFS, customers can have a planned foundation for file systems management for cross-platform access solutions. This book examines the functional, integration, simplification, and usability changes with GPFS v3.4. It can help the technical teams provide file system management solutions and technical support with GPFS, based on Power Systems virtualized environments for cross-platform file systems management. The book provides answers to your complex file systems management requirements, helps you maximize file system availability, and provides expert-level documentation to transfer the how-to skills to the worldwide support teams. The audience for this book is the technical professional (IT consultants, technical support staff, IT architects, and IT specialists) who is responsible for providing file system management solutions and support for cross-platform environments that are based primarily on Power Systems.

### **IBM Power 520 and Power 550 (Power6) System Builder**

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This IBM® Redbooks® publication provides best practices for planning, installing, maintaining, and monitoring the IBM PowerVM® Enterprise Edition virtualization features on IBM POWER7® processor technology-based servers. PowerVM is a combination of hardware, PowerVM Hypervisor, and software, which includes other virtualization features, such as the Virtual I/O Server. This publication is intended for experienced IT specialists and IT architects who want to learn about PowerVM best practices, and focuses on the following topics: Planning and general best practices Installation, migration, and configuration Administration and maintenance Storage and networking Performance monitoring Security PowerVM advanced features This publication is written by a group of seven PowerVM experts from different countries around the world. These experts came together to bring their broad IT skills, depth of knowledge, and experiences from thousands of installations and configurations in different IBM client sites.

## **IBM Midrange System Storage Hardware Guide**

The enterprise data center has evolved dramatically in recent years. It has moved from a model that placed multiple data centers closer to users to a more centralized dynamic model. The factors influencing this evolution are varied but can mostly be attributed to regulatory, service level improvement, cost savings, and manageability. Multiple legal issues regarding the security of data housed in the data

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center have placed security requirements at the forefront of data center architecture. As the cost to operate data centers has increased, architectures have moved towards consolidation of servers and applications in order to better utilize assets and reduce "server sprawl." The more diverse and distributed the data center environment becomes, the more manageability becomes an issue. These factors have led to a trend of data center consolidation and resources on demand using technologies such as virtualization, higher WAN bandwidth technologies, and newer management technologies. The intended audience of this book is network architects and network administrators. In this IBM® Redbooks® publication we discuss the following topics: The current state of the data center network The business drivers making the case for change The unique capabilities and network requirements of system platforms The impact of server and storage consolidation on the data center network The functional overview of the main data center network virtualization and consolidation technologies The new data center network design landscape

### **IBM System Storage Business Continuity: Part 1 Planning Guide**

### **IBM System Storage SAN Volume Controller and Storwize V7000 Replication Family Services**

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Systems™ with IBM PowerHA® SystemMirror® Standard and Enterprise Editions (hardware, software, practices, reference architectures, and tools) documents a well-defined deployment model within an IBM Power Systems environment. It guides you through a planned foundation for a dynamic infrastructure for your enterprise applications. This information is for technical consultants, technical support staff, IT architects, and IT specialists who are responsible for providing high availability and support for the IBM PowerHA SystemMirror Standard and Enterprise Editions on IBM POWER® systems.

### **IBM XIV Storage System Architecture and Implementation**

This IBM® Redpaper™ is a comprehensive guide covering the Power 550 server. The goal of this paper is to introduce the innovative Power 550. It introduces major hardware offerings and discusses their prominent functions, including:

- o The POWER6 processor available at frequencies of 3.5 GHz, 4.2 GHz, and 5.0 GHz.
- o The specialized POWER6 DDR2 memory that provides greater bandwidth, capacity, and reliability.
- o The 1 Gb or 10 Gb Integrated Virtual Ethernet adapter that brings native hardware virtualization to this server
- o EnergyScale technology that provides features such as power trending, power-saving, capping of power, and thermal measurement
- o PowerVM Live Partition Mobility
- o Mainframe continuous availability brought to the UNIX environment

This Redpaper expands the current set of IBM System p documentation by providing a

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desktop reference that offers a detailed technical description of the 550 system. This Redpaper does not replace the latest marketing materials and tools. It is intended as an additional source of information that, together with existing sources, may be used to enhance your knowledge of IBM server solutions.

### **Exploiting IBM AIX Workload Partitions**

This IBM® Redbooks® publication illustrates implementation, testing, and helpful scenarios with IBM Power® Systems 780 and 795 using the comprehensive set of the Power virtualization features. We focus on the Power Systems functional improvements, in particular, highlighting the reliability, availability, and serviceability (RAS) features of the enterprise servers. This document highlights IBM Power Systems Enterprise Server features, such as system scalability, virtualization features, and logical partitioning among others. This book provides a documented deployment model for Power 780 and Power 795 within a virtualized environment, which allows clients to plan a foundation for exploiting and using the latest features of the IBM Power Systems Enterprise Servers. The target audience for this book includes technical professionals (IT consultants, technical support staff, IT Architects, and IT Specialists) responsible for providing IBM Power Systems solutions and support.

### **IBM i and Midrange External Storage**

This IBM® Redbooks® publication will help you

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install, tailor, and configure IBM ProtecTIER® products with IBM Tivoli® Storage Manager to harness the performance and the power of the two products working together as a data protection solution. This book goes beyond the preferred practices of each product and provides in-depth explanations of each of the items that are configurable, and the underlying reasons behind the suggestions. This book provides enough detailed information to allow an administrator to make the correct choices about which methods to use when implementing both products to meet and to exceed the business requirements. This publication provides descriptions and guidance about the following topics: Terminology and concepts of ProtecTIER and Tivoli Storage Manager Planning for ProtecTIER to run with Tivoli Storage Manager Setup and configuration of the IBM ProtecTIER device as a storage pool in the Tivoli Storage Manager environment, primarily as a Virtual Tape Library (VTL) interface, with a description as a File System Interface (FSI) Day-to-day administration of ProtecTIER when it is used in a Tivoli Storage Manager environment Overview of how to plan for disaster recovery in a ProtecTIER and Tivoli Storage Manager environment Monitoring and problem solving: How a system administrator can review ProtecTIER logs and Tivoli Storage Manager server logs to identify the source of problems Hints, tips, and use cases for ProtecTIER and Tivoli Storage Manager administrators This book is intended for storage administrators and architects who have ordered and installed IBM ProtecTIER Products and want to implement Tivoli Storage Manager as part of a data protection solution. This book is also intended for anyone that wants to learn

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more about applying and using the benefits of ProtecTIER running with Tivoli Storage Manager.

### **IBM System Storage DS Storage Manager Copy Services Guide**

Every organization has large amounts of data to store, use, and manage. For most, this quantity is increasing. However, over time, the value of this data changes. How can we map data to an appropriate storage media, so that it can be accessed in a timely manner when needed, retained for as long as required, and disposed of when no longer needed? Information Lifecycle Management (ILM) provides solutions. ILM is the process of managing information-from creation, through its useful life, to its eventual destruction-in a manner that aligns storage costs with the changing business value of information. We can think of ILM as an integrated solution of five IT management and infrastructure components working together: Service management (service levels), content management, workflow management (or process management), storage management, and storage infrastructure. This IBM Redbooks publication will help you understand what ILM is and why it is of value to you in your organization, and provide you with suggested ways to implement it using IBM products.

### **IBM Spectrum Virtualize and SAN Volume Controller Enhanced Stretched Cluster with VMware**

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A disruption to your critical business processes could leave the entire business exposed. Today's organizations face ever-escalating customer demands and expectations. There is no room for downtime. You need to provide your customers with continuous service because your customers have a lot of choices. Your competitors are standing ready to take your place. As you work hard to grow your business, you face the challenge of keeping your business running without a glitch. To remain competitive, you need a resilient IT infrastructure. This IBM Redbooks publication introduces the importance of Business Continuity in today's IT environments. It provides a comprehensive guide to planning for IT Business Continuity and can help you design and select an IT Business Continuity solution that is right for your business environment. We discuss the concepts, procedures, and solution selection for Business Continuity in detail, including the essential set of IT Business Continuity requirements that you need to identify a solution. We also present a rigorous Business Continuity Solution Selection Methodology that includes a sample Business Continuity workshop with step-by-step instructions in defining requirements. This book is meant as a central resource book for IT Business Continuity planning and design. The companion title to this book, IBM System Storage Business Continuity: Part 2 Solutions Guide, SG24-6548, describes detailed product solutions in the System Storage Resiliency Portfolio.

### **IBM Power Systems SR-IOV: Technical Overview and Introduction**

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This IBM® Redbook captures some of the best practices based on field experience and details the performance gains that can be achieved by implementing the IBM System Storage™ SAN Volume Controller. This book is intended for very experienced storage, SAN, and SVC administrators and technicians. Readers are expected to have an advanced knowledge of the SVC and SAN environment, and we recommend these books as background reading: IBM System Storage SAN Volume Controller, SG24-6423 Introduction to Storage Area Networks, SG24-5470 Using the SVC for Business Continuity, SG24-7371.

### **Certification Guide Series**

Businesses of all sizes are faced with the challenge of managing huge volumes of data that are becoming increasingly valuable. But storing this data can be costly, and extracting value from the data is becoming more and more difficult. IT organizations have limited resources and cannot afford to make investment mistakes. The IBM® Storwize® V3500 system provides a smarter solution that is affordable, simple, and efficient, which enables businesses to overcome their storage challenges. IBM Storwize V3500 is the most recent addition to the IBM Storwize family of disk systems. It delivers easy-to-use, entry-level configurations that are specifically designed to meet the modest budgets of small and medium-sized businesses. IBM Storwize V3500 features the following highlights: - Consolidate and share data with low cost iSCSI storage networking. - Deploy storage in minutes

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and perform storage management tasks quickly and easily through a breakthrough graphical user interface. - Experience peace of mind with proven IBM Storwize family high-availability data protection with snapshot technology and IBM warranty support. - Optimize efficiency by allocating only the amount of disk space needed at the time it is required with high performance, thin-provisioning capabilities.

### **IBM Power Systems LC921 and LC922: Technical Overview and Introduction**

### **High Performance Computing on Vector Systems 2005**

### **IBM Data Center Networking: Planning for Virtualization and Cloud Computing**

Data migration has become a mandatory and regular activity for most data centers. Companies need to migrate data not only when technology needs to be replaced, but also for consolidation, load balancing, and disaster recovery. This IBM Redbooks® publication addresses the aspects of data migration efforts while focusing on the IBM System Storage® as the target system. Data migration is a critical and complex operation, and this book provides the phases and steps to ensure a smooth migration. Topics range from planning and preparation to execution and validation. The book also reviews products and describes available IBM data migration services

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offerings. It explains, from a generic standpoint, the appliance-based, storage-based, and host-based techniques that can be used to accomplish the migration. Each method is explained including the use of the various products and techniques with different migration scenarios and various operating system platforms. This document targets storage administrators, storage network administrators, system designers, architects, and IT professionals who design, administer or plan data migrations in large data Centers. The aim is to ensure that you are aware of the current thinking, methods, tools, and products that IBM can make available to you. These items are provided to ensure a data migration process that is as efficient and problem-free as possible. The material presented in this book was developed with versions of the referenced products as of June 2011.

### **IBM Power 550 Technical Overview**

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

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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.

## **A Guide to the IBM Clustered Network File System**

This IBM® Redbooks® publication represents a compilation of best practices for deploying and configuring IBM Midrange System Storage™ servers, which include the DS4000® and the DS5000 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 Midrange System Storage family of products. We realize that setting up DS4000 and 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. 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 DB2®, Oracle, Tivoli® Storage Manager, Microsoft® SQL server, and in particular, Microsoft Exchange with IBM Midrange System Storage servers. Then we review the various tools available to simulate workloads and to measure, collect, and analyze performance data. We also consider the AIX® environment, including High Availability Cluster Multiprocessing (HACMP™) and General Parallel File System (GPFS™). Finally, we provide a quick guide to the storage server

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installation and configuration using best practices. This edition of the book also includes guidelines for managing and using the DS4000 and DS5000 with the IBM System Storage SAN Volume Controller (SVC).

## **IBM XIV Storage System**

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

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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)

## **Implementing the IBM General Parallel File System (GPFS) in a Cross Platform Environment**

In this IBM® Redbooks® publication, we describe recommendations based on an IBM b-type storage area network (SAN) environment that is utilizing VMware vSphere ESXi. We describe the hardware and software and the unique features that they bring to the marketplace. We then highlight those features and how they apply to the SAN environment, and the best practices for ensuring that you get the best out of your SAN. For background reading, we recommend the following Redbooks publications: - Introduction to Storage Area Networks and System Networking, SG24-5470 - IBM System Storage SAN Volume Controller Best Practices and Performance Guidelines, SG24-7521 - IBM System Storage SAN Volume Controller and Storwize V7000 Replication Family Services, SG24-7574 - Implementing the IBM System Storage SAN Volume Controller V6.3, SG24-7933 - IBM SAN Volume Controller Stretched Cluster with PowerVM and PowerHA, SG24-8142 - Implementing

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the IBM SAN Volume Controller and FlashSystem 820, SG24-8172 - IBM System Storage DS8000 Copy Services for Open Systems, SG24-6788 - IBM System Storage DS8000: Host Attachment and Interoperability, SG24-8887 This book is aimed at pre- and post-sales support, system administrators, and storage administrators.

## **Harnessing the Power of ProtecTIER and Tivoli Storage Manager**

This IBM® Redbooks® publication describes the positioning of the IBM Systems Director in the complete management range. It also compares the IBM Systems Director with the IBM Flex Systems Manager (FSM) and describes the environments for which each tool is best suited. This publication helps you plan, install, tailor, and configure the IBM Systems Director on different platforms. It contains information about required system resources and which network ports are used. It shows how to use the Workload Estimator to select the appropriate hardware for IBM Systems Director server and provides information about the IBM Systems Director Editions. Best practices are covered for the basic management tasks that are available in IBM Systems Director, including how to perform discovery; how to collect inventory on discovered resources; how to deploy agent, driver, and firmware updates; how to manage hardware events; and other miscellaneous tasks. An overview of best practices is provided for using IBM Systems Director VMControl™. Systems Director VMControl is a cross-platform product that

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assists you in rapidly deploying virtual appliances to create virtual servers that are configured with the operating system and software applications that you want. It also enables you to group resources into system pools, which enable you to centrally manage and control the different workloads in your environment. The following plug-in offerings are described: Energy monitoring and management features offered by IBM Systems Director Active Energy Manager™ along with the best practice, which needs to be followed in using the IBM Systems Director Active Energy Manager. The IBM AIX® Profile Manager is a tool that can help implement and monitor the security of all AIX servers in a production environment but also implement and monitor the system compliance of those AIX servers. Best practices and the most important questions to ask before creating Workload Partition Manager (WPAR) and WPAR Manager infrastructure. In addition, how you can manage and relocate WPARs using WPAR Manager graphical interface and the command-line interface. Network Control basic functionalities and how to plan for Network Control deployments and also a number of common scenarios with best practices. The IBM Systems Director Service and Support Manager describes how to set up and how to handle serviceable events. Best practices for the Storage Monitoring and Management capabilities offered by IBM Systems Director server. This book is for IBM IT specialists and IT architects, IBM Business Partners, and clients, who are utilizing or considering implementing IBM Systems Director.

## **IBM Systems Director 6.3 Best Practices**

This IBM® Redbooks® publication provides an update of the latest AIX Workload Partition (WPAR) capabilities. It provides a how-to guide and well-defined and documented deployment model for system administrators and architects using WPARs in AIX® Version 7.1 within an IBM POWER® System virtualized environment. This book helps clients create a planned foundation for their future deployments. This book is targeted toward technical professionals, such as business intelligence (BI) consultants, technical support staff, IT architects, and IT specialists, who are responsible for providing solutions and support for IBM POWER Systems and IBM AIX Version 7.1.

## **IBM System Storage Solutions Handbook**

The book presents the state of the art in high performance computing and simulation on modern supercomputer architectures. It covers trends in hardware and software development in general and specifically the future of vector-based systems and heterogeneous architectures. The application contributions include computational fluid dynamics, physics, chemistry, astrophysics, and biology. Innovative application fields like multiphysics simulations and material science are presented.

## **IBM PowerVM Best Practices**

This IBM® Redbooks® publication describes the new

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features that have been added with the release of the IBM System Storage® SAN Volume Controller (SVC) and IBM System Storage Storwize® V7000 6.4.0 code, including Replication Family Services. Replication Family Services refers to the various copy services available on the SVC and Storwize V7000 including IBM FlashCopy®, Metro Mirror and Global Mirror, Global Mirror with Change Volumes, Volume Mirroring, and Stretched Cluster Volume Mirroring. The details behind the theory and practice of these services are examined, and SAN design suggestions and troubleshooting tips are provided. Planning requirements, automating copy services processed, and fabric design are explained. Multiple examples including implementation and server integration are included, along with a discussion of software solutions and services that are based on Replication Family Services. This book is intended for use by pre-sales and post-sales support, and storage administrators. Readers are expected to have an advanced knowledge of the SVC, Storwize V7000, and the SAN environment. The following publications are useful resources that provide background information: Implementing the IBM System Storage SAN Volume Controller V6.3, SG24-7933 Implementing the IBM Storwize V7000 V6.3, SG24-7938 IBM SAN Volume Controller and Brocade Disaster Recovery Solutions for VMware, REDP-4626 IBM System Storage SAN Volume Controller Upgrade Path from Version 4.3.1 to 6.1, REDP-4716 Real-time Compression in SAN Volume Controller and Storwize V7000, REDP-4859 SAN Volume Controller: Best Practices and Performance Guidelines, SG24-7521 Implementing the Storwize V7000 and the IBM System Storage

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SAN32B-E4 Encryption Switch, SG24-7977

## **SAN Multiprotocol Routing: An Introduction and Implementation**

This IBM Redbooks publication supersedes both: IBM TotalStorage: Introduction to SAN Routing, SG24-7119-00 Implementing the IBM TotalStorage Multiprotocol Routers, SG24-7246-00 The rapid spread and adoption of production storage area networks (SANs) has fuelled the need for multiprotocol routers. The routers provide improved scalability, security, and manageability by enabling devices in separate SAN fabrics to communicate without merging fabrics into a single, large SAN fabric. This capability enables clients to initially deploy separate SAN solutions at the departmental and data center levels. Then, clients can consolidate these separate solutions into large enterprise SAN solutions as their experience and requirements grow and change. Alternatively, multiprotocol routers can help to connect existing enterprise SANs for a variety of reasons. For instance, the introduction of Small Computer System Interface over IP (iSCSI) provides for the connection of low-end, low-cost hosts to enterprise SANs. The use of an Internet Protocol (IP) in the Fibre Channel (FC) environment provides for resource consolidation and disaster recovery planning over long distances. And the use of FC-FC routing services provides connectivity between two or more fabrics without having to merge them into a single SAN. This book targets storage network administrators, system designers, architects, and IT

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professionals who sell, design, or administer SANs. It introduces you to the products, concepts, and technology in the IBM System Storage SAN Routing portfolio. This book shows the features of each product and examples of how you can deploy and use them.

### **Guide to IBM PowerHA SystemMirror for AIX Version 7.1.3**

This IBM® Redbooks® publication positions the IBM PowerHA® SystemMirror® V6.1 for AIX® Enterprise Edition as the cluster management solution for high availability. This solution enables near-continuous application service and minimizes the impact of planned and unplanned outages. The primary goal of this high-availability solution is to recover operations at a remote location after a system or data center failure, establish or strengthen a business recovery plan, and provide separate recovery location. The IBM PowerHA SystemMirror Enterprise Edition is targeted at multisite high-availability disaster recovery. The objective of this book is to help new and existing PowerHA customers to understand how to plan to accomplish a successful installation and configuration of the PowerHA SystemMirror for AIX Enterprise Edition. This book emphasizes the IBM Power Systems™ strategy to deliver more advanced functional capabilities for business resiliency and to enhance product usability and robustness through deep integration with AIX, affiliated software stack, and storage technologies. PowerHA SystemMirror is designed, developed, integrated, tested, and

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supported by IBM from top to bottom.

## **IBM System Storage DS3000**

This IBM® Redbooks® publication consolidates, in one document, detailed descriptions of the hardware configurations and options offered as part of the IBM System Storage DS5000 families of products. This edition covers updates and additional functions available with the IBM System Storage DS® Storage Manager Version 10.77 (firmware level 7.77). This book presents the concepts and functions used in planning and managing the storage servers, such as multipathing and path failover. The book offers a step-by-step guide to using the Storage Manager to create arrays, logical drives, and other basic (as well as advanced) management tasks. This publication also contains practical information about diagnostics and troubleshooting, and includes practical examples of how to use scripts and the command-line interface. This publication is intended for customers, IBM Business Partners, and IBM technical professionals who want to learn more about the capabilities and advanced functions of the DS5000 series of storage servers with Storage Manager Software V10.77. It also targets those who have a DS5000 storage subsystem and need detailed advice about how to configure it. This book is designed specifically to address the hardware features and configuration of the IBM System Storage DS5000 family and can be used in conjunction with the following IBM Redbooks publications: IBM System Storage DS5000 Series Implementation and Best Practices Guide, SG24-8024

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IBM System Storage DS Storage Manager Copy Services Guide, SG24-7822

### **Data Migration to IBM Disk Storage Systems**

### **IBM SAN Solution Design Best Practices for VMware vSphere ESXi**

This IBM Redbooks publication is a companion to IBM System Storage Business Continuity: Part 1 Planning Guide, SG24-6547 . We assume that the reader of this book has understood the concepts of Business Continuity planning described in that book. In this book we explore IBM System Storage solutions for Business Continuity, within the three segments of Continuous Availability, Rapid Recovery, and Backup and Restore. We position these solutions within the Business Continuity tiers. We describe, in general, the solutions available in each segment, then present some more detail on many of the products. In each case, the reader is pointed to sources of more information.

### **Implementing the IBM Storwize V3500**

This IBM® Redpaper™ publication will help you plan, install, tailor, and configure the new IBM PowerHA® with IBM HyperSwap® clustering solution. PowerHA with HyperSwap adds transparent storage protection for replicated storage, improving overall system availability by masking storage failures. The PowerHA

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cluster is an Extended Distance cluster with two sites. It manages, in principle, the replicated storage infrastructure through HyperSwap functionality. The storage is provided by two DS8800s configured to replicate each other using Metro Mirror Peer-to-Peer Remote Copy (PPRC) synchronous replication. DS8800 supports in-band (SCSI commands) communication, which is used to manage (and automate) the replication using IBM AIX® HyperSwap framework and PowerHA automation and management capabilities.

### **ILM Library**

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