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This IBM® Redbooks® publication helps you install, tailor, and configure a solution with IBM Systems Director VMControl so that you can move beyond simply managing virtualization to using virtualization to better manage your IT infrastructure. This book describes how the combination of IBM Systems Director and VMControl reduces the total cost of ownership of a virtualized environment by decreasing management costs, increasing asset use, and linking infrastructure performance to business goals. This book provides a broad understanding on how VMControl simplifies the management of virtual environments across multiple virtualization technologies and hardware platforms, freeing you from silos of virtualization and delivering enterprise-wide visibility and control. A leading multi-platform virtualization management solution, VMControl is now available in three Editions (Express, Standard, and Enterprise) to best match your virtualized environment. In addition, this book describes the VMControl Enterprise Edition plug-in for IBM Systems Director, which uses a workload-optimized approach to decrease infrastructure costs and improve service levels. With VMControl Enterprise Edition, you can manage system pools with the simplicity of managing a single system, an essential capability for moving to cloud computing and a dynamic infrastructure.

In this IBM® Redbooks® publication we discuss IBM Systems Director Navigator for i, which is a Web console interface for IBM i administration where you can work with the Web-enabled tasks of System i® Navigator. IBM Systems Director Navigator for i includes a number of welcome pages that allow you to quickly find the task that you want to perform. The IBM Systems Director Navigator for i interface is not just a set of URL addressable tasks, but is a robust Web console from which you can manage your IBM i system. However, the System i Navigator Tasks on the Web, which are a set of URL-addressable tasks, can be accessed by using the URL or from within the IBM Systems Director Navigator for i interface. The information in this book is intended to help you start using the Web-based console, IBM Systems Director Navigator for i, by providing you with a look at the new interface as well as tips for working with various parts of the new console.

This IBM® Redpaper™ publication is a comprehensive guide covering the IBM Power 770 (9117-MMC) and Power 780 (9179-MHC) servers supporting IBM AIX®, IBM i, and Linux operating systems. The goal of this paper is to introduce the major innovative Power 770 and 780 offerings and their prominent functions, including: The IBM POWER7™ processor available at frequencies of 3.3 GHz, 3.44 GHz, 3.72 GHz, and 3.92 GHz, and 4.14 GHz The specialized IBM POWER7™ Level 3 cache that provides greater bandwidth, capacity, and reliability The 1 Gb or 10 Gb Integrated Multi-function Card provides two USB ports, one serial port, and four Ethernet connectors for a processor enclosure and does not require a PCI slot The new Active Memory™ Mirroring (AMM) for Hypervisor feature that mirrors the main memory used by the firmware IBM PowerVMT™ virtualization including PowerVM Live Partition Mobility and PowerVM Active Memory™ Sharing Active Memory Expansion that provides more usable memory than what

is physically installed on the system IBM EnergyScale™ technology that provides features such as power trending, power-saving, capping of power, and thermal measurement Enterprise-ready reliability, serviceability, and availability Professionals who want to acquire a better understanding of IBM Power Systems™ products should read this paper. This paper expands the current set of IBM Power Systems documentation by providing a desktop reference that offers a detailed technical description of the 770 and 780 systems. This paper does not replace the latest marketing materials and configuration tools. It is intended as an additional source of information that, together with existing sources, can be used to enhance your knowledge of IBM server solutions.

Digital business has been driving the transformation of underlying information technology (IT) infrastructure to be more efficient, secure, adaptive, and integrated. IT must be able to handle the explosive growth of mobile clients and employees. It also must be able to process enormous amounts of data to provide deep and real-time insights to help achieve the greatest business impact. This IBM® Redbooks® publication addresses the new IBM z Systems™ single frame, the IBM z13s server. IBM z Systems servers are the trusted enterprise platform for integrating data, transactions, and insight. A data-centric infrastructure must always be available with a 99.999% or better availability, have flawless data integrity, and be secured from misuse. It needs to be an integrated infrastructure that can support new applications. It also needs to have integrated capabilities that can provide new mobile capabilities with real-time analytics delivered by a secure cloud infrastructure. IBM z13s servers are designed with improved scalability, performance, security, resiliency, availability, and virtualization. The superscalar design allows z13s servers to deliver a record level of capacity over the prior single frame z Systems server. In its maximum configuration, the z13s server is powered by up to 20 client characterizable microprocessors (cores) running at 4.3 GHz. This configuration can run more than 18,000 millions of instructions per second (MIPS) and up to 4 TB of client memory. The IBM z13s Model N20 is estimated to provide up to 100% more total system capacity than the IBM zEnterprise® BC12 Model H13. This book provides information about the IBM z13s server and its functions, features, and associated software support. Greater detail is offered in areas relevant to technical planning. It is intended for systems engineers, consultants, planners, and anyone who wants to understand the IBM z Systems™ functions and plan for their usage. It is not intended as an introduction to mainframes. Readers are expected to be generally familiar with existing IBM z Systems technology and terminology.

Monitoring and managing your system's performance is critical to ensure that you are keeping pace with the changing demands of your business. To respond to business changes effectively, your system must change too. Managing your system, at first glance, might seem like just another time-consuming job. But the investment soon pays off because the system runs more efficiently, and this is reflected in your business. It is efficient because changes are planned and managed. Managing performance of any system can be a complex task that requires a thorough understanding of

that system's hardware and software. IBM® i is an industry leader in the area of performance management and has many qualities that are not found in other systems, such as: - Unparalleled performance metrics - Always-on collection of metrics - Graphical investigation of performance data While understanding all the different processes that affect system performance can be challenging and resolving performance problems requires the effective use of a large suite of tools, the functions offered by IBM i are intended to make this job easier for users. This IBM Redbooks® publication explains the tasks and rich tools associated with performance management on IBM i.

To meet today's complex and ever-changing business demands, you need a solid foundation of compute, storage, networking, and software resources that is simple to deploy and can quickly and automatically adapt to changing conditions. You also need to be able to take advantage of broad expertise and proven preferred practices in systems management, applications, hardware maintenance, and more. The IBM® Flex System™ p260 and p460 Compute Nodes are IBM Power Systems™ servers optimized for virtualization, performance, and efficiency. The nodes support IBM AIX®, IBM i, or Linux operating environments, and are designed to run various workloads in IBM PureFlex™ System. This IBM Redbooks® publication is a comprehensive guide to IBM PureFlex System and the Power Systems compute nodes. We introduce the offerings and describe the compute nodes in detail. We then describe planning and implementation steps and go through some of the key the management features of the IBM Flex System Manager management node. This book is for customers, IBM Business Partners, and IBM technical specialists that want to understand the new offerings and to plan and implement an IBM Flex System installation that involves the Power Systems compute nodes.

The popularity of the Internet and the affordability of information technology (IT) hardware and software have resulted in an explosion dramatic increase in the number of applications, architectures, and platforms. Workloads have changed. Many applications, including mission-critical ones, are deployed on a variety of platforms, and the IBM® System z® design has adapted to this change. It takes into account a wide range of factors, including compatibility and investment protection, to match the IT requirements of an enterprise. This IBM Redbooks® publication provides information about the IBM zEnterprise® BC12 (zBC12), an IBM scalable mainframe server. IBM is taking a revolutionary approach by integrating separate platforms under the well-proven System z hardware management capabilities, while extending System z qualities of service to those platforms. The zEnterprise System consists of the zBC12 central processor complex, the IBM zEnterprise Unified Resource Manager, and the IBM zEnterprise BladeCenter® Extension (zBX). The zBC12 is designed with improved scalability, performance, security, resiliency, availability, and virtualization. The zBC12 provides the following improvements over its predecessor, the IBM zEnterprise 114 (z114): Up to a 36% performance boost per core running at 4.2 GHz Up to 58% more capacity for traditional workloads Up to 62% more capacity for Linux workloads The zBX infrastructure works with the zBC12 to enhance System z virtualization and management through an integrated hardware platform that spans mainframe, IBM POWER7®, and IBM System x® technologies. The federated capacity from multiple architectures of the zEnterprise System is managed as a single pool of resources, integrating system and workload management across the environment through the Unified Resource Manager. This book provides an overview of the zBC12 and its functions, features, and associated software support. Greater detail is offered in areas relevant to technical planning. This book is intended for systems engineers, consultants, planners, and anyone who wants to understand zEnterprise System

functions and plan for their usage. It is not intended as an introduction to mainframes. Readers are expected to be generally familiar with existing IBM System z technology and terminology.

IBM® PowerVM® virtualization technology is a combination of hardware and software that supports and manages virtual environments on IBM POWER5, POWER5+, POWER6®, and POWER7® processor-based systems. These systems are available on IBM Power Systems™ and IBM BladeCenter® servers as optional editions, and are supported by the IBM AIX®, IBM i, and Linux operating systems. With this set of comprehensive systems technologies and services, you can aggregate and manage resources with a consolidated, logical view. By deploying PowerVM virtualization and IBM Power Systems, you can take advantage of the following benefits: Lower energy costs through server consolidation Reduced cost of your existing infrastructure Better management of the growth, complexity, and risk of your infrastructure This IBM Redpaper™ publication is a quick start guide to help you install and configure a complete PowerVM virtualization solution on IBM Power Systems. It highlights how to use the following management console interfaces to configure PowerVM: Integrated Virtualization Manager (IVM) Hardware Management Console (HMC) Systems Director Management Console (SDMC) This paper also highlights advanced configuration of a dual Virtual I/O Server setup. This paper targets new customers who need assistance with quickly and easily installing, configuring, and starting a new PowerVM server in a virtualized environment.

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 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.

This IBM® Redpaper™ publication is a comprehensive guide covering the IBM Power 750 and Power 760 servers supporting IBM AIX®, IBM i, and Linux operating systems. The goal of this paper is to introduce the major innovative Power 750 and Power 760 offerings and their prominent functions: The IBM POWER7+™ processor is available at frequencies of 3.1 GHz, 3.4 GHz, 3.5 GHz, and 4.0 GHz. The larger IBM POWER7+ Level 3 cache provides greater bandwidth, capacity, and reliability. The newly introduced POWER7+ dual chip module (DCM). New 10GBase-T options for the Integrated Multifunction Card that provides two USB ports, one serial port, and four Ethernet connectors for a processor enclosure and does not require a PCI slot. New IBM PowerVM® V2.2.2 features, such as 20 LPARs per core. The improved IBM Active Memory™ Expansion technology provides more usable memory than is physically installed in the system. Professionals who want to acquire a better understanding of IBM Power Systems™ products should read this paper. This Redpaper expands the current set of IBM Power Systems documentation by providing a desktop reference that offers a detailed technical description of the 750 and 760 systems. This paper does not replace the latest marketing materials and configuration tools. It is intended as an additional source of information that, together with existing sources, may be used to enhance your knowledge of IBM server solutions. For additional reading: A Technote is available that explains the performance architecture of this server. It is of interest to those migrating workloads from existing Power 750 servers. It can be found at: Architecture of the IBM POWER7+ Technology-Based IBM Power 750 and IBM Power 760 Technote

This IBM® Redbooks® publication for IBM Power 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.

In a traditional deployment model, software is installed on a physical server, and it is configured for the particular data center environment. The cloud deployment model requires that the dependency on a specific hardware configuration is severed. This IBM® Redbooks® publication guides you through the transition from the traditional application deployment model to the cloud-friendly deployment model. It explains how to achieve these goals by packaging the software stacks into industry standard virtual appliances. A key part of this transition involves using the IBM Image Construction and Composition Tool. This tool is the IBM tool for creating virtualized workloads that target several private cloud deployment platforms, including platforms from IBM and not from IBM. In fact, this tool is unique in its ability to support such a wide range of cloud offerings. It is also the only tool in the marketplace that can create virtual appliances for both x86 and IBM Power hardware architectures. This book provides an in-depth look at the capabilities and internal workings of Image Construction and Composition Tool. It focuses on the capabilities of this tool, which target the virtualization and cloud offerings of IBM Systems and Technology Group. These offerings include IBM Systems Director VMControl™, IBM SmartCloud® Entry, and IBM

PureFlex™ System with IBM Flex System Manager™ appliance. The Image Construction and Composition Tool also has a much richer set of capabilities. Specifically, it supports IBM Workload Deployer, IBM PureApplication™ Systems, and IBM SmartCloud Provisioning. This publication targets software architects, cloud solutions architects, and cloud administrators. Its goal is to provide you with the expert-level skills required to package the existing and newly created applications into self-configurable, smart virtual appliances. Related publication: Smart Virtual Appliances Made Easy with IBM Image Construction and Composition Tool, TIP-S1037

This IBM® Redpaper™ publication is a comprehensive guide covering the IBM Power 710 (8231-E1D) and Power 730 (8231-E2D) servers that support IBM AIX®, IBM i, and Linux operating systems. This paper also describes the IBM PowerLinux™ 7R1 (8246-L1D and 8246-L1T) and the PowerLinux 7R2 (8246-L2D and 8246-L2T) servers that support the Linux operating system. The goal of this paper is to introduce the innovative Power 710, Power 730, PowerLinux 7R1, and PowerLinux offerings and their major functions: IBM POWER7+™ processor is available at frequencies of 3.6 GHz, 4.2 GHz, and 4.3 GHz. Larger IBM POWER7+ Level 3 cache provides greater bandwidth, capacity, and reliability. Integrated SAS/SATA controller for HDD, SSD, tape, and DVD supports built-in hardware RAID 0, 1, and 10. New IBM PowerVM® V2.2.2 features, such as 20 LPARs per core. Improved IBM Active Memory™ Expansion technology provides more usable memory than is physically installed in the system. Professionals who want to acquire a better understanding of IBM Power Systems™ products can benefit from reading this paper. This paper expands the current set of IBM Power Systems documentation by providing a desktop reference that offers a detailed technical description of the Power 710 and Power 730 systems. This paper does not replace the latest marketing materials and configuration tools. It is intended as an additional source of information that, together with existing sources, can be used to enhance your knowledge of IBM server solutions.

The popularity of the Internet and the affordability of IT hardware and software have resulted in an explosion of applications, architectures, and platforms. Workloads have changed. Many applications, including mission-critical ones, are deployed on a variety of platforms, and the System z® design has adapted to this change. It takes into account a wide range of factors, including compatibility and investment protection, to match the IT requirements of an enterprise. This IBM® Redbooks® publication discusses the IBM zEnterprise System, an IBM scalable mainframe server. IBM is taking a revolutionary approach by integrating separate platforms under the well-proven System z hardware management capabilities, while extending System z qualities of service to those platforms. The zEnterprise System consists of the IBM zEnterprise 114 central processor complex, the IBM zEnterprise Unified Resource Manager, and the IBM zEnterprise BladeCenter® Extension. The z114 is designed with improved scalability, performance, security, resiliency, availability, and virtualization. The z114 provides up to 18% improvement in uniprocessor speed and up to a 12% increase in total system capacity for z/OS®, z/VM®, and Linux on System z over the z10™ Business Class (BC). The zBX infrastructure works with the z114 to enhance System z virtualization and management through an integrated hardware platform that spans mainframe, POWER7™, and System x technologies. The federated capacity from multiple architectures of the zEnterprise System is managed as a single pool of resources, integrating system and workload management across the environment through the Unified Resource Manager. This book provides an overview of the zEnterprise System and its functions, features,

and associated software support. Greater detail is offered in areas relevant to technical planning. This book is intended for systems engineers, consultants, planners, and anyone wanting to understand the zEnterprise System functions and plan for their usage. It is not intended as an introduction to mainframes. Readers are expected to be generally familiar with existing IBM System z technology and terminology.

This IBM® Redbooks® publication describes the new member of the IBM Z® family, IBM z14™. IBM z14 is the trusted enterprise platform for pervasive encryption, integrating data, transactions, and insights into the data. A data-centric infrastructure must always be available with a 99.999% or better availability, have flawless data integrity, and be secured from misuse. It also must be an integrated infrastructure that can support new applications. Finally, it must have integrated capabilities that can provide new mobile capabilities with real-time analytics that are delivered by a secure cloud infrastructure. IBM z14 servers are designed with improved scalability, performance, security, resiliency, availability, and virtualization. The superscalar design allows z14 servers to deliver a record level of capacity over the prior IBM Z platforms. In its maximum configuration, z14 is powered by up to 170 client characterizable microprocessors (cores) running at 5.2 GHz. This configuration can run more than 146,000 million instructions per second (MIPS) and up to 32 TB of client memory. The IBM z14 Model M05 is estimated to provide up to 35% more total system capacity than the IBM z13® Model NE1. This Redbooks publication provides information about IBM z14 and its functions, features, and associated software support. More information is offered in areas that are relevant to technical planning. It is intended for systems engineers, consultants, planners, and anyone who wants to understand the IBM Z servers functions and plan for their usage. It is intended as an introduction to mainframes. Readers are expected to be generally familiar with existing IBM Z technology and terminology.

Not a new version - included warning for self signed X509 certificates - see section 5.2 This IBM® Redbooks® publication describes the concepts, architecture, and implementation of the IBM XIV® Storage System. The XIV Storage System is a scalable enterprise storage system that is based on a grid array of hardware components. It can attach to both Fibre Channel Protocol (FCP) and IP network Small Computer System Interface (iSCSI) capable hosts. This system is a good fit for clients who want to be able to grow capacity without managing multiple tiers of storage. The XIV Storage System is suited for mixed or random access workloads, including online transaction processing, video streamings, images, email, and emerging workload areas, such as Web 2.0 and cloud storage. The focus of this edition is on the XIV Gen3 running Version 11.5.x of the XIV system software, which brings enhanced value for the XIV Storage System in cloud environments. It offers multitenancy support, VMware vCloud Suite integration, more discrete performance classes, and RESTful API enhancements that expand cloud automation integration. Version 11.5 introduces support for three-site mirroring to provide high availability and disaster recovery. It also enables capacity planning through the Hyper-Scale Manager, mobile push notifications for real-time alerts, and enhanced security. Version 11.5.1 supports 6TB drives and VMware vSphere Virtual Volumes (VVOL). In the first few chapters of this book, we describe many of the unique and powerful concepts that form the basis of the XIV Storage System logical and physical architecture. We explain how the system eliminates direct dependencies between the hardware elements and the software that governs the system. In subsequent chapters, we explain the planning and preparation tasks that are required to deploy the system in your environment by using the intuitive yet powerful XIV Storage Manager GUI or the XIV com-

mand-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.

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.

Digital business has been driving the transformation of underlying IT infrastructure to be more efficient, secure, adaptive, and integrated. Information Technology (IT) must be able to handle the explosive growth of mobile clients and employees. IT also must be able to use enormous amounts of data to provide deep and real-time insights to help achieve the greatest business impact. This IBM® Redbooks® publication addresses the IBM Mainframe, the IBM z13™. The IBM z13 is the trusted enterprise platform for integrating data, transactions, and insight. A data-centric infrastructure must always be available with a 99.999% or better availability, have flawless data integrity, and be secured from misuse. It needs to be an integrated infrastructure that can support new applications. It needs to have integrated capabilities that can provide new mobile capabilities with real-time analytics delivered by a secure cloud infrastructure. IBM z13 is designed with improved scalability, performance, security, resiliency, availability, and virtualization. The superscalar design allows the z13 to deliver a record level of capacity over the prior IBM z Systems™. In its maximum configuration, z13 is powered by up to 141 client characterizable microprocessors (cores) running at 5 GHz. This configuration can run more than 110,000 millions of instructions per second (MIPS) and up to 10 TB of client memory. The IBM z13 Model NE1 is estimated to provide up to 40% more total system capacity than the IBM zEnterprise® EC12 (zEC1) Model HA1. This book provides information about the IBM z13 and its functions, features, and associated software support. Greater detail is offered in areas relevant to technical planning. It is intended for systems engineers, consultants, planners, and anyone who wants to understand the IBM z Systems functions and plan for their usage. It is not intended as an introduction to mainframes. Readers are expected to be generally familiar with existing IBM z Systems technology and terminology.

The popularity of the Internet and the affordability of IT hardware and software have resulted in an explosion of applications, architectures, and platforms. Workloads have changed. Many applications, including mission-critical ones, are deployed on a variety of platforms, and the System z® design has adapted to this change. It takes into account a wide range of factors, including compatibility and investment protection, to match the IT requirements of an enterprise. The zEnterprise System consists of the IBM zEnterprise 196 central processor complex, the IBM zEnterprise Unified Resource Manager, and the IBM zEnterprise BladeCenter® Exten-

sion. The z196 is designed with improved scalability, performance, security, resiliency, availability, and virtualization. The z196 Model M80 provides up to 1.6 times the total system capacity of the z10TM EC Model E64, and all z196 models provide up to twice the available memory of the z10 EC. The zBX infrastructure works with the z196 to enhance System z virtualization and management through an integrated hardware platform that spans mainframe, POWER7TM, and System x® technologies. Through the Unified Resource Manager, the zEnterprise System is managed as a single pool of resources, integrating system and workload management across the environment. This IBM® Redbooks® publication provides an overview of the zEnterprise System and its functions, features, and associated software support. Greater detail is offered in areas relevant to technical planning. This book is intended for systems engineers, consultants, planners, and anyone wanting to understand the zEnterprise System functions and plan for their usage. It is not intended as an introduction to mainframes. Readers are expected to be generally familiar with existing IBM System z technology and terminology. The changes to this edition are based on the System z hardware announcement dated July 12, 2011.

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).

IBM® Power Systems™ servers coupled with IBM PowerVM® technology are designed to help clients build a dynamic infrastructure, helping to reduce costs, manage risk, and improve service levels. IBM PowerVM delivers industrial-strength virtualization for IBM AIX®, IBM i, and Linux environments on IBM POWER® processor-based systems. IBM PowerVM V2.2.3 is enhanced to continue its leadership in cloud computing environments. Through the chapters of this IBM Redbooks® publication, you will learn about the following topics: New management and performance tuning software products for PowerVM solutions. Virtual I/O Server (VIOS) Performance Advisor has been enhanced to provide support for N\_Port Identifier Virtualization (NPIV) and Fibre Channel, Virtual Networking and Shared Ethernet Adapter, and Shared Storage Pool configurations. IBM Power Virtualization Performance (PowerVPTM) is introduced as a new visual performance monitoring tool for Power Systems servers. The scalability, reliability, and performance enhancements introduced with the latest versions of the VIOS, IBM PowerVM Live Partition Mobility, and the Hardware Management Console (HMC). As an example, this book goes through the Shared Storage Pool improvements that include mirroring of the storage pool, dynamic contraction of the storage pool, dynamic disk growth within the storage pool, and scaling improvements. This book is intended for experienced IBM PowerVM users who want to enable 2013 IBM PowerVM virtualization en-

hancements for Power Systems. It is intended to be used as a companion to the following publications: IBM PowerVM Virtualization Introduction and Configuration, SG24-7940 IBM PowerVM Virtualization Managing and Monitoring, SG24-7590

This IBM® Redpaper™ publication is a comprehensive guide covering the IBM Power 710 (8231-E1C) and Power 730 (8231-E2C) servers supporting IBM AIX®, IBM i, and Linux operating systems. The goal of this paper is to introduce the innovative Power 710 and Power 730 offerings and their major functions, including these: The POWER7™ processor available at frequencies of 3.0 GHz, 3.55 GHz, and 3.7 GHz. The specialized POWER7 Level 3 cache that provides greater bandwidth, capacity, and reliability. The 2-port 10/100/1000 Base-TX Ethernet PCI Express adapter included in the base configuration and installed in a PCIe Gen2 x4 slot. The integrated SAS/SATA controller for HDD, SSD, tape, and DVD. This controller supports built-in hardware RAID 0, 1, and 10. PowerVM™ virtualization including PowerVM Live Partition Mobility and PowerVM Active Memory™ Sharing. Active Memory Expansion that provides more usable memory than what is physically installed on the system. EnergyScale™ technology that provides features such as power trending, power-saving, capping of power, and thermal measurement. Professionals who want to acquire a better understanding of IBM Power Systems products can benefit from reading this paper. This paper expands the current set of IBM Power Systems documentation by providing a desktop reference that offers a detailed technical description of the Power 710 and Power 730 systems. This paper does not replace the latest marketing materials and configuration tools. It is intended as an additional source of information that, together with existing sources, can be used to enhance your knowledge of IBM server solutions.

IBM® PowerVM® virtualization technology is a combination of hardware and software that supports and manages the virtual environments on POWER5-, POWER5+, IBM POWER6®, and IBM POWER7®-based systems. PowerVM is available on IBM Power Systems™, and IBM BladeCenter® servers as optional Editions, and is supported by the IBM AIX®, IBM i, and Linux operating systems. You can use this set of comprehensive systems technologies and services to aggregate and manage resources by using a consolidated, logical view. Deploying PowerVM virtualization and IBM Power Systems offers you the following benefits: Lower energy costs through server consolidation Reduced cost of your existing infrastructure Better management of the growth, complexity, and risk of your infrastructure This IBM Redbooks® publication is an extension of IBM PowerVM Virtualization Introduction and Configuration, SG24-7940. It provides an organized view of best practices for managing and monitoring your PowerVM environment concerning virtualized resources managed by the Virtual I/O Server.

IBM® Systems Director is a platform management foundation that streamlines the way that physical and virtual systems are managed. Using industry standards, IBM Systems Director supports multiple operating systems and virtualization technologies. This paper provides guidance and preferred practices about how to install and configure IBM Systems Director Version 6.3. Also, installation guidance, fundamental topics, such as discovery and inventory, and more advanced topics, such as troubleshooting and automation, are covered. This paper is meant to be a partner to the comprehensive documentation in the IBM Systems Director Information Center. This paper is aimed at IT specialists who are planning to install and configure IBM Systems Director on Microsoft Windows, Linux, or IBM AIX®.

This IBM® Redbooks® publication focuses on the enhancements to IBM AIX® Version 7.1 Standard Edition. It is intended to help

system administrators, developers, and users understand these enhancements and evaluate potential benefits in their own environments. AIX Version 7.1 introduces many new features, including: - Domain Role Based Access Control - Workload Partition enhancements - Topas performance tool enhancements - Terabyte segment support - Cluster Aware AIX functionality AIX Version 7.1 offers many other new enhancements, and you can explore them all in this publication. For clients who are not familiar with the enhancements of AIX through Version 5.3, a companion publication, AIX Version 6.1 Differences Guide, SG24-7559, is available.

IBM® iFlow Director is a high performance, low-latency 10 Gb Ethernet switch integrated flow balancer with policy-based traffic steering capability. It delivers high-availability, scalability, and lower total cost of ownership (TCO) for appliance vendors that offer IBM BladeCenter® based solutions for applications, such as Security Gateways, Wireless Gateways, Lawful Interception & Network Surveillance, Traffic Management & Service Differentiation, and so on. The system throughput can be scaled by adding more blade servers and up to four switches that run iFlow Director. iFlow Director is designed with a number of advanced features to deliver high availability in mission-critical environments. The solution is built around industry-leading hardware to help eliminate any single point of failure. iFlow Director uses BladeCenter innovations such as internal monitoring, redundant mid-plane, redundant network connections per blade, redundant power supplies and fans, and switching features, such as uplink failure detection and controlled failover with network interface card (NIC) teaming, to deliver high availability. iFlow Director provides up to 480 Gbps of nonblocking, wire-speed bidirectional throughput to BladeCenter to meet your network traffic load distribution needs. With ten 10 Gbps uplink ports and 14 nonblocking 10 Gbps internal ports, iFlow Director offers unmatched performance, with latency as low as 1.60 microseconds. The iFlow Director solution provides significant savings compared to a solution that consists of multiple stand-alone appliances, Layer 2 switches and load balancers. With 480 Gbps of raw throughput, the iFlow Director solution provides a price/performance advantage. This IBM Redpaper™ publication is intended for network professionals who want to reduce the complexity associated with appliance sprawl by using an integrated solution that includes a high performance 10 Gb Ethernet embedded switch for BladeCenter, and a stack of software that allows the control of the flow of traffic inside the chassis.

Over the last few years, IBM® IMSTM and IMS tools have been modernizing the interfaces to IMS and the IMS tools to bring them more in line with the current interface designs. As the mainframe software products are becoming more integrated with the Windows and mobile environments, a common approach to interfaces is becoming more relevant. The traditional 3270 interface with ISPF as the main interface is no longer the only way to do some of these processes. There is also a need to provide more of a common looking interface so the tools do not have a product-specific interface. This allows more cross product integration. Eclipse and web-based interfaces being used in a development environment, tooling using those environments provides productivity improvements in that the interfaces are common and familiar. IMS and IMS tools developers are making use of those environments to provide tooling that will perform some of the standard DBA functions. This book will take some selected processes and show how this new tooling can be used. This will provide some productivity improvements and also provide a more familiar environment for new generations DBAs. Some of the functions normally done by DBA or console operators can now be done in this eclipse-based environment by the application developers. This means that the need to request these services from others can be eliminated. This IBM Redbooks® publication examines spe-

cific IMS DBA processes and highlights the new IMS and IMS tools features, which show an alternative way to accomplish those processes. Each chapter highlights a different area of the DBA processes like: PSB creation Starting/stopping a database in an IMS system Recovering a database Cloning a set of databases

For many years, IBM® Cluster Systems Management (CSM) provided a single point of management for IBM Power Systems servers running the AIX® operating system. Now you can transform your environment to IBM Systems Director®, which provides CSM clients with the next generation of Cluster Systems Management for their Power Systems servers. The target audience for this IBM Redbooks® publication includes technical professionals (IT consultants, technical support staff, IT Architects, and IT Specialists) responsible for planning and implementing the Cluster Systems Management software transformation from CSM to IBM Systems Director.

Booting servers from a storage area network (SAN) is being used increasingly in complex data center environments today, due to its significant benefits over the traditional method of booting from local disks. SAN Boot enables organizations to maximize consolidation of their IT resources, minimize their equipment costs, and realize the considerable management benefits of centralizing the boot process. In SAN Boot, you can deploy diskless servers in an environment where the boot disk is located on (often RAID-capable) storage connected to the SAN. The server (initiator) communicates with the storage device (target) through the SAN using the Fibre Channel host bus adapter (HBA). The system downtime is greatly minimized in case a critical component such as a processor, memory, or host bus adapter fails and needs to be replaced. The system administrator needs to swap only the hardware and reconfigure the HBA's BIOS, switch zoning, and host-port definitions on the storage server. The system image still exists on the logical drive, therefore the server is fully operational after the hardware swap and configuration change is completed. This IBM® Redbooks® publication can help you with the SAN Boot implementation. We present various SAN Boot scenarios using IBM System Storage® products that include DS5000, DS8000®, XIV®, and SVC. The operating systems that are covered include Windows 2008, Red Hat Linux, SUSE Linux, and VMware.

The popularity of the Internet and the affordability of IT hardware and software have resulted in an explosion of applications, architectures, and platforms. Workloads have changed. Many applications, including mission-critical ones, are deployed on various platforms, and the IBM® System z® design has adapted to this change. It takes into account a wide range of factors, including compatibility and investment protection, to match the IT requirements of an enterprise. This IBM Redbooks® publication addresses the new IBM zEnterprise® System. This system consists of the IBM zEnterprise EC12 (zEC12), an updated IBM zEnterprise Unified Resource Manager, and the IBM zEnterprise BladeCenter® Extension (zBX) Model 003. The zEC12 is designed with improved scalability, performance, security, resiliency, availability, and virtualization. The superscalar design allows the zEC12 to deliver a record level of capacity over the prior System z servers. It is powered by 120 of the world's most powerful microprocessors. These microprocessors run at 5.5 GHz and are capable of running more than 75,000 millions of instructions per second (MIPS). The zEC12 Model HA1 is estimated to provide up to 50% more total system capacity than the IBM zEnterprise 196 (z196) Model M80. The zBX Model 003 infrastructure works with the zEC12 to enhance System z virtualization and management. It does so through an integrated hardware platform that spans mainframe, IBM POWER7®, and IBM System x® technologies. Through the

Unified Resource Manager, the zEnterprise System is managed as a single pool of resources, integrating system and workload management across the environment. This book provides information about the zEnterprise System and its functions, features, and associated software support. Greater detail is offered in areas relevant to technical planning. It is intended for systems engineers, consultants, planners, and anyone who wants to understand the zEnterprise System functions and plan for their usage. It is not intended as an introduction to mainframes. Readers are expected to be generally familiar with existing IBM System z® technology and terminology.

The IBM® i operation system (formerly IBM i5/OS®) is considered one of the most secure systems in the industry. From the beginning, security was designed as an integral part of the system. The System i® platform provides a rich set of security features and services that pertain to the goals of authentication, authorization, integrity, confidentiality, and auditing. However, if an IBM Client does not know that a service, such as a virtual private network (VPN) or hardware cryptographic support, exists on the system, it will not use it. In addition, there are more and more security auditors and consultants who are in charge of implementing corporate security policies in an organization. In many cases, they are not familiar with the IBM i operating system, but must understand the security services that are available. This IBM Redbooks® publication guides you through the broad range of native security features that are available within IBM i Version and release level 6.1. This book is intended for security auditors and consultants, IBM System Specialists, Business Partners, and clients to help you answer first-level questions concerning the security features that are available under IBM. The focus in this publication is the integration of IBM 6.1 enhancements into the range of security facilities available within IBM i up through Version release level 6.1. IBM i 6.1 security enhancements include: - Extended IBM i password rules and closer affinity between normal user IBM i operating system user profiles and IBM service tools user profiles - Encrypted disk data within a user Auxiliary Storage Pool (ASP) - Tape data save and restore encryption under control of the Backup Recovery and Media Services for i5/OS (BRMS) product, 5761-BR1 - Networking security enhancements including additional control of Secure Sockets Layer (SSL) encryption rules and greatly expanded IP intrusion detection protection and actions. DB2® for i5/OS built-in column encryption expanded to include support of the Advanced Encryption Standard (AES) encryption algorithm to the already available Rivest Cipher 2 (RC2) and Triple DES (Data Encryption Standard) (TDES) encryption algorithms. The IBM i V5R4 level IBM Redbooks publication IBM System i Security Guide for IBM i5/OS Version 5 Release 4, SG24-6668, remains available. 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 - Man-

age 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.

This IBM® Redbooks® publication explains how to configure and manage independent disk pool (IASP) functionality of IBM i 6.1. It is designed to help IBM technical professionals, business partners, and customers understand and implement independent disk pools in the IBM i 6.1. In addition, this publication provides the background information that is necessary to plan, implement, and customize this functionality to your particular environment. It provides guidance on running user applications with either application data or most application objects residing in an independent disk pool. Considering that you can also use independent disk pools in a cluster environment, this publication shows you the basic steps to make your independent disk pool switchable between two Power Systems™ servers or a single server with multiple LPARs. Independent auxiliary storage pools have many business and technical advantages for Power Systems using IBM i. Not only are independent auxiliary storage pools (IASPs) easy to create and maintain, most applications can use them by simple work management changes. IASPs can provide immediate benefits to your enterprise.

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

This IBM® Redbooks® publication positions the IBM Systems Director Management Console (SDMC) against the IBM Hardware Management Console (HMC). The IBM Systems Director Management Console provides system administrators the ability to manage IBM Power System® servers as well as IBM Power Blade servers. It is based on IBM Systems Director. This publication is designed for system administrators to use as a desk-side reference when managing Virtual Servers (formerly partitions) using the SDMC. The major functions that the SDMC provides are server hardware management and virtualization management.

This IBM Redbooks publication focuses on the differences introduced in IBM AIX Version 6.1 when compared to AIX 5L Version 5.3. It is intended to help system administrators, developers, and users understand these enhancements and evaluate potential benefits in their own environments. AIX Version 6.1 introduces

many new features, including workload partitions, advanced security, continuous availability, and managing and monitoring enhancements. There are many other new features available with AIX Version 6.1, and you can explore them all in this publication. For clients who are not familiar with the enhancements of AIX through Version 5.3, a companion publication, AIX 5L Differences Guide Version 5.3 Edition, SG24-7463 is available, along with an addendum, AIX 5L Differences Guide Version 5.3 Addendum, SG24-7414, which includes between release enhancements that are available through applying service updates.

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.

This IBM® Redpaper™ publication is a comprehensive guide covering the IBM Power 720 and Power 740 servers supporting AIX®, IBM i, and Linux operating systems. The goal of this paper is to introduce the innovative Power 720 and Power 740 offerings and their major functions, including these: The POWER7™ processor available at frequencies of 3.0 GHz, 3.55 GHz, and 3.7 GHz. The specialized POWER7 Level 3 cache that provides greater bandwidth, capacity, and reliability. The 2-port 10/100/1000 Base-TX Ethernet PCI Express adapter included in the base configuration and installed in a PCIe Gen2 x4 slot. The integrated SAS/SATA controller for HDD, SSD, tape, and DVD. This controller supports built-in hardware RAID 0, 1, and 10. The latest PowerVMTM virtualization including PowerVM Live Partition Mobility and PowerVM Ac-

tive Memory™ Sharing. Active Memory Expansion that provides more usable memory than what is physically installed on the system. EnergyScale™ technology that provides features such as power trending, power-saving, capping of power, and thermal measurement. Professionals who want to acquire a better understanding of IBM Power Systems products can benefit from reading this paper. This paper expands the current set of IBM Power Systems documentation by providing a desktop reference that offers a detailed technical description of the Power 720 and Power 740 systems. This paper does not replace the latest marketing materials and configuration tools. It is intended as an additional source of information that, together with existing sources, can be used to enhance your knowledge of IBM server solutions.

IBM® Scale Out Network Attached Storage (SONAS) is a scale out network-attached storage offering that is designed to manage vast repositories of information in enterprise environments that require large capacities, high levels of performance, and high availability. SONAS provides a range of reliable, scalable storage solutions for various storage requirements. These capabilities are achieved by using network access protocols such as Network File System (NFS), Common Internet File System (CIFS), Hypertext Transfer Protocol Secure (HTTPS), File Transfer Protocol (FTP), and Secure Copy Protocol (SCP). Using built-in RAID technologies, all data is well-protected with options to add more protection through mirroring, replication, snapshots, and backup. These storage systems are also characterized by simple management interfaces that make installation, administration, and troubleshooting uncomplicated and straightforward. This IBM Redbooks® publication is the companion to IBM SONAS Best Practices, SG24-8051. It is intended for storage administrators who have ordered their SONAS solution and are ready to install, customize, and use it. It provides backup and availability scenarios information about configuration and troubleshooting. This book applies to IBM SONAS Version 1.5.5. It is useful for earlier releases of IBM SONAS as well.